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THE
JOURNAL OF BOTANY,
BRITISH AND FOREIGN.

EDITED BY

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ADJUNCT OF THE IMPERIAL L. C. ACADEMY NATURE CURIOSORUM.

ASSISTED BY

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BRITISH MUSEUM.

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GARDEN.

VOLUME VIII.

With Plates and Woodcuts.

LONDON:
TAYLOR AND CO., 10, LITTLE QUEEN STREET,
LINCOLN'S INN FIELDS.
ANDREW ELLIOT, 15, Princes Street, Edinburgh; J. ROTHSCHILD, Paris;
ASHER AND CO., Berlin; WESTERMANN, New York.

1870.

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PRINTED BY TAYLOR AND CO., LITTLE QUEEN STREET,
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THE
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Original Articles.

SUGGESTIONS ON THE "SPECIES" QUESTION AS
REGARDS RUBUS.

BY THE HON. J. B. LEICESTER WARREN, M.A., F.L.S.

BOTANISTS are not held in over-reverence by the outer world, and collectors of Brambles are often rated very low even by botanists. The puzzle of getting *Rubus fruticosus* into order, even as regards its forms occurring in this island, is neither a pleasant nor a remunerative task. Yet *R. fruticosus* may have its side-light or two to throw on the vexed question of species. It is a creature requiring a study to itself, and one that even great authorities have dismissed in a somewhat perfunctory manner. One school says, "*R. cæsius*, L., is a good species, *R. discolor*, W. and N., is a better; but when it comes to naming every other bush like certain French friends of ours, the matter grows serious, and we ought to intervenc." By no means, it is the better excess of the two, as long as you bear in mind that you are cataloguing merely *forms* or *varieties*. *R. discolor* is no better a species than *R. Sprengelii*, Weihe (excluding *R. Borreri*, Bell-Salt.), than *R. fissus*, Lind. (excluding *R. suberectus*, Anders.); that is to say, if, by conceding the name of species to *R. discolor*, we deny the possibility of its having ever had a common ancestor with any other *Rubus*. "No," will be the reply, "when

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we talk of a bramble species, we merely mean a form or connected series of forms, isolated in itself or in their aggregate at the present day, and through the area of our personal observation. This is our test. Take, for example, *R. macrophyllus*, Weihe, a bundle of forms hugely different *inter se* at their extremes, still graduated into each other, or as we conceive graduated, by a series of transitional links so finely, that the very double of *R. thyrsoides*, Wimm., finds itself in one box with the near neighbour of *R. rhamnifolius*, W. and N. An arrangement which again ties up typical *macrophyllus*, W. and N., with extreme Westmoreland *R. umbrosus*, Arn., which seems miles away." Very well, let us accept species in *Rubus* to mean forms between which transitional links *are not found*. We have drawn in our horns, remember, in saying "are not found." We have said nothing about links having existed in all time, and ceased to do so, links that have altered through soil, climate, and the infinite factors of vegetable variance. We pass in silence the fact how imperfectly known and inadequately described are still many native forms, even in this little insular corner of our observation. But let us try species as applied to *Rubus* even on this test, and return to the remark of high authorities. "*R. cæsius* is a good species, *R. discolor* is a better." So they are; excellent *groups*, for their forms are legion, for all practical purposes, but distinctly failing as species; if to run by imperceptible gradations into other "species," constitutes a failure to the name. There is the starved *discolor* of the north (*R. rusticanus*, Mercier), passing into the enormous real *discolor* of W. and N., as at Thames Ditton; often with its leaflets quite green beneath and broader than *R. cordifolius*, R. G.; and then this real *R. discolor*, W. and N., passes so gradually into a Bramble, which you may call *R. sylvaticus*, and lump under the better known *R. villicaulis*, W. and N., or label *R. thyrsoides*, Wimm., and class with the very different typical form of that plant. And when we get so far into the haven of the vague *sylvaticus* synonym, we stumble unawares on the confines of *macrophyllus*, and so much for the "species" *R. discolor*. Now *R. cæsius*, L., repeats the same story in the glandular brambles. Nothing can look more distinct than a nicely dried, fully grown, well-selected panicle and stem of *R. cæsius* in a little neat herbarium; here is surely firm ground at last. Why, we should know it again in a hundred. So you would, *some R. cæsius*, but have you ever examined that troublesome conterminous group—that mass of

chaos which the names *dumetorum*, *nemorosus ferox*, *Schleicheri*, *diversifolius*, call up to the student of Brambles? Not cæasian truly these; but where is the line of separation to fall,—to say nothing of *R. Balfourianus*, Blox., *R. degener*, Müll., as understood by Geneviev, and a host more of Continental forms, which connect our lately isolated *cæsius*, even with some strange corylifolium-looking things.

Enough of illustration. The whole question, we are inclined to think, is merely a verbal one, between any two Rubiologists, assuming to each an equally wide knowledge of *growing* plants. We can't do without the name "species;" and we must faggot our Rubi forms into bundles somehow. Some, to adopt metaphor, may be bundles of long sticks, and some of short sticks, some of green sticks, some of dry. It is an excellent arrangement, that sticks of one length, and so forth, should be tied together, and sticks of another length separated from them. Only don't forget one thing, that *we* have sorted the sticks for our convenience, and that the short stick and the long may have been originally chopped from a common log of timber. And do not suppose that this illustration is intended to throw slight on the observation of the minutest structural differences, whether in Rubi forms or elsewhere in the vast range of physical observation. On the contrary, we say, if appreciable difference exist, catalogue and describe it by all means. I take it we shall be nearer the physical fact, if we, even ultimately, run up our native English *Rubi forms* (not species, mind, or even subspecies) into two hundred, as our neighbours have done theirs in one river basin, than we are with our present some half-hundred recognized "species" of such diverse equivalent values. Let us arrange more in groups and forms. Let us be more Benthamian in our group, more Jordanic in our forms, or if you choose "subspecies." Let us make the practical test of a form difference, as opposed to a mere catalogue of individuals, the occurrence of a structural difference sufficient to admit of its being formulated with tolerable precision, and likely to allow of recognition by an experience as trained as its describer's. No one knows, till the attempt is made, what progress can be expected, how difficult groups almost settle themselves, with time, patience, and continuous observation of independent minds. If the protean *forms* of *Polygonum aviculare* are beginning to shake into order, no observer of Rubi need desist, for the advice so readily be-

stowed upon his task from many quarters, that he is engaged in a profitless or a hopeless endeavour. How much remains to be done may be gathered from this one fact, that the study of petals, styles, anthers, and filaments in Rubi has only recently penetrated to this side the Channel.

NOTE ON *QUERCUS WALLICHIANA*, Lindl.

BY H. F. HANCE, PH.D., ETC.

In arranging the Oaks of my herbarium some time ago, I found one which had been collected in and sent me from Penang, but which I was unable to refer to any of those described in the 'Prodromus.' Thinking it most likely, however, that the species would occur amongst the collections of the late Dr. Wallich, I transmitted specimens to Kew; and Professor Oliver, who was so kind, at my request, as to compare them with those in the herbarium under his care, informs me that they are certainly referable to *Quercus Wallichiana*, Lindl.

As this species, which has been erroneously referred by A. De Candolle, from the comparison of a single leaf only (which, after all, can scarcely have belonged to the Penang tree), to the very distinct *Q. lamellosa*, Sm., has never, that I am aware, been described, I have thought it as well to draw up the subjoined diagnosis from the materials at my disposal.

Quercus Wallichiana, Lindl. (in Wall. List); ramis junioribus ramulisque tomento subflaventi-cinereo aspectu furfuraceo obtectis, foliis coriaceis $5\frac{1}{2}$ -7-pollicaribus incl. petiolo semipollicari e basi cuneata oblongis apice abrupte caudato-acuminatis margine obscure undulatis adultis supra præter costam obscure furfuraceo-tomentosam glaberrimis lævibus opacis infra costa valida costulisque utrinque circ. 11 valde acuteque prominulis angulo circ. 60° excurrentibus venisque tertiariis transversis minus elevatis notatis albicantibus glabratis, fructibus secus spicam dense fasciculatis, cupulis subsessilibus basi sæpe connatis cupuliformibus 2-3 lin. longis 5-6 lin. latis extus fulvo-tomentosis lamellis 4-5 concentricis denticulatis vix conspicuis intus fulvo-velutinis cicatrice magna pallida rugosissima, glandibus pallide castaneis cinereo-tomentosis globoso-vel ovoideo-conicis umbonatis hilo exsculpto pal-

lido rugoso cupula bis longioribus, stylis tribus brevibus crasse lineari-bus divergentibus.

In common with *Q. Teijsmanni*, Bl., and *Q. Irwinii*, Hance, the leaves of this species give out a resinous exudation, causing them, when washed over with spirit, to shine as if varnished.

I avail myself of this opportunity to state that the opinion recently expressed by me (Linn. Journ. Bot. x. 489) that the nearest allies of *Q. dentata*, Thbg., notwithstanding the annual maturation of its fruit, are very probably *Q. Cerris*, L., and *Q. pseudo-suber*, Santi, has received unexpected and valuable support by the positive declaration of Parlato-re (Fl. Ital. iv. 176) that each of these last-named species fruits in the year of its growth; Michaux and Gay's assertion to the contrary, acquiesced in by A. De Candolle, and which I had supposed unimpeach-able, being, according to the Florentine Professor, erroneous.

CRASSULACEAS QUATUOR NOVAS CHINENSES,

DESCRIBIT H. F. HANCE, PH.D., ETC.

I. *Kalanchoë macrosepala*, n. sp.; glaberrima, glauca, foliis basi paulo ampliata semiamplexantibus a medio pinnatifido-laciniatis segmentis varie sectis vel integris lineari-oblongis summis integerrimis $4\frac{1}{2}$ – $6\frac{1}{2}$ poll. longis $2\frac{1}{2}$ –7 lin. latis, cymis terminalibus subcorymbosis, calycis laciniis usque ad basin discretis lanceolatis acutis patentibus corolla lutea urceolato-hypocraterimorpha vix brevioribus. (Exsicc. n. 1723).—A Sinis culta. Specimina mea obtinui in ins. Hongkong, Aprili 1858.—Hanc primum pro *K. laciniata*, De Cand. habueram; veram tamen ejus necessitudinem potius esse cum *K. varianti*, Haw., aliquot abhinc annis statuit ille Bentham. Sed folia, etiamsi ampliora quam in tabula Wightiana (Icon. pl. Ind. Or. iii. t. 1151), *A. laciniatæ* de-pinguntur, architectura illis omnino convenient; dum ea *K. variantis*, testibus Hookero filio et Thomsonio, sunt “crenata, obtusa, inferiora simplicia ovata, suprema trifoliata.” (Journ. Linn. Soc. Bot. ii. 91.) Nostra species calyce magno,* uenon corollæ suburceolatae tubo brevi, distinctissima videtur.

* The sepals of *Kalanchoë*, which are united into a tube, retain their form with scarcely any modification in each species. (Hook. and Thoms. Fl. Ind. Introd. Ess. p. 29.)

II. *Kalanchoë gracilis*, n. sp.; glaberrima, foliis parce pinnatifido-lacinatis segmentis angustis linearibus hinc sectis vix 2 pollices longis $\frac{3}{4}$ –1 lineam latis summis integerrimis, cymis 1–5-floris axillaribus in corymbum laxum digestis, calycis laciniis basi breviter sed distincte connatis lanceolatis acutis erectis basin urceolatam corollæ tantum æquantibus, corollæ basi urceolatæ tubo æquali gracili lobis ellipticis acutis tubo æquilongis.—In insula Formosa, a. 1861, collegit clar. R. Swinhoe. (Exsicc. n. 7578.)—Affinis *K. laciniatæ*, De Cand., sed gracilior, flores pauciores, corollæ laciniæ longiores. Præter species hæc, accepi a defuncto Krone, societatis Rhenanæ missionario, *K. spathulatam*, De Cand., lectam ad Sai-héung, in prov. Cantonensi. In recensione Crassulacearum Indicarum, in 'Præcursoribus' data, celeb. Hooker fil. et Thomson *K. Ritchieanam*, Dalz. (Hook. Kew Journ. iv. 346), speciem insignem, generis *Bryophylli* imbecillitatem, jam monente Dalzellio, plane demonstrantem, casu quodam præterniserunt.

III. *Sedum (Eusedum) chrysastrum*, n. sp.; glaberrimum, dilute viride, ramis lineolis rubellis notatis, foliis primo ortu distincte decussatim quaternato-verticillatis confertis iis ramorum sterilium repentium demum rosulas terminales efformantibus iis ramorum florigerorum erectorum 3–4 pollices longorum demum ob axes elongationem irregulariter sparsis omnibus crasse carnosis linguiformibus supra scilicet subplanis subtus convexiusculis acutiusculis basi soluta truncata distincte producta erecto-patentibus 3–5 lin. longis lineam latis, floribus 18–25 sessilibus in cymam scorpioideam trifidam corymbosam terminalem ramis simplicibus vel nunc bifidis digestis, bracteis foliis homomorphis, calycis laciniis carnosis linearibus obtusiusculis basi non productis, petalis flavis rhomboideo-lanceolatis acutiusculis patenti-reflexis calyce plus duplo longioribus albido-marcescentibus, staminibus 10 æqualibus filamentis glaberrimis flavis antheris croceis, squamulis hypogynis minutis quadratis subencllatis, ovariis glaberrimis flavis sub anthesi erectis oblongis obtusiusculis rostratis basi intus non gibbis cum staminibus petala vix non æquantibus, folliculis divergentibus ad medium usque connatis intus deorsum medio semifido-sulcatis marginibus rotundatis recurvulis velut lacinula inter utrumque emarginata connexis cavum latum stelliformem in centro floris relinquentibus, seminibus paucis minutis oblongis brunneis subtiliter tuberculatis.—In rupes-tribus calcareis ad fauces Shin-hing, fl. West River, prov. Cantonensis, legit Sampson. (Exsicc. n. 15087.)—Flores pulchre flavos, leviter

fragrantes, $4\frac{1}{2}$ lineas diametro, medio m. Aprilis profert. Herbæ sapor leviter acris. Ex agmine *S. Forsteriani*, Sm., et commilitonum. Characteres e speciminibus vivis erui.

IV. *Sedum (Eusedum) Alfredi*, n. sp.; cæspitosum, glaberrimum, dilute viride, foliis alternis sparsis iis ramorum sterilium magis confertis sed non rosulatis carnosis planis spathulatis supra medio leviter sulcatis integerrimis acutiusculis vel obtusis basi soluta obtuse producta patulis 5–11 lineas longis, floribus sessilibus 5 lineas diametro in cymam terminalem scorpioideam multifloram laxiusculam trifidam ramis dichotome divisis digestis, bracteis foliis homomorphis, calycis laciniis oblongis obtusis basi non productis inæqualibus alia magis evoluta, petalis flavis ligulatis acuminatis patentibus calyce triplo longioribus, staminibus 10 alternis parum brevioribus petalis paulo brevioribus filamentis glaberrimis flavis antheris croceis, squamulis hypogynis minutis albis truncato-rotundis planis, ovariis flavis glaberrimis sub anthesi erectis oblongis in rostrum breve sensim attenuatis basi intus non gibbis stamina æquantibus, folliculis divergentibus ad medium usque connatis parte libera intus medio leviter sulcatis sulcis cavum anguste 5-radiatum minus profundum efformantibus marginibus non recurvidis sinu acuto junctis, seminibus paucis minutis oblongis brunneis subtiliter tuberculatis.—Ad cacumina cautium Psammitis rubri procerimarum, in monte Lien-fa-shan, *i. e.* ‘mons Nelumbii,’ juxta ripas fluvii Cantoniensis sitarum, pulvinos densos efformans, primus detexit filius meus Alfredus, cui sacravi, d. 3. Maii 1869. (Exsic. n. 15605.)—Herbæ sapor fatuus. Species pulchra, ab omnibus lucusque descriptis, ut videtur distinctissima, nec ulli alii, nisi forte *S. spathulifolio*, Hook., a me non viso, cognata. Plurima viva examinavi specimina. Species binæ supra descriptæ habitu, foliis carnosis, squamularum præsentia, cum genuinis *Sedis* prorsus congruentes, folliculis tamen per dimidiam longitudinem arcte coalitis, transitum directum ad *Penthorum* moliantur. Ordo Crassulacearum, nullo stabili superstructus caractere, mihi omni pacto videtur Saxifragaceis subjugandus.

Scripti Whampoa Sinarum, Prid. Id. Maias, a. 1869.

SHORT NOTES.

ASTER NOVI-BELGII, L.—This plant has become established in three localities in Surrey, in the neighbourhood of London, and it is probable that many other localities exist for it under like circumstances. Two of the places where I have seen the plant are on the banks of the Thames; one about half a mile below Richmond railway bridge, where Mr. Baker has observed it in previous years, and the other about half a mile above Hammersmith bridge, where Mr. Britten has noticed it for several years. It also occurs in Putney parish, by a ditch in some waste ground close to Bayeley bridge, near Wimbledon Common. The plant has been seen by Prof. Asa Gray, and the name of *Aster Novi-Belgii*, L., has been approved by him. Several species of *Aster* will probably be found to establish themselves in Britain, and it is worth while to record them as they appear. This is an American plant, and in this respect differs* from *Aster salignus*, Willd., which is European, and has occurred in Cambridgeshire and other places.—W. P. HIERN.

COTULA CORONOPIFOLIA, L.—This inconspicuous Composite weed has occurred in some plenty this autumn in a brickfield in Green Lanes, Highbury New Park, London, where it was found by Mr. P. Gray, to whom we are indebted for specimens. The plant occurs in East Friesland, Oldenburg, and near Hamburg, in places near the coast of the German Ocean; and also in Spain. Out of Europe it has an extensive range, being found in Brazil and Chili, at the Cape of Good Hope, in New Zealand and Van Diemen's Land, and elsewhere. *C. aurea*, L., a native of S. Europe and the East, occurred a year or two ago in cornfields at Mitcham, where it was associated with many other exotics, obviously introduced with foreign grain.

ERICA VAGANS, L.—We have been shown specimens of this, said to have been gathered last August, in a perfectly wild state, in North Wales, between Dolgelly and Machynlleth. This species has been recorded from Glamorgan, and many other counties besides Cornwall,

* Professor Babington, following De Candolle, considers *A. salignus*, Willd., exclusively European (Journ. of Bot. Vol. V. 368); but it seems to be scarcely separable from the American plants called *A. longifolius*, Lam., *A. simplex*, Willd., and *A. puniceus*, L. (see Journ. of Bot. Vol. VII. pp. 139, 140). Professor Asa Gray, indeed, quotes (Man. Bot. Northern U.S. p. 234) *A. salicifolius*, Scholler (a synonym of *A. salignus*) under *A. longifolius*.—[EDITORS JOURN. OF BOT.]

where alone it is undoubtedly native. It appears to be readily established in suitable situations.

COLEANTHUS SUBTILIS, *Seidel*.—British botanists, especially those in the south-west of England, should be on the look-out for this very distinct and singular little grass, which M. Sirodot has lately been finding in numerous localities in the department Ille-et-Vilaine, north-west France. It had been previously found in three isolated localities in Brittany, but at intervals and in small quantities. M. Sirodot states (*Ann. Sc. Nat. (Bot.) sér. 5, vol. x. p. 65*) that the plant grows only on the fine sandy shore left exposed by the partial drying up of large deep ponds, and that it is in flower from the end of August till the beginning of November. So, too, Sternberg noticed (*Regensb. Flora, vol. ii. p. 7*) near Wosseck, in Bohemia, that the seeds did not germinate when submerged, but required a hot season and consequent subsidence of the water. 1868, the year M. Sirodot discovered the grass in so many stations, was one very favourable to its growth. Besides the Bohemian locality, long the only one known, and one in Moravia, *Coleanthus subtilis* occurs near Christiania, Norway, but has not hitherto been collected elsewhere in Europe. The original figure in Trattinick's 'Flora des Oesterreichischen Kaiserthumes,' vol. i., under the name of *Schmidtia subtilis*, is a good one, and so is that in Nees, *Gen. Fl. Germ. (Gram.) t. 27*; a luxuriant plant is drawn in *Regensb. Flora, vol. ii. (Schmidtia utriculosa)*, and there is an indifferent drawing in *Reichb. Ic. Fl. Germ. vol. i. n. 1468*.

FERTILIZATION OF RUSCUS ACULEATUS.—Can any botanist give me a clue to the mode of fertilization of *Ruscus aculeatus*? It is always described as truly diœcious. With most of our diœcious plants, which flower very early in the season, or even with those in which the flowers are unisexual, the male flowers are so arranged, in catkins or otherwise, that the pollen is dispersed by every breath of wind, and some of it can hardly fail to fall on the female flowers. In *Ruscus*, on the other hand, the rigid pseudo-leaves, which bear the flowers, would hardly be at all disturbed even by a heavy gale; and, in addition, the plant generally grows under the protection of Holly or some other evergreen shrub. The time of flowering, in the depth of winter, not March and April, as very commonly stated, would seem to preclude the suggestion that it depends normally on insect-agency for its fertilization.—ALFRED W. BENNETT, 3, *Park Village East, London*.

Since writing the above, I have seen the report of a paper presented by Mr. M'Nab to the Edinburgh Botanic Society, in which he speaks of the male flowers of *Ruscus* not appearing till March and April. I can speak, from my own observation, of finding the plant abundantly in flower in Surrey, several years in the early part of January, even during the present season after the severe frost at Christmas. I cannot, however, be certain of having observed male flowers at that time. Is it possible that the female flowers appear in January, and the male flowers not till March? May I be permitted to doubt whether there is not a possibility of error in the instance alleged by Dr. M'Nab, of fruit and rudimentary male flowers being found on the same branch? * It would, I think, be difficult to distinguish the male from the female buds at a very early stage, even by the microscope.—A. W. B.

Reports.

[Under this head the editors hope to be able to give a periodical *résumé* of the progress of different branches of botanical science at home and abroad. Arrangements have been made for a series of reports on critical, British, physiological, structural, fossil and economic botany, from botanists who have made a special study of these various branches.]

REVIEW OF THE CONTRIBUTIONS TO FOSSIL BOTANY PUBLISHED IN BRITAIN IN 1869.

BY WILLIAM CARRUTHERS, F.L.S.,

Of the British Museum.

During the year the following papers have been published:—

BAILY, W. H. Notice of Plant-remains from Beds interstratified with the Basalt in the County of Antrim. *Quart. Journ. Geol. Soc.*, vol. xxv. pp. 397–362, pl. xiv. and xv.

These beds occur under similar conditions to those in the Island of Mull, and contain a series of allied fossils, chiefly dicotyledonous leaves

* The editors of the 'Gardeners' Chronicle' have seen a similar instance (*vide Gard. Chron.* 1870, p. 178). We have collected male flowers in perfection at the end of April in Surrey.—[EDITORS JOURN. OF BOT.]

and fruits; wood, foliage, and cones of *Coniferæ*; and leaves of endogens. They are considered to be of Miocene age.

BRONGNIART, A. Notice of a Fossil Lycopodiaceous Fruit. (Translated from the 'Comptes Rendus,' August, 1868.) Journ. Bot. Vol. VII. pp. 3-8; Ann. Nat. Hist. ser. 4, vol. iii. p. 74.

The author had obtained a complete specimen of the cone described from the upper portion by Robert Brown under the name *Triplosporites*. He shows that the lower portion contains macrospores and the upper microspores, as in the recent genus *Selaginella*.

CARRUTHERS, W. On some undescribed Coniferous Fruits from the Secondary Rocks of Britain. Geol. Mag. vol. vi. pp. 1-7, pl. i. and ii.

Several species are described, and the views of M. Pomel regarding *Brachyphyllum*, etc., are examined, and his family *Lepidocarpiæ* shown to be based on erroneous interpretation.

————— On *Beania*, a New Genus of Cycadean Fruit from the Yorkshire Oolites. Geol. Mag. vol. vi. pp. 97-99, pl. iv.

A fruit nearly allied to the cone of *Zamia*, but having the scales scattered over the axis, so as to form a loose spike.

————— On the Plant-remains from the Brazilian Coal-beds, with Remarks on the Genus *Flemingites*. Geol. Mag. vol. vi. pp. 151-156, pl. v. and vi.

Three Palæozoic species are described, from the materials from Brazil. A more complete diagnosis of *Flemingites* is given, and its affinities examined.

————— The Cryptogamic Forests of the Coal Period, being a lecture before the Royal Institution of Great Britain. Proc. Roy. Inst., and Geol. Mag. vol. vi. pp. 289-300; woodcuts.

An attempt to show the relation between the Palæozoic and existing vascular Cryptogams.

————— On the Genus *Kuorria*. Journ. of Bot. Vol. VII. pp. 153-155, pl. xciii.

Showing that this genus is based upon casts of the interior of Lepidodendroid stems.

————— On the Structure of the Stems of the Arborescent *Lycopodiaceæ* of the Coal Measures. No. I. *Lepidodendron selaginoides*, Sterub. Month. Micro. Journ. vol. i. pp. 177-181, pl. xxvii.

CARRUTHERS, W., On the Structure of the Stems of the Arborescent *Lycopodiaceæ* of the Coal Measures. No. II. *Ulodendron minus*, Lindl. and Hutt. Month. Micro. Journ. vol. i. p. 225-227, pl. xxxi.

The author proposes to describe the minute structure of these stems, and compare them with recent structures. Two forms are described in these papers.

On the Structure and Affinities of *Sigillaria* and allied Genera. Quart. Journ. Geol. Soc. vol. xxv. pp. 248-254. pl. x.

The structure of the known parts of this genus is described, and it is referred to *Lycopodiaceæ*.

COEMANS, EUG. Note sur la Famille des Équisétacées. Journ. Bot. Vol. VII. pp. 337-340.

The author reviews the different parts of *Calamites* which have received separate names, and unites them under four genera,—*Calamites*, *Annularia*, *Sphenophyllum*, and *Phyllothea*,—in the suborder *Calamiteæ* of *Equisetaceæ*.

DAWSON, J. W. On *Calamites*. Ann. Nat. Hist. ser. 4, vol. iv. pp. 272, 273.

The author confirms the views of M. Grand'Eury, but in two points his observations differ from those of M. Grand'Eury. None of his specimens had long rhizomes, the secondary stems budding almost directly from the primary; and he has found leaves in connection with three species.

GRAND'EURY. Observations on *Calamites* and *Asterophyllites*. (Translated from the 'Comptes Rendus,' March, 1868.) Ann. Nat. Hist. ser. 4, vol. iv. pp. 124-128.

From observations on upright *Calamites* in the coal-measures of the Loire, he describes this genus as having creeping rhizomes; articulated, fistular, and septate stems; the thin outer portion of which consists of (1) an exterior cortical layer, now converted into coal; (2) a thin layer of vascular tissue, now invariably destroyed; and (3) a sort of inner lining of epidermis, which is carbonified. The flutings are on the outer surface of the thin vascular cylinder. There is no evident trace of the insertion of leaves. The greater number of *Asterophyllites* he considers as belonging to other stems than *Calamites*, and for them he proposes the name *Calamophyllites*, and distinguishes them from *Calamites* as having articulate, very certainly hollow, and septate stems, of herbaceous nature, and not always regularly striate; leaves

caducous, situated above the articulation; and caducous branches above the articulations in the axils of the leaves.

HANCOCK, A., AND T. ATTHEY. On some curious Fossil Fungi from the Black Shale of the Northumberland Coal-field. *Ann. Nat. Hist.* ser. 4, vol. iv. pp. 221-228, pl. ix. and x.

The authors describe a number of lenticular bodies from the Cramlington black shale, which, from their resemblance to *Sclerotium stipitatum*, Berk. and Curr., they consider to be *Fungi*. These fossil bodies are supposed by Messrs. Hancock and Atthey to be fully-developed plants, producing spores, and related to the higher *Fungi*. The authors have overlooked the fact that this "doubtful" (Berk.) production, which led them to take this view of these bodies, is only a *mycelium*-tuber, the fructification of which is yet unknown. Five species are described.

HICKS, H. Notes on a Species of *Eophyton* (?) from the Lower Arenig Rocks of St. David's. *Geol. Mag.* vol. vi. pp. 534, 535, pl. xx.

It is very doubtful whether this fossil belongs to the vegetable kingdom. The large-sized continuous tubes of which it is composed are unlike plant-structure.

LINNARSON, J. G. O. On some Fossils found in the *Eophyton* Sandstone at Lugnas in Sweden. (Translated from the Danish Roy. Acad. Ofversigt for March, 1869.) *Geol. Mag.* vol. vi. pp. 393-406, pl. xi.-xiii.

Some additional forms of the impressions from these ancient beds are figured and described, establishing that they represent plants of a high organization, most probably monocotyledonous, as supposed by Torell.

MAHONEY, J. A. On the Organic Remains found in Clay near Croft-head, Renfrewshire. *Geol. Mag.* vol. vi. pp. 390-393.

The author enumerates the following recent plants as found in stratified beds of sand and mud, intercalated with boulder-clay, viz. :— 3 species of *Desmidiæ*, 31 of *Diatomaceæ*, 10 of *Musci*, 9 of *Phanero-gamia*.

NICHOLSON, H. A. On the Occurrence of Plants in the Skiddaw Slates. *Geol. Mag.* vol. vi. pp. 494-498, pl. xviii.

The author figures and describes four fossils, which he thinks most probably plants.

WANKLYN, A. Description of some New Species of Fossil Ferns,

from the Bournemouth Leaf-bed. Ann. and Mag. Nat. Hist. ser. 4, vol. iii. pp. 10-12, pl. i.

The Ferns are rare in these beds. Four forms are figured, two probably fragments of *Adiantum* and of a species of *Cyathea*. The others represent two species of *Gleicheniaceæ*, for which the author proposes the genus *Mertensites*. It exactly agrees with Debey and Ettingshausen's genus *Didymosorus*, containing three plants from the Cretaceous beds of Aix-la-Chapelle.

WILLIAMSON, W. C. On the Structure of the Woody Zone of an undescribed form of Calamite. Mem. Lit. and Phil. Soc. Manch. ser. 3, vol. iv. pp. 155-183, pl. i.-v.

The specimen is elaborately described, and the genus *Calamopitus* is established for those forms of Calamite "in which the woody elements consist of reticulated vessels associated with medullary rays, and having verticils of medullary radii near the nodes."

Additional Notes on the Structure of *Calamites* :

Abstract. Proc. Lit. and Phil. Soc. Manch. vol. viii. pp. 153-155.

The author is satisfied that the stem had an exogenous growth, with cryptogamous fruit.

On a New Form of Calamitian *Strobilus* : Abstract.

Proc. Lit. and Phil. Soc. Manch. vol. ix. pp. 7-9.

This fruit is supposed to belong to the author's genus *Calamopitus*, and differs from the *Volkmania* described in Journ. Bot., Vol. VI., in the sporangia being supported on a sporangiophore rising from the surface of the scales.

On the Structure and Affinities of some Exoge-

nous Stems from the Coal-measures. Month. Micr. Journ. vol. i. pp. 66-72, pl. xx.

A new genus (*Dictyoxylon*) is established for the exogenous stem of the coal-measures, whose tissues are composed of reticulated fibres.

Synopsis of the Genera and Species described in the preceding Papers.

FUNGI?

Archagaricon bulbosum, globuliferum, radiatum, dendriticum, conglomeratum, Hancock and Atthey, Ann. Nat. Hist. ser. 4, vol. iv. p. 226. *Carboniferous*. Cramlington, Northumberland.

FILICES.

- Mertensites Hantoniensis*, Wanklyn (*Didymosorus*, Deb. and Ettings.),
Ann. Nat. Hist. vol. iii. p. 11; pl. i. figs. 1a-g. *Eocene*.
Bournemouth.
- M. crenata*, Wanklyn (*Didymosorus*, Deb. and Ettings.), l. c. p. 12;
pl. i. fig. 3. *Eocene*. Bournemouth.
- Noeggerathia obovata*, Carr. Geol. Mag. vol. vi. p. 154; pl. vi.
fig. 1. *Carboniferous*. Rio Grande do Sul, Brazil.
- Odontopteris Plantiana*, Carr. l. c. p. 154; pl. vi. fig. 2 and 3.
Carboniferous. Rio Grande do Sul, Brazil.

EQUISETACEÆ.

- Calamites*. Journ. Bot. Vol. VII. p. 337; Ann. Nat. Hist. vol. iv.
pp. 124, 272.
- Calamopituis*, Williamson, Mem. and Proc. Lit. and Phil. Soc. Manch.
Calamophyllites, Grand'Eury, Ann. Nat. Hist. vol. iv. p. 124.

LYCOPODIACEÆ.

- Knorria*. Journ. Bot. Vol. VI.
- Sigillaria*. . Quart. Journ. Geol. Soc. vol. xxv. p. 248; pl. x.
- Triplosporites Brownii*, Brongn. Journ. Bot. Vol. VII. p. 3. *Car-*
boniferous. From the Drift, Volpe, Haute-Garonne, France.
- Flemingites Pedroanus*, Carr. Geol. Mag. vol. vi. p. 151; pl. v.
Carboniferous. Rio Grande do Sul, Brazil.
- Lepidostrobis selaginoides*, Sternb. Month. Micr. Journ. vol. i. p. 177;
pl. xxvii. *Carboniferous*. Halifax.
- Ulodendron minus*, Lindl. and Hutt. l. c. p. 225; pl. xxxi. *Car-*
boniferous. Bradford.

MONOCOTYLEDONES?

- Eophyton Linnæanum*, Torell, Geol. Mag. vol. vi. p. 399; pl. xi.
figs. 3 and 4, pl. xii. *Lower Cambrian*. Lugnas, Sweden.
- E. Torelli*, Linnars. l. c. p. 402; pl. xiii. *Lower Cambrian*. Lug-
nas, Sweden.
- E. (?) palmatum*, Nich. Geol. Mag. vol. vi. p. 497; pl. xviii. fig. c.
Llandeilo. Barff, Keswick.
- E. (?) explanatum*, Hicks, Geol. Mag. vol. vi. p. 535; pl. xx.
Arenig. Ramsey Island, St. David's.

CYCADEÆ.

- Beania gracilis*, Carr. Geol. Mag. vol. vi. p. 97; pl. iv. *Oolite*.
Scarborough.

CONIFERÆ.

- Dietyoxylon Oldhamium*, Williamson, Month. Micr. Journ. vol. i. p. 70. *Carboniferous*. Lancashire.
- Pinites Leckenbyi*, Carr. Geol. Mag. vol. vi. p. 2 ; pl. i. fig. 1-5. *Lower Greensand*. Shanklin, Isle of Wight.
- P. gracilis*, Carr. l. c. p. 2 ; pl. i. fig. 9. *Gault*. Folkestone.
- P. gracilis*, Carr. l. c. p. 2 ; pl. ii. fig. 10. *Kimmeridge Clay*. Weymouth.
- P. Plutonis*, Baily, Quart. Journ. Geol. Soc. vol. xxv. p. 360 ; pl. xv. fig. 1, 2. *Miocene*. Antrim.
- Araucarites Brodiei*, Carr. Geol. Mag. vol. vi. p. 3 ; pl. ii. figs. 1-6. *Stonesfield Slate*. Stonesfield.
- A. Phillipsii*, Carr. l. c. p. 6 ; pl. ii. fig. 7-9. *Oolite*. Yorkshire.
- Sequoites Gardneri*, Carr. l. c. p. 7 ; fig. 7 and 8. *Gault*. Folkestone.
- S. Du Noyeri*, Baily, Quart. Journ. Geol. Soc. vol. xxv. p. 361 ; pl. xv. fig. 4. *Miocene*. Antrim.
- Cupressites MacHenrii*, Baily, l. c. p. 361 ; pl. xv. fig. 5. *Miocene*. Antrim.

DICOTYLEDONES.

Mr. Baily refers the leaves found in the Miocene beds of Antrim to *Platanus?*, *Fagus?*, *Andromeda?*, *Quercus?*, and *Rhamnus?*. Quart. Journ. vol. xxv. p. 361 ; pl. xiv.

INCERTÆ SEDIS.

- Rhysophycus dispar*, Linnars. Geol. Mag. vol. vi. p. 403. *Lower Cambrian*. Lugnas, Sweden.
- Buthotrephis Harknessii*, Nich. Geol. Mag. vol. vi. p. 495 ; pl. xviii. fig. A. *Llandeilo*. Thornship Beck, Shap.
- B. (?) radiata*, Nich. l. c. p. 496 ; pl. xviii. fig. B. *Llandeilo*. Thornship Beck, Shap.

THE LOCAL FIELD-CLUBS OF GREAT BRITAIN.

I. BERWICKSHIRE NATURALISTS' CLUB.

[It is our intention to give, as completely as possible, an account of the botanical proceedings of local natural history societies, and Mr. James Britten, of the Royal Herbarium, Kew, has undertaken to super-

intend their publication. He will, therefore, be glad to receive from the secretaries of such societies, all information of interest upon the subject, together with copies of proceedings or papers, especially those bearing upon local botany. In connection with this, he hopes to give each month an account of the formation, progress, and work of some one society in detail; and to this end the co-operation of local naturalists is invited. The particulars on which information is most desired are—date of formation, number of members, details of management, publications, mode of working, number of meetings in the year.]

This was the first local field-club established in the kingdom. We are mainly indebted for the following particulars to the kindness of the active Secretary, George Tate, Esq., F.G.S., of Alnwick.

The first meeting was held Sept. 22, 1831, when nine gentlemen were present, and three short rules, defining the objects of the Club, its times of meeting, and mode of election of members, were agreed upon. Mr. Hardy, in his 'Anniversary Address,' 1868, traces the connection of the Club with the Plinian Society, of Edinburgh, which was established in 1823; stating that it was through the exertions of the principal members of the latter Society that the Berwickshire Club was established, and that it was formed on the same plan as the older institution: so that the Club may be regarded as the branch of a society established so far back as 1823.

Of the original members two only remain—Dr. W. Baird, F.R.S., of the British Museum, and Mr. R. C. Embleton, of Beadnal.

At the close of the first year there were eighteen members, among whom were the late Prideaux J. Selby, of Twizel, and Sir William Jardine, Bart., of Jardine Hall; and when Dr. Johnston, the founder, died, on July 30, 1855, there were eighty-five members. Since that time the numbers have increased; and there are now in the Club 233 ordinary, 5 honorary (all ladies), and 3 corresponding members. The only officers are a President, who is elected yearly, and two Secretaries.

The area of the Club's investigations extends over Northumberland north of the Coquet, over Berwickshire, and over as much of Roxburghshire as is conveniently accessible. The members are scattered over this area, but the principal part of them are in Northumberland. The meetings are held on the last Thursday of the months of May, June, July, August, and September—two usually being held in Northumberland, two in Berwickshire, and one in Roxburghshire. In

the notice of each meeting issued by the Secretaries, a programme is given to guide the proceedings of the day. At 9 A.M. the members assemble at breakfast in an inn, after which the explorations commence, and are continued till 4 P.M., when the members reassemble at dinner; the observations made are then reported and discussed, and papers are read. These gatherings are well attended. At the last meeting in September, the accounts are audited, new members are elected, the President's address is read, and a President for the ensuing year chosen. The yearly subscription is 6s., and new members pay an entrance fee of 10s.; the proceeds are applied to pay expenses attending the meetings, to printing and lithography for the yearly proceedings, and sometimes to aid in the exploration of antiquities. Two copies of the yearly printed proceedings are given to each member; none are sold, but they are freely distributed among public societies and others interested in such productions. Five volumes of 'Proceedings' have been printed; and the first part of vol. vi. is nearly completed. All subjects in local natural history, including geology, have been more or less treated of in these volumes; and in the later numbers there are several important papers on local archæology.

Much has been accomplished in local botany by the Club. A succession of botanists has been reared under its auspices; and there have been recorded in its proceedings, year after year, by Mr. Embleton and other members, plants new to the district, and new localities for the rarer plants; special lists have been given—of the botany of the Faroe Islands and of the Cheviots, by Dr. Geo. R. Tate, F.L.S.; the Roxburgh Fungi, by Mr. A. Jerdon; the Eastern Border Mosses and Lichens, by Mr. James Hardy; and in the proceedings for 1869, there will appear, a list of the plants around Melrose, by Mr. Stewart, with an account of several foreign genera and species found on the banks of the Gala and Tweed, and introduced by the foreign wool used in the manufactories on the Gala water. Other more important productions, though not appearing in the proceedings of the Club, are the work of its members, and are results of the action and influence of the Club; among these are the 'Botany of the Eastern Borders,' by Dr. G. Johnston; with the 'Fossil Botany,' by George Tate, Esq., F.G.S.; the 'Flora of North Northumberland,' contributed to the Flora of Northumberland and Durham, and the 'Flora of the District around Alnwick,' by Dr. G. R. Tate, F.L.S., with the Muscology of the same

district, by Mr. R. A. Middlemas, published in the 'History of Alnwick.' In the 'Botany of the Eastern Borders,' as well as in the 'Proceedings,' are some special papers on the folk-lore connected with plants.

Through the researches of the members, few districts have been better explored in their botany than that belonging to the Club.

The Club is, financially, in a very satisfactory position. In the 'Proceedings' for 1867 and 1868, a copy of which has been forwarded us by Mr. Tate, we find, besides Mr. Hardy's careful enumeration of the Mosses of the Eastern Border, many short notes on the phanero-gamic and cryptogamic flora of the district. Among the former we observe the addition of *Rosa micrantha* to the flora of Northumberland and Durham; and a note of *Eschscholtzia californica*, Cham., as a plant claiming admittance among our naturalised species, "covering miles of railway embankment and chalk downs in Kent;" and "more abundant than the clover" in a clover field near Maidstone.

JAMES BRITEN.

Extracts and Abstracts.

CHINCHONA CULTIVATION IN BENGAL.

Official Report from C. B. Clarke, Esq., M.A., Officiating Superintendent, Botanical Gardens, and in charge of Chinchona cultivation in Bengal, to the Secretary to the Government of Bengal,—(No. 110, dated Botanic Gardens, the 27th May, 1869.)

Sir,—I beg leave to submit the Annual Report on the cultivation of Chinchona in Bengal, for the year ending 31st March, 1869.

2. I took charge of the office of Superintendent of the Botanic Gardens, Calcutta, yesterday only, and the present report is constructed almost entirely out of materials supplied by Mr. Gammie, in charge of the Government Chinchona Gardens near Darjeeling, and by Mr. Biermann, in charge of the Government Chinchona Nursery at Nunklow, Cossyah Hills.

3. In the Government Chinchona Gardens near Darjeeling, the propagation has been hitherto by cuttings only, as the shrubs do not pro-

duce seeds till they have attained a few years' growth. It is expected that in a year or two large quantities of seeds will be obtained. Chinchona seed has always been raised under glass, in order to ensure the germination of the greatest possible proportion of the rare and precious seeds, but Dr. Anderson lately caused a quantity of the seeds of *Chinchona Pahudiana* (a worthless species) to be sown under mats, and excellent plants were raised quite as well as under glass. It may be hoped from the result of this important experiment that the propagation by cuttings may be shortly discontinued, and that any person wishing to commence Chinchona cultivation may be able to do so by simply purchasing a little seed.

4. The propagation (at the Darjeeling Government Gardens) of *C. succirubra* by cuttings has been discontinued and the stock plants thrown away, because enough nursery plants have already been obtained to complete the planting of 1000 acres, which is the area intended to be occupied by *C. succirubra*. The stock plants of *C. Calisaya* have been increased from 4158 to 10,000, because it has been ascertained that the species is a very valuable one in quinine, and the number of this species planted out is as yet very few as compared with that of *C. succirubra* and *C. officinalis*. The stock plants of *C. micrantha* have been thrown away. The stock plants of *C. officinalis* have not been increased, as seed is expected this year, and better plants can be produced by seed than from cuttings.

5. The increase during the year of all the species of Chinchona plants is 673,654, being 12,816 less than that of the preceding year. The increase in each month is as under :—

1868.	
April	63,600
May	70,400
June	91,000
July	204,000
August	88,200
September	72,000
October	51,000
November	38,000
December	2,000
1869.	
January	2,000

February	1,000	
March	1,500	
		684,700
Deduct number distributed	10,046	}
Ditto thrown away	1,000	
Total		673,654

6. In the nursery beds on the 1st of April, there were 556,798 plants all in excellent condition, and 200,000 of them ready for transplanting out in the plantations so soon as the weather should be favourable.

7. In the permanent plantations 534,236 plants have been planted out. Of this number 342,807 are *C. succirubra*, 167,320 are *C. officinalis*, and 24,109 are *C. micrantha*. The area of ground planted with Chinchonas on 1st of April, 1869, was 610 acres, of which 500 acres are *C. succirubra*, the remaining 500 acres of *C. succirubra* proposed to be planted have been cleared of jungle, and will be planted before the end of 1869-70. For *C. officinalis* 80 acres have been cleared, and for *C. Calisaya* 10 acres. The growth made by the plants in the Rungbee and Rishap plantations during the year has far exceeded that during the preceding year. The tallest plant of *C. succirubra* is 19 feet high, of *C. officinalis* is 11 feet 3 inches. Many plants of *C. officinalis* have a good crop of seeds ripening on them, and others are coming into flower. A few plants of *C. succirubra* are also coming into flower.

8. The number of Chinchonas distributed during the year was as under:—

Mr. Johnson, Dooterial, Darjeeling	8,000
Officiating Superintendent, Botanic Gardens, North-Western Provinces	1,300
Lord Lawrence	600
Dr. J. M. Coates, Hazareebaugh	100
Colonel Strutt, Kangra Valley	42
Mr. Miller, Darjeeling	4
Total	10,046

9. Of ipecacuanha there are five rooted plants, and one cutting in the Government Chinchona Gardens, Darjeeling.

10. The Darjeeling Chinchona Association possessed, on 1st of April, 1869, 671,518 Chinchonas, of which 652,506 were *C. succirubra*. The area planted was 275 acres. The plantations are in good order, and the Association has lately purchased a large tract of land adjoining their plantation, and continue to push on the cultivation with great rapidity.

11. On the Tuckvar Tea Company's estate there are 75,000 Chinchonas, 20,000 of which are planted out and growing well.

12. The Darjeeling Tea Company have 30,000 plants of *C. succirubra* on the Tukvar Tea plantation ; of these 20,000 are planted out and growing well.

13. In other plantations near Darjeeling there are 19,000 Chinchonas.

14. The total number of Chinchonas in the Darjeeling district is 3,028,050, viz. 2,232,532 in Government, and 795,518 in private plantations. The area planted is about 965 acres.

15. Between 1st of April, 1868, and 31st of March, 1869, there was paid into the Darjeeling Treasury, by the Chinchona cultivation, 1562 rupees and 12 annas, as under :—

	Rs.	As.	P.
Rent of land	1162	0	0
Rent of shops	42	0	0
Sale of Chinchona plants	289	12	0
Sale of Wardian cases	60	0	0
Sale of timber	9	0	0
	<hr/>		
Total	1562	12	0

16. At Nunklow, in Khasia Hills, the total number of Chinchonas in the Government gardens was 18,975 on 31st of March, 1869, as against 6778 on 31st of March, 1868. Of these, 18,221 are *C. succirubra*, 421 are *C. micrantha*, and 333 are *C. officinalis*. The garden here being of scarcely more than two years' standing, the chief part of this number of plants are cuttings or nursery plants, but 823 have been planted out in experimental plantations.

17. During the year, 1045 plants (all of *C. succirubra*) have been

sold and rupees 240 annas 10 resulting therefrom, and from the sale of some Wardian cases, has been paid into the Treasury.

18. The plants of *C. succirubra*, planted out for experiment at elevations varying from 1000 to 3800 feet of elevation, look promising. The experimental plantations near Nunklow were severely cut by hail in April, 1868, when hailstones 2 inches in diameter fell. The young plants, even up to a growth of 2 inches diameter of stem, have been eaten through by locusts in some cases.

19. Neither *C. officinalis* nor *C. micrantha* can be said to have succeeded as yet in these nurseries.

20. A path of four miles has been made to connect the experimental nurseries. The labourers' huts have been repaired, and good drinking-water brought to them. About eight acres of ground have been cleared ready for planting out. Mr. Biermann considers there is little hope of the cultivation of the tropical Chinchonas being successful near Shillong; plants of *C. succirubra*, which have been tried there by private persons, have been severely injured by frost.

21. Mr. Biermann considers that, in order the object for which he was sent to the Khasia Hills may be attained, it is essential that the nursery should be placed where facilities for communication exist, as the great cost of coolie hire in the Khasia Hills must otherwise render the transmission of plants, and the formation of paying plantations impracticable.

Number and Distribution of Chinchona Plants in the Government Plantations of Darjeeling on the 31st of March, 1869.

Names of species of Chinchona.	Number in permanent plantations.	Number of stock plants for propagation.	Number of seedlings or rooting cuttings in nursery beds for permanent plantations.	Number of rooted plants in cutting beds.	Number of cuttings made during March.	Total number of plants, cuttings, and seedlings.
<i>C. succirubra</i> . . .	6,15,730	20,000	2,83,006	3,24,979	None	12,43,715
<i>C. Calisaya</i> . . .	220	10,000	2,460	13,174	1,500	27,354
<i>C. micrantha</i> . . .	29,667	None	None	None	None	29,667
<i>C. officinalis</i> and varieties . . .	3,12,719	10,000	2,71,332	3,32,653	None	9,26,704
<i>C. Pahudiana</i> . . .	5,092	None	None	None	None	5,092
Totals . . .	9,63,428	40,000	5,56,798	6,70,806	1,500	22,32,532

BRITISH ROSES.

The recently published part of the Linnean Society's Journal contains Mr. J. G. Baker's 'Monograph of the British Roses,' read before the Society in March last. The following is a list of the species and varieties described in the paper:—

Group 1. SPINOSISSIMÆ.

1. *R. spinosissima*, *L.*
2. *R. rubella*, *Smith.* Not indigenous.
3. *R. involuta*, *Smith.*
 Var. *Sabini*, *Woods* (includes *R. gracilis*, *Woods*).
 — *Doniana*, *Woods*.
 — *gracilescens*, *Baker*.
 — *Robertsoni*, *Baker*.
 — *Smithii*, *Baker* (= *R. involuta*, *Sm.*)
 — *lævigata*, *Baker*.
 — *Moorei*, *Baker*.
 — *occidentalis*, *Baker*.
 — *Wilsoni*, *Borr.*

4. *R. Hibernica*, *Smith.*

Var. *cordifolia*, *Baker*.

Group 2. VILLOSÆ.

5. *R. pomifera*, *Herm.* (= *R. villosa*, *Sm.*). Not indigenous.
6. *R. mollissima*, *Willd.* (= *R. mollis*, *Sm.*).
 Var. *cærulea*, *Woods*.
 — *pseudo-rubiginosa*, *Lejeune*.
7. *R. tomentosa*, *Sm.*
 Var. *subglobosa*, *Sm.* (includes *R. Sherardi*, *Davies*).
 — *farinosa*, *Rav.*
 — *scabriuscula*, *Sm.*
 — *sylvestris*, *Woods* (includes *R. Jundzilliana*, *Baker*).
 — *obovata*, *Baker*.

Group 3. RUBIGINOSÆ.

8. *R. rubiginosa*, *L.*
 Var. *permixta*, *Déséglise*.

Var. *sylvicola*, *Déség. and Répart.*

9. *R. micrantha*, *Sm.*
 Var. *Briggsii*, *Baker*.
 — *Hystrix*, *Leman*.
10. *R. sepium*, *Thuill.**
 Var. *pulverulenta*, *M. Bieb.* (= *R. inodora*, *Fries*).
 — *Billicti*, *Puget* (= *R. sepium*, *Borr. non Thuill.*).
 — *cryptopoda*, *Baker*.
 Group 4. CANINÆ.

11. *R. canina*, *L.*

Series 1. Ecristatæ.

- Var. *Lutetiana*, *Leman*.
 — *surculosa*, *Woods*.
 — *sphærica*, *Gren.*
 — *senticosa*, *Ach.*
 — *dumalis*, *Bechst.*
 — *biserrata*, *Mérat*.
 — *urbica*, *Leman* (= *R. Forsteri*, *Sm.*, and *R. collina*, vars. β and γ , *Woods*).
 — *frondosa*, *Steven* (= *R. dumetorum*, *Woods*).
 — *arvatica*, *Baker*.
 — *dumetorum*, *Thuill.*
 — *pruinosa*, *Baker* (= *R. cæsia*, *Borrer*, ex parte).
 — *incana*, *Woods*.
 — *tomentella*, *Leman*.
 — *Andegavensis*, *Bastard*.
 — *verticillacantha*, *Mérat*.
 — *collina*, *Jaqc.*
 — *cæsia*, *Smith*.
 — *concinna*, *Baker*.
 — *decipiens*, *Dumort.*

* Mr. Baker found the true *R. sepium*, *Thuill.*, at Hind Head, in Surrey; it had not been previously observed in this country, though a common form on the Continent.

Series 2. *Subcristata*.Var. *Reuteri*, *Godet*.— *subcristata*, *Baker*.— *Hailstoni*, *Baker*.— *implexa*, *Gren*.— *coriifolia*, *Fries* (= *R. bractescens*, *Woods*).— *Watsoni*, *Baker*.— *celerata*, *Baker*.Series 3. *Subrubiginosæ*.Var. *Borreri*, *Woods* (= *R. dumentorum*, *E. B.*, *R. inodora*, var. *α*, *Borrer*).Var. *Bakeri*, *Déséglise*.— *marginata*, *Wallr*.Group 5. *SYSTYLÆ*.12. *R. stylosa*, *Desv*.Var. *Systyla*, *Bast.* (= *R. collina*, *E. B.*).— *Desvauxii*, *Baker*.— *opaca*, *Baker*.— *gallicoides*, *Baker*.— *Monsoniæ*, *Lindl*.13. *R. arvensis*, *Huds*.Var. *bibracteata*, *Bastard*.

In the last edition of Babington's Manual, 17 species are described. Of these, *R. Wilsoni*, Borr., and *R. Sabini*, Woods, are reduced by Mr. Baker to varieties of *R. involuta*, Smith; *R. inodora*, Fries, to a variety of *R. sepium*, Thuill.; and *R. bractescens*, Woods, and *R. cæsia*, Sm., to vars. of *R. canina*, L. Mr. Baker adds *R. pomifera*, Herm., but it is not a native species.

HOW TO GATHER SPECIMENS OF ROSES.

The care which has been taken in the preparation of specimens has grown with the progress of botany. At first the gatherings were generally made in a very parsimonious fashion, and collections contained only small fragments of the plants. In proportion as the species and their forms were better studied, the need has been more and more felt for beautiful and numerous specimens. For the genus *Rosa*, of which the species or forms are numerous and distinguished by subtle characters, it is needful more than in almost any other set of plants, to devote great attention to the gathering and preparation of specimens, and to gather the latter at different stages of the growth of the plant so as to be able to follow the evolution of all the organs. If one makes exchanges, one must not confine one's gatherings to a few branches. The botanist should use scissors rather than a knife; the first instrument is more convenient to use, and saves a good many pricks of his fingers; with scissors it is easy to take portions of the stem furnished with two or more flowering or fruit-bearing branches, which is more useful than to take mere branches without portions of the main stem.

Such specimens show how the branches are inserted on the stems. To complete the gathering, isolated branches should be always taken. When it is possible, barren shoots, divided into pieces of two or three internodes, should be collected along with the flower-bearing shoots.

For a Rose to be really well gathered, it should be represented in the specimen by—

- 1st. Flowering-branches with flowers and buds.
- 2nd. Flowering-branches with well-developed green fruit.
- 3rd. Flowering-branches with ripe fruit.
- 4th. Portions of the radical shoots and barren stems.

It is not necessary to say that these complete specimens can only be made when one has the bush at hand during the whole season. Upon an excursion, away from home, one has often to be contented with one or two states.

The tickets of the specimens should give details respecting those characters which disappear in drying, or which cannot be shown by the specimens, and should also furnish information on the following points, viz. :—

1. Whether the rootstock be spreading or erect.
2. Whether the plant be gregarious or solitary.
3. The form and aspect of the bush and its height.
4. The colour of the stem and upper surface of the leaves.
5. The colour of the petals and odour of the flowers and glands.
6. The kind of station (shady or exposed, etc.), kind of soil and altitude.

The greater part of these details are not however necessary, when an ordinary form belonging to a well-known group is in question.

One thing which must be always kept in view, is never to mix specimens of allied forms coming from two or several different bushes. This separation of specimens from different gatherings enables one to have a command over one's observations in a way that is not possible if this plan be not adopted. I strongly recommend this plan to amateurs who send me Roses for examination.

My plan has been to mark the bushes in the fields and woods with tickets of lead bearing a number ; to have two tickets bearing the same number, and fasten one on the bush and the other round the specimens taken away from it. If this be done, there is no confusion to be feared in the gatherings made at different dates.

Having had many Roses to gather in large quantity, I have been in the habit of using in my autumnal excursions a cover made of American leather, which I have found very useful. This cover, made out of about a yard of the fabric, with three large transverse bands with buckles, two strings run in the borders, and finally a fourth band by which to carry it on the shoulder or back, may be increased or diminished at will. Light of itself, it adds little to the weight of the specimens, which is often considerable. I have carried home in it as many specimens as might be crowded into half-a-dozen ordinary collecting-boxes. It may be used with advantage not only for Roses and Brambles, but for many other kinds of plants.

Roses in flower should be put into a small press on the spot. To make good specimens they should be taken in the morning before the dissemination of the pollen. After the dehiscence of the anthers, the petals fall much more easily.—*Prof. Crepin, in Bulletin de la Soc. Royale de Bot. de Belgique, tome viii. p. 320.*

REVIEW OF THE GENUS NARCISSUS.

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

(*Extracted from the 'Gardener's Chronicle' for 1869.*)

In view of the reviving interest in this beautiful genus, I propose to devote a little space this spring to a review of the species and principal varieties, pointing out their characteristic distinctions as well as the materials at my command will allow, and endeavouring to group them so that my remarks may serve the reader as a guide to the naming and arranging of his specimens. In the last generation, at the time when the public interest in *Narcissi* reached its highest point, Mr. Haworth and the Hon. and Rev. W. Herbert studied the genus from living plants in English gardens in a very careful and elaborate manner, and both published the result of their investigations. In Haworth's monograph, which was printed in 1831, and published as a supplement to Sweet's 'Flower Garden,' in the year 1831 (vol. i., second series), nearly 150 so-called species are enumerated and characterized; but what Haworth understood by a species, is what most botanists mean when they speak of a slight garden variety; and not only have a large proportion of his plants never been identified in the

wild state, but a considerable number of them he had never seen himself, but had taken up from the rude woodcuts of the pre-Linnæan herbalists. These 150 species he classified under 16 genera.

The Dean of Manchester, who for many years made a special study of *Amaryllidaceæ*, performed a very useful service in revising Haworth's work, which he did by reducing his 16 genera to 6, rejecting such of his types as were known from figures only, and grouping the rest into combinations of a higher order of value; but he, too, here, as in the other genera of the Order, took a different view of what constitutes a species to that which it is possible for any writer who deals with wild plants to adopt, and, in consequence, often founded species upon a basis of character so narrow as to make it quite impossible for those who use his book to apply his definitions in practice. The principal writers upon the genus on the Continent have followed our two English monographers almost implicitly, both as regards the arrangement and characterization of the plants; Spach, and Rœmer and Schultes, treading in the footsteps of Haworth; and Kunth, in his 'Enumeratio,'—which is the book generally used, both at home and abroad, for naming and classifying *Amaryllidaceæ* and *Liliaceæ*,—following close upon the track of Herbert. My own view is, that the range in structure which the plants show, taking in view the gradual manner in which the extremes are connected by intermediate links, is not too great for them to be associated together in a single genus, as Linnæus planned; and I believe that the number of what may be fairly called species, as the term is understood by the majority of botanists, which it is possible to characterize as clearly as species ought to be characterized, and which are known definitely in a wild state, is not much over 20. In the present paper I propose to pass these under review, giving for each as good distinctive characters as can be furnished, and enumerating under each its principal varieties and synonyms, with a reference to the figures where the typical plants and varieties will be found represented.

At the outset it will be better to clear the way by a few general remarks on the parts of the plant which vary sufficiently in the different species to furnish characters by which they may be known from one another; and for this purpose I will pass the parts of the plant rapidly under review.

Bulbs.—The bulbs of the different kinds vary in size very much, but in all are quite uniform in general character.

Leaf.—There are two well-marked types of leaf with intermediate gradations; one kind, rush-like in shape, and nearly or quite round in horizontal section; the other, though rather thicker in the middle than towards the edge, yet nearly flat in the upper half, but becoming convex on the back and slightly concave on the face, as it descends to elasp the base of the scape. We have good examples of the rush-like type of leaf in *Narcissus juncifolius* and *Jouquilla*, and of the nearly flat kind, attaining a breadth of half an inch or more, in *N. Tazetta* and *Pseudo-Narcissus*. In *N. odorus* and *N. intermedius* we have a half-cylindrical leaf with a deep channel down the face, and in several kinds a less convex leaf, two or three lines broad. The rush-like and semi-cylindrical leaves are always a bright glossy green; those that are nearly flat are usually more or less covered with a glaucous bloom. In all, except one of the autumn-flowering species, the leaves are contemporary with the flowers.

Scape.—In most of the species the scape is more or less compressed, with a raised line on the two opposite edges (ancipitous); in a few it is nearly or quite round in horizontal section (terete). In *N. Pseudo-Narcissus*, *N. Bulbocodium*, *N. poeticus*, and *N. incomparabilis*, it is essentially single-flowered; but generally there is a tendency to produce more than one flower, and in some of the varieties of *N. Tazetta* we have as many as a dozen or even twenty. The spathe has never more than a single valve. Sometimes the flower is nearly sessile in the spathe, but more usually the pedicels are nearly or quite as long as the spathe.

Tube of the Perianth.—The tube is generally as long as or rather longer than the divisions of the perianth. In all but two species it is a slender cylinder, slightly dilated at the throat, or a funnel with a narrow neck; but in *N. Pseudo-Narcissus* and *N. Bulbocodium* it is shaped like a reversed cone.

Divisions of the Perianth.—In *N. Broussonetii* and the two species just mentioned, the divisions of the perianth form permanently an acute angle with the crown. In *N. calathinus* and *N. triandrus* they become decidedly reflexed when the flower expands; but in the majority of the species they spread out from the base of the crown horizontally, being usually broad enough to wrap over one another; but in the three autumn-flowering species very narrow, and narrowed gradually from the base to a sharp point.

Corona.—The crown in the centre of the flower varies very much, and furnishes some of the best marks which we can get for characterizing the species. Beginning with *N. Broussonetii*, it shows itself as a layer almost entirely confluent with the upper part of the tube. We get it in the next stage of development in the autumn-flowering species, in which it is an erect rim, scarcely over half a line high. In *N. poeticus* and *N. biflorus* it is a similar but rather deeper rim, with a very much crisped scariose edge. In the *N. Tazetta* group it is a cup, from a third to a quarter as long as the divisions of the perianth. In *N. incomparabilis* and *N. odorus* it is an erect cylinder, half an inch deep, and quite as broad as deep, whilst in *N. Pseudo-Narcissus* and *N. Bulbocodium* we have it either as a reversed cone or a cylinder with a spreading mouth, which is quite as long or rather longer than the divisions of the perianth.

Stamens.—Usually the length of the filaments is in proportion to that of the corona. In *N. Tazetta*, *N. poeticus*, and most of the others with a short crown, the stamens are nearly or quite sessile in two contiguous rows near the throat of the tube; but we have a marked exception to this in *N. Broussonetii*, which has filaments one and a half to two lines long. In *N. odorus*, *N. incomparabilis*, *N. montanus*, and *N. Macleaii*, the filaments about equal the anthers. In *N. calathinus* and *N. triandrus* they are two or three times as long as the anthers, the lower three issuing from near the base, and the upper three from near the top of the tube. In *N. Pseudo-Narcissus* they all spring from one level low down in the tube, and are quite straight and more than half an inch long. In *N. Bulbocodium* they spring from near the base of the tube, and reach nearly or quite to the mouth of the crown, and are all distinctly upcurved toward the point.

Style.—Herbert attaches great importance to the length of the style in characterizing species and varieties, but it certainly is not at all safe to do so. In general terms I may say that the stigma is on a level with the upper row of stamens.

Colour of the Flower.—In nearly all the species there is considerable variation here. The corona is more constant in colour than the rest of the flower, and generally deeper in hue. From snow-white and milk-white, we pass gradually to a bright yellow, getting no other bright shade of colour except green in the limb of one rare, little-known species, and bright red in the crown of *N. poeticus*.

Time of Flowering.—The Daffodil leads the way, beginning generally near London early in March, and finishing before the end of the month. Next in order come *N. incomparabilis*, *N. odorus*, *N. radiiflorus*, *N. Macleaii*, and the early varieties of *N. Tazetta*, which are in full flower by the end of March, and continue through the early part of April. A third set, *N. poeticus*, *N. biflorus*, *N. Jouquilla*, *N. juncifolius*, *N. Bulbocodium*, and the late varieties of *N. Tazetta*, come out in April, and some of them continue into May; and three species—*N. viridiflorus*, *N. elegans*, and *N. serotinus*—flower in September.

On the whole, the character which appears to be most readily applicable for dividing the species into groups, is that furnished by the proportion which the crown bears to the divisions of the flower; and I intend, therefore, in enumerating the species, to classify them as follows:—

Group 1. *Magnicoronatæ*.—Crown as long as or rather longer than the divisions of the perianth.

Group 2. *Mediocoronatæ*.—Crown half as long as the divisions of the perianth (in one or two exceptional cases three-quarters as long).

Group 3. *Parvicoronatæ*.—Crown less than half as long as the divisions of the perianth.

Group I. **MAGNICORONATÆ**: *crown as long or rather longer than the divisions of the perianth.*

Of the Narcissi which have the crown in the middle of the flower as long as the divisions of the flower, there are only three well-marked species, each of which corresponds to a genus of Haworth's, two of which are well known in cultivation, but the third, which is very rare in a wild state, is now, we fear, lost from our gardens. They may be distinguished from each other as follows, viz.:—

Tube inversely conical, varying from as long to twice as long as broad, with the stamens from the bottom; divisions of the flower more or less distinctly ascending.

Filaments and style straight; divisions of the perianth linear-lanceolate, a line to an eighth of an inch broad at the base. } 1. **BULBOCODIUM** (Genus *Corbularia*, Haworth).

Filaments and style curved; divisions of the perianth oblong-lanceolate, 5-6 lines broad at the base. } 2. **PSEUDO-NARCISSUS** (Genus *Ajax*, Haworth).

Tube cylindrical, rather widened at the top, five or six times as long as broad; divisions of the perianth distinctly reflexed. } 3. **CALATHINUS** (Genus *Assaracus*, Haworth).

The following is a detailed description of the typical form of each, with its principal varieties and their synonyms:—

I. N. *BULBODIUM* (L. Sp. Plant. p. 417).—Bulb ovoid, $\frac{1}{2}$ – $\frac{3}{4}$ in. thick; leaves two or three to a scape, subterete, 4–8 in. long, not more than a line broad, bright green, generally rather shorter than the scape; scape 4–8 in. high, slender, terete; flowering about London late in April or early in May, and never bearing more than a single flower, which is either ascending or horizontal, not drooping, with a pedicel within the spathe 3–9 lines long. Perianth gradually widened from the ovary to the mouth of the crown, 18–21 lines deep, exclusive of the ovary; the whole flower bright yellow, the lower part and the divisions of the limb rather deeper than the rest, the tube and crown very nearly equal in depth, the latter scarcely at all crisped, and very indistinctly toothed at the throat; the divisions of the limb ascending, linear, a line to an eighth of an inch broad at the base, narrowed gradually from the base to an acute point. Stamens, subbiseriate from the base of the tube, the filaments filiform, reaching nearly or quite to the throat of the crown and decidedly upcurved, like the style, which is often slightly protruded. Anthers, linear, 2–2 $\frac{1}{2}$ lines long. A native of Spain, Portugal, the opposite coast of Africa, and the south-west of France as far north as Bordeaux.

This, the “hoop petticoat,” was divided into “species” by Herbert as follows, and we give references to the figures and Haworth’s and some other synonyms; but we fear that, even taking the plants as slight varieties, they are barely distinguishable:—

C. Bulbodium, Herb. Amar. p. 297.—Size as described above; corona slightly undulated, entire or slightly lobed; style shorter than the corona. Redouté, Lil. t. 24.—*C. lobulata* and *C. serotina*, Haworth, Mon. p. 1; the latter figured Bot. Mag. t. 88; Sweet, Flow. Gard. ser. 2, t. 164.

2. *C. conspicua*, Herb. Amar. p. 298.—A robust form, with a slightly repand corona and exserted style. Sweet, Flow. Gard. ser. 2, t. 326.—*N. aureus*, De Cand. in Red. Lil. vol. viii. *C. gigas*, *C. conspicua*, and *C. aurea*, Haworth.

3. *C. tenuifolia*, Herb. Amar. p. 298.—A slender form, with erect shining leaves, a distinctly exserted style, and a distinctly lobed corona.—*N. tenuifolius*, Salisb. Prodr. p. 222; Red. Lil. t. 486; Sweet, Flow. Gard. t. 114. *C. tenuifolia* and *C. Bulbodium*, Haw.

4. *C. obesa*, Herb. Amar. p. 298.—More slender than the type; leaves drooping; corona entire, inflated; style exserted.—*N. obesus*, Salisb. Prodr. p. 222. *N. inflatus*, Haw. L. Trans. v. p. 243.

The following are more striking varieties than any of the above:—

5. *N. nivalis*, Graells, Indic. Pl. Nouv. p. 9.—Leaves 2–3, scape not more than 3–4 in. high; perianth not more than 8–9 lines long above the very shortly-stalked ovary, the divisions of the limb as long as the faintly crenate corona; the style, and usually both sets of stamens, exserted. Spain. Bourgeau, n. 2280. From this *C. hedraantha*, Webb and Held, in Blanc. Exsic. n. 220, differs only by its sessile ovary.

6. *C. Graellsii*, Webb, in Bourg. Exsic. n. 2281.—Leaves 2–3, scape 4–6 in. long; perianth an inch long above the ovary, the divisions subpatent, with a brown keel, which is decurrent to the base of the tube; corona subentire; style and longer stamens exserted. Spain.

7. *C. monophylla*, Durieu in Duchartre Rev. Bot. 1847, p. 1847; *N. Clusii*, Dunal, Mem. Acad. Sc. Mont. p. 9, t. 6.—Leaf very slender (one-third of a line broad), usually solitary, ovary nearly sessile in the spathe; perianth nearly white, as is also the crenulate corona, 15–18 lines long above the ovary; the style exserted. Algeria. Balansa, n. 235.

II. *N. PSEUDO-NARCISSUS* (L. Sp. Plant. p. 414).—Bulb ovoid, 1 or $1\frac{1}{2}$ in. thick; leaves five or six to a scape, glaucous, erect, flat-tish upwards, equalling or rather shorter than the scape at the time of flowering, five or six lines broad. Scape about a foot high, with two prominent edges, flowering in the middle of March, before any of the other species. Flowers always solitary, nearly sessile, or with a very short pedicel within the spathe. Flower 18–20 lines long above the ovary, the obconical tube about $\frac{1}{2}$ in. deep, the divisions of the limb more or less ascending, sulphur-yellow, paler than the crown, oblong-lanceolate, 9–10 lines long, 5–6 lines broad at the base, the outer ones rather blunter than the others, the crown just equalling the divisions, deeper and more orange-yellow than the divisions, the mouth about an inch across, slightly plicate and inciso-crenate; filaments uni-seriate from the base of the tube, 7–8 lines long, flattened downwards, straight, the anthers linear, 4 lines long. Style above an inch long, straight, slightly exceeding the anthers. Extending as a wild plant from Sweden and England to Portugal, Spain, Italy, and Transylvania.

Of this, the Daffodil, there are five well-marked varieties, which were known to, and described and named by Linnæus, and which keep up their characters well enough under cultivation to stand as species for all garden purposes, as follows :—

1. *Pseudo-Narcissus*, L., the ordinary average form of which we have described above, Reich. Germ. t. 816.—*Ajax Pseudo-Narcissus* of Herbert and Kunth; *A. Pseudo-Narcissus*, Haworth (Eng. Bot. t. 17). *A. serratus*, Haw. *A. nobilis*, Haw. (Red. Lil. t. 158). *A. Talamonius*, Haw. (Herb. Amar. t. 38, f. 7.) *A. lobularis*, Haw. (a form with a more spreading mouth to the crown, with six regular rounded lobes a quarter of an inch deep). *A. rugilobus* and *A. Cambricus*, Haw. (near the last). *A. muticus*, J. Gay, Bull. Bot. Soc. France, vol. vii. p. 308 (divisions of the limb longer in proportion to the tube).

2. *Major*, L. Sp. Plant. p. 415.—Larger in all its parts than the last; the leaves 6–8 lines broad, the flower 2–2¼ inches long above the ovary; the divisions of the limb twice as long as the broadly ob-conical tube, the same colour as the crown, which slightly exceeds them, and spreads more at the throat (in an extreme specimen that lies before us whilst we are writing, 1½ inch broad). Reich. Germ. t. 817, Curt. Bot. Mag. t. 51.—*A. luteus*, Herb. and Kunth. *A. maximus*, Haw. (*N. maximus*, Don, Sweet, Brit. Fl. Gard. ser. 2, t. 286). *N. grandiflorus*, Salisb. Prodr. p. 221. *A. propinquus*, Haw. (Bot. Mag. t. 1301, upper figure). *A. obvallaris*, Haw. (Bot. Mag. t. 1301, lower figure). *A. spurius*, Haw.

3. *Minor*, L. Sp. Plant. p. 415.—Smaller in all its parts than the type; the whole plant when cultivated not above 6 or 8 in. high; the leaves ¼ in. broad, often only 3 or 4 in. long, the flower 12–15 lines long, exclusive of the ovary; the crown the same colour as the divisions, and slightly exceeding them, the divisions ¼ in. broad at the base.—*Ajax minor*, Herb. and Kunth; *A. minor*, Haw. (Red. Lil. t. 480). *A. minimus*, Haw. (Bot. Mag. t. 6). *A. pumilus*, Haw. (Sweet, Brit. Fl. Gard. ser. 2, t. 143). *N. exiguus*, Salisb. Prodr. p. 200. *N. pygmaeus* and *N. cuneiflorus*, Salisb. Hort. Trans. vol. i. p. 343.

4. *Bicolor*, L. Sp. Plant. p. 415.—Stature of the type and flower the same size, but the corona a full bright yellow, forming a conspicuous contrast with the very pale sulphur-yellow divisions of the limb. With us at Kew this flowers later than the other varieties, and the divisions are more decidedly spreading. Ait. Hort. Kew. edit. 2, p. 215;

Bot. Mag. t. 1187.—*Ajax bicolor*, Salisb. Herb. and Kunth. *A. bicolor*, *A. lorifolius*, and *A. brevifolius*, Haw. *N. Pseudo-Narcissus*, var. *bicolor*, Gren. and Godr. Fl. France, vol. iii. p. 254.

5. *Moschatus*, L. Sp. Plant. p. 415.—Flowers large or middle-sized, at first a very pale sulphur-yellow, finally nearly white, the divisions narrower and more lanceolate than in the type, the crown the same colour as the rest of the flower, equalling or slightly exceeding the divisions. Bot. Mag. t. 1300.—*Ajax moschatus*, Haw. Herb. and Kunth (*N. candidissimus*, Red. Lil. t. 188). *A. tortuosus*, Haw. Herb. and Kunth (Bot. Mag. t. 924). *A. cernuus*, Haw. Herb. and Kunth (Sweet, Fl. Gard. ser. 2, t. 101).

All these five varieties are none of them very rare in cultivation in England at the present time, but 1 and 2 are very much the commonest, both being frequently seen "double" in gardens. *N. Sabini*, Lindl. Bot. Reg. t. 762 (*Diomedes major*, Haworth), is most like No. 5, but the corona is decidedly shorter than the divisions, and the filaments are inserted higher up in the tube, and scarcely exceed the anthers. Doubtless it is a garden hybrid.

III. *N. CALATHINUS* (L. Sp. Plant. p. 415).—Bulb ovoid, not more than $\frac{1}{2}$ in. thick. Leaves generally two to a scape; very slender, green, $1\frac{1}{2}$ –2 lines broad, concave on the face; scape 8–12 in. high, very slender, terete; flowers one or two to a stem, on pedicels 9–15 lines long, which equal or exceed the spathes, decidedly cernuous, 14–15 lines long, exclusive of the ovary; the tube $\frac{1}{2}$ in. long, less than a line thick in the lower half, the same colour as the rest of the flower, the divisions of the limb oblong-lanceolate, bluntish or subacute, 4– $4\frac{1}{2}$ lines broad at the base, decidedly reflexed when the flower is fully expanded, white, or a very pale sulphur-yellow; crown the same colour as the divisions, and the same length; the throat erecto-patent, scarcely at all plicate, with six shallow, rounded, subentire lobes; stamens biseriate, with straight filaments about $\frac{1}{2}$ in. long, the upper three inserted near the mouth of the tube, and reaching nearly to the throat of the crown; style filiform, reaching nearly or quite to the throat of the crown. Red. Lil. t. 40 and 177, Gren. and Godr. Fl. France, vol. iii. p. 261.—*N. reflexus*, Brot. Lus. vol. i. p. 550; Lois. Not. p. 165. *Ganymedes reflexus*, Herb. and Kunth. *Assaracus reflexus*, Haw. *Ganymedes capax*, Herb. and Kunth. *Assaracus capax*, Haw.

A very distinctly-marked plant, easily known from the Daffodil and

from *N. Bulbocodium* by its slender tube, biseriate stamens, long pedicels, and reflexed divisions; and from *N. triandrus*, which otherwise it very closely resembles, by its longer corona. We have seen wild specimens only from the Isle of Glenans, in Brittany, gathered by Gay and others; and from Portugal, gathered by Baron Paiva, and are not aware that it is now in cultivation in this country. We follow Redouté and De Candolle in regarding it as the *Calathinus* of Linnæus, but the plant figured in the 'Botanical Magazine' under that name is very different, being a slight form of *N. odorus*.

(To be continued.)

ON THE HIBERNATION OF LEMNACEÆ.

BY F. VAN HOREN.

Abridged and Translated from the Bulletin de la Société Royale de Botanique de Belgique for Aug. 1869, by ALFRED W. BENNETT, M.A., B.Sc., F.L.S.

Notwithstanding the attention paid to the physiology of the *Lemnaceæ* by Richard, Brongniart, Schleiden, Hoffmann, Weddell, and other botanists, and the magnificent monograph of the Order by Hegelmaier, M. Van Horen has recently afresh investigated some points in their physiology, especially those connected with the phenomena of hibernation, and has arrived at conclusions in some respects different from those of previous observers. The Order is represented in Belgium by the same five species as are found in England, which, however, following other Continental botanists, M. Van Horen dividés into two suborders, *Lemneæ* and *Wolffææ*, and four distinct genera:—*Lemna minor* and *gibba*, *Spirodela polyrrhiza*, *Staurogeton trisulca*, and *Wolffia arrhiza*.

The whole tribe of Lemnas possesses an apparatus of air-vessels, consisting of lacunæ and passages. The petioles and roots contain elongated tubular anastomosing passages; in the leaf itself the chambers are of a considerable size, and one situated immediately beneath the epidermis. The submerged leaves of *S. trisulca* contain no lacunæ, as they have no stomata; in *L. gibba* and *minor*, and *S. polyrrhiza*, they are spread over almost the whole surface of the leaf; in *S. trisulca* they are more unequally distributed.

With regard to the changes which take place in the winter in the foliation of the *Lemnaceæ*, Schleiden* was the first writer who published detailed investigations. According to him all the species survived the winter by means of special buds, which in the autumn dropped to the bottom of the ditches, and regained the surface in the spring. These buds were supposed to be destitute of roots, and of a closer and more fleshy tissue than the summer leaves, and became spontaneously detached from the parent-leaf. In *S. polyrrhiza* this latter remained on the surface of the water, while in the other species it was dragged with its offspring to the bottom. The researches of Schleiden were taken up by Hoffmann,† whose attention was specially directed to *W. arrhiza*, where he detected also leaves specially adapted for the winter. He thus summed up the results of his observations on the tribe. 1. In the whole of them the winter buds are destitute of roots, which is often also the case with those of *L. minor*, produced in summer. 2. The winter buds descend to the bottom in the autumn, pass the winter buried in the mud, and ascend again in the spring. 3. In *L. polyrrhiza*, the winter buds are very different from those which are produced in the summer; while in *L. arrhiza* the difference is inconsiderable, but still very characteristic. 4. In *L. minor* and *gibba*, which often pass the winter on the surface, the form of the buds offers scarcely any difference. 5. Finally, as respects *L. trisulca*, Hoffmann states that the relations between the two kinds of leaves are more difficult to observe, because their connection is closer, and it is only flowering plants which float on the surface. The same subject has, finally, been followed out by Hegelmaier, who differs from some of the observations of his predecessors. In *L. minor* and *S. trisulca* he was unable to detect the production of leaves specially adapted for winter. He confirmed Schleiden's observations with respect to *S. polyrrhiza*, and described, with greater exactness, the hibernation of *W. arrhiza*. The following are M. Van Horen's observations more in detail:—

Spirodela polyrrhiza. At the approach of winter, individuals of this species produce usually leaves of a new form, which are known as winter-leaves. The date of their production varies with the locality; in general, plants growing in very favourable conditions produce them towards the end of August or in September; in exposed places or

* 'Linnæa,' 1839; also in his 'Beiträge zur Botanik,' 1844.

† 'Annales des Sciences Naturelles,' 2nde série, t. 14.

stagnant water they are even earlier; in shady places their production is considerably delayed, or even completely suspended. These leaves are for the most part somewhat reniform, occasionally elliptical; they present no gibbosity, are flat, and of very small thickness; of an olive-brown colour on both sides. Their aëriferous system is very simple, and causes them to resemble, up to a certain point, an ordinary bud arrested in its development. The lacunæ similar to those in the summer-leaves, do not exist; the system consisting entirely of star-like passages. These winter-leaves are heavier than water, and descend to the bottom as soon as any mechanical cause, such as rain or the agitation of the water, causes them to become detached from the parent-leaf, which they sometimes drag down with them. They pass the winter in the mud, protected from the frost, and regain the surface only at the period of the general awakening of vegetation. The first phenomenon which marks their approaching ascension, consists in the appearance of a bubble of oxygen on their upper surface. Lightened by the adhesion of this bubble, the leaves reach the surface, whence they may descend again should unfavourable weather occur, to rise once more with a fresh bubble, which finally remains attached to them for a sufficient time for the upper surface to become thoroughly dry, when the leaf assumes its ordinary floating character. During the spring the leaves undergo considerable changes, increase in size, the roots make their appearance, and they become green. The complete aëriferous system then develops itself, especially towards the upper surface, the true lacunæ making their appearance. Finally, about March, other leaves are produced from buds developed in their clefts. Although under ordinary circumstances the summer-leaves perish with the production of the winter-leaves, and frost is fatal to them, yet they occasionally live through the winter till the month of February. Sometimes also this species is propagated through the winter by floating leaves intermediate in character between the two kinds described above.

Lemna gibba. This species, like the preceding, possesses leaves specially adapted for the winter. In favourable places they appear towards the end of the summer, principally in September and October. They are floating, flat, obovate, and remarkably symmetrical, of a violet-green on their upper surface. They possess a free pendent root. Their aëriferous system is remarkable from its imperfect development; the lacunæ are reduced to a rudimentary condition, or changed into simple

passages. As with *S. polyrrhiza*, the cells of the parenchyma are gorged with fecula, which imparts to them their high specific gravity. They remain, however, floating through the winter, and present, until the period of their death, very little change of form, except a slight increase in the spring of their aëriferous system, disappearing about May or June. They give birth, not to buds, but to leaves of a new form, which may be termed spring-leaves, flat, but of a less regular shape, closely resembling those of *L. minor*. The first heat of summer changes them into the ordinary gibbous form of the summer-leaves. These perish at the approach of winter, as soon as the winter-leaves are produced, being very sensitive to frost.

Lemna minor. This species does not possess any form specially adapted for the winter, the differences by which the leaves of this season are distinguished from those of summer are inconsiderable, they are somewhat smaller in size, and the lacunæ of their aëriferous system are less prominently developed. The winter-leaves are lighter than water, and float on the surface; they are provided with roots of variable length; under the influence of frost, however, their aëriferous system becomes filled with water, their tissue perishes, and they sink to the bottom, carrying with them the young buds, which remain protected by the mud till the return of spring, when their activity returns, and they rise again to the surface, quickly covering the water with a green carpet.

Staurogeton trisulca. Like the last species, this is not preserved through the winter by leaves of a special character. The leaves produced on the approach of winter participate in the general sleep of nature; their density is similar to that of the summer-leaves, but their size and thickness are less. From various circumstances, probably in great part mechanical, they are carried to the bottom of the water during the winter, and become disengaged and released towards the spring. They are, equally with the other species, susceptible to frost, and require the protection of the mud for their preservation during the winter.

Wolffia arrhiza. This species M. Van Horen has only had the opportunity of observing under cultivation. The leaves found in winter are scarcely distinguishable from those of summer either in form or internal constitution. A portion of them remain floating on the surface through the winter; others undergo the submersion in the

winter and revival in the spring which is characteristic of the other species of the Order.

THE GENUS ASCOBOLUS.

M. Boudier has prepared a monograph, illustrated with coloured figures, of all the species of the *Ascolei*, which is printed in the last parts of the Ann. des Sc. Nat. In the second volume of this Journal (pp. 147-154) is a review of the genus *Ascobolus*, by Mr. M. C. Cooke, in which 34 species are enumerated, the 16 British ones being described. In the paper under notice, M. Boudier increases the number to 44, which, as he reduces 3 of those in Mr. Cooke's list to varieties, and excludes 9 others, represents an increase of 22 species. As no less than 10 of these were discovered by the author in the neighbourhood of Paris, there can be no doubt that the number would be much extended by further investigation. He has divided the old genus *Ascobolus* into 6 genera, which are grouped into *Ascolei genuini* and *Ascolei spurii*, as in the annexed table :—

<p>Spores with a waxy, coloured (often violet) epispore. Thecæ very prominent, so that the disk looks darkly papillose from the coloured spores. <i>Ascolei genuini.</i></p>	<p>Receptacle when fresh, tremulous; when dry, horny, hysteriform.</p> <p>Receptacle when fresh, not tremulous; when dry, variously contracted, but not hysteriform.</p>	<p><i>Angelina?</i></p>
<p>Spores with a membranous colourless epispore. Thecæ slightly prominent, so that the disk looks a crystalline papillose from the hyaline spores. <i>Ascolei spurii.</i></p>	<p>Thecæ many-spored.</p> <p>Thecæ 8- (one 16-) spored</p>	<p>Paraphyses very slender, elongated. Thecæ long, but broad. Spores free or easily separable, naked, or each furnished with an adnate or surrounding membrane. <i>Ascobolus.</i></p> <p>Paraphyses slender, as long as the thecæ. Thecæ short, broad. Spores all provided with a coherent membrane, not easily separable. <i>Saccobolus.</i></p> <p>Paraphyses slender, numerous, long. Thecæ elongated, broad, much exserted. <i>Thecotheus.</i></p> <p>Paraphyses few or very few, often shorter than the thecæ. Thecæ very wide, often ovate, slightly exserted. <i>Ryparobius.</i></p> <p><i>Ascophanus.</i></p>

We append a list of the species ; the numbers within brackets are those of Mr. Cooke's list above alluded to.

ASCBOLEI GENUINI.

? *Angelina*, Fries.

A. conglomerata, Schweinitz. North America.

Ascobolus, Pers.

(4.) *A. lignatilis*, Alb. and Schw. Germany.

A. Crouani, Boud. (N.S.). France.

(9.) *A. denudatus*, Fries. England, France.

(6.) *A. viridis*, Currey. England, France.

Var. *pruinusos*.

(5.) *A. furfuraceus*, Pers. Everywhere.

Var. *coronatus*.

Var. *nudus*.

(12.) *A. vinosus*, Berk. England, France.

A. Cubensis, Berk. and Curtis. Cuba.

(17 and 30.) *A. ærugineus*, Fries (*A. marginatus*, Schum., and *A. immarginatus*, Beccari?). Sweden, England, France, etc.

(14 and 21.) *A. glaber*, Pers. (pro max. parte), includes *A. albidus*, Crouan. All Europe.

Var. *lenticularis*.

A. Leveillei, Boud. (N.S.) France.

(1.) *A. porphyrosporus*, Fries. Sweden, France, Germany.

(7 and 23.) *A. immersus*, Pers. (*A. macrosporus*, Crouan). England, France, Germany, Italy, N. America, Chili.

Saccobolus, Boud.

(24.) *S. Kerverni*, Boud. (*Ascobolus*, Crouan). England, France, Belgium.

S. violascens, Boud. (N.S.). France.

S. neglectus, Boud. (N.S.). France.

S. globulifer, Boud. (N.S.). France.

Ascobolei genuini incertæ sedis.

(8.) *A. sphaericus*, Preuss. N. Am.

A. Daldinianus, De Notaris. Italy.

A. rufo-pallidus, Krst. Norway.

A. Lapponicus, Krst. Norway.

ASCBOLEI SPURII.

Thecotheus, Boud.

(26.) *T. Pelletieri*, Boud. (*Ascobolus*, Crouan). England, France, Belgium.

Ryparobius, Boud.

R. brunneus, Boud. (N.S.). France.

R. Cookei, Boud. (*Ascobolus*, Crouan). France, Germany.

R. felinus, Boud. (N.S.). France.

R. dubius, Boud. (N.S.). France.

R. myriosporus, Boud. (*Nectria*, Crouan). France.

Ascophanus, Boud.

A. subfuscus, Boud. (*Peziza*, Crouan). France.

A. minutissimus, Boud. (N.S.). France.

A. Coemansii, Boud. (*Ascobolus granuliformis*, Coemans). France, Belgium.

(18.) *A. granuliformis*, Boud. (*Ascobolus granuliformis*, Crouan). England, France, Belgium.

(20.) *A. argenteus*, Boud. (*Ascobolus*, Currey). England.

A. vicinus, Boud. (N.S.). France.

A. ochraceus, Boud. (*Ascobolus*, Crouan). France.

(25.) *A. sexdecimsporus*, Boud. (*Ascobolus*, Crouan). England, France.

A. aurora, Boud. (*Peziza*, Crouan?). France.

(16.) *A. cinereus*, Boud. (*Ascobolus*, Crouan). France, Belgium.

(15.) *A. carneus*, Boud. (*Ascobolus*, Persoon). All Europe.

(28.) *A. saccharinus*, Boud. (*Ascobolus*, Currey). England, France.

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| <p><i>A. difformis</i>, Boud. (<i>Ascobolus</i>, Nylander). Abo.</p> <p>(3?) <i>A. papillatus</i>, Boud. (<i>Peziza</i>, Pers.). France.</p> <p>(10.) <i>A. ciliatus</i>, Boud. (<i>Ascobolus</i>, Schmidt). England, France, Germany, Sweden.</p> | <p>(22.) <i>A. pilosus</i>, Boud. (<i>Ascobolus</i>, Fries). All Europe.
 Var. <i>equinus</i>.
 Var. <i>vaccinus</i>.
 <i>Ascobolei spurii dubii</i>.</p> <p>(31.) <i>A. miniatus</i>, Preuss. Germany.
 <i>Phialea</i>?</p> |
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The following are excluded:—

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| <p>(2.) <i>A. pulcherrimus</i>, Crouan. <i>Peziza</i>.</p> <p>(11.) <i>A. insignis</i>, Crouan. <i>Peziza</i>.
 <i>A. Persoonii</i>, Crouan. <i>Humaria</i>.</p> <p>(29.) <i>A. Crech'queraultii</i>, Crouan. <i>Humaria</i>.</p> <p>(13.) <i>A. Crouani</i>, Cooke (<i>A. miniatus</i>, Crouan). <i>Humaria</i>?</p> <p><i>A. Guernisaci</i>, Crouan.</p> | <p>(33.) <i>A. Brassicæ</i>, Crouan.</p> <p>(19.) <i>A. microscopicus</i>, Crouan.</p> <p>(32.) <i>A. coccineus</i>, Crouan. <i>Humaria</i>.</p> <p><i>A. Leveillei</i>, Crouan.</p> <p>(34.) <i>A. Trifolii</i>, Bernhardt. <i>Phacidium</i>.</p> <p>(27.) <i>A. testaceus</i>, Wallroth. <i>Peziza</i>.</p> |
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THE OVULES OF GYMNOSPERMS.

M. Ph. von Tieghem has published a Paper (Ann. des Sc. Nat. Botanique, ser. v. vol. x. p. 269) on the female flower and fruit of the *Cycadææ*, *Coniferæ*, and *Gnetaceæ*. The author, by an examination of the disposition of the vascular bundles which pass to the reproductive bodies in the families named, seeks to determine whether these organs are borne on leaves or on branches, that is to say, whether they are naked ovules or appendicular or axillary organs. His conclusions are as follows:—

The *Cycadææ* are true Gymnosperms; the ovules are borne on the margins of modified leaves or open carpels, springing directly from the axis of the female bud.

The *Coniferæ* are also Gymnosperms; but the ovules are never borne on a primary bract, that is, a bract springing from the axis of the female bud; and in this there is an essential difference between *Coniferæ* and *Cycadææ*. The coniferous ovule is always produced on the dorsal face of the first and only leaf of an axillary branch, which disappears in producing it; this leaf is an open carpel, and is itself the complete flower; it is produced opposite to the parent leaf, on the branch, so that the two leaves are in contact by the inner surfaces.

The *Gnetaceæ* possess an ovary, but it is open and without style or stigma. They form a link, uniting the *Coniferæ*, and through them the *Cycadeæ*, to Angiosperms.

New Publications.

How Crops Grow: a Treatise on the Chemical Composition, Structure, and Life of the Plant, for Agricultural Students. By SAMUEL W. JOHNSON, M.A., Professor of Analytical and Agricultural Chemistry in the Sheffield Scientific School of Yale College. Revised, with numerous additions, and adapted for English use, by A. H. CHURCH, M.A., Professor of Chemistry, and W. T. THISELTON DYER, B.A., Professor of Natural History at the Royal Agricultural College, Cirencester. London: Macmillan and Co. (Pp. 392.)

No botanical work is more required in this country than a trustworthy text-book of vegetable physiology; it is not too much to say that a good proportion of our systematic botanists are almost entirely ignorant of the facts of plant-life, which have been made out with so much patient investigation by French and German observers, whilst one is compelled to confess that original researches of the kind are of excessive scarcity in England. It is true that Mr. Darwin's experiments are second to none in value, but among the host of his followers in Great Britain, we look in vain for any who will be at the pains of endeavouring to accurately observe the phenomena of vegetable life with an unbiassed mind; all seem bent on trying to pick out some isolated facts which appear to favour the hypothesis of their leader.

Though the book before us does not altogether fill this gap in British literature, it supplies a good deal of material for doing so. It is not very often that an American book is reproduced in this country, but we certainly think that Professor Johnson's treatise was worth importation, and adaptation for English use.

The plan of the book is very good, the life of the plant being treated of under the three heads of chemical composition, structure and function. Under the first we find the volatile elements of the plant passed in review, their properties described and illustrated, and these are fol-

lowed by the organic proximate principles which are noticed at considerable length. The non-volatile part or ingredients of the ash of plants are then examined, their combinations, proportions, and functions in plant-economy. Under the second head the different organs and their parts are shortly described, and their offices explained. In the third part are accounts of germination, nutrition, the movements of the sap, and the reproductive processes, the last given very briefly. The book concludes with an Appendix, consisting of elaborate tables of analysis.

The value of this treatise lies especially in the clearness of its style, and in being brought well up to the time. In the chemical portion, for instance—where English text-books of Botany are, without exception, not only defective from the neglect of recent researches, but often positively misleading—great care has been taken to express with accuracy and clearness the modern views of the nature and reactions, real composition and relationships of substances; the names and formulæ adopted are those of Roscoe's 'Lessons in Elementary Chemistry.' Professor Johnson seems to have taken especial care in getting together records of analyses and experiments from the German Agricultural Journals and Reports, and his English editors have well seconded his endeavours.

In the more specially botanical part of the book, we are glad to see considerable alterations from the original treatise; the errors into which Professor Johnson had fallen have been corrected, and much new matter has been added, *e. g.* Darwin's researches on climbing plants, Spencer's physical views of the cause of sap-movements and wood-formation, and chapters on reproduction and on the death of the plant. In one case, however, we notice an alteration for the worse: Professor Johnson, in quoting Unger's experiments with coloured vegetable fluids and white hyacinths, rightly states (p. 341) that Unger found the red fluid passed entirely up the wood-cells, the spiral vessels remaining empty; whilst the English editors adduce (p. 323) Unger's experiments to support Herbert Spencer's view that nutrient fluids ascend mainly by the vessels. There is also some laxity in the use of the term "vascular tissue" in several parts of the book.

Sixty-five excellent original woodcuts illustrate the text, which is printed on toned paper; a running marginal abstract down each page somewhat supplies the place of a quite insufficient index.

There is no doubt Professors Church and Dyer have done their work well; there are no signs of patching up, but the whole reads consistently and easily. Probably they could write a still better original book on the subject, or on more general physiological botany, but the present work is a real advance on existing English ones, and must prove of use not only to agricultural students, but to all interested in botanical science.

Lichenes Britannici; seu Lichenum in Anglia, Scotia et Hibernia viventium enumeratio, cum eorum stationibus et distributione. Scripsit
 Rev. JACOBUS M. CROMBIE, M.A., F.L.S. et G.S. London: L.
 Reeve and Co. 1870. (Pp. 138.)

In this little volume the author has catalogued all the British Lichens, so far as they have been at present described, giving their general distribution, and special localities for the less common species. Such a work was much needed, for since the publication of Mudd's 'Manual' in 1861, a large number of new species have been added to the Lichen flora of these Islands, chiefly by Messrs. Carroll, Leighton, Crombie, and especially by the late Admiral Jones, whose untiring zeal did much good service for British Lichenology. The total number of species given in the Manual,—and it no doubt contains all that were known at the date of its publication,—excluding the varieties, amounts to 485. In the present work this number has been raised to 660, but as the arrangement and limitation of the species in the two works is not precisely the same, no exact comparison can be made between them. In the volume under notice, the arrangement of Nylander has been strictly followed; and although this arrangement is defective in detail, yet in the absence of a generally accepted classification, it perhaps fulfils the object of the author as well as any other.

The usefulness of Mr. Crombie's little work is considerably enhanced by the fact that it gives the nomenclature of all our British Lichens as at present understood by Nylander, whose intimate acquaintance with the contents of the Acharian herbarium has enabled him to correct many false references to the types described by that great Lichenologist. We must protest, however, against the removal of *Borreria isioides*, Borr. (E. B. Sup. 2808), to the genus *Lecanora*.

Collema dermatinum, Borr. (E. B. 2716), is doubtfully referred to

Leptogium tremelloides, L., probably on the authority of Nylander, but the plants so named by Taylor in the collection of the British Museum, are certainly referable to *C. furvum*, Ach., and there is good reason for believing that Taylor was well acquainted with Borrer's species. If Dr. Nylander be correct in asserting that *C. dermatinum*, Ach., is only a state of *Leptogium tremelloides*, L., the probabilities are that Borrer's species is not the true plant of Acharius. *Lecidea Gagei* (E. B. 2580) is included among the synonyms of *Lecidea laevigata*, Nyl. We would, however, refer the author to the small specimen attached to the original drawing of 'English Botany,' which consists solely of spermatogonia in an undeterminable white, crustaceous thallus; moreover Salwey's name of *Lecidea Taylori* (1853) should stand, in preference to *L. laevigata*, Nyl. (1857), both in justice to its proposer, and in honour of an old British botanist. We notice a few other instances in which the prior claims of British botanists appear to have been overlooked. These, however, are small matters which in no way detract from the usefulness of a book which we heartily commend to the notice of Lichenologists.

Flore de la Chaîne Jurassique. Par M. CH. GRENIER. Paris: Première partie, 1865; seconde partie, Juin 1869. (Pp. 1001.)

In England, the best local Floras recently published have for their objects the elucidation of the topographical distribution of species, their range in altitude, the influence upon them of local or climatic conditions, their mode of introduction, history, and associations. It is but rarely that descriptive matter is introduced, this being foreign to their main object, and left to treatises on the general flora of Great Britain.

The geographical aspect of vegetation has probably been investigated in England to a greater extent than in any other country. Our insular condition, dense population, and the small area of our field of observation, have all tended to render records of localities very numerous and generally diffused, whilst the labours of Mr. H. C. Watson and others have enabled us to accurately group them, and easily master the whole result of so much investigation.

On the Continent, local Floras are usually of a different kind. Looking far less at the geographical part of the question, their authors con-

cern themselves with descriptions of the species met with, and make their books a vehicle for critical observations on synonymy, distinctive characters, and relationships.

The 'Flore de France' of MM. Grenier and Godron was published in the years 1848-56, and is well known as the best general descriptive work on the flora of the country. When in 1865* the first part of the book under notice appeared, it was evident that its value lay more in being a supplement or appendix to the earlier work, than as an exposition of the phyto-geography of the Jura range, which indeed had been thoroughly examined in M. Thurmann's 'Essai de Phytostatique,' published in 1849.

The first part (pp. 346) contains the polypetalous Orders (Dialypétales) of Dicotyledons, the second finishes the whole series of Phanerogams, and includes the Ferns and their allies; it has also a good analytical table of the Orders, and an index to the whole book. The arrangement of the Orders is that usually adopted, but we notice that *Myriophyllum* is placed with the polypetalous Orders, whilst *Hippuris*, *Callitriche*, and *Ceratophyllum* are found amongst the Apetalæ. *Sanguisorbeæ* is also ranged with the latter.

Under each species is given an exact reference to the work where the name adopted is first used, a full description of the plant, rather meagre indications of its localities, and (in small type) frequently critical notes. Synonyms are not systematically quoted, but are given for some of the critical species.

In his views of species, M. Grenier is what we call here a "splitter," but he is not a very marked, or perhaps one should rather say a very consistent one; for whilst sixteen Jordanie "species" of *Euphrasia* are duly described and localized, there are only eight *Menthæ*, and *Draba verna* remains intact with five "varieties." Like many other botanists on the Continent, our author is inclined to make hybridization account for a good many awkwardly intermediate plants, e. g. *Potamogeton decipiens*, *Juncus diffusus*, many *Menthæ* and *Cardui*, etc. He is also careful to note the supposed male and female parents respectively when possible; the mode of determination of this point is very ingenious in the case of *Carduus personato-defloratus* (p. 445).

What most strikes a student who has worked at only the English

* See 'Journal of Botany,' Vol. III. pp. 195-198.

flora and with only English books when he first consults a foreign Flora, is the number of cases in which a name is current abroad for a plant different to that which it bears in this country. In many cases this is due to a careful working out of synonymy by the consultation of the early Linnæan Floras, which has led to the discovery of the original name; and much remains to be done even in our own botanical literature, but in other instances, from the difficulty of ascertaining whether the plants described by different writers are really the same, authors are compelled to adopt the name that they are certain refers to the plant in question, and this name will have usually been given by some one of their own countrymen. Thus the plant called in England *Scrophularia Ehrharti*, is *S. umbrosa* in Belgium, *S. aquatica* in Germany, and *S. alata* in France (as in the book under notice), each name having been bestowed by an English, Belgian, German, and French author respectively. In yet other cases changes of name result from an excessive refinement, or from division of old well-defined species; thus our author discards *Senecio Jacobæa*, L., for *S. nemorosus*, Jord., because Linnæus describes his species as perennial, whilst the French plant is biennial; and *Centaurea nigra*, L., for *C. obscura*, Jord., the *C. nigra* of the 'Flore de France' being *C. nemoralis*, Jord. Such changes are of very doubtful expediency.

Many valuable criticisms and observations on British species will be found in the book. *Cuscuta Trifolii* is regarded as a luxuriant variety or monstrosity of *C. Epithymum*; M. Grenier states that in a very hot and dry summer he has seen the former pass into the latter. The only doubt here is whether the true *C. Trifolii*, as we know it in England, was under observation at all. The *Hieracia* are very fully treated, and there are excellent accounts of the Grasses and *Cyperaceæ*.

We must consider this as a valuable addition to our knowledge of the European flora; one thing, however, has struck us forcibly. Mr. Syme's excellent descriptions and critical remarks are never once quoted or alluded to in the book. Is the new edition of 'English Botany' unknown in France?

Proceedings of Societies.

LINNEAN SOCIETY.—*January 20th, 1870.*—G. Bentham, Esq., F.R.S., President, in the chair. The following botanical papers were read:—1. *Contributions to British Muscology.* By Professor Lindberg, viz.:—Notes on some *Andreae*, on *Pottia intermedia*, Turn., on *Tortula squarrosa*, on *Trichostomum diffractum*, Mitt., on *Orthotrichum leiocarpum*, on *Leucobryum glaucum*, on the British *Dicranum strictum*, on a British *Seligeria* (*S. acutifolia*, Lindb.), on *Neckera complanata*, on *Sphagnum curvifolium*, Wils. 2. *The Flora of Iceland.* By Professor C. C. Babington, F.R.S. This paper was preceded by some introductory observations. Professor Babington stated that though Iceland was larger than Ireland, yet but a small portion of the country was botanically productive, *i. e.* the coast and the tracts near the large rivers, the remainder being occupied by snow-covered mountains and extensive volcanic tracts. The climate is also very unfavourable to vegetation; there is but little direct sunshine, and the amount of rain is excessive. No grain of any kind is now grown, but potatoes are cultivated on the north coast, which is the most fertile portion of the island. The only trees in the country are Birches, which form “forests,” they are about eight feet high, or rather higher; there were once trees of greater size, but all have been cut down by the inhabitants. The commonest Birch is *Betula intermedia*, but *B. alba* and *B. nana* occur. A very complete account of all previous writings on the plants of Iceland was given from König in 1765 to the present day, including Mr. I. Carroll’s list in this Journal.* Professor Babington has looked through all available herbaria, and believes his list to be complete, or nearly so; he expressed his gratitude to Professor Lange, of Copenhagen, for his valuable help. The number of Phanerogams is 467, the great bulk of which are Scandinavian, and all but 62 are British. Three only are purely arctic, *Gentiana detonsa*, *Pleurogyne rotata*, and *Epilobium latifolium*; these occur in Arctic Russia, but not in Scandinavia or the Alps. The paper itself is a systematic catalogue of the species, with their earliest notices as Icelandic, and a copious list of localities. *Bellis perennis* is a great rarity, and has been only once found.

GEOLOGICAL SOCIETY.—*December 22nd, 1869.*—Professor Huxley, LL.D., F.R.S., in the chair.—“Notes on the Structure of *Sigillaria.*” By Principal Dawson, F.R.S., F.G.S., Montreal. In this paper the author criticized the statements of Mr. Carruthers on the structure of *Sigillaria* (see Q. J. G. S. xxv. pp. 248). He remarked that *Sigillaria*, as evidenced by his specimens, is not coniferous; that the coniferous trunks found in the coal-formation of Nova Scotia do not present discigerous tissue of the same type as that of *Sigillaria*; that no conifer has a slender woody axis surrounded by an enormously thick

* See ‘Journal of Botany,’ Vol. IV. pp. 107–110.

bark ; that *Calamodendron* was probably a gymnosperm, and allied to *Sigillaria* ; that although *Stigmaria* may not always show medullary rays, the distinct separation of the wood into wedges is an evidence of their having existed ; that the difference in minute structure between *Sigillaria* and *Stigmaria* involves no serious difficulty if the former be regarded as allied to *Cycadaceæ* ; and further, that we do not know how many of the *Stigmariæ* belong to *Sigillaria* proper, or *Favularia*, or to such forms as *Clathraria* and *Leioderma*, which may have been more nearly allied to *Lepidophloios* ; that the fruit figured by Goldenberg as that of *Sigillaria* is more probably that of *Lepidophloios*, or may be a male catkin with pollen ; and that he has found *Trigonocarpa* scattered round the trunks of *Sigillaria*, and on the surface of the soil in which they grew. He agreed with Mr. Carruthers in regarding Mr. Binney's *Sigillaria vascularis* as allied to *Lepidodendron*. Professor Morris thought that *Clathraria* and *Lepidophloios* ought to be discriminated from the *Sigillariæ*, as being rather more nearly allied with Cycadaceous plants, especially the former. He pointed out the manner in which certain vascular bundles communicating between the centre of the stem of *Sigillaria* and allied genera and their bark might be mistaken for medullary rays.

LITERARY AND PHILOSOPHICAL SOCIETY OF MANCHESTER. — *Ordinary Meeting, December 28th, 1869.*—J. P. Joule, LL.D., F.R.S., etc., President, in the chair. “On Pollen, considered as an aid in the Differentiation of Species.” By Charles Bailey, Esq. Having recently examined the pollen of several thousand species of plants, I am led to think that the characters presented by these grains might prove useful as a means of differentiation in allied species ; the following notes are thrown out as indications of some of the more noticeable distinctions to be drawn from a careful comparison of these organs, and they may serve to draw the attention of others to the matter. 1. *Form*. It has long been noticed that certain types of pollen are characteristic of the Natural Order to which the plants which produce them belong, as for instance, the peculiar pitted polyhedral pollen of the *Caryophyllaceæ*, the spherical spiny pollen of the *Malvaceæ*, the large triangular pollen of the *Onagraceæ*, the peculiar pollen of the *Coniferae*, or the elliptical pollen of the *Liliaceæ* and other monocotyledonous Orders ; in fact, most Orders possess a type sufficiently marked to be characteristic of each. This statement, however, must be accepted with limitations ; the *Compositæ*, for instance, have three or more well-marked types, represented by the beautifully sculptured pollen of the Chicory, the minute oval spiny pollen of the *Asters*, *Calendulas*, *Cacalias*, etc., and another form wholly destitute of spines, as in the *Centaurea scabiosa*. There are, besides, other Natural Orders where similar variety occurs. But differences of form are met with in plants of the same genus, by which the one species or the other is readily marked off by its pollen ; thus the pollen grain of *Anemone sulphurea* is roundish, but that of *A. montana* is elliptic ; the pollen of *Aronicum Doronicum* is much more elongate than that of *A. scorpioides* ; and while the grains of *Ranunculus philonotis* are round and yellow, those of *R. platanifolius* are elliptic, white, and smaller. 2. *Markings*. A

few instances only of the more striking differences can be given here. The pollen of the *Ceraniaceæ* and *Campanulaceæ* is for the most part globular, but while some of the grains are quite smooth, others are covered with spines; thus the pollen of *Campanula media* has a number of short spines sparsely scattered over the surface of the grain, but *C. rapunculoides* is wholly destitute of them. In other plants these spines are replaced by tubercles, and both spines and tubercles vary greatly in length and number; for example, in *Valeriana tuberosa* the spines are only half the length of those on the pollen of *V. montana*, the grains being also slightly smaller. The pollen of the *Liliaceæ* is often covered with a more or less prominent reticulation, which is subject to much variation; compare, for example, the coarse network which invests the pollen of *Lilium croceum* with the finer reticulation of *L. Canadense*, the grains of the latter species being much more globose and smaller. 3. *Dimensions*. Some instances of the differences observable in the size of pollen grains have already been published by Professor Gulliver, whose measurements of the pollen of various species of *Ranunculus** show the help that may be derived from this character; *R. arvensis* is nearly twice the size of *R. hirsutus*, their dimensions being respectively $\frac{1}{4}\frac{1}{10}$ and $\frac{1}{8}\frac{1}{88}$ of an inch. I have not had the time to make similar careful measurements with the micrometer, but I have seen sufficient to be satisfied that while there is considerable variation in dimensions between the pollen of one species and that of another, they are tolerably constant in size in the same species. For some noticeable differences compare the smaller pollen of *Epilobium brachycarpum* with the larger pollen of *E. Fleischeri* or that of *Senecio Gallicus* with *S. incanus*, the spines on the latter species being also much coarser. Again, the pollen of *Silene acaulis* is but half the size of that of *S. alpina*, the latter having some beautiful markings in addition; the pollen grains of this genus differ from the usual caryophyllaceous type in not having the pits or depressions common in the Order, so that the grains become spherical rather than polyhedral. 4. *Colour*. This is not so reliable a character for differentiation as the others noticed, since species differ amongst each other according to the soil, etc., of the place where they have grown. I remember gathering, some years ago, near Aslibourne, Derbyshire, a variety of *Stellaria Holostea*, having a dark purple pollen instead of the ordinary pale yellow. An example or two under this head will suffice. The pollen of *Ajuga Genevensis* is yellow, but that of *A. pyramidalis* is usually white; again, while the grains of *Ornithogalum umbellatum* are large and yellow, those of *O. nutans* are small and white. Some objection may be raised to any reliance being placed upon the dry shrivelled-up grains of herbaria specimens—such specimens being, in most cases, the only ones obtainable for purposes of investigation; but the structure of pollen is such as to bring into greater prominence the pores, folds, valves, and other markings which are met with on their surface after the grains have collapsed by the discharge of their contents. In regard to the mounting of these objects for the microscope, they show to the best advantage when put up perfectly dry; the cells should be sufficiently

* See 'Journal of Botany,' Vol. IV. p. 281.

shallow to admit of no more than a single layer, and, at the same time, deep enough to permit the grains to move about. If pollen is mounted soon after it has been discharged from the fresh anthers, the fovilla is apt to condense on the covering glass, and the slide soon becomes useless. The stamens taken from an unopened flower-bud furnish the best and cleanest pollen, and these should be selected in preference to those taken from the fully developed flower. Canada balsam, glycerine, and other media, are occasionally helpful in making out structure; thus the pores of *Campanula rotundifolia*, *Phyteuma Halleri*, and other allied species, are made much more distinct when mounted in balsam. A large series of slides illustrative of the above remarks was exhibited.

EDINBURGH BOTANICAL SOCIETY.—The first meeting of the thirty-fourth Session of the Society was held on Thursday, 11th of November, at 5, St. Andrew Square; Dr. Cleghorn, President, in the chair. Professor Balfour referred to the great loss which the Society had sustained since their last meeting, by the death of William Brand, Esq., W.S., their auditor. The President delivered an opening address on the "Progress and State of Botany in Britain," which we hope to give *in extenso*. On the motion of Professor Balfour, a vote of thanks was cordially given to Dr. Cleghorn for his address. The following communications were read:—I. On Equations to the Curved Outlines of the Leaves of Plants. By Mr. William Mitchell. The author stated that, some time ago, he read a paper before the Society, in which he suggested a method of approximating the mean curves of leaves of plants, intending to follow it up by a series of measurements. During last summer he had resumed the subject, taking, however, the *true outline* instead of the mean curve. All he proposed was, to find formulas to express the curves of the outlines, so closely that the calculated values should not differ from those measured more than the proportional measurements of several leaves of the same plant differ among themselves, by reason of their ordinary variations. His mode of procedure was as follows:—"Selecting a characteristic and well-developed leaf of any plant, I carefully trace its outline when placed on cardboard or stout paper; but when both sides appear to be equally developed, one-half the outline is sufficient. On this copy all the measurements are made. The point corresponding to the base of the midrib of the leaf is fixed on for the pole, or origin of measurement, and from it lines are drawn to the outline, making equal angles with each other. These lines are then measured by a scale divided on the edge into tenths of an inch; and as the first line, or radius vector, is the longest, we have a descending series of terms from which to construct a formula for the curve in question." II. Supplementary Notes on the Lichen Flora of Greenland. By W. Lauder Lindsay, M.D., F.L.S., F.R.S.E. This paper was supplemental to a former one by Dr. Lindsay, published in the Society's Transactions, vol. x. (1869) p. 32, and consisted chiefly of a commentary on a list of Greenland lichens, by the Chevalier Charles Louis Giesecke, in Brewster's 'Edinburgh Encyclopædia,' vol. x. (1830) pp. 495-6, the existence of which the author was ignorant of when the former paper was published. Giesecke's list comprehended only fifty-seven species, while the

species already recorded from the collections of Mr. Robert Brown, and the Danish botanists, were two hundred and sixty-eight. Several of Giesecke's names were now doubtful, as his list was formed prior to the microscopic era of lichenology. III. On Dr. Gray's Arrangement of the Hepaticæ. By Benjamin Carrington, M.D. The author remarked, that Secmann's 'Journal of Botany' for 1865 contained an article of great interest by Mr. Carruthers, claiming priority for the classification of the *Hepaticæ*, proposed in Gray's 'Natural Arrangement of British Plants' (1821). Mr. Carruthers deserved the thanks of English botanists for enabling them to rectify an act of injustice. Fifty years ago, priority of nomenclature was a matter of much less consideration than in our time. Thus, about the time when Gray's work appeared, two other botanists published arrangements of the *Hepaticæ*, Raddi (1820) and Dumortier (1822). Singularly enough, each seems to have been ignorant of the other's work. Subsequent writers have shown little more regard for the work of their predecessors, so that the genus *Jungermannia*, which Hooker (1816) left intact—a little oasis in scientific botany where synonyms were unknown—now abounds with these objectionable appendages. An objection has been offered to Dr. Gray's names, the masculine terminology of his genera, which renders them rough and uncouth to our ears, accustomed to the softer feminine. Thus, although more correct, who would exchange *Hookerius* for *Hookeria*, or *Linnæus* for *Linnæa*? Dr. Carrington concluded by contrasting Dr. Gray's system with the system now adopted. IV. Miscellaneous Communications. Professor Dickson, Glasgow, made some remarks regarding the formation of the fruit of *Hippophae rhamnoides*, and exhibited preserved specimens. He stated that Mr. Sadler and he had paid a visit to Tynninghame last month, where they found the plant fruiting in the greatest profusion on the shore. Dr. Dickson also exhibited a flower of *Tropeolum* (Indian Cress), having two spurs. Mr. Gorrie exhibited cones of *Picea Cephalonica* and *Cupressus Lambertiana*, produced at St. Fort, Fifeshire. Duncan Forbes, Esq., presented cones of *Picea Cephalonica*, taken from a tree at Culloden House, 15 feet 8 inches high. Mr. Fowler, gardener, Castle Kennedy, sent cones of *Picea Pindrow*, *P. Webbiana*, and *Abies orientalis*, produced there. Mr. Bissett presented cones of *Picea Cephalonica*, produced at Monerieffe, Perthshire. Mr. M'Nab exhibited cones of *Picea Nordmanniana* from the Cambridge Botanic Garden. Professor Christison presented the fruit of a species of *Strophanthus*, which yields an arrow poison used by the African natives on the Shire. Donations to the herbarium were announced from Mrs. Millar, plants from the Cape of Good Hope; Dr. James Cox, Australian plants; D. L. Beckingsale, Esq., rare English plants; Mr. Sim, plants naturalized on the banks of Tay; Rev. Thos. Bell, specimens of *Drosera longifolia*, collected on Benhar Moor, near Whitburn.

Thursday, December 9.—Sir Walter Elliot, the newly-elected President, in the chair.—The following communications were read:—I. On the Structure of a Lignite from the Old Red Sandstone. By W. R. M'Nab, M.D., Edinburgh. The longitudinal sections exhibit at certain parts peculiar punctated discs. The external disc is slightly oval, closely resembling the circular discs of the

ordinary conifers, but the central dot is replaced by an elliptical opening, exactly the same as the peculiar central markings found in the punctated tissue of the *Cycaduceæ*. The presence of medullary rays, the uniform size of the cells, as seen on transverse section, and the presence of punctations, although they are peculiar, seem all to point to a close relation to the *Coniferæ*. As I cannot refer the Lignite to the carboniferous genera, *Dadoxylon* or *Dietyoxylon*, it seems possible that it will have to be referred to a new genus; if so, I would venture to suggest the name of *Palæopitys Millerii*, for the Old Red Sandstone Lignite now described.

II. Histological Notes. By W. R. M'Nab, M.D., Edinburgh.

1. On the Structure of the Adventitious Roots of the Portugal Laurel. They arise in patches, more or less large, from the branches, but not in any regular order, their position on the branch not giving any clue to their relative age. The bark was always ruptured and pushed aside by the rootlets, showing that they have a deep-seated and not a superficial origin. The only difference between these adventitious and true roots is in their position and irregular mode of growth. In their growing by addition to the growing point, and in histological characters, they are undistinguishable from true roots. Root hairs were also produced in abundance by the epidermis.

2. On Intercellular Substance and Cuticle. Careful observation of the growth of cells in the young roots of the white Mustard, *Phalaris canariensis*, and the garden Pea and Bean, have led to the conclusion that the so-called intercellular substance is, in reality, the original or primary cell-wall—that as growth goes on, this primary cell-wall becomes thickened by the addition of numerous more or less marked layers on the inside. In the stems of many plants it requires some care to be able to demonstrate that the cell-wall and thickening layers are separate. In the layer of cells of the epidermis, on which the cuticle rests, the outer surface is in general greatly thickened, while the inner part of the cells are only thickened at the angles at which the other cells join. This thickening at the angles is often so great that the cell appears almost filled up, or the thickening appears as a continuous layer. In the epidermal and sub-epidermal cells of the Ivy the thickening is so great that without careful examination the thickening might be considered continuous. On the more or less thickened external surface the cuticle rests, and may be considered as thickening occurring outside the cell-wall. From the observations made, the statements of Wiegand, Schacht, and others, regarding the identity of intercellular substance and cuticle, were considered untenable.

III. Notice of *Hieracium stoloniflorum*, Waldst. and Kit.; *H. glomeratum*, Fr.; *H. præaltum*, Vill., as occurring in the neighbourhood of Edinburgh. By Professor Balfour. Professor Balfour gave descriptions of the above three species of *Hieracium*, which had recently been met with, growing in a wild state in the neighbourhood of Edinburgh. *H. præaltum* was collected by Dr. John Kirk, in 1854, near Kincardine, in Fife; *H. glomeratum*, by Mr. John M'Laren, in June, 1869, growing on railway banks between Edinburgh and Granton; and *H. stoloniflorum*, collected by himself and Mr. Sadler, in October, 1869, on the railway banks between Warriston and Trinity.* Specimens were exhibited and pre-

* See 'Journal of Botany,' Vol. VII. p. 337.

sented to the Herbarium. IV. Notice of Additions to the Botany of Shetland, since the publication of Edmonston's 'Flora.' By Mr. John Sadler. V. On the Propagation of the Ipeacacuan Plant (*Cephaelis Ipeacacuanha*). By Mr. M'Nab. The roots, or rather rhizomes, of the *Cephaelis* are moniliform. A few of these were taken from one of the plants in the Botanic Garden during the month of August, 1869, and after being cut into small transverse sections, they were inserted in a horizontal position over the surface of a pot prepared with drainage and white sand. This pot was placed under a hand-glass in a warm propagating bed and kept moist. A few weeks after, the cuttings showed buds on the upper side, roots being also sent out from the under surface. The plants are now beginning to grow, each being furnished with two leaves, the largest measuring three-quarters of an inch over. In order to meet the demand, which, in all likelihood, will be made on nurserymen for plants of the *Cephaelis*, it is well to know how it can be propagated independently of cuttings, and at the same time without injury to the parent plant. VI. Notes on the 'Dogwood' of Powder Manufacturers. By Mr. M'Nab. In a letter, Mr. George E. Frere, Roydon Hall, Diss, remarks, "Are you aware that the wood which is called 'Dogwood' at the gunpowder works, and used in the manufacture of the finer kinds of powder for small arms and fowling-pieces, is not *Cornus sanguinea*, but *Rhamnus Frangula*, and that the main supply of it is imported into this country from Belgium and Prussia? The notice by Mr. Frere on the use of the *Rhamnus Frangula*, or Alder Buckthorn, as it is called, in the manufacture of the finer kinds of gunpowder, is not new, having been already noticed by several old authors. It is, however, a most important subject, and one worthy of the attention both of nurserymen and arboriculturists. It is not improbable that many other genera of shrubby plants are capable of producing a fine quality of charcoal as well as the common Alder, the Alder Buckthorn, and Dogwood, all now in use. Experiments could be made on the following British woods (if they have not already been tried):—The Sea Buckthorn, common Maple, white Hawthorn, Rowan-tree, Bladder-nut, Spindle-tree, Barberry, Guelder Rose, Wayfaring-tree; also the Hazel, Birch, Hornbeam, Black Sloe, Furze, Broom, or even the Ivy, which, in many districts, is injuring our forest trees to a great extent, likewise several exotic shrubs and trees, now largely cultivated in this country. Experiments could also be made with dried roots of many of our forest trees. After felling, such roots are generally left in the ground to rot, and are often very troublesome. If any, or all, could be turned to account for producing a useful charcoal, it would hold out an inducement to remove them from the ground, which could then be used for planting, or for agricultural purposes. The high price which the wood and branches of the *Rhamnus Frangula* bring in the British market—£10 to £14 a ton—is certainly an inducement for landholders to turn their attention to the cultivation of the Alder Buckthorn, Dogwood, or any other trees and shrubs found best calculated for producing the finer kinds of charcoal. The dry Buckthorn branches are sent from the Continent in the form of compressed faggots, and peeled previous to being charred. Since the above was written, I have received, through the kindness of Mr. P. S. Robertson, a

sample of the gunpowder-wood from the Roslin Mills, with the following letter from Messrs. Hay, Merrieks, and Co. :—" We have pleasure in sending you a sample of the Dogwood we use here in the manufacture of gunpowder. The sample sent is of English growth, in the county of Sussex, and the price varies from £10 to £14 per ton, according to quality. We require all peeled and packed into bundles of one hundred pieces in each. The wood is cut generally in May and June." The specimen sent from the Roslin Mills was subjected to a microscopic examination, with recent woods of Buckthorn and Dogwood, and turns out to be the true Alder Buckthorn (*Rhamnus Frangula*). Besides structure, it can readily be distinguished, both in the fresh and dried state, from the Dogwood (*Cornus sanguinea*), by turning yellow immediately on being moistened, which is not the case with Dogwood. If Dogwood is really a charcoal-producing shrub, no plant could be so easily grown, as cuttings can be got in quantity. They will soon strike root, and grow as free as a Red or Black Currant.

VII. Notice of *Ruscus aculeatus*. By Mr. M'Nab. Mr. M'Nab exhibited a specimen of the *Ruscus aculeatus*, or Butcher's Broom, covered with rich crimson berries, sent by George E. Frere, Esq., of Roydon Hall, Diss, with the following letter :—" Some years ago, I found this plant in a state of ripe fructification. It is brought every Christmas into the market at Brighton, for the decoration of houses at that season. I had never seen before, in any other part of England, more than one or, at most, two berries in any one clump of the plant, and I wished very much to get it to fruit in profusion at this place. I was reminded that the plant was dioecious, and I found friends to supply me with female plants. Soon after I received them, it was suggested to me that my plants might possibly not have been hitherto barren, because they were of the male sex, but for want of impregnating agencies." Mr. M'Nab mentioned that, although several large clumps of the Butcher's Broom exist in various parts of the Botanic Garden, he had never seen ripe fruit on any of them. All the plants but one have a dark green colour, all are very compact, and are now covered (8th of December, 1869) with rudimentary fruit buds, but no male flowers have yet been obtained. The one above alluded to, a tall light green variety, has a few incipient scales on the side of the leaf. This may be the male plant, but as it is not growing beside what is undoubtedly the female plants, no seeds could be perfected. The specimen sent by Mr. Frere, although containing numerous ripe berries, has also a number of apparent rudimentary fruit buds for next year, similar to those now seen on the plants in the Garden. It is difficult to say at what stage the impregnation of the ovule takes place. The plant is recorded as dioecious, and flowers during March and April, and possibly this is the time when the male blossoms expand. It will be interesting to ascertain whether these rudimentary fruit buds, now covering the plants, remain as they are till the month of March, when the male flowers expand. I have just received from the nursery gardens of Messrs. P. Lawson and Son, two specimens of *Ruscus*, one called *R. aculeatus*, and the other *R. aculeatus rotundifolius*. The former is identical with the one cultivated here, and is also covered with rudimentary female flowers. The specimen called *R. aculeatus rotundifolius* is also covered

with buds ; but, after a careful microscopic examination, all turn out to be male buds, while the specimen sent from England, by Mr. Frere, has male buds, and ripe fruit on the same branch. From the state of the male buds on both plants alluded to, it seems impossible that these male flowers can have the stamens sufficiently developed before March or April. VIII. Notes on *Carex paniculata*. By Mr. M'Nab. The Royal Botanic Garden has recently been presented with three plants of *Carex paniculata*, sent by Mr. Archibald Gorrie, forester to the Earl of Leicester, Holkham Hall, Norfolk. The plants measure, from the base of the roots to the extreme points of the leaves, 8 feet 6 inches, independent of what must have been cut off in the lifting. They have been growing in deep rich soil, as three feet of the lower portion of each has been bared of the peat ; the part remaining is filled up with a mass of longitudinal roots or fibres, each nearly half an inch round. The circumference of the upper root portion of the largest plant is 5 feet 3 inches wide, from which a large crown of leaves proceeds. One of the plants has an upright stem above the peat, 1 foot 9 inches long, and 3 feet 6 inches in circumference, composed of the dead portions of the leaves ; from the top of this pseudo-stem the large tuft of leaves is growing. The stem of this plant between the leaves and the peat has the lower base of the fallen leaves quite short and brown, appearing as if they had been destroyed by fire. It is impossible to guess at the age of these gigantic sedges ; but, judging from the quantity of decayed leaves round the base of each plant, and the way the peat seems to grow or rise round them, they must at least be a century old. Very few fruit spikes were observed, and of those found, the heads were comparatively small, the largest not more than 2½ inches long. Some idea may be formed of the size and weight of these plants from the fact that it required three men to lift each of them. Mr. Gorrie writes :—" We have some taller and heavier plants than any of those sent. I observe they grow strongest when the roots get into the water. I am told, when foxes abound, they are very fond of lying on the top of the *Carex* tussocks, and basking in the sun. This gigantic *Carex* is very common on sodden peaty soils in Norfolk. I have also seen it at the Duke of Grafton's, and at other places in Suffolk, likewise near Bury St. Edmund's." IX. Notes on *Pinus Benthamiana*. By Mr. M'Nab. Mr. C. W. Peach, of Haddington Place, Edinburgh, exhibited a large cone, ripened at Overton, Orton, Peterborough, the seat of Charles Bodger, Esq., under the name of *Pinus macrocarpa*. This cone is 6½ inches long and 14 inches in circumference. *Pinus macrocarpa* is by many considered as synonymous with *Pinus Coulteri* and *P. Sabiniana*. The cone sent by Mr. Peach agrees with the description of *Pinus Benthamiana*, of Hartweg, which we have never seen in cone. Numerous plants are cultivated throughout the country, raised from cones, introduced about eight years ago, under the name of *Pinus Benthamiana*. The cones were 4½ inches long and 7 inches in circumference. The habit of the plants, and the size and arrangement of the leaves of many of them, resemble the true *P. Benthamiana*. It is not improbable that all will turn out to be *P. ponderosa*, or a variety of it. In all cases, a few cones ought to be sent home with seeds for identification. X. Exhibitions and Presentations. 1. Major Peplow exhibited and presented a cone of

Pinus Sabiniana, produced this season at Garston. 2. Mr. Gorrie, forester to the Earl of Leicester, exhibited and presented cones of *Cupressus Goveniana*, and male and female cones of *Araucaria imbricata*, produced at Holkham Hall, Norfolk. Mr. Gorrie also exhibited a section of a stem, showing a graft between *Quercus aesculus* and the common Oak, the former being the graft. The graft had increased to 23 inches in circumference, while the attachment was very limited. When blown down during a recent gale, it was found that the stems had only adhered to each other by a small portion of the wood and bark. 3. Mr. C. W. Peach exhibited a collection of Shetland plants, a twin Apple, and specimens of Dandelions with double heads of flowers and leafy appendages on the flowering-stalks. 4. Professor Dickson exhibited, under the microscope, preparations of the drupe of *Viburnum Lantana*, and made some remarks regarding its structure. 5. Professor Balfour exhibited photographs of Indian forest scenery, including Palms, Banyans, etc., sent by Professor Stephen Coull Mackenzie, Calcutta. 6. Mrs. Wright presented a specimen of *Lythrum flexuosum*, which had been gathered in the woods at Hallston, Shropshire. 7. Mr. A. Craig Christie exhibited a specimen of *Argemone odorata*, collected by the waterfall in Glen Easdale, Arran; and also a specimen of a *Hypericum* from Birk Glen, Arran, which was considered a variety of *H. Androsæmum*. 8. Messrs. Hay, Merriek, and Co., of the Roslin Powder Mills, presented a small bundle of Dogwood, used by them in the manufacture of gunpowder.

Thursday, January 13th.—Robert Brown, Esq., Vice-President, in the chair. Donations to the Library, Herbarium, and Museum were laid on the table. Professor Balfour noticed the death of Miss Jane Farquharson, who joined the Society as a Lady-Associate in 1842. The following papers were read:—I. Note on the Embryo of *Ruscus aculeatus*. By Professor Alex. Dickson. The author found the embryos of this plant remarkable for their great variability in size, general form, and more particularly in the orifice of the cotyledon. Regarding the last point, the majority of the specimens examined exhibited the lips of the cotyledonary orifice as approximated, thus forming a "slit;" this being evidently the normal arrangement, and corresponding to the ordinary type of cotyledonary orifice in monocotyledons. In some cases the lips of the orifice were seen to gape in a remarkable manner. In these embryos the plumule is almost always small, rudimentary and pretty deeply sunk in the cavity of the cotyledons; in one case, however, it was observed to be very much enlarged, completely filling up the cotyledonary cavity, and appearing externally between the lips of the cotyledon. The paper was illustrated by specimens under the microscope and by drawings. II. Notice of Plants collected in Spitzbergen and Nova Zembla in the summer of 1869. By Mr. Wilham Livesay. III. Notice of some Botanical Excursions with pupils during the summer of 1869. By Professor Balfour. IV. On the Botany of the Dominion of Canada and adjacent parts of British America. Part I. *Ranunculaceæ*. By Professor Lawson, Dalhousie College, Nova Scotia. Communicated by Mr. Sadler. V. On the Propagation of the Ipecacuan Plant (*Cephaelis Ipecacuanha*). By Mr. M'Nab. VI. Notice of *Sicana odorifera*, Naudin. By Sen. Joaquim Correa de Mello, St. Paulo, Brazil. Communi-

cated by Daniel Hanbury, Esq. VII. On Collecting and Preserving the Cryptogamia. By Professor Dickie, Aberdeen. VIII. On the Dates of Flowering of *Eranthis hyemalis* and *Leucojum vernum* in the Royal Botanic Garden for the last twenty years. By Dr. W. R. M'Nab. IX. Notes on *Abies rubra*, *nigra*, and *alba*. By Mr. William Gorrie.

Botanical News.

NEW BOOKS, PERIODICALS, ETC.

We welcome the third volume of the Royal Society's 'Catalogue of Scientific Papers,' which carries on the index of names to LEZ inclusive. The fourth volume is well on; and the Society have entered into an arrangement with Professor Carus, of Leipzig, for the preparation of an alphabetical list of subjects which will be of very great service to all students of natural science.

Mr. M'Ken, of the Botanic Garden, Natal, has just printed a 'Synopsis' (pp. 28) of the Ferns known to inhabit the Colony. The classification and nomenclature is that of Hooker and Baker's 'Synopsis Filicum.' Natal has been carefully searched for Ferns during many years by Mr. M'Ken himself, Mr. Krauss, the Rev. J. Buchanan, Mr. Sanderson, and others, and near 120 species are known within its limits, several of which are subtropical species which do not reach Cape Colony proper.

Mr. George Barber, a pharmacist, of Liverpool, has published a Medico-Botanical Map of the World, in which the names of the various substances of the Materia Medica are entered on the countries whence they are derived. The map is also furnished with isothermal lines.

Mr. T. B. Flower's 'Flora of Wiltshire' has reached its eleventh part, which brings the enumeration of species to the end of the *Solanaceæ*.

We notice the appearance of K. M. Lyell's 'Geographical Handbook of all known Ferns,' divided into six territorial divisions (Murray, 7s. 6d.); and of F. S. Cordier's 'Les Champignons de la France,' Part I., with coloured plates (5s.); also of the first part of 'Microscopic Objects Described and Figured,' by G. H. Martin (Van Voorst), which contains 16 drawings of vegetable tissues.

Mr. Axel Blytt, of Christiania, has published a Flora of the Sogne fjord ('Om Vegetationsforholdene ved Sognefjorden'), which lies in lat. 61° N., on the east coast of Norway, between Christiania and Trondhjem. Mr. Blytt read an interesting paper on the subject before the Botanical Congress which met in London in 1866 (see Journ. Bot. Vol. V. p. 86), but now gives a complete list of species and localities. 737 are included, and many varieties, and there is also a list of the Mosses by Mr. N. Wulfsberg. The book is illustrated by a good map of the fjord, and there is an introduction on the climate and topography, and range and altitude of various species.

The fourth edition of Brébisson's useful 'Flore de la Normandie' has just appeared.

The new decades (7 to 10) of the 22nd volume of Reichenbach's 'Icones Floræ Germ. et Helv.' contain the genera *Medicago*, *Melilotus*, and a part of *Trifolium*; the enlarged dissections are excellent, and will be found to give much information on the characters of these plants, but the natural-size figures are rather stiff, and do not very well portray the general habit of the species they represent; they are also too highly coloured.

The 38th, 39th, and 40th centuries of Billot's 'Flora Exsiccata Galliæ et Germaniæ,' and the 11th and 12th centuries of F. Schultz's 'Herbarium Normale,' have recently appeared. In connection with the last, we are glad to see that the 'Archives de Flore,' or observations on the plants in the herbarium, have been resumed, after a rather long interval; we hope to give extracts and notes on some of the British species shortly.

A new part (vol. xxvii. part 1) of the Linnean Society's 'Transactions' has appeared. It contains Dr. Welwitsch's "Sertum Angolense," Latin descriptions and accounts of new or ill-understood plants from Angola, illustrated with 25 plates, viz.:—*Monodora Angolensis*, Welw., *Ceranthera ilicifolia*, Welw., *Oncoba Welwitschii*, Oliv., *Polygala Gomesiana*, Welw., *Fatica Africana*, Welw., *Octolobus spectabilis*, Welw., *Paivæusa dactylophylla*, Welw., *Myrothamnus flabellifolia*, Welw., *Basananthe Nummularia*, Welw., *Machadoa Haillensis*, Welw., *Acanthosicyos horrida*, Welw., *Corallocarpus Welwitschii*, Hook. f., *Mussaenda splendida*, Welw., *Corynanthe paniculata*, Welw., *Schrebera Golungensis*, Welw., *Pachypodium Lealii*, Welw., *Faroua salutaris*, Welw., *Sesamothamnus Benguellensis*, Welw., *Atvesia rosmarinifolia*, Welw., *Faurea speciosa*, Welw., *Hydnora longicollis*, Welw., *Pilostyles Æthiopica*, Welw., *Morus excelsa*, Welw., *Ascolepis speciosa*, Welw., *A. anthemiflora*, Welw., *Aristida prodigiosa*, Welw.

The first part of the second volume of Mr. Wilson Saunders's 'Refugium Botanicum' has just appeared. This volume is edited by Dr. Reichenbach, and is devoted entirely to the figuring and describing of rare and interesting species of *Orchideæ*, which have flowered in Mr. Saunders's collection at Hillfield. It includes 24 species, most of which are here drawn, and several here described, for the first time.

The last part of Walpers' indispensable 'Annales' (vol. vii. fasc. 4) continues the *Zygophylleæ*, and carries on the enumeration of new species into the *Anacardiaceæ*.

Mr. James Collins read an encyclopædic paper on India-rubber at a well-attended meeting of the Society of Arts in December. It has been published in the Society's Journal, and is a useful contribution to economic botany.

Professor Perceval Wright has contributed to the twenty-fourth volume of the Transactions of the Royal Irish Academy a description, with plates by Fitch, of three new plants gathered by himself on a recent visit to the Seychelles. Of these the most interesting is a Pitcher-plant, which grows in two of the islands on the exposed summits of mountain peaks at a height of 2500 feet above sea level. This he names *Nepenthes Wardii*.

Dr. William Ogle has published, in the January number of the 'Popular Science Review,' the results of his continued observations on the fertilization of plants with didynamous stamens. He details the arrangements found in *Pedicularis*, *Melampyrum*, *Rhinanthus*, *Teucrium Scorodonia*, *Thymus Serpyllum*, *Origanum*, and other Labiates and Scrophulariads, and states that in all of them the stigmas of the older flowers are fertilized by the stamens of younger ones, and that insect agency is necessary to effect this.

The leading article of the 'Agricultural Gazette' for January 29th deals with the subject of the germination of *Cuscuta Trifolii*. The seeds are small, about half the size of those of *C. Epilinum*; they germinate only in the soil, not as has been stated also in the capsule; the young plant is thread-like and leafless, the testa remains at the radical end, whilst in *C. Epilinum* it is elevated to the apex of the plumule. The plant grows rapidly, and soon climbs on to the plant it attacks. The writer succeeded in growing it on *Trifolium incarnatum*, *pratense*, *perenne*, *medium*, and *hybridum*. The first crop is usually destroyed by farming before the seeds have ripened, and the second crop, which is that usually seen, has rarely time to come to maturity.

The new year has introduced several improvements in scientific journalistic literature. The 'Gardener's Chronicle' has adopted better type, and by the omission of its general news, has gained space for more special matter and for woodcuts. The 'Athenæum' is also altered in appearance by larger print. We are sorry to see, however, that no more space is devoted to science, of which we were led to expect a considerable extension. We notice also the appearance of 'The Scientific Summary,' an advertising medium, which contains, however, a judicious selection of cuttings. 'Nature,' 'Scientific Opinion,' and the 'Academy,' the 'Popular Science Review,' and 'Science Gossip,' all continue their endeavours to satisfy the scientific public.

The Rev. W. H. Purchas's 'Flora of Herefordshire' is in the press, and promises, from the character of the early pages, which we have been permitted to see, to be an excellent county Flora.

The East Kent Natural History Society have determined on compiling a Flora of the eastern half of the county of Kent, and have issued a circular detailing the plan on which it is intended to carry it out. It is to be hoped that the Society will see the wisdom of somewhat modifying their scheme, and especially of abandoning the intention of disregarding all records previous to 1839, the date of the publication of Cowell's 'Floral Guide.' The district in question has the richest flora of any part of England, and from its proximity to continental Europe, possesses a special interest. Historically, the earliest dates of the observation of each species would be interesting, and botanically, likely to lead to some valuable results bearing on the origin of many doubtfully native species.

Professor M. A. Lawson, of Oxford, contemplates the compilation of a Flora of Oxfordshire.

Lichenologists will be glad to hear that the Rev. W. A. Leighton's 'Lichen-Flora of Great Britain,' on which he has been many years engaged, is drawing towards completion.

We hear that Dr. Hooker's new 'British Flora' is partly printed, and will, in all probability, be published (Macmillan) during this spring.

Dr. Benjamin Carrington's 'Monograph of the British Hepaticæ' will be shortly published (Hardwicke). There will be figures of all the species, the whole of which are engraved. We are glad to find that Dr. Carrington intends to adopt S. F. Gray's names published in his 'Natural Arrangement of British Plants' (1821) in all cases where they have the right of priority over those generally adopted. (See Report of Edinb. Bot. Soc. in this Journal.)

Mr. William Robinson, F.L.S., author of 'The Parks, Promenades, and Gardens of Paris,' has nearly ready for publication (Warne and Co.) a book on the common Mushroom and its cultivation. It is profusely illustrated, and contains illustrations of 17 edible British Fungi, from the pencil of Mr. Worthington Smith.

Mr. J. Britten, of the Royal Herbarium, Kew, W., requests us to state that he and Mr. Robert Holland, of Mobberley, Knutsford, Cheshire, are collecting local English plant-names, and will thankfully receive and acknowledge any information on the subject.

Professor Oswald Heer announces that the second volume of his 'Fossil Flora of the Polar Regions' will be shortly printed. It will contain:—1. Contributions to the Fossil Flora of North Greenland, the plants collected by Mr. Whymper in 1867 (with 18 plates). 2. Flora Fossilis Alaskana, containing the plants collected by Mr. Furuljelm in the north part of Alaska territory (with 10 plates). 3. The Miocene and Diluvian Flora and Fauna of Spitzbergen, the results of the Swiss expedition in 1868 (with 16 plates). 4. The Carboniferous Flora of Bear-Island, containing the plants discovered by Professors Norden-skiöld and Malmgren (with 13-15 plates). Of these memoirs the first has been published in the Royal Society's Transactions, and the other three in the Memoirs of the Royal Academy of Science of Stockholm. The price of the volume is 50 francs, and subscribers' names are to be sent at once to Wurster and Co., Winterthur, Switzerland.

PERSONAL NOTICES.

The valuable and extensive herbarium of *Compositæ* formed by the late C. H. Schultz-Bipontinus has been purchased by Dr. Cosson, of Paris.

Mr. W. Thiselton Dyer, Professor of Natural History in the Cirencester Agricultural College, has been appointed to the Chair of Botany in the College of Science, Dublin. We are surprised to see that exception has been taken in a scientific journal to this appointment, than which none more suitable could have been made.

Mr. James de Carle Sowerby, in consequence of advanced age, has resigned the office of secretary to the Royal Botanic Society, and Mr. William Sowerby, who has acted as assistant-secretary for many years, has been appointed to succeed him. Mr. Sowerby was one of the founders of the Society, and has been secretary since 1839. Mr. Thomas Don has been appointed Superintendent of the Society's gardens.

The murder is announced of Dr. Maingay, Superintendent of the jail at Rangoon, who was shot down in the attempt to stop a mutiny amongst the convicts there. He graduated in medicine at Edinburgh in 1858, and was then much interested in Cryptogamic Botany. When serving with the cavalry under Sir Hope Grant, in the last Chinese war, he collected many plants in North China, and at the time of his death, was engaged in investigating the Flora of Burmah.

The Rev. J. M. Crombie, whose 'Lichenes Britannici' is noticed in our pages, is actively engaged in re-arranging the extensive collection of British Lichens in the British Museum; and some notes on the critical species will appear in this Journal at intervals.

The great library of the late Dr. C. H. Ph. von Martius will be sold by public auction by T. O. Weigel at Leipzig, on the 7th March and following days; catalogues can be had at Asher and Co.'s, 15, Bedford Street, Covent Garden.

The "Societas Itineraria Cryptogamica," of which Professor Schimper, of Strasburg, is President, has engaged Professor Zetterstedt, of Jönköping, and another Swedish botanist, to explore the Dovrefjeld and other mountainous parts of Scandinavia during the coming summer, with the object of collecting Mosses, Lichens, and the rarer Phanerogams. The expenses of the journey are estimated at about £60; and to cover this, 60 subscribers of £1 each are required. Each subscriber will receive at least 300 species of plants. Subscriptions, which should be paid before the end of April, may be sent to Dr. James Stirton, 15, Newton Street, Glasgow.

Journalists have seldom the opportunity of recording the public recognition of unobtrusive, persevering, and important labours in science. Such a case we have in the recent presentation of a handsome testimonial to Professor Morris. His published memoirs give him rank among the leading founders and promoters of the science, and his 'Critical Catalogue of British Fossils' gave a new impulse to Palæontology, and has formed a starting-point for every subsequent investigator, but even these labours are greatly surpassed by the verbal information and advice always frankly given to investigators, derived from his extensive field knowledge, his acquaintance with the literature of Geology and Palæontology, and his familiarity with cabinet specimens of rocks and fossils.

We have to record the death of Mr. John E. Sowerby, the illustrator of Mr. Syme's new edition of 'English Botany,' and of other similar works.

We are also informed that the author of 'Darwinism Examined by a Graduate of the University of Cambridge' has recently died. He was a member of one of the great Yorkshire families, and unmarried. At the time of his death he was preparing the third edition of his book for the press.

Few of our readers are probably aware that M. Raspail, who has lately figured so prominently as a political agitator in France, is the same as the botanist who has written extensively on botanical, agricultural, and chemical subjects.

We have been pleased to receive as a reprint, from Mechain's 'Gardener's Monthly,' Mr. James's edition of Pursh's quaint account of his Tour through

Pennsylvania and New York in 1807. This has reminded us that a few years since, when the tomb of Pursh, who died June 11, 1820, was discovered, a subscription was raised for its restoration, to which several European botanists contributed. We should be glad to know from some of our Canadian friends whether the restoration was ever effected.

'Nature' believes that we may hope soon to have a Minister of Public Instruction. Such a minister should take charge of the whole range of natural knowledge in all matters in which the State in any way intervenes to advance such knowledge: the comprehensive term 'natural knowledge' including education, science, the fine arts, and music. In order to ensure continuity of system and avoid its interruption when the head of the department vacates office with the change of ministers, it will, we believe, be found necessary to place over each of these subdivisions a permanent, that is unparliamentary, Under Secretary of State.

We are requested by Mr. Carruthers, of the British Museum, to ask our readers for information as to specimens in local museums or private collections of fossil *Coniferae* or *Cycadeæ*. He is engaged in the investigation of these Orders in relation to the stratified rocks of Britain, and would be thankful for any assistance which would enable him to make his work more complete.

NOTICES TO CORRESPONDENTS.—Those subscribers who have not yet paid their subscriptions are requested to do so without delay to the publishers, Messrs. Taylor and Co.

The present Part contains the numbers for January and February. Another double number will be published on the first of April, after which, this Journal will appear regularly with the monthly periodicals.

Communications have been received from J. Britten, A. W. Bennett, Rev. A. Bloxam, W. Carruthers, Rev. J. Fergusson, G. E. Hunt, Dr. Holl, R. Kip-pist, Professor Lawson, Dr. Masters, J. Sadler, Hon. J. L. Warren.

BOOKS, ETC., RECEIVED.—Kryptogamen Flora von Sachsen, etc.; by Dr. L. Rabenhorst; part 2.—Die Flechten; first half: Leipzig, 1870.—Journal of a Botanical Excursion in the north-eastern parts of the States of Pennsylvania and New York during the year 1807; by Frederick Pursh: Philadelphia, 1869.—Popular Science Review: January, 1870.—Science Gossip: January and February, 1870. Mosses indigenous to Forfarshire not included in the Flora of Forfarshire: by the Rev. J. Fergusson.

Original Articles.

ON TWO NEW BRITISH HEPATICÆ.

BY BENJAMIN CARRINGTON, M.D.

[Read before the Edinburgh Botanical Society, March 10th, 1870.]

1. *Nardia sphacelata* (Gies.), Carr. ; primary shoots creeping, stoloniferous ; branches erect, subramose ; leaves remote, vertically patent, cordate, complicate, erect, and sheathing at the base ; apex emarginate ; lobes rounded, obtuse, incurved ; sinus acute.—*Jungermannia sphacelata*, Gies. Lind. Syn. Hep. p. 76. t. 1. f. 9, 13. *Sarcoscyphus sphacelatus*, Nees ab E.—Collected by my friend Mr. G. E. Hunt, of Manchester, at Loch Kandor, and Ben Mac Duigh, July, 1868.

Stems 2–4 in. long by $\frac{1}{20}$ in. broad, flexuose, very slender, simple, or vaguely ramose, stoloniferous at the base. Rootlets scattered at the bases of the leaves, more abundant on the creeping stems. Colour green, the apices of the leaves and stems sphacelate. Whole plant of a dirty olive when dry. Leaves alternate, distant, *patent from an erect tumid sheathing base*, very concave, cordate to obovate, bilobed ; lobes equal, rounded, obtuse ; sinus narrow, sometimes gibbous, equal to about one-third of the length of the leaf. Texture of the leaves thin and tender, not shining, shrinking when dry. Areolæ minute, discrete ; the limits of the cells well marked ; walls delicate ; “trigones” distinct ; interior of the cells subpellucid.

N. sphacelata is an important accession to our list of *Hepaticæ*, and not easily confounded with its allies. The remarkably long and slender stems and distant sheathing leaves, reflexed at the apex, and the colour will usually serve for its identification. In slender forms of *N. emarginata*, Ehrh. (Gray), the leaves are of a more cartilaginous texture, somewhat polished, and scarcely altered when dry, and the leaf-cells are larger and “guttulate.” The stems too are stouter and shorter, and the leaves more crowded and bluntly lobed. From *N. Funckii* it may be always known by the more rigid approximate leaves and acute lobes of that species. From *J. inflata*, which it resembles in colour and texture, by the oblique insertion of the leaves

of that species, which are frequently plane, and narrowed at the base, and not at all sheathing. At first I felt some doubt as to the identity of our species with Lindenberg's *J. sphacelata*, misled by specimens distributed under that name in Rabenhorst's Hepat. Eur. Ex. n. 137, from Dr. Hepp, but which really belong to *Nardia Funckii*. Through the kindness of my friend Professor Lindberg, I have received recently a portion of the original tuft collected by Gieseke, which agrees in all respects with the Loch Kandor plant. The perigonal leaves of *N. sphacelata* are more erect and gibbous at the base, with shorter inflexed lobes. I have not yet met with fertile individuals, but in one or two cases the leaves at the base of innovant shoots differ from the rest in their larger size, and are divided into three lingulate lobes, and may have pertained to abortive involucre.

I have ventured to reinstate Gray's genus *Nardia* ('Arrangement of British Plants,' 1821) to include *Sarcoscyphus* and *Alicularia*, which only differ as the bidentate *Jungermanniæ* do from the entire-leaved ones. I have only altered the masculine terminology.

2. *Adelanthus Carringtoni*, Balfour; primary stems rhizomatous; shoots erect, sparingly branched, circinate at the apex; leaves secund, deflexed, round or reniform, approximate, very convex, appressed, polished; anterior margin narrow, decurrent, for a distance equal to half the breadth of the leaf; posterior margin abruptly rounded; areolation "guttulate."—*Jungermannia compressa*, Hook., Dr. Greville's Herb. *Alicularia oclusa*, H. and G., Dr. Stirton in Sched.

This fine species was first recognized as distinct by Dr. Stirton, who collected it on Ben Lawers, July, 1866. It appears to be not unfrequent in the Scotch highlands. I have received specimens collected from rocks above Loch Avon, August, 1830, by the late Dr. Greville, who mistook it for *Nardia compressa*. Mr. A. Crook found it in the same locality July, 1856; and Mr. C. Howie met with it at Loch Maru, Ross-shire, July, 1867. It prefers boggy places, either growing alone or forming loose tufts with other species.

Stems 2-4 in. high by 1 line in breadth, slender, flexuose, of a brownish colour, destitute of rootlets except on the creeping portion, sparingly branched; the branches arising from the ventral aspect, sometimes innovant at the apex, which is more or less curved or scorpoidal. Leaves of nearly uniform size, except at the base of the stem, where they are smaller and more distant, about $\frac{1}{20}$ in. in diameter,

obliquely orbicular to reniform, entire or very rarely truncate, and bearing one or two teeth at the apex; convex margin inflexed, posterior lobe abruptly rounded, the anterior very narrow and decurrent. Colour pale olive or stramineous; texture firm, polished, scarcely altered when dry. Areolation "dotted," that is to say, the true outlines of the cells are obscured, and what is in truth the cell-cavity is mistaken for the cell. If, however, a leaf be boiled in Liquor Potassæ, and a few drops of Iodide of Zinc solution added, the true outlines will appear as a clear narrow band surrounding the six-sided cells. Each angle of the cell is seen to be occupied by a triangular body, the "trigonum interstitiale" of authors, which is a deposit of cellulose *within*, not outside the cell, and, like the outer walls, uncoloured by the Iodide of Zinc; whereas the six-lobed "membrana secundaria," enclosing the processes (pori) of the primordial utricle of Mohl is coloured violet by the solution. The cell-structure alone will serve to distinguish *A. Carringtoni* from *Nardia compressa*, in which the limits of the cell are well marked without preparation, and the trigones are absent or inconspicuous. The leaves, too, in that species are nearly plane, appressed to each other, and gradually enlarging to the apex of the stem; their texture is more tender and delicate, the colour a pale, translucent green, often tinged with purple, and they project equally on each side of the stem, and, from their succulent texture, they shrink more when dry. The immersed terminal involucre, when present, will at once distinguish the species.

Adelanthus oclusus (*Alicularia oclusa*, Hook. f. and T.) is about a third of the size of our plant, with the leaves less convex and decurrent, of firmer texture, olive-brown, whilst the stem is black and polished. The leaf-cells are smaller, subquadrate, radiating in regular lines from base to apex, where they are smallest. This species bears a close resemblance to *Nardia (Alicularia) compressa*, so that it was referred by Dr. Taylor with confidence to the same genus. And yet, among the Campbell Island specimens, collected by Dr. Hooker, I have met with two perianths, sessile on the rhizomatous shoots, which agree in character with the fructification of *A. decipiens*. Guided by this indication, I refer the new species to *Adelanthus* rather than to *Nardia*, Gray.

Plag. Magellanica, Ldg., seems also to belong to the entire-leaved section of *Adelanthus*, and may be known by its narrower

secund deflexed leaves, which are closely imbricated, and not at all convex.

With his partiality for condensing species, Mr. Mitten, in his paper on *Adelanthus* (Journ. Linn. Soc. n. 28, April, 1864) quotes *P. spha- lera* and *P. unciiformis*, Hook. f. and T., as synonyms of *Adelanthus Magellanicus*. To my eyes the three seem as distinct as the majority of *Hepaticæ*. He also clubs together *A. falcatus*, Hook. Musc. Ex. t. 89, in which the leaves are crenulate-dentate, and the involucre rough with minute papillæ, and *A. oclusus*, Hook. f. and T. Cryp. Ant. t. 62. f. 8, in which the involucre is smooth and subcylindrical, and the leaves entire. After such an example, is it too much to ask an arrest of judgment before Taylor's species, cancelled in the 'Flora Novæ Zelandiæ' and 'Flora Tasmanica,' are consigned to oblivion?

In one genus only, *Lophocolea*, we find *twenty* species, figured by Hook. f. and Taylor, reduced to *five*, nor is one of these mentioned even as a variety. Has Mr. Mitten no fear that some coming Nemesis may, in like manner, slaughter his multitudinous progeny of critical species, so few of which contemporary writers have been in a position to verify?

A NEW GENUS OF CELASTRINEÆ FROM NEW CALEDONIA.

By BERTHOLD SEEMANN, PH.D., F.L.S.

Amongst the plants collected in 1774 in New Caledonia by William Anderson, there is an unnamed one, which has long engaged my attention. It is woody, glabrous, has alternate ovate-oblong or oblong leaves, with entire margin and pinnated venation; the inflorescence is axillary and cymose, and the flowers themselves are sessile and very small. The calyx is 5-lobed, the lobes being ovate-linear, but there are no petals nor stamens on the specimen, and it remains, therefore, an open question, whether the plant is apetalous and polygamous or not. The ovary is 2-celled, and crowned by two long divergent stigmas; each cell has a solitary ovule ascending from the axis; and the fruit is an indehiscent, 2-celled, 2-seeded drupe, the seeds being without an arillus, and albuminous; whilst the embryo is straight.

Though there may be doubts about the nature of the petals and

stamens, the specimen is sufficient to enable us to say that it is the representative of a new genus of *Celastrineæ*, belonging to Bentham and J. D. Hooker's subtribe *Elæodendreæ*, and that group of it which has cells with solitary ovules.

PHOCEA, gen. nov. Flores polygami (?). Calyx 5-fidus. Petala . . . (v. 0 ?). Stamina . . . Discus nullus. Ovarium sessile, 2-loculare, loculis 1-ovulatis; ovula ab axi adscendentia. Stylus brevissimus, stigmatibus 2 elongatis. Drupa sicca, parva, 2-ocularis. Semina erecta, exarillata, albumine carnoso; embryone recto. Frutex v. arbor Austro-Caledoniæ, ramis teretibus; foliis alternis petiolatis ovatis v. obovato-oblongis obtuse acuminatis basi rotundatis v. subcuneatis integerrimis, coriaceis penninerviis; cymis axillaribus, floribus sessilibus, pedunculis, calycibus ovariisque villosopubescentibus, drupis glabris. Species unica:—

1. *P. Andersonii* (n. sp.). Seem. in Herb. Mus. Brit.—Habitat in Austr. Caledonia (W. Anderson! leg. anno 1774).

RUBUS OBLIQUUS, Wirtg.

BY THE REV. A. BLOXAM, M.A.

I am not aware that this species is described in any foreign work on the *Rubi*, but the following is a translation from the German of the description of it, accompanying the specimen so named in my collection of Wirtgen's Fasciculi.

Wirtg. Herb. Rubor. Rhen. ed. i. fasc. iv. 98, *Glandulosi*, Müll.; a. *Aculeati*, Wirtg.—“Stem beset with short reflexed prickles, broad at the base, and with aciculi, glands, and hairs. Leaf 5-nate, terminal leaflet cordate, acuminate, glabrous on both sides, unequally sharply toothed, *almost always oblique*. Flower branches more densely clothed with similar armature, calyx and pedicels especially prickly; inflorescence principally axillary, consisting of numerous many-flowered racemes. Sepals long pointed, exceeding the obovate white petals.”

The above description accords well with the specimen accompanying it, with one exception, viz., the leaves are slightly hairy on both sides. Some three or four years since, Mr. Briggs sent me from Devonshire, amongst other specimens, a *Rubus* not answering to any of our well-known British species, but which, soon after I received Wirtgen's pub-

lished 'Fasciculi,' I found to accord well with his "*obliquus*." On receiving additional specimens, and also a living plant which flowered with me last year, I felt more convinced on the subject. The original specimen from Wirtgen is, in an early state, similar to those grown in my garden; the leaves of the latter, however, are much more hairy than in the original specimen, but in all other respects similar, so that I have little doubt of the identity of the two. Mr. Briggs has furnished me with a more complete description of the plants as growing in the neighbourhood of Plymouth, which I add to the foregoing:—"Stem nearly prostrate, often tortuous and branched below, rooting readily, strongly tinged with vinous purple, and often also mottled with white. Leaves 5-nate, leaflets rugose, and somewhat convex above from the edges being bent back. Sepals reflexed. Petals greenish-white, narrowly ovate, notched and jagged. Filaments white. Styles greenish, often when withered, attached to and conspicuous on the ripe drupes. The drupes are regularly formed, abundantly produced, and of a very fine flavour; they have the peculiarity of not separating readily from the plant, even when quite ripe." I can add but little to this description; but in some of the specimens from Devon, which are in a very mature state, I have observed that the leaves are thick, and clothed with a white tomentum beneath, similar to those of *R. Radula* when growing in an exposed situation. The plant occurs in many places in the neighbourhood of Plymouth, as about Cann and Runple Slate Quarries; in the valley of the Plym in abundance; at Riverford; near the tunnel on the Dartmoor tramway at Leigham; and in many hedges in the parish of Egg-Buckland, as at Goosewell, Fursdon, etc.; in a lane leading to Bickleigh village from the Plymouth and Tavistock road, just beyond the fifth milestone from Plymouth; between Roborough village and Tamerton Foliot; in Ham Valley, Weston Peverell, within three miles of Plymouth; on a bank by the road leading from the Plymouth and Plympton road, by Saltram Lodge to Plymstock etc. etc. The above list of localities shows that it is widely diffused in the neighbourhood of Plymouth.

I have a specimen from Mr. Baker's herbarium, gathered in N. Yorkshire, which I believe to be the same species; it has, however, a more zigzag rachis than that observed in the original in Wirtgen's Fasc. I have also a specimen gathered by Mr. H. C. Watson near Hook, Surrey, in 1854, which I believe to be the same, and I have

also gathered a similar one in the Isle of Anglesea, all with the obliquely turned leaflet of the barren stem.

SERTULUM CHINENSE QUINTUM: A FIFTH DECADE
OF NEW CHINESE PLANTS.

BY H. F. HANCE, PH.D., ETC.

1. *Clematis (Flammula) cæsariata*, n. sp.; caule scandente cum petiolis petiolulisque cinereo-hirtis, foliis torto-petiolatis pinnatisectis segmentis 3 e basi cuneata ovatis acutis distanter denticulatis supra pubenti-hirtis subtus villosis trinerviis petiolulatis, cymis trifloris pedunculo brevi apice bracteas binas oblongas integras vel basi 2-3-sectas gerente suffultis, floribus longe ($2\frac{1}{4}$ poll.) pedicellatis, pedicellis supra basin bibracteolatis cum pedunculo fulvo-tomentosis, achæniis confertissimis lanecolatis compressis hirsutis 3 lineas longis cauda bipollicari longe fulvescenti-villosa terminatis.—In provincia Fokien, a. 1861, legit amicissimus C. F. M. De Grijns. (Exsicc. n. 6700.)

I have seen no flowering specimens of this plant, which may be the southern Chinese one suggested by Drs. Hooker and Thomson (Fl. Indica, vol. i. p. 8) as possibly identical with *C. Javana*, De Cand.; which latter, however, Miquel has quite recently (Ann. Mus. Bot. Lugd.-Bat. vol. iv. p. 66) reduced as a variety to *C. Gouriana*, Roxb.

2. *Artabotrys Honkongensis*, n. sp.; ramulis nigrescentibus novellis fulvo-hirtellis, foliis coriaceis ellipticis breviter et obtuse acuminatis supra lucidis subtus elevato-reticulatis novellis fulvo-sericeis adultis præter costam subtus strigosam glaberrimis 2-3-pollicaribus, pedunculis unifloris, sepalis ovatis acutis, petalorum inter se vix dissimilium parte basali excavata late ovata pallida dense sericea laminæ crassissimæ linguiformi saturatori minus sericeæ æquilonga superne in corniculum obtusum distinctum producta.—In insula Hongkong; specimen meum lectum est m. Aug. 1853, in monte Gough. (Exsicc. n. 269.) *A. Blumei*, Hook. f. et Thomson, ex parte; Benth. in Fl. Hongk.

Neither Drs. Hooker and Thomson nor Mr. Benthham had seen Javanese specimens of the plant associated by the first-named authors with Champion's Hongkong species. Through the kindness of Mr. Teijsmann, of the Buitenzorg Garden, to whom I am indebted for a beautiful collection of the *Anonaceæ* of Netherlands India, I have been en-

abled to compare the two ; and, having done so, have no hesitation in regarding the Chinese plant as quite distinct. The true *A. Blumei* (for it is obvious the name should be applied to the Java species) is distinguished by a pale, dull cinnamon-coloured bark, much narrower, truly oblong leaves, less coriaceous in texture, sometimes attaining as much as 6 inches in length, and with the midrib smooth beneath, rather larger flowers, the sepals broader in regard to their length (transversely oblong), the petals uniformly rufously velvety or pannose, the outer ones nearly twice as wide, and with the upper margin of the excavated portion bounded by an even raised line. In *A. Hongkongensis*, the protuberance of this margin is so remarkable, coupled with the much greater width, deeper tint, and comparative smoothness of the lamina, as to cause the latter to look like an appendage on the back of the concave portion. Although Hooker and Thomson describe the outer petals of Champion's plant as double the width of the inner ones, Mr. Bentham calls the two verticils very similar ; and so I find them in my specimeu.

3. *Pygeum phæostictum*, n. sp. ; arbuscula 15–20-pedalis, ramis nigricantibus lenticellosis, foliis breviter petiolatis membranaceis oblongis integerrimis basi cuneatis apice abrupte caudato-acuminatis acumine ipso apice obtuso tenuiter reticulato-venulosis glaberrimis basi utrinque glandula oblonga impressa notatis supra lucidis subtus lucidulis vel opacis punctisque fuscis crebris consitis 3–4 poll. longis 9–13 lin. latis, racemis axillaribus solitariis folium dimidium vix æquantibus glaberrimis laxiusculis, pedicellis calyce duplo longioribus, calycis glabri lobis rotundatis denticulatis, petalis calyce duplo longioribus obovoideis obtusis albis margine parce ciliato excepto glabris, ovario piloso, achænio* pisi mole sphærico coriaceo glaberrimo ruguloso.— Specimen a seipso in insula Hongkong lectum, jam pluribus elapsis annis mecum communicavit cl. J. C. Bowring ; stirpem floriferam in silvula infra verticem montium Pakwan, exeunte Aprili, fructiferamque initio Junii, 1869, iterum detexit cl. Sampson. (Exsicc. n. 6015.)

* The fruit in this genus is called by nearly all writers *drupa sicca* ; in my opinion a most objectionable term. In the use of this designation, botanists have probably been half unconsciously swayed by the affinity of *Pygeum* to *Prunus* and the other members of the tribe, all of which have true drupes. But, whilst in the majority of *Rubi*, the *etærio* is composed of an assemblage of drupes, in those species sometimes separated under the name of *Dalibarda*, it is an aggregate of achænia. In *Pygeum* the fruit answers in every respect to the ordinary definition of an achæmium, and is unquestionably as much entitled to that name as those of *Fragaria* or *Anacardium*.

This is nearest *P. acuminatum*, Colebr.,* of which I possess Khasia specimens from both Griffith and Dr. Hooker; it is, however, perfectly distinct, by the much thinner texture of its leaves, their smaller size, delicate prominent reticulation, conspicuous abrupt acumen, and especially the dense brown glands with which they are dotted beneath; by the solitary racemes and the larger and more conspicuous lobes of the calyx. *P. Ceylanicum*, Gærtn., to which Thwaites, with a query (Enum. Pl. Zeyl. p. 102), quotes Colebrooke's name as a synonym, is certainly specifically distinct from the Indian plant, by its pubescent petioles and short dense racemes, with the rachis, calyx, and ovary thickly clothed with short fulvous hairs; *P. Wightianum*, Bl., is nearest this. Of *P. latifolium*, Miq., I have seen no specimens, but I have what I take to be *P. parviflorum*, T. and B., sent from Java by Teijsmann himself, under the name of *P. Blumei*, which, in the 'Catalogus Horti Bogoriensis,' he keeps separate from both *P. latifolium* and *P. parviflorum*. I have, however, remarked many similar multiplications of names in that book.

4. *Hedyotis (Oldenlandia) Boerhaavioïdes*, n. sp.; caulibus diffusis crispulo-pilosis, foliis breve petiolatis carnosulis $1\frac{1}{4}$ -2-pollicaribus e basi cuneata deltoideo-ovatis acutis penninerviis pilosulis pilis septatis subtus glauco-pallentibus sub exsiccatione cinerascensibus, cymis axillaribus et terminalibus simplicibus vel furcatis paucifloris subcapituliformibus, calycis laciniis oblongis acutis patentibus accrescentibus, corolla breviter infundibulari, genitalibus inclusis, stylo ad medium usque bifido, ovario biloculari compresso vertice subbilobo, ovulis paucis serobiculatis.—In rupibus præcipitibus humidis torrentis juxta templum Sheung-king, prope cacumina montium Pak-wan, supra Cantonem, m. Septembri, 1868, collegit cl. Sampson. (Exsicc. n. 15133.)

Although too young to show the dehiscence of the capsule, the resemblance in habit to *H. Thwaitesiana*, mihi, and *H. monosperma*, W. and A., leaves no doubt of the position of this plant. In the inflorescence and size of the leaves it is more nearly allied to those species than to *H. affinis*, W. and A., or *H. deltoidea*, W. and A. The dried plant is strikingly like *Boerhaavia diffusa*, L., in appearance.

5. *Wendlandia wariifolia*, n. sp.; arbuscula 10-12-pedalis, ramulis

* If Wight's figure (Icon. Pl. Ind. Or. vol. iii. p. 993) be really taken from this species, the petals are very badly depicted as to shape and size relative to the calyx-segments.

ferrugineo-hirsutis, foliis oblongis vel subobovatis petiolo semipollicari suffultis basi cuneatis apice in acumen breve obtusiusculum abeuntibus supra subnitidis scabris parce hirtellis subtus pallidioribus opacis cinereo-pubentibus costa nervisque primariis utrinque 10–12 atque secundariis prominulis dense ferrugineo-hirsutis $3\frac{1}{2}$ –7 poll. longis $1\frac{3}{4}$ – $3\frac{1}{2}$ poll. latis, stipulis hirsutis e basi lata medio constrictis limbo reniformi obtusissimo recurvo, paniculæ amplæ cinereo-hirsutæ ramis patentibus, floribus in glomerulos dissitos digestis, calycis strigoso-hirsuti lobis ovatis vix acutis, corollæ infundibularis extus glaberrimæ intus fauce dense albo-hirsutæ tubo calyce 3–4-plo longiore laciniis obtusis recurvis, filamentis antheras vix æquantibus.—In fruticetis ad Sai-chü-shan, secus fl. West River, prov. Cantoniensis, d. 26 Februarii, 1869. detexit am. Sampson. (Exsicc. n. 15587.)

Allied apparently to *W. exserta*, De Cand., and perhaps also *W. Luzoniensis*, De Cand., but the descriptions in the 'Prodrômus' are insufficient for the determination of the species. In the interruptedly fasciculate arrangement of the flowers, this plant approaches *W. Notoniana*, Wall. In some of the specimens seen by Mr. Sampson the panicles were a foot in length and proportionally broad.

6. *Salvia (Eusphace) Prionitis*, n. sp. ; caule erecto simplici subpedali glanduloso-piloso nudiusculo paria bina vel tria tantum foliorum gerente, foliis non rugosis e basi subcordata ovato-oblongis obtusis margine undulato-crenatis radicalibus pluribus caulisque inferioribus petiolo longo laminam sæpe superante mediis petiolo brevi suffultis nunc basi lobulo utrinque auctis summis sessilibus supra glaberrimis nitidis infra pallidis opacis præter nervos prominulos pilosos glaberrimis, bracteis oblongis pedicellum semiæquantibus, verticillastris disjunctis 6-floris, pedicellis calyce duplo brevioribus, calycis campanulato-tubulosi capitato-pilosi cum inflorescentia viscosi 2 lineas longi labio superiore subintegro inferiore acuminato bidentato, corollæ violaceæ glanduloso-tomentellæ calycem sesquiduplo superantis tubo haud ampliato parum exserto intus piloso-annulato labiis inter se æquilongis superiore galeato integro lateralibus oblongis obtusis reflexis inferiore late emarginato macula quadrata alba purpureo-punctata medio notato, staminibus corollæ labium superius duplo superantibus, stylo staminibus dimidio longiore.—In herbis prope lapicidinas psammiticas derelictas, ad Lien-fa-shán, h. e. 'mons Nelumbii,' secus fluvium Cantoniensem, 12 mill. pass. infra Whampoam sitas, ipse legi, d. 3 Maii,

1869. (Exsicc. n. 15511.)—In foliage singularly resembling our common Betony,—the *Πριονίτης* of Alexander Trallianus,—whence I have derived the specific name.*

7. *Salvia (Drymosphace) umbratica*, n. sp.; glanduloso-pilosa, caule erecto simplici bipedali, foliis petiolatis e basi cordata hastato-triangularis lobis basalibus divergentibus acutis plerumque brevibus crenatodentatis floralibus sensim minoribus summis oblongis, racemis simplicibus, verticillastris remotis 4–6-floris, pedicellis calyce duplo brevioribus, calycibus campanulato-tubulosis glanduloso-pilosis 4 lin. longis labio antico parum longiore, corollæ subsigmoideæ pubescentis pulchre cæruleæ inferne pallidæ et cærulco-striatæ tubo æquali parum exserto intus piloso-annulato fauce ampliato labio superiore fornicato apice emarginato lobis lateralibus rotundatis, staminibus corollæ circiter æquilongis loculo antherarum antico alteri subconformi lineari sed curvulo atque minore copiose pollinifero, stylo exserto stigmatibus inæqualibus postico longiore dilatato.—Prope Jehol, sub umbra scopulorum crescentem, invenit rev. pat. A. David, miss. apost. (Exsicc. n. 14711.)

A very close neighbour of *S. glutinosa*, L., which it much resembles in the herbarium. The reduced anther-cell seems quite as fertile as the normal one. There is an approach to this in *S. Nipponica*, Miq. ! in which the cell is, however, still a good deal deformed. In that species (which from the dried specimens seems to have white or cream-coloured flowers) the upper lip of the corolla is continuous in almost a straight line with the tube. According to the plate (Illustr. Himal. Bot. t. 75*) the curvature is very slight too in *S. hians*, Royle, which agrees with M. David's plant in its blue flowers.

8. *Monolophus cœnobialis*, n. sp.; erectus, gracilis, 6–12-pollicaris, foliis vix petiolatis oblongo-lanceolatis attenuato-acuminatis glaberris

* The *Κέστρον* of Dioscorides is usually supposed to be identical with *Betonica officinalis*, L. Thus Pliny (Hist. Nat. vol. xxv. p. 8), "Vettones in Hispania invenere eam, quæ vettonica dicitur in Gallia, in Italia autem serratula, in Græcis cestron aut psychrotrophon;" so also Macer Floridus (De Virib. Herb. vol. xi. p. 1, ed. Choulant), "Betoniam soliti sunt cestron dicere Græci;" and Cæsalpinus (De Plant. vol. xi. p. 21), "Dioscorides cestron vocat et psychrotrophon, quia locis frigidis invenitur." This is also the opinion of Schneider, Sprengel (Hist. Rei Herb. vol. i. p. 179), Forcellini in his noble Lexicon, and Liddell and Scott. Billerbeck, however, (Flor. Class. p. 153; Lips. 1824) considers that the Greek plant is *B. alopecuros*, L.; whilst Fraas (Synopsis. Fl. Class. p. 175, München, 1845) is disposed to refer it to *Sideritis Syriaca*, L.

mis 2-5 poll. longis 6-12 lin. latis, ligulis breviter productis truncatis vel obtusis, floribus terminalibus paucis, bracteis scariosis ex apice truncato lacinulam exquisite subulatam exserentibus.—In rupibus muscosis stillantibus torrentium cœnobio buddhistico Fi-loi-tsz oppositorum, secus fluvium North River, florentem et fructificantem, d. 27 Julii, 1864, coll. Sampson. (Exsicc. n. 11369.)

This plant, of which I have not seen living specimens, is exceedingly close to *M. linearis*, Wall., but differs by its broader, less gradually attenuated leaves, shorter, almost truncate ligulæ, and scarious bracts, with a blunt apex, from whence arises a long setaceous point.

9. *Fritillaria collicola*, n. sp.; glaberrima, foliis infimis oppositis mediis ternis summo solitario lanceolato-linearibus planis acutis floralibus cuique flori geminis anguste linearibus apice cirrhoso-revolutis flores paulo superantibus, floribus 2 nutantibus pollicaribus, pedunculis 5-linealibus, perigonii campanulati etessellati venoso-striati phyllis conformibus oblongis obtusis genitalia inter se æqualia duplo excedentibus, filamentis e basi dilatata filiformibus antheris obtusis duplo longioribus, stylo ovario bis longiore apice trifido lobis patentibus.—In collibus provinciæ Che-kiang collegit clar. Guil. Tarrant. (Exsicc. n. 1165.)

Belongs to the group containing *F. verticillata*, Willd., *F. Ruthenica*, Wikstr., etc. The Japanese *F. Thunbergii*, Miq., unknown to me, must be a very near ally; but it is described as with the anthers longer than the filaments and apiculate, and the shape only slightly longer than the ovary, besides differences in the foliage.

10. *Diplachne Sinensis*, n. sp.; radice crasse fibrosa, bipedalis, erecta, nodis glabris, vaginis elongatis ore pilosis, ligula nulla, foliis elongato-linearibus acutissimis glaucescentibus scabris, paniculæ elongatæ diffusæ rachi flexuosa angulata ramis solitariis scabris ad insertionem pilosis erecto-patentibus infimis subsecunde ramulosis, spiculis 6-7-floris, glumis inæqualibus superiore fere duplo majore flosculi proximi dimidium attingentibus membranaceis lanceolatis acuminatis exaristatis carina scabriusculis inferiore plerumque 3- superiore 5-nervia nervis lateralibus sursum evanescentibus, flosculis pedicello tertiam glumellæ longitudinis partem circiter æquanti callo barbato terminato impositis, glumellis subæqualibus ciliatis inferiore subseptemnervia apice tricuspidata cuspidate media in aristulam brevem producta superiorem paululo breviorum inferne nervis binis altius confluentibus percursam apice emar-

ginatam vel sublaceram amplectante, staminibus 3 filamentis elongatis, antheris flavis, stylis plumosis purpureis.—In collibus a Peking occasum versus sitis, mense Augusto, 1865, raro obvenit cl. Dri. S. W. Williams. (Exsicc. n. 12572.)

This plant is possibly soboliferous, as I find a scaly shoot, like those of *Muhlenbergia*, arising above the stout radical fibres. Neither the limits nor station of this genus have hitherto been very satisfactorily settled. To me it appears, on the one hand, closely allied to *Tricuspis*, Beauv., and, on the other, to *Triodia*, R. Br., and especially *Scolochloa*, Link (= *Flumina*, Fr.), genera placed widely apart by Nees v. Esenbeck, in the outline of his arrangement given in the second edition of Lindley's 'Natural System of Botany.' The *Festuca serotina*, of Linnæus, seems to have been correctly referred here by Link, a view also taken by the younger Nees, by Parlatore, and, I believe, by General Munro (Linn. Journ. Bot. Vol. VI. p. 41); though the description of the genus (identical with that in Nees' "Gramineæ Africæ Australioris"), as having the lower palea 3-nerved, given by this gentleman, in the fullest exposition of his views with which he has yet favoured the public (Harvey, Gen. S. African Pl. ed. 2. 449), would technically exclude it. Koch, the elder Nees, Kunth, Grisebach, and Steudel place this species in *Molinia*; the affinity of which is surely rather with *Glyceria*, and the genera or sections into which it has been divided of late years. *Molinia squarrosa*, Trin., unknown to me, may be an ally of the Chinese plant; but is described as having 1-3-flowered spikelets. I gathered *Diplachne fusca*, Beauv., at Amoy, some years ago.

ON ROSA SEPIUM, Thuill., AND OTHER NEW OR LITTLE-KNOWN FORMS OF BRITISH ROSES.

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

In this paper I propose to describe in full the typical form of *R. sepium*, Thuill., mentioned in a note in my monograph (Linn. Journ. Bot. vol. ii. p. 224, and Journ. Bot. Vol. VIII. p. 24), as gathered by myself last year in Surrey, on the southern slope of Hind Head, and also to notice one or two other forms which I have had the opportunity of seeing since the paper was read.

To find the *R. sepium*, take the lane that leads from Haslemere station on the west side of the railway, and runs nearly parallel with it up the hollow past Stootley Farm, following this lane out to the head of the valley, and leaving it where a cart-track diverges from the main road on the edge of the moor, due south of the fir-wood that crests the conspicuous hill (a spur of Hind Head) that overlooks the railway about two miles north of Haslemere station. I saw only a single bush of the Rose on the edge of the moor that slopes down to this cart-track, and could find no other anywhere else in the neighbourhood. The elevation of the place above sea-level will not be more than 300 or 400 feet.

This Hind Head Rose corresponds precisely with the *R. sepium* of Déséglise's Herbarium Rosarum, No. 30, which was named by him after study of an original type-specimen of Thuillier's plant, communicated by Professor Boreau; and, out of the crowd of references that belong to it, the following may be cited:—

R. sepium, Thuill. Par. (1799) p. 252; De Cand. Fl. Franc. vol. v. p. 538; Merat. Fl. Par. 192; Leman, Bull. Phil. Extr. p. 10; Tratt. Mon. Ros. vol. ii. p. 32; Boreau, Fl. du Centre, ed. 3. vol. ii. p. 229; Déséglise, Essai, p. 103. *R. sepium*, var. *rosea*, Desvaux, Journ. Bot. 1813, p. 116. *R. sepium*, *a.* Gren. Fl. Jurass. p. 250. *R. sepium*, *a. archetypa*, Dumort. Ros. Belg. p. 55. *R. rubiginosa*, var. *sepium*, Seringe in De Cand. Prodr. vol. ii. p. 617; Gren. and Godr. Fl. France, vol. i. p. 560.—Billot, Exsic. 1871, bis, ter, et quater. Déség. 30.

A bush 5 or 6 feet high, not appreciably different from *R. micrantha* in general habit, with a slight Sweetbriar fragrance. Prickles uniform or with a few scattered aciculi intermixed, those of the main branches decidedly falcate, 4–4½ lines long, with a scar as deep. Fully developed leaves scarcely over 2 inches long, with the terminal leaflets oblong-lanceolate, 10–12 lines long, 6–7 lines broad, the base cuneate, the main serratures erecto-patent, copiously compound, with fine gland-tipped teeth, the upper surface quite glabrous, the lower with conspicuous viscous glands thickly scattered all over, slightly and inconspicuously pubescent on the midrib; the common petiole with 2–4 uniform, slightly falcate aciculi, copious glands, and a few hairs. Stipules glandular on the surface, and copiously gland-ciliated. Flowers 1–4 on naked peduncles 6–9 lines long. Calyx-

tube narrow-obovoid, quite free from aciculi and glandular setæ. Sepals 8-9 lines long, naked on the back, the main ones copiously compound, with a slightly foliaceous elongated point and 2 or 3 linear pinnæ on each side. Petals pinkish, 6-8 lines deep, the expanded corolla an inch or an inch and a quarter across. Styles glabrous. Fruit (not seen in the English specimen) narrow-obovoid-urceolate, 7-8 lines long, quite glabrous, the sepals subpersistent, the disk moderately developed.

This form is one of the commonest Roses of the southern half of Europe, reaching northward to Belgium, and eastward certainly to the Tyrol, and probably further. From *R. Billietii*, Puget (*R. sepium*, Borrer in E. B. S. t. 2653), it differs by its leaves glabrous and more densely glandular on the under surface, terminal leaflet narrower and more narrowed from the middle to both ends, glabrous styles and narrower fruit. *R. agrestis*, Savi, Fl. Pisana, vol. i. p. 475; Déségl. Mon. p. 104; Exsic. p. 33, is a variety with still smaller leaves and flowers, white corolla and shorter fruit. If I were to plan out my monograph now, I should incline to place this, as the most widely-distributed and best and longest known of the forms, as the typical plant, making *Billietii*, *cryptopoda*, and *pulverulenta* varieties of it. A considerable number of other South European forms would also, according to the plan of subordination there followed, rank as varieties here, but this point it is not necessary to follow out now. Taking the species as a whole, it comes very near *micrantha*, differing principally in its naked peduncles and calyx-tube, and sepals not glandular on the back.

R. obtusifolia, Desv. This variety of *canina*, which I have been for many years expecting to meet with as British, has been gathered by Dr. St. Brody lately in two places (near Berkeley, and on St. Vincent's rocks) in Gloucestershire. It is briefly noticed at page 229 of my monograph, and, according to the plan of arrangement there adopted, ranks next to var. *dumetorum*, in the set of forms with deciduous sepals, naked peduncles, and leaves hairy on both sides. It is a plant which is widely, spread, and which has been distinguished by many Continental authors and the following is a selection from its synonyms:—

R. obtusifolia, Desv. Journ. Bot. 1809, p. 317; Tratt. Mon. vol. i. p. 134; Gren. and Godr. Fl. France, vol. i. p. 557; Boreau, Fl. du Centre, ed. 3. vol. ii. p. 213; Déséglise in Billot, Annot. 1855, p. 9;

Essai, p. 81. *R. leucantha*, Bastard, Suppl. Fl. Maine et Loire, p. 32; De Cand. Fl. France, vol. v. p. 535; Lois. Not. p. 82; Lejeune, Fl. Sp. vol. ii. p. 347. *R. collina*, var. *obtusifolia*, Dumort. Ros. Belg. p. 58.—It has the lithe green branches, small white flowers, and small neat leaflets, at first hairy on both sides and permanently so beneath, of *R. tomentella*, and agrees also with that variety in its fruit and sepals, differing from it principally in the serratures of the leaves, being quite simple, and from *R. frondosa*, Stev., in the leaves being at first hairy above, and more decidedly so in the lower surface.

R. tomentosa. Mr. James Ward has found near Richmond, in Yorkshire, a form of this species, which comes very near to Dumortier's *R. cinerascens* (Dumort. Prodr. Fl. Belg. p. 98; Ros. Belg. p. 50; Déséglise, Toment, p. 31). It has slender straight prickles, densely aciculate, subglobose fruit, and more decidedly softly-grey-downy leaflets than is usual in *tomentosa*, with erecto-patent, nearly simple teeth. He has also found in the same neighbourhood another form of *tomentosa*, with the peduncle and calyx-tube quite naked, but with the leaves much less decidedly grey-velvety than in Hailstone's Blair Athol plant referred by Déséglise to *R. farinosa*, Ran (see Baker, Linn. Proc. vol. xi. p. 217).

R. arvensis, Huds. This is clearly the same plant as *R. repens* of Scopoli, and, according to Professor Crepin in his recently published 'Primitiæ' (p. 31), this latter name takes priority, Hudson's name going back to 1762, and Scopoli's to 1760. *R. repens* is described clearly in the second edition of Scopoli's 'Flora Carniolica' (1772), but I have no opportunity of referring to the first to verify the accuracy of this statement.

ADDENDA TO THE 'CYBELE HIBERNICA.'

BY RALPH TATE, ASSOC. LINN. SOC., F.G.S., ETC.

Galium cruciatum.—This plant, which, as the sequel will show, has good claim to rank among the plants indigenous to Ireland, is not included in either the 'Flora' or the 'Cybele Hibernica.' The first notice of it in Ireland is by K'Eogh, who published in 1735, and describes the plant, under the English name "Crosswort," so minutely as to leave no manner of doubt as to its identification. Harris,

who investigated the botany of the co. Down, in his "Antient and Present State of the co. Down," published in 1743, enumerates the plant in his catalogue, and at p. 180 states that it occurs on rubbish at the old cathedral, Downpatrick. The "Crosswort" was rediscovered by Dr. Hodges and Mr. F. Whitla; from the former gentleman Mr. William Thompson received specimens in flower, now in the herbarium of the Belfast Museum, and concerning which, in a letter dated June 21, 1842, Dr. Hodges writes,—"*Galium cruciatum* is found in only two situations in this neighbourhood; at the bottom of a field adjoining the marshes near the cathedral, and on the sides of the old rath, where I discovered it about five years ago." (*Vide* Ann. and Mag. of Nat. Hist. vol. ix. p. 519, 1842.) Mr. F. Whitla (Ann. and Mag. Nat. Hist. vol. x. p. 75, 1842) points out that Harris gives the identical habitat where Dr. Hodges found it, and "where I have annually for many years observed it growing." I became acquainted with the above facts only after the publication of the 'Cybele Hibernica,' but communicated them in a paper read before the Belfast Field Naturalists' Club, 21st of March, 1867, since which date indisputable evidence has been obtained of the continuance of *G. cruciatum* in the same locality, substantially identical with that of Dr. Hodges, and on the spot which it has occupied, certainly since 1743. This second rediscovery we owe to Miss Mulgan, who collected it in the summer of 1868, "in fields close to Downpatrick Cathedral."

Melilotus arcensis.—This was collected by me in the summer of 1869 on the railway embankments between Kilroot and Whitehead, and between Glynn and Larne, co. Antrim; the two stations distant about six or seven miles from each other. Miss Maffett collected apparently this species near Donaghadee, co. Down, but now there can be no doubt of the occurrence of the species in district 12.

Lotus corniculatus, var. *tenuis*.—Collected by Mr. S. A. Stewart near Glynn, in the summer of 1869; hitherto known only near Dublin.

Sedum reflexum and *S. dasyphyllum*.—Growing in company on rocks in Glenariff Glen, co. Antrim. The proprietor had no knowledge of the plants having been planted, and if either species can be ranked as native, they certainly seem perfectly wild in this station.

PAPERS RELATING TO THE FLORA OF IRELAND.

Babington, Professor C. C.—Recent additions to the Flora of Ireland.

Ann. and Mag. Nat. Hist. vol. vi. p. 328 (1841).

————— New British Carices, id. vol. x. p. 363 (1842).

Gage, Miss C.—Plants of Rathlin. Ann. and Mag. Nat. Hist. vol. v. p. 145 (1850).

Hincks, Rev. Dr.—On the Flora of Ireland. Ann. and Mag. Nat. Hist. vol. vi. pp. 1, 126.

Moore, David.—Botany in Ordnance Survey, co. Derry. Vol. i. 1837, pp. 9–11, and pp. 6–8 of Notices, plates 4, 5.

Portlock, Capt.—Botany of Parish of Templemore, 'Survey of co. Derry,' 1835 (ascribed to D. Moore in edition of 1837).

Sampson, Rev. G. V.—Memoir of co. Londonderry (1814). Cat. of Plants, pp. 152–171.

Trench, Miss.—Mag. Zool. and Bot. vol. ii.

NOTES ON RAY'S 'HORTUS SICCUS.'

BY HENRY TRIMEN, M.B., F.L.S.

In the first volume of this Journal, p. 32, will be found a notice of the existence, in the Botanical Department of the British Museum, of this interesting relic of the great English naturalist. It consists of 20 books of different sizes, each containing about 30 sheets of thin, rough paper, on which the specimens are sown. The parcels are distinguished by letters of the alphabet, and an MS. alphabetical catalogue (apparently written by Dale, and not, as was stated in the notice above alluded to, by Ray) gives references to all the specimens but those in the last three fasciculi, which, perhaps, do not form really a part of Ray's herbarium. The collection has been badly used; many of the specimens have been cut out. Probably, some of the labels, too, are in Dale's writing, which it is difficult always to distinguish from Ray's. There is no apparent order in the collection, the plants having probably been laid in as they were collected.

The bulk of the species are European. Switzerland, Italy, and Sicily are best represented: there are a few from Belgium, Holland, and Germany. The extra-European species are probably from Con-

tinental gardens. Localities are not generally given, but many specimens from the Jura and Sicily are very definitely localized. There can be little doubt that these were collected during Ray's foreign tour in the years 1663-1665, of which he has left us an interesting account in his 'Journey,' published in 1673, in which book lists of the plants found are given, which agree with those in the 'Hortus Siccus.' These lists were afterwards extended and improved in the 'Stirpium Extra Brit. Nasc. Sylloge' (1694). With these are a few British plants, of which some have localities affixed, which it will be interesting to quote:—

Ribes alpinum, L. (probably). A bad specimen. (C 13.) *Ribes alpinus dulcis*, J. B.—In com. Eboracensi invenit D. Dodsworth. (See R. Syn. ii. 298.)

Scirpus cæspitosus, L. (D 16.) *Juncus parvus montanus cum parvis capitulis luteis*, J. B.—In the meadows about Middleton in Warwickshire. (See R. Cat. i. 181.)

Trifolium glomeratum, L. (I 7.) *Trifolium glomerulis ad genicula rotundis*.—Note to a Messina specimen; Hoc in Anglia prov. Suffolcia et circa Londinum provenit. (See R. Syn. 134.)

Carex pendula, L. (M 29.) *Gramen cyperoides, spica pendula longiore et angustiore*, C. B.—In Essexia non procul a Brantria. (See R. Cat. i. 147.)

Draba incana, L. (O 7.) *An Bursa-pastoris loculo oblongo affinis pulchra planta*, J. B.?—In the hilly country of Craven in Yorkshire. (See R. Cat. i. 49, 50.)

Ilecebrum verticillatum, L. (O 8.) *Polygonum verticillatum*, J. B.—In palustribus et aquosis prope extremum Cornubiæ angulum plurimum. (See R. Cat. i. 248.)

Trifolium maritimum, L. (O 9.) *Trifolium capitulis Dipsaci nostras*.—In palustribus prope ostium Thamesis fluvii. (See R. Cat. i. 305-6?)

Silene Anglica, L. (O 9.) *Ocymoides minus speciosus, annuum*, J. B.—Found near ye Divcl's ditch on Newmarket Heath among ye corn. An *Lychnis segetum parva, viscosa*, P. B.? (See R. Cat. i. 202.)

Lathyrus hirsutus, L. (O 12.) *Lathyrus flore purpureo, siliqua hirsuta*.—Found in Hockley parish, in Rochford hundred in Essex. (See R. Cat. i. 190.)

Hypericum montanum. *Androsæmum campoclareuse*, Col. This grows in many mountainous places and in bushes in the west of England. (See R. Cat. i. 174, and R. Syn. i. 143.)

Galium boreale, L. (O 13.) *Galium*, sive *Rubia cruciata*, sive *lævis quadrifolia*.—In Westmorlandia variis in locis, as by a little brook near Orton, etc. (See R. Cat. i. 268, 9.)

Saxifraga aizoides, L. (O 13.) *Sedum montanum*, folio gramineo, flore luteo. Upon the skirts of Ingleborough Hill plentifully, and on several other mountaines in Westmoreland, etc. (See R. Cat. i. 279.)

Cornus Suecica, L. (R 2.) *Periclymenum parvum Prutenicum*, Clus. Upon ye north end of ye highest of Cheviot Hills in Northumberland plentifully. (See R. Cat. ii. 67.)

Anemone Pulsatilla, L. (R 3.) *Pulsatilla vulgaris*.—Upon Barnak Heath, about three miles from Stamford, in great plenty. (See R. Cat. i. 256, and R. Cat. ii. 246.)

Potentilla fruticosa, L. (R 4.) *Pentaphylloides fruticosum*, ad ripas fluvii Tees in com. Eboracensi non longe a Greta bridge. (See R. Cat. ii. 228, Hist. i. 616, and Syn. i. 91.)

Most of these were probably collected by Ray in his botanical expeditions in 1667 and 1668, the latter into Yorkshire and Westmoreland; several are the first records of the species in this country. There are many more British specimens, but without localities. All are of the greatest value in determining with certainty what the plants of Ray's published works are.

SHORT NOTES.

ASARUM EUROPEUM, L.—I here offer a few remarks upon the distribution of this plant in the Channel and Thames provinces. The first published locality, south of Lancashire, is that given in the third edition of Ray's 'Synopsis' (p. 158):—"In a hedge on the left-hand as soon as you are in the gate, the first field from Chernells-Green going to Sir Th. Seabright's Beachwood: Th. Knowlton." On the authority of the 'Flora Hertfordiensis' (p. 252), (where "Chernells" is queried "Cheverells") this is in Herts. In this work the quotation runs thus:—"Going to Sir Th. Sebright's, Beachwood;" but the comma does not appear in the original; and "Beachwood" would

probably mean, not the name of a place, but simply "beech-wood," the woods in this district being composed almost entirely of beech. It does not appear to have been since found in the county. The next record is that quoted by Mr. Watson in *Cyb.* iii. 503. He says, "There is some probability that this plant may be a true native of Wiltshire. Mr. T. B. Flower informs me that in Sole's MS. Flora, dated 1782, it is mentioned as growing 'in the Duke of Queenborough's woods, near Amesbury.' And 'one large patch of it was found by Mr. Popham, about the year 1820, away from any house, in the left-hand hedge of the lane, going from Standlynch Down, to the large chalk-pit at Redlynch, near Salisbury.' In August, 1850, Dr. Bromfield wrote to me thus :—'Mr. Borrer thinks the Wiltshire station for *Asarum* a good and natural one. The station is very elevated, on chalky marl amongst brushwood, on a steep bank, not on an artificial hedgebank. Mr. Flower has obligingly sent me a specimen from this station, and I understand his opinion to incline in the same way as that of Mr. Borrer. Unless there are two stations, however, there is a strange contradiction in the reports respecting the 'hedge' and 'bank.'” In 'English Botany,' t. 1083, the plant is figured from a specimen which was "gathered by the Rev. Charles Abbot, D.D., by the roadside between Henley and Maidenhead." The date on the published plate is Oct. 1, 1802; and on the original drawing in the British Museum is a MS. note of Sowerby's, which gives the date of the specimen, "June 10, 1802." The county of this locality is first given in the 'Botanist's Guide,' where it is placed in Berks. The direct road from Henley to Maidenhead is certainly in this county; but the plant has lately been found on a high chalk bank at the back of Templehouse, on the high-road from Marlow to Henley; and as Maidenhead may be reached from Henley by way of Marlow, crossing Marlow Bridge, it is possible that Abbot's locality may be in Buckinghamshire. The matter, however, stands thus: if these two localities are the same, the plant has existed here upwards of sixty years, and the former record must be removed from Berks and placed under Bucks; if they are different, we have it occurring in similar situations on each side of the river. Mr. Watson (*Cyb.* ii. 354) states that its occurrence in Berks requires verification. Last spring the Rev. H. Harpur-Crewe, of Drayton-Beauchamp, Bucks, forwarded me several fine specimens from the neighbourhood of Halton in the same county, and favoured

me with the following note upon its locality:—"The station for *Asarum Europæum* is about a mile from Halton House, the late residence of Sir John Dashwood King; it grows all along the hedge in a small copse close to the roadside. Sir John Dashwood King planted a good many flowering shrubs in some of his plantations round Halton, but there are none in the copse where *Asarum* grows. It has evidently grown for a long time in its present habitat, and has been known there for several years." This locality has been communicated to me by two other botanists, who have found the plant in this station. It is worthy of note that Halton cannot be many miles distant from the old Hertfordshire locality. I am inclined to think that the evidence is in favour of the nativity of the *Asarum* in the Thames province, or at least in the subprovince of West Thames. The Templehouse (Bucks) habitat seems to correspond closely with that at Redlynch, and this is similar to those on the Continent. Dr. Trimen informs me that there is a specimen in Sowerby's herbarium labelled, "Wild near Oxford; Rev. Dr. Abbot:" so that we have a record of its occurrence in each of the counties comprised in the West Thames subprovince. As Mr. Watson (Comp. Cyb. Brit.) states that *Asarum* is "decreasing in Britain," the above Buckinghamshire localities, which have not been before published, may be of interest.—JAMES BRITTEN.

NOTE ON THE HISTORY OF THE GENUS SCHREBERA, Roxb.—In common with other botanists, I have been delighted to see Dr. Welwitsch's paper on "African Plants" in the twenty-seventh volume of the Linnean Society's Transactions, but I regret to find that, in giving the rather full history of the genus *Schrebera*, he has overlooked what E. Bureau, Monog. Bignon. p. 100 (Paris, 1864) says respecting the position of the genus, which he correctly refers to *Oleaceæ*. And Dr. Welwitsch has further overlooked, that I may fairly lay claim to having pointed out the true limits and position of the genus, by identifying it with *Nathusia*, not only in my review on Bureau's work (Journ. of Bot. 1864, November 1, p. 357), but also in that part of my 'Flora Vitiensis' (published October 1, 1866), where I stated (p. 153) under *Jasmineæ*:—

"The genus *Schrebera*, Roxb., which De Candolle, 'Prodromus,' viii. p. 674, refers to *Jasmineæ* (having nothing to rely upon except Roxburgh's figure and description), I hold to be identical with *Nathusia*,

which that same author correctly places in *Oleaceæ*, as pointed out by me (Journ. Bot. 1864, p. 357). There are in Africa species with simple and compound leaves."—B. SEEMANN.

MISTLETOE ON THE OAK.—Dr. Bull has figured for the forthcoming volume of the Woolhope Club Transactions, the Mistletoe Oak of Deerfold Forest. "This very interesting tree grows in the hedgerow of a field called 'The Harps' at Haven, in the ancient forest of Deerfold, on the property of the Messrs. Fortey. It was discovered about three months since, but the Mistletoe must have been growing upon it for some years. At five feet from the ground the girth of the Oak is 5 ft. 8 in. The Mistletoe grows in one large wide-spreading branch, with a diameter of 3 ft. 6 in., though it springs out from the oak by only a single stem, nearly 4 in. in circumference. This tree makes the eighth example of an Oak bearing Mistletoe."* Turner says, "I never sawe more plentye of righte Oke miscel, then Hugh Morgan shewed me in London. It was sente to him oute of Essex: where there is more plentye then in anye other place of Englande that I have ben in." Warner ('Plantæ Woodfordienses,' 1771) mentions it (for the same county) as "found on an oak between Woodford Row and the Bald-faced Stag near the Ten Mile Stone: and on several trees, many of them oaks, between that place and Mr. Conyers's, Copped Hall." There is a specimen in the Kew herbarium labelled, "From the Oak near Winchester, T. O. Duke."—JAMES BRITTEN.

ORCHIS MILITARIS IN MIDDLESEX.—In the Banksian Herbarium at the British Museum, are some specimens of this labelled by Sir Joseph Banks, "Chalky bank above Gulch well, Harville, near Uxbridge." Harville is the old spelling of Harefield, but the locality is a different one to Blackstone's, given in 'Flora of Middlesex,' p. 269. The specimens are certainly *O. militaris*, L., of Syme and Babington, and not *O. Simia*, Lam. (*O. Tephrosanthos*, Vill.). The unsatisfactory 'English Botany' figure 1873 ("*O. militaris*"), which Mr. Syme has retained as a figure of *O. Simia*, Lam. (Syme, E. B. vol. ix. t. 1453), appears to have been made up from more than one species. On Sowerby's original sketch, the specimen is stated to have been "gathered near Dartford by Mr. Peet, May 27th, 1807." There is, however, another (unpublished) and much better drawing made from plants collected at "Casham (=Caversham) Heath, near

* See 'Journal of Botany,' Vol. II. p. 372.

Reading, May 24th, 1796," which undoubtedly represents *O. Simia*. In Sowerby's herbarium are three specimens of "*O. militaris*, var.," but all are unlocalized; of these, two are certainly *O. Simia*, the other is probably a small specimen of *O. purpurea*, Huds. The unpublished drawing appears to have been made from one of the former; E. B. 1873 possibly from the latter, modified by the others. I may here correct an error in the 'Middlesex Flora' (*loc. cit.*), where *O. militaris*, of Bicheno, is made synonymous with *O. Simia*; it arose from Bicheno, in his paper (Linn. Trans. vol. xii.), quoting this same E. B. 1873 as a figure of the former, which it certainly cannot represent. He subsequently, when describing the true *militaris* for t. 2675 of the 'Supplement to English Botany,' corrects himself, and there refers the figure to *O. tephrosanthos*, Vill.—HENRY TRIMEN.

DR. BROMFIELD'S HERBARIUM.—There are two herbaria of plants collected by the late Dr. Bromfield in existence, one at Kew, and the other at Ryde, in the Isle of Wight. The latter was lately intrusted to me by the trustees of the Isle of Wight Philosophical and Scientific Society, in order that it might be rearranged. Though some of the specimens have suffered from the attacks of insects, the collection is still a very valuable one as illustrating the botany of the district. There are in it, Isle of Wight specimens of about 550 of the plants described or mentioned in Dr. Bromfield's 'Flora Vectensis,' and amongst these many very interesting ones; for instance, the unique Isle of Wight specimen of *Euphorbia Peplis*, L., found at Sandown, by Mr. J. Stuart Mill, the original plants of *Calamintha sylvatica*, Bromf., etc. Nearly all were collected either by Dr. Bromfield or Mr. A. G. More. Besides these, there is a large number of specimens of the genus *Rubus*, collected by the late Dr. Bell Salter, and a collection of sea-weeds, presented by Miss Hamborough. There is also a good series of Hampshire plants, and of plants from various other parts of Britain. The collection is kept in the rooms of the Isle of Wight Philosophical Society at Ryde.—FRED. STRATTON.

CALLITRICHE AUTUMNALIS, Linn., IN CHESHIRE.—In collecting a large series of specimens to clear up my own views on the genus *Callitriche* as represented in Cheshire, I came upon a remarkable plant in fruit from the lake at Lower Tabley, near Knutsford, which, when submitted to Mr. Boswell Syme, he pronounced to be true *C. autumnalis*. I believe there is at present no recent English provincial record, except

Tyne,* beyond doubt and contest, for this plant. I mean English, of course, as opposed to Welsh and Scottish. In Wales and Scotland the plant is well known. Our nearness to Wales in Cheshire prepares us in a degree for the occurrence of this plant, and very possibly it may be found to recur in other Cheshire meres.—J. L. WARREN.

PLANTS OF HIND HEAD, SURREY.—List of species noted in July, 1869, by the Rev. W. W. Newbould and J. G. Baker at an elevation above sea-level of 300 yards or more on Hind Head, Surrey. Soil sandy.

Polygala depressa.	Pedicularis sylvatica.
Cerastium triviale.	Rumex Acetosella.
Spergularia rubra.	Luzula campestris.
Ulex Europæus.	Carex pilulifera.
U. nanus.	Aira præcox.
Potentilla Tormentilla.	A. flexuosa.
Rubus umbrosus.	Triodia decumbens.
Galium saxatile.	Anthoxanthum odoratum.
Apargia autumnalis.	Poa annua.
Achillea Millefolium.	Festuca ovina.
Campanula rotundifolia.	Agrostis vulgaris.
Calluna vulgaris.	Nardus stricta.
Erica cinerea.	Pteris aquilina.
Vaccinium Myrtillus.	

ADDITIONS TO THE SHETLAND FLORA.—Mr. Alexander Craig-Christie, in September, 1868, noticed the following species not enumerated in Mr. Tate's list in this Journal. (Vol. IV. pp. 2-15.)

Nasturtium officinale.	Luzula spicata.
Epilobium alsinifolium.	Sparganium ramosum.
Vaccinium Vitis-Idæa.	Eleocharis acicularis.
Juncus trifidus.	

See Trans. Bot. Soc. Edin. (vol. x. pp. 165-170 and 254-256) for a full list of all the species collected by Mr. Christie.

RIHAMNUS FRANGULA IN ROSS-SHIRE.—Dr. F. Buchanan White has found this apparently wild in the parish of Contin, Ross-shire (Trans. Bot. Soc. Ed. pp. 151-153), considerably north of previously-recorded stations.

COLEANTHUS SUBTILIS, *Seidel*.—Mr. Churchill has informed us that, in addition to the stations given at page 9, this plant was found,

* But see Mr. Watson's Compendium of Cyb. Brit. pt. i. p. 173, where No. 9 refers to my plant, and Syme's Eng. Bot. vol. viii. p. 122.

in 1852, at the Wolfsgraben See, on the Ritten plateau, above and north of Bozen, south Tyrol. (See Hausmann's 'Flora von Tirol,' p. 1504.)

FERTILIZATION OF *RUSCUS ACULEATUS*.—Professor Balfour and Mr. Sadler have lately examined the flowers of *Ruscus* very carefully, and have found male and female flowers on the same plant, and male flowers alone on other plants. Mr. Robert Tucker has collected it in flower on January 18th in the Isle of Wight. In Guernsey, Professor Dyer informs us, it is one of the most abundant plants on the broken cliffs *in the most exposed spots*; it is much stunted, but fruits abundantly.

Reports.

THE LOCAL FIELD-CLUBS OF GREAT BRITAIN.

II. TODMORDEN BOTANICAL SOCIETY.

This Society was founded on the 26th May, 1852, and has for its object "the promotion of the study of botany by the purchase of botanical books and periodicals, and the investigation of plants, not only as regards their classification and names, but also physiologically and anatomically, and in their relation to agriculture and horticulture." Its transactions are not published, but Mr. Thomas Stansfield, the Hon. Secretary, has kindly forwarded us copies of the annual reports for the last three years, from which we glean the following particulars:—

The subscription is six shillings yearly, or sixpence monthly. In May, 1869, there were 185 regular, or paying members, and 22 associates, or honorary and corresponding members, making a total of 207; and each year shows an increase in numbers. The meetings were held monthly until 1866, but have since taken place, on an average, fortnightly. At these the business of the Society is transacted, papers are read, objects exhibited, and (during the summer months) excursions take place. We are sorry to find that the attendance at these last is not always satisfactory; but the energetic manner in which the desirability of their continuance was evinced at a recent meeting, when this was called in question, leads us to hope that an improve-

ment may take place in this particular. The winter meetings are well attended; and the papers appear to be both useful and interesting.

We are glad to learn that the Society has carefully investigated the flora of Todmorden; and the last report announces that "the manuscript is very nearly completed, and that copy may be put into the hands of the printer as soon as the funds of the Society warrant such a proceeding." As the balance-sheet shows that the funds are in a satisfactory condition, we hope that the publication of this Flora may ere long be proceeded with, as such a work is peculiarly suitable to a local club.

Besides a library of more than 600 books, the Club possesses a large and valuable herbarium, various preparations illustrative of economic botany, and collections of fossils, minerals, etc. The accommodation for these is stated to be at present very inadequate. Among the more important contributions to the herbarium are those of the late Vice-President, Mr. John Nowell; his collection of British mosses is considered one of the most complete in existence.

Mr. Nowell was a most energetic officer of the Club, from its formation until his death in 1867; an obelisk has been raised to his memory by the members; he was well known as an able muscologist, and is further commemorated in the genus *Nowellia* (Mitten).

III. THE CHESTER-LE-STREET (DURHAM) NATURAL HISTORY AND SCIENCE CLUB.

This Society was established in December, 1868, and numbers at the present time between fifty and sixty regular, and three corresponding members. The officers are a President (Rev. R. Kirwood), two Vice-Presidents, a Treasurer, Secretary (Mr. Joseph Robinson), and a Committee, composed of twelve members. During 1869 several evening meetings have been held, two lectures by the Rev. A. M. Norman and George Lyall, Esq., F.G.S., have been given, and four field meetings have taken place. No definite work has at present been undertaken by the Society; but we learn that it is proposed to investigate carefully the flora of the district, which, when completed, will probably be published. The Society may be congratulated on having, in so short a time, enrolled so many members; but it must be remembered that the mere joining of such a body is in itself of little use, unless the

object for which it is established—"the practical study of natural history and science in all its branches"—be carried out.

It is intended to establish a museum and library in connection with the Society, donations to each of which are acknowledged in the report for 1869. A prize is offered for the best herbarium, collected between March and December, 1870.

The annual subscription is five shillings. No publications have been at present issued by the Club, except the brief report for 1869, to which we have above referred. The Treasurer's report shows a considerable balance in favour of the Society.

JAMES BRITTEN.

RECENT ADDITIONS TO OUR MOSS FLORA.

BY R. BRATHWAITE, M.D., F.L.S.

I.

Few departments of the British flora can show so marked an increase in the list of species as that of Bryology, for in the interval of fifteen years since the publication of Wilson's classical '*Bryologia Britannica*,' their number has been extended from 446 to 560, and this may be attributed, not only to an increase in the number of active collectors and students, but also to the much extended use of the microscope, and the greater attention paid to minute structural differences.

Besides our great English teachers Wilson and Mitten, the names of Schimper, Carl Müller, De Notaris, Lindberg, Hampe, Milde, Molendo, and Juratzka, are well known as those of authors and collectors who are constantly extending our knowledge of continental Mosses, and thus stimulating the search for, and discovery of, new ones in this country.

The short specific characters of the older bryological writers are often insufficient for the certain identification of species, and the haste to name new discoveries, or to supersede the established nomenclature for trivial reasons, coupled with the changes in generic names consequent upon the different opinions of authors, have so burdened the nomenclature of Mosses with synonyms, as to render their study quite discouraging to a beginner.

The magnificent '*Bryologia Europæa*' of Prof. Schimper first gave us an idea of the extent to which some of the old genera might be

broken up; *Hypnum* alone being divided into 16 genera, a few, indeed, truly natural, but others scarcely to be maintained on the slight characters assigned to them; for it is clear that a short or rostrate lid, a smooth or rough fruitstalk, can only be of sectional importance, though I am ready to admit that we may have genera of distinct habit and appearance which it is most difficult to define on paper.

Carl Müller, in his 'Synopsis Muscorum,' went too far in the opposite direction, at least among the *Pleurocarpi*, and massed together under *Hypnum* and *Neckera* a host of species, differing widely in habit and structure. His specific descriptions, however, are admirable, and in both these works we find the areolation, or form of cells in the leaf, taking a prominent place in diagnosis. Following these were the valuable communications of Mr. Mitten, on foreign Mosses, to the 'Journal of the Linnean Society,' in which he proposed a classification differing much from that generally accepted, and in which the modifications of the peristome hold quite a subordinate value in the construction of genera.

Now it is evident that when we find the leaf-structure to be constant in every Moss, and that many come before us only in the barren state, we have far greater advantages for the identification and arrangement of species, by characters derived from the leaf-cells, than by those founded on the peristome, because they are obtainable at any time during the existence of the individual. The majority of Mosses have also a certain habit or facies associated with their distinctive areolation, which readily enables us to refer them to their respective families, as, *e. g.*, the *Bryaceæ*, *Funariaceæ*, *Dicranaceæ*. Having bestowed much thought on the subject, I feel bound to admit that I consider Mr. Mitten's arrangement the most philosophical that has yet appeared, and in fact one that will be more appreciated hereafter, because it is, so to speak, in advance of the time, few bryologists being prepared to give up so much of the old views as to the value of the peristome. As some may be unacquainted with it, I append an outline of the principal divisions.

All Mosses are arranged in two suborders, *Schistocarpi*, comprising *Andreaea*, and *Stegocarpi*, or those with a lid, and the latter of these has two divisions,—*Homodictyi*, with areolation of uniform cells, and *Heterodictyi*, having two kinds of cells, and containing only the genus *Sphagnum*.

The *Homodietyi* are separated into three subdivisions, according to the structure of the peristome. 1. *Elasmodontes*; teeth composed of confluent cells—*Tetraphidaceæ*. 2. *Nematodontes*: teeth composed of filaments, sometimes free, usually combined into solid, tongue-shaped processes as in *Polytrichaceæ*, or into a folded membrane as *Buxbaumia*. 3. *Arthrodontes*; teeth transversely jointed, composed of a double layer of cells, the outer of two rows of coloured ones, the inner of a single series of hyaline cells; an internal membranous peristome is also often present. Here the *Cleistocarpous* section is abolished, and the species distributed among those families possessing kindred leaf-structure. If we compare the old *Phascum serratum*, *P. cuspidatum*, and *P. subulatum*, it is clear they have nothing in common save the deficiency of a lid, which, after all, is a matter of development, for in *crispum* and *rostellatum* the lid is perfectly distinct, though it does not fall off, and there is thus a gradual transition to *Gymnostomum microstomum*, *G. tortile*, etc.

In enumerating the Mosses recently recorded as British, I shall endeavour to render the list more complete by the addition of synonyms and descriptive characters, and I beg first to offer my sincere thanks to the Rev. J. Fergusson, of New Pitsligo, and to Messrs. Hunt, of Manchester, and Davies, of Brighton, for valuable information, and specimens of rare species.

ANDREÆACEÆ.

The close resemblance to one another among the species of the genus *Andreaea*, has caused several to have been overlooked, but the investigations of Zetterstedt, Thedenius, and Schimper, have enabled us to discriminate them, as well as to rectify their nomenclature.

It may be a question whether some of the species are more than varieties, especially when we see the endless forms assumed by *A. petrophila*, nine of which having received names, I transcribe them here, as probably most of them occur with us. Besides the British species here tabulated, *A. Hartmanni*, *A. Thedenii*, *A. sparsifolia*, and *A. Blyttii*, are found in Norway and Lapland.

* *Leaves nerveless.*

1. *A. petrophila*, Ehrhart—*A. rupestris*, Hed.: var. β . *acuminata*; γ . *flaccida*; δ . *squarrosula*; ϵ . *sybvicola*; ζ . *gracilis*; η . *alpicola*; θ . *pygmaea*; ι . *robusta*; κ . *homomalla*.

2. *A. alpestris*, Schimper.—Stems taller, “very slender, much branched, densely tufted. Leaves crowded, very small, patent on all sides when moist,” shorter than in the last species, ovate, obtuse, with laxer areolation, quadrate at margin. Glen Callater (Fergusson), Perthshire (M’Kinlay).

3. *A. obovata*, Thed.—Densely tufted, blackish brown, tall and robust. Leaves somewhat like those of *alpina*, from an imbricating base, ovato-panduriform, gradually lanceolate, nearly smooth, glossy, quite entire at margin, areolation much laxer. Glen Callater (Fergusson).

4. *A. alpina*, Turner.—*Lichenastrum alpinum*, Dill.

** *Leaves nerved.*

5. *A. rupestris*, Turner.—*Jungermannia rupestris*, L. *A. Rothii*, Web. and Mohr; var. *β. septentrionalis*.

6. *A. Grimsulana*, Bruch.—Usually regarded as a form of *rupestris*, but much more robust, rufous-black, the leaves broader, more solid, falcato-secund, and the perigonal leaves broadly ovate, not acuminate. Ingleborough.

7. *A. crassinervia*, Bruch.—In depressed, deep black tufts. Stem prostrate, ascending, very fragile. Leaves crowded, falcato-secund, glossy, oblong at base, gradually subulate in the upper half, apex occupied solely by the stout nerve, which is round in section and papillose, margin entire, cells quadrate. Alpine rocks, generally confounded with *A. rupestris*.

8. *A. falcata*, Schimper.—Smaller than last, black, very fragile. Leaves opaque, falcato-secund, from a dilated base, suddenly lanceolate-subulate, nerve flattened, ending at or below the apex, which is crose at margin. Cader Idris and Snowdon (Schimper). Perthshire (M’Kinlay).

9. *A. nivalis*, Hooker.

ADDITIONS TO THE BRITISH LICHEN-FLORA.

BY THE REV. J. M. CROMBIE, M.A., F.L.S.

Since the completion of the MSS. of my ‘Lich. Brit. Enum.’ in August, 1869, various species and varieties, which could not well be inserted as it passed through the press, have been added to the Lichen-

flora of Great Britain. To record these, as well as to correct any mistakes and omissions in my 'Enumeratio,' is the object of the present article.

Collema diffractum, Nyl.—The plant so named by Jones, Mr. Carroll informs me is the same as *Pyrenopsis diffundens*, Nyl., and is, therefore, to be omitted from the British list.

C. auriculatum (Hoffm.), Nyl. Syn. 106.—On decayed mosses on shady walls in subalpine districts. Apparently rare, as at Appin, Argyleshire (Crombie), but may be expected to be met with elsewhere in similar tracts.

Pilophoron fibula, Tuck. L. N. Amer. 46.—On schistose mountainous rocks. Rare and local, having as yet been detected only on Cader Idris, Wales (Leighton), though from its external similarity to *Stereocaulon cereolinum*, it may probably have elsewhere been overlooked. The previously recorded habitats for this interesting plant are the White Mountains, North America, and Dianovagora in Finland.

Usnea florida, var. *rubiginea*, Ach.—On trunks of trees in shady woods, probably not uncommon in the South of England, as in St. Leonard's and the New Forests.

Usnea ceratina, Ach.—In subalpine woods on aged pines, as at Hafod, Cardiganshire, and Killin, Breadalbane.

Cetraria aculeata, var. *acanthella*, Ach.—Amongst mosses on the ground in moorlands. Apparently not very common, as at Hill of Ardo, near Aberdeen.

Platysma cucullatum (Hoffm. Pl. Lich. 66, 2).—On sterile ground in alpine places. Extremely rare, and gathered only very sparingly on the summit of Cairntoul, Braemar (Crombie). Transition states between this and *P. nivale* are occasionally seen on the higher mountains of the same district.

P. sæpincola, * *ulophyllum*, Ach.—On Pine-trees and pales. This is the form which most frequently occurs, at least in Scotland, the other being there but rarely met with.

Nephromium lusitanicum (Schær.).—This is a distinct species, and in addition to the Irish locality, has since been gathered in Appin, at Dolgelly, and in Cornwall, and is probably not uncommon in the sub-alpine tracts of West Britain.

Parmelia discreta (Nyl.) = *P. alpicola*, Th. Fries.—Abundant on Morrone, Braemar, as also on Ben More, Breadalbane, and more

sparingly on others of the higher Grampians. It is evidently var. *stygioides*, Linds., of *P. encausta*, from the typical form of which, very rare on the Braemar Mountains, as Cairntoul, it is readily recognised.

Parmeliopsis hyperopta, Ach. Syn. 208 (*P. aleurites*, Ach. Nyl. Scan. 105). On the lower part of the trunks of pines in mountainous districts. Perhaps not very rare, as in Glen Dee, Braemar (Crombie), and formerly gathered in the Scotch Highlands, the locality not specified, by the Rev. J. Dalton.

Physcia aipolia (Ach.), Nyl. Scan. 111.—On trunks of trees, rarely on stones of walls in cultivated tracts. Probably not rare, at least in the southern counties of England, with its forms *acrita*, Ach., and *tribacia*, Ach.

Placodium murorum, var. *pusillum*, Hepp.—On calcareous rocks in mountainous regions. Apparently rare, as on the limestone ridge, Morrone (Crombie), but scarcely distinct from states of var. *miniatum* (Hoffm.).

P. variabile (Pers.), Nyl. Scan. 138.—On rocks in subalpine districts. Apparently rare and local, at Buxton, Derbyshire (Holl.), but perhaps to be detected elsewhere in the north of England.

Lecanora ferruginea, var. *concilians*, Nyl. Scan. 143. On rocks in maritime tracts. Not unfrequent on the coast of Kincardineshire (Crombie), along with f. *festiva* and others.

L. atro-cinerea (Deks., Sm. E. B. 2096).—On maritime rocks, Beaufort Bay, Jersey (Larbalestier), and no doubt in other localities on the British coasts. According to Nyl. in litt., the reaction of the thallus (K +) shows this to be a distinct species from *L. atro-cinerea*, Fries.

L. umbrina, f. *subdistans*, Nyl. in litt.—On granitic maritime rocks. Apparently rare at Portlethen, Kincardineshire (Crombie); var. *conferta*, Dub. On granite stones of a wall near Aberdeen (Crombie), a state with thin greenish or evanescent thallus, and paraphyses scarcely discrete.

L. hypophæa, n. sp., Nyl. in Flora, 1870, p. 34.—On granite stones of old walls. This new species was gathered by me sparingly, August, 1869, near Old Machar Cathedral, Aberdeen. It is allied to *L. privigena*, Ach., from which it is distinguished chiefly by its greyish-green granulate thallus, and the crenulate or undulate margin of the apothecia.

L. elatina, Ach. L. U. 387. On the trunk of holly in subalpine districts. Apparently very rare and local, having been met with only very sparingly at Killarney in Ireland (Carroll), though from its general resemblance to states of *Lecidea luteola*, it may have been elsewhere overlooked.

Lecidea plicatilis, n. sp., Leight. Ann. and Mag. Nat. Hist. 1869, p. 201.—On schistose, mountainous rocks. Rare and local, having been gathered but sparingly on Cader Idris (Leighton), though it is likely to occur also on the Western Grampians of Scotland.

L. vermifera, Nyl.—This, in my Enum. was by mistake given as a subspecies of *L. holomelena*, Hepp., instead of *L. holomelena*, Flk. = *L. pelidna*, Ach.

L. resinæ, var. *rubicundula*, Mudd, Man. 189.—This from a specimen in Herb. Brit. Mus., and according also to Leighton, is evidently the same as *L. tantilla*, Nyl., and is therefore to be regarded only as a synonym of the latter species.

L. squalida, Ach. L. U. 169.—On the ground in crevices of calcareous rocks in mountainous districts. Apparently rare and local, having been gathered only very sparingly on the north-western slope of Morrone, Braemar (Crombie), and externally resembling states of *L. bacillifera*, Nyl.

L. interludens, n. sp., Nyl. in Flora, 1870, p. 35.—On schistose boulders in alpine regions. Rare and local near the summit of Morrone, Braemar (Crombie). This new species is allied to *L. mollis*, Whlbb., from which it is distinguished chiefly by its apothecia being convex, immarginate, or with a white epithalline margin, colourless within, as well as by its large elliptical spores.

L. contigua, var. *notabilis*, Nyl. Scan. 225.—On quartzose rocks in shady places in subalpine tracts. Apparently rare, having as yet been gathered only on the lower wooded slope of Morrone, Braemar (Crombie), but will no doubt occur also in other parts of that district.

L. amphibia, Frs. L. Ref. 307.—On schistose, mountainous rocks. Perhaps not uncommon, though as yet found only on Cader Idris (Leighton), and not readily distinguished from states of *L. contigua* and its allies.

L. jurana, Schær. Enum. 123.—On rocks and walls in mountainous districts. Probably not unfrequent, as on Cader Idris (Leighton), and at Castleton of Braemar (Crombie).

L. symphorella, n. sp., Nyl. in Flora, 1870, p. 35.—On quartzose stones in alpine places. Rare and local on the summit of Morrone, Braemar. This new species, Nylander observes, is somewhat doubtful as to genus; that which apparently is the true thallus being adnate, or under the apothecia, with green, elliptical gonidia (almost gonimia).

L. aglæa, Smmf. Lapp. 144.—Extremely rare on the Scottish Grampians, having been found only very sparingly on Ben Cruachan (Crombie). The thalline reaction shows *L. Crombiei*, Jones, to be only a var. of this, distinguished chiefly by the colour of the hypothecium.

L. alpicola (Schær.), Nyl. Prod. 142.—On rocks in alpine places. Though reported from various localities, I have met with the true plant only once, on whinstone boulders, towards the summit of Ben Nevis.

L. colludens, Nyl. in Flora, 1870, p. 38 = *L. albo-atra*, var. *chlorospora*, Nyl. olim.—On rocks in subalpine districts. Perhaps not unfrequent, as near Dolgelly in Wales (Holl.), and if I mistake not, also on the coast of Kincardineshire.

Schizoxylon corticola (Frs.), Nyl. Scan. 249.—On trunks of trees in wooded districts. Not unfrequent on old oaks about Lyndhurst in the New Forest (Crombie). This genus is allied to *Odontotrema*, Nyl., but both, perhaps, are rather to be regarded as belonging to the Fungi.

Verrucaria subumbrina, Nyl.—This was originally gathered on Ben Lawers by Admiral Jones, and Mr. Carroll informs me that the plant from the Irish locality given in my Enum. was doubtfully referred to this species.

There are thus eighteen species, four of which are new to science, and nine varieties, collected chiefly in August and September last, to be added to the list of the British Lichen-flora. Nor does this represent the sum total, for amongst many rare Lichens collected by Dr. Holl last autumn, in the Breadalbane Highlands, there are evidently several new species, which will no doubt be duly recorded in this Journal.

Extracts and Abstracts.

REVIEW OF THE GENUS NARCISSUS.

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

(*Extracted from the 'Gardeners' Chronicle' for 1869.*)

(*Concluded from page 36.*)

Group II. *MEDIOCORONATÆ*: *crown half as long as the divisions, or in one or two exceptional cases three-quarters as long.*

Of this group there are seven leading types known, five of which appear to be species, in the broad botanical sense, and are known definitely as wild plants, whilst the other two, though tolerably well known in horticulture, and keeping up a distinctly marked individuality, are not known anywhere in a native state.

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|--|--------------------|
| Divisions of the perianth distinctly reflexed . . . | 4. TRIANDRUS. |
| Divisions of the perianth spreading at a right angle from the base of the crown. | |
| Large-flowered; the divisions 9-12 lines long, and the corona 5-6 lines. | |
| Divisions of the limb white. | |
| Crown white, half as long as the divisions . . | 5. POCULIFORMIS. |
| Crown bright yellow, three-quarters as long as the divisions | 6. MACLEAIL. |
| Crown and divisions of the limb both yellow. | |
| Flower always solitary; leaf 6-7 lines broad, glaucous | 7. INCOMPARABILIS. |
| Flowers 1-2; leaf 3-3½ lines broad, bright green | 8. ODORUS. |
| Small-flowered; the divisions 3-6 lines deep, and the crown half as long. | |
| Divisions and limb bright yellow; leaf green, cylindrical | 9. JUNCIFOLIUS. |
| Divisions and limb white; leaf glaucous, flattish | 10. DUBIUS. |

IV. *N. TRIANDRUS* (L. Sp. Plant. p. 416).—Bulb not more than half an inch thick. Leaves very slender, semi-cylindrical, 6-8 in. long, green, 3-4 to a scape, under a line broad. Scape very slender, 6-12 in. long, one- or two-flowered. Spathe 6-9 lines long, the pedicels of the solitary or the uppermost flowers equalling or exceeding it.

Flowers produced in its native localities in the south of Europe in April, horizontal or cernuous, measuring 9–10 lines from the top of the ovary to the top of the crown, the tube cylindrical, under $\frac{1}{2}$ line thick in the lower half, pure white, like the reflexed divisions of the limb, which just equal it in length, and are lanceolate, acute, $1\frac{1}{2}$ –2 lines broad at the base; crown pure white, obconical, $2\frac{1}{2}$ –3 lines deep, erecto-patent and entire at the throat. Stamens distinctly biseriate, the three lower ones inserted low down in the tube, the three upper ones near the top of the tube, the filaments straight, 3–4 lines long, sometimes, as is the style, slightly exerted from the corona.—*Ganymedes triandrus* and *G. albus*, Haw. *N. coronatus* and *N. Coornei*, De Cand. in Redouté, Lil. vol. viii. *Ganymedes Linnæi*, Kunth, Enum. 5, p. 719. *Illus triandrus*, Haw. Mon. p. 4. *N. pallidulus*, Graells in Bourg. Exsic. Hisp., n. 2282.

A native of Spain, not, so far as we know, in cultivation in this country. From the other plants of this group it is distinguishable at a glance by its very slender habit and the reflexed divisions of the perianth, in both of which it exactly corresponds with *N. calathinus*, of the group treated in our last paper, from which the difference in the size of the corona separates it. The name *triandrus* originated in a misconception, Linnæus having overlooked the three stamens of the lower row, which sometimes remain hidden down in the tube, whilst the outer three, which rise from the top of the tube, are conspicuous. The following are the principal varieties:—

1. *pulchellus*, 3–4-flowered, the corona white, the divisions bright yellow.—*N. pulchellus*, Salisb. Prodr. p. 223. *Ganymedes pulchellus*, Haw. and Kunth, Sweet, Brit. Flow. Gard. ser. 2, t. 99. *N. triandrus*, var. *luteus*, Bot. Mag. t. 1262.

2. *cernuus*, 1–2-flowered, the flower pale yellow, the crown a rather deeper yellow, and both divisions and crown rather larger than in the type.—*N. triandrus*, Bot. Mag. t. 48. *N. cernuus*, Salisb. Prodr. p. 223. *Ganymedes cernuus*, Salisb. Haw. Herb. Kunth.

3. *concolor*, 2–4-flowered, the divisions and crown a concolorous pale yellow, the same size as in the type.—*Ganymedes concolor*, Haw. Herb. Kunth; Sweet, Brit. Flow. Gard. ser. 2, t. 113.

4. *nutans*, 2–3-flowered, the crown a deeper yellow than the divisions, crenulate.—*N. trilobus*, Bot. Mag. t. 945. *Ganymedes nutans*, Haw. Herb. Kunth.

V. *N. POCULIFORMIS* (Salisb. Prodr. p. 224).—Bulb an inch thick. Leaves 4 or 5 to a scape, flattish, glaucous, $\frac{1}{4}$ – $\frac{3}{8}$ in. broad, rather shorter than the scape. Scape a foot high, with two not very prominent edges, 1- or 2-flowered, flowering early in April. Pedicel generally equalling, or, if there are two flowers, that of the uppermost exceeding the spathe, which is about an inch long. Flower cernuous, pure white, odorous, 18–21 lines long above the ovary; the tube cylindrical, shorter than the divisions (9–10 lines), a line thick in the lower half; the divisions an inch long, oblong-lanceolate, acute, often slightly twisted, $\frac{3}{8}$ or even $\frac{1}{2}$ in. broad at the middle; the crown the same colour as the rest of the flower, $\frac{1}{2}$ in. deep, uniform in texture throughout, moderately plicate and crenulate at the throat. Stamens subuniseriate from high up in the tube, the filaments scarcely longer than the anthers, the latter exerted from the tube, but standing down deep in the corona.—*Quellia moutana*, Herb. Kunth. *N. moutanus*, Lindl. Bot. Reg. t. 123. *Tros poculiformis* and *T. galanthifolia*, Haw.

This is a plant which has long been well known in garden cultivation, but which has never been satisfactorily matched with wild specimens, and which, as it is said never to produce seed, is, in all probability, a garden product. Judging purely from its characters, the plants most likely to have produced it are those which Herbert suggested, *N. dubius* and *Pseudo-Narcissus* var. *moschatus*. In both habit and characters it looks a good deal like a white-flowered variety of *incomparabilis*, but the leaves are not quite the same, the flower is cernuous, and frequently two are produced, and it is sweet-scented.

VI. *N. MACLEAII* (Lindl. Bot. Reg. t. 987).—Bulb an inch or more thick. Leaves 5 or 6 to a scape, 8–10 in. high, bright green, concave on the face, 5–6 lines broad. Scape about a foot high, subcompressed and slightly two-edged, bearing one or rarely two flowers early in April. Pedicel of the solitary flowers considerably shorter than the spathe, which is 15–18 lines long. Flower ascending as in the Daffodil, 15–16 lines deep, exclusive of the ovary; the tube cylindrical, 7–8 lines long, $\frac{1}{3}$ in. thick, white, tinged downwards with green; the divisions milk-white, spreading at a right angle from the base of the crown, oblong-lanceolate, much imbricated, 8–9 lines long, $4\frac{1}{2}$ –6 lines broad, bluntish or subacute. Crown 5–6 lines deep, bright yellow, very slightly plicate, $\frac{1}{2}$ in. broad at the mouth, slightly lobed.

Stamens subuniseriate from above the middle of the tube, just reaching into the corona. Style $\frac{3}{4}$ – $\frac{7}{8}$ in. long, included in the corona.—Bot. Mag. t. 2588. *Queltia Macleana*, Herb. Kunth. *Diomedes minor*, Haw.

This also, like the last, is known only in cultivation. It flowered well at Kew this year, both in No. 4 house and in the borders, and our description is taken from the living specimens. It resembles most the *bicolor* variety of *Pseudo-Narcissus*, from which it may be known by its smaller size, bright green leaves, and crown not more than $\frac{1}{2}$ in. long. Is it a hybrid between *Tazetta* and some of the varieties of the Daffodil? The *N. super-Pseudo-Narcisso-poeticus* of Grenier (Fl. France, 3, p. 255) corresponds with it, judging from the description, but we have not seen specimens.

VII. *N. INCOMPARABILIS* (Curt. Bot. Mag. t. 121).—Bulb ovoid, 12–18 lines thick. Leaves 3 or 4 to a scape, about a foot long, bluntly keeled, 6–7 lines broad, slightly glaucous. Scape a foot or sometimes 15–18 in. high, compressed and distinctly two-edged. Flower always solitary, produced about London late in March or early in April, more or less distinctly ascending. Pedicel 6–9 lines long, always considerably exceeded by the spathe. Expanded flower $2\frac{1}{4}$ – $2\frac{1}{2}$ in. broad, not sweet-scented, the tube nearly or quite an inch deep, cylindrical, $1\frac{1}{2}$ –2 lines thick at the middle, 3 lines at the throat, the divisions spreading, slightly imbricated, an inch long, generally a rather paler yellow than the crown, oblong-lanceolate, 6–8 lines broad. Crown 6–7 lines deep, orange-yellow, nearly erect, much plaited at the throat, and furnished with six deep imbricated lobes; the mouth 8–9 lines across. Stamens subuniseriate, inserted about the middle of the tube, the filaments and anthers each 3 lines long, the filaments reaching to the top of the tube. Style 13–14 lines long, reaching about halfway up the crown.—Reich. Fl. Germ. t. 819. *Queltia incomparabilis*, Haw. *Q. fetida*, Herb. Am. p. 311; Kunth, Enum. 5, p. 723. *Q. ampla*, Salisb. *N. Gouani*, Roth. *Q. senipartita*, Haw. (form with a more spreading and more deeply-lobed crown). *Q. concolor*, Haw.

Var. 1, *aurantius*.—A robust form with the crown orange, but the divisions a pale (sulphur) yellow.—*N. aurantius*, Schult. Syst. 7, p. 948. *N. Gouani*, Redouté, Lil. t. 220. *Queltia Gouani* and *Q. aurantia*, Haw. Mon. p. 5. Flore-pleno forms of this are the “Non-

pareil" and "Butter-and-Eggs" of English gardens. In one specimen from Messrs. Barr and Sugden, the flower quite 3 in. across.

Var. 2, *albus*.—The crown still orange, but the divisions a very pale sulphur-yellow or milk-white.—*N. albus*, Spach. *Quellia alba*, Haw. *N. albidus*, Schult. *Q. foetida*, var. *grisea*, Herb. and Kunth. The flore-pleno form is the "Orange Phoenix" of the gardens.

Extending as a wild plant from Spain and the south-west of France to the Tyrol, and nearly or quite as common as the Daffodil in cultivation. It quite corresponds with the Daffodil in the leaves and general habit, but even through the double-flowered forms may always be known by the crown being not more than half as long as the divisions of the limb. Herbert produced a plant, which is figured at tab. 38 of vol. xxix. of the 'Botanical Register,' which is exceedingly like the var. *albus*, by fertilizing one of the varieties of the Daffodil with the pollen of *N. poeticus*. We cannot distinguish *N. Bernardi* of Henon, judging of it from Henon's figure, and from copious dried specimens, by any definite character from *N. incomparabilis*; but Prof. Grenier, in his excellent and full account of the French Narcissi in the 'Flore de France,' keeps up *N. incomparabilis* as a species, but regards *Bernardi* as a hybrid between the Daffodil and *poeticus*. If this view be correct, we have a true and a hybrid *incomparabilis*, barely distinguishable from one another, like the true and hybrid Oxlip.

VIII. *N. ODORUS* (L. Sp. Plant. p. 416).—Bulb ovoid, 12–15 lines thick; leaves 3–4 to a scape, nearly a foot long, $2\frac{1}{2}$ –3 lines broad, very concave on the face and convex on the back, bright green or very slightly glaucescent; scape 12–15 in. high, scarcely at all compressed or two-edged, producing early in April 1–4, generally 2 flowers, which are sweet-scented and horizontal or ascending, the pedicel of the upper one nearly or quite equalling the spathe, which is more than an inch long. Perianth bright yellow, 15–21 lines deep, exclusive of the ovary, the tube 6–9 lines long, more slender than in *incomparabilis*, $\frac{1}{8}$ in. thick in the lower part, but wider at the throat, the divisions 9–12 lines long, oblong-lanceolate, acute, very slightly paler than the corona, a fresh bright yellow, 5–8 lines broad in the middle, usually imbricated for the lower half or third. Crown 5–6 lines deep, not so much plaited as in *incomparabilis*, the throat subcrect, more or less distinctly 6-lobed, $\frac{1}{2}$ – $\frac{5}{8}$ in. across; stamens subuniseriate in the tube, the filaments and

anthers both about the same length ($2\frac{1}{2}$ –3 lines), the latter reaching out of the throat of the tube. Style 10–12 lines long, reaching about halfway up the corona. Red. Lil. t. 157; Reich. Fl. Germ. t. 818.—*N. trilobus*, L. Sp. Plant. p. 417. *N. calathinus*, Bot. Mag. t. 934, non L. *N. infundibulum*, Poiret, Ency. iv. p. 427. *Queltia odora*, Herb. Amar. p. 313; Kunth, Enum. v. p. 725. *Philogyne Campernelli*, *P. calathina*, *P. rugulosa*, *P. interjecta*, *P. terminalis*, and *P. triloba*, Haworth.

Var. *lætus*.—Flowers smaller, the divisions shorter and blunter, scarcely more than half as long again as the crown.—*N. lætus*, Salisb. Prodr. p. 224; Reich. Fl. Germ. t. 820. *N. odorus*, Curt. Bot. Mag. t. 78. *Philogyne Curtisii*, Haw. Mon. p. 6.

A very distinct and well-marked plant, deservedly common in our gardens, extending in a wild state from Spain through the south of France to Italy and Dalmatia. Neither the divisions nor the crown, so far as we have seen, vary materially in colour, being always both of them a decided bright yellow. It comes nearest the typical *incomparabilis*, but the leaves are quite different, and the flowers are rarely solitary, and possess a decided fragrance. It was in order to mark the contrast in this latter point between the two that Herbert changed the name *incomparabilis* to *foetida*, an alteration which, of course, is quite inadmissible.

IX. *N. JUNCIFOLIUS* (Requien in Lois. Not. p. 14).—Bulb ovoid, about half an inch in thickness; leaves 3–4 to a scape, of a bright green, quite cylindrical and rushlike (whence the name) in shape, 4–6 in. long; scape scarcely exceeding the leaves, very slender, and not at all 2-edged. Flowers 1 or 2, rarely 3, produced in England about the middle of April, nearly sessile in the spathes, or elevated on pedicels 6–12 lines long; tube 7–9 lines long, very slender, cylindrical, scarcely more than half a line in thickness; divisions bright yellow, patent, obovate, $\frac{3}{8}$ – $\frac{1}{2}$ in. long, $\frac{1}{4}$ in. broad, cuspidate, decidedly imbricated. Crown the same colour as the divisions, obconical, faintly crenulate, $2\frac{1}{2}$ –3 lines deep, $4\frac{1}{2}$ –5 lines in diameter at the mouth. Stamens sessile, biseriate, the upper anthers at the throat of the tube, the lower three a short space below it; style scarcely exceeding the tube. Gren. Fl. France, iii. p. 257.—*Queltia juncifolia*, Herbert and Kunth. *N. Requienii*, Rœm. Amaryll. p. 236. *Philogyne minor*, Haw. Mon. p. 6. *Q. pusilla*, Herb. Amary. t. 43, fig. 2. *N. Assoanus*, Dufour in

Schult. Syst. vii. p. 962. *Q. Assoana*, Kunth, Enum. v. p. 730. *N. apodanthus*, Boiss. and Reut. Diagn. p. 25.

Var. *gaditanus*.—Flower smaller, the divisions being scarcely longer than the crown, which is the same size as in the type.—*N. gaditanus*, Boiss. and Reut. Diagn. iv. p. 96; Willk. Bot. Zeit. 1860, p. 104; Bourg. Pl. Exsic. Hisp. n. 2042.

A native of Spain and the South of France. This is one of the smallest plants in the genus, and is too small to be generally popular. It is in cultivation at Kew, and we have seen it lately in two private collections. It is very like the Jonquil on a smaller scale, and may be readily distinguished by the crown being half as long as the divisions.

X. *N. DUBIUS* (Gouan, Illust. 22).—Bulb ovoid, 9–12 lines in thickness; leaves 4–6 to a scape, concave on the face, glaucescent, 5–6 in. long, $1\frac{1}{2}$ –3 lines broad; scape 6–9 in. long, slender, decidedly compressed, and 2-edged. Flowers 2–6, the pedicels of the upper ones considerably exceeding the spathe. Tube cylindrical, pure white, 5–6 lines long, about a line in thickness. Expanded flower, 6–9 lines across, the divisions pure white, ovate-oblong, 3 lines long, 2–2 $\frac{1}{2}$ lines broad, imbricated, patent or slightly reflexed, subobtusate or cuspidate. Crown pure white, obconical, $\frac{1}{8}$ in. deep, slightly crisped and crenulate at the throat, which is not more than 3 lines across. Stamens biserrate, subsessile, the upper three reaching into the corona. Style about as long as the tube. Reich. Fl. Germ. t. 812; Gren. Fl. France, iii. p. 260; Moggridge, Cont. Fl. Mentone, t. 71.—*N. pallidus*, Poir, Ency. iv. p. 424. *Hermione dubia*, Haworth, Herbert, and Kunth.

A native of the South of France, about Toulon, Marseilles, Avignon, and Nice. We have not seen it in English gardens, but there are excellent figures in the works of Reichenbach and Moggridge, which we have quoted. On the one hand it resembles *juncifolius*, but the leaves and stem are quite different, and the flowers are a uniform pure white, instead of a bright yellow. On the other hand, it comes exceedingly near some of the multiform varieties of *Tazetta*.

Group III. PARVICORONATÆ: *crown less than half as long as the divisions of the perianth.*

Of this group we may define 11 leading types, as follows:—

Limb of the flower horizontal, or nearly so, when expanded; anthers sessile, or very nearly so.

Flowering in spring:—

- Crown cupshaped, 2-4 lines deep, the edge uniform with the rest—
- Leaves glaucous, flattish, $\frac{1}{2}$ - $\frac{5}{8}$ in. broad . . . 11. TAZETTA.
- Leaves subterete, green—
- Flowers 1-2, nearly white, with a tube 12-14 lines long 12. GRACILIS.
- Flowers 3-6, yellow, with a tube 8-9 lines long 13. INTERMEDIUS.
- Crown obconical, uniform, not more than a line deep—
- Flowers white; leaves flattish, glaucous, 3-4 lines broad 14. PACHYBOLBUS.
- Flowers bright yellow; leaves terete, bright green 15. JONQUILLA.
- Crown obconical, 1-1 $\frac{1}{2}$ line deep, the edge different in texture to the rest, and much crisped and crenulate—
- Flowers in pairs; crown with a yellow rim . 16. BIFLORUS.
- Flowers solitary; crown with a scarlet rim . 17. POETICUS.
- Flowering in autumn:—
- Leaves contemporaneous with the flowers—
- Divisions of the flowers greenish 18. VIRIDIFLORUS.
- Divisions of the flower white 19. ELEGANS.
- Leaves produced after the flower 20. SEROTINUS.
- Limb of the flower campanulate; crown nearly obsolete; anthers shorter than their filaments . . . 21. BROUSSONETII.

XI. *N. TAZETTA* (L. Sp. Plant. p. 416) — Bulb $1\frac{1}{2}$ -2 in. thick, copiously tunicated, with brown membranous coats; leaves 4-6 to a scape, glaucescent, flattish, bluntly keeled on the back, $\frac{1}{2}$ - $\frac{5}{8}$ in. broad in the wild plant. Scape a foot or more high, furnished with 2 raised lines, and distinctly compressed. Flowers odorous, produced late in March or early in April near London, usually 4-8; the spathe $1\frac{1}{2}$ -2 in. long, the lower pedicels exceeding it. Tube $\frac{3}{4}$ - $\frac{7}{8}$ in. long above the ovary, the divisions of the flower white, rather shorter than the tube, the alternate ones frequently narrower, all much imbricated, bluntish or cuspidate, 4-5 lines broad, spreading horizontally when fully expanded or slightly reflexed; the expanded flower in the wild plant 12-15 lines across. Crown a uniform bright yellow, $2\frac{1}{2}$ -3 lines deep, the edge subentire or slightly crenulate or lobed. Anthers sessile, biseriate, the upper ones protruded into the crown.

The above description applies to a plant which is very common in cultivation, and extends in a wild state from the south of Europe,

through Syria, Cashmere, and the north of India, to China and Japan. There is a very large number of forms wild in the south of Europe, and known in cultivation, which do not differ from it in any important characters, and which appear to slide into one another so gradually, that it is impossible to individualize them, or characterize them in any definite manner. Of those known in our gardens thirty years ago, 46 are briefly described in Haworth's Monograph under specific names, and recently 26 of the wild ones have been fully described by Professor Parlatore ('Flora Italica,' vol. iii. pp. 125-156), and 14 of them have been beautifully figured in Jordan and Fourreau's 'Icones Floræ Europææ.' To these works we refer any of our readers who wish to study out the subject in full detail. All that we propose to attempt here is to characterize a few of the most striking of these various forms, and to enumerate under each of them the most important or best known figures and synonyms.

Series 1.—*Segments of the limb white, crown yellow.*

Var. 1, *N. lacticolor*.—The typical plant, as just described, of which good figures will be found in Sibthorp and Smith's 'Flora Græca,' t. 358, and Moggridge's 'Mentone,' t. 23.—*Hermione brevistyla* and *H. Tazetta*, *ex parte*, Herbert and Kunth. *H. formosa*, Jordan, t. 189, *H. discolor*, Jordan, t. 183, and *H. pratensis*, Jordan, t. 187. *H. Trewiana*, Sweet, ser. 2. t. 118; Jord. Ic. t. 188 (a large form, common in cultivation, with flowers nearly 2 inches across). *H. floribunda*, Haw. Mon. p. 11; Jord. Ic. t. 181 (large). *N. Cypri*, Sweet, ser. 2. t. 92. *H. crispicorona*, Haw. Mon. p. 11; Jord. Ic. t. 190 (a large-flowered form, with a deep-coloured, crisped corona, $\frac{1}{2}$ – $\frac{5}{8}$ in. broad at the mouth). *H. breviflora* and *H. auranticorona*, Haw. Mon. p. 11, and *N. orientalis*, Bot. Mag. t. 940 (nearly or quite the same as the last). *N. patulus*, Lois. Journ. Bot. 1809, ii. p. 276, the same as *Hermione patula*, Haw. Mon. 11; Kunth, v. p. 755 (a small form, with the expanded flower 9-10 lines across, tube $\frac{1}{2}$ in. long, leaves 3-4 lines broad). *

Var. 2, *N. mediterraneus*.—Differs from the last by the narrower divisions of the flower, which are not more than a quarter of an inch broad, not at all imbricated, and more lengthened out at the point.—*H. mediterranea*, Jord. t. 185. *H. monspeliensis*, Jord. t. 186. *H. insolita*, Jord. t. 184. *H. ganymedoides*, Jord. t. 182 (divisions slightly reflexed).

Var. 3, *N. polyanthos*.—Flowers 8–20, 12–15 lines across when fully expanded. Divisions pure white, 4–5 lines broad, imbricated, bluntish or euspidate, equalling or shorter than the tube. Corona about a third as long as the divisions, at first a very pale yellow, finally becoming nearly the same colour as the divisions, slightly plicate, the edge subentire.—*N. polyanthos*, Lois. Fl. Gall. i. p. 236; De Cand. Fl. Franc. p. 323; Reich. Ic. t. 367. *Hermione polyantha*, Haw. Mon. p. 11; Kunth, vol. v. p. 757.

Var. 4, *N. ochroleucus*.—Leaves greener and more convex on the back, and stem more nearly terete than in the foregoing. Expanded flower 12–15 lines across; the divisions milk white, half an inch broad, much imbricated; the corona citron-yellow, with a subentire edge, nearly half as long as the divisions.—*N. ochroleucus*, Lois. Gall. i. p. 236; De Cand. Fl. Franc. v. p. 325. *Hermione tereticaulis*, Haw. Mon. p. 8; Sweet, Flow. Gard. ser. 2. t. 179; Kunth, v. p. 752.—This var. connects *Tazetta* with the two next species.

Series 2.—*Crown and segments of the limb both pure white.*

Var. 5, *N. papyraceus*.—Leaves glaucescent, $\frac{1}{2}$ – $\frac{5}{8}$ in. broad; stem ancapitous; expanded flower 15–18 lines across; the tube greenish-white, 8–9 lines long above the ovary; the divisions pure white, 3–4 lines broad, generally narrowed gradually to a point, and moderately imbricated; crown 2–2 $\frac{1}{2}$ lines deep, with a crenulate edge, just the same colour as the divisions.—*N. papyracea*, Gawl. Bot. Mag. t. 947 (1806); Mogggridge, Cont. Ment. t. 70; Parl. Fl. Ital. iii. p. 125. *Hermione papyracea*, Haworth, Herb. Kunth. *N. unicolor*, Vent. Hort. Malm. t. 26; Tenore, Fl. Neap. i. p. 144, t. 26. *N. niveus*, Lois. Narciss. p. 37 (1810); Gren. and Godr. Fl. Franc. iii. p. 260; Reich. Ic. t. 815.

Var. 6, *N. Panizzianus*, bears the same relation to the last that *N. patulus* does to *N. laticolor*, that is, it is more slender and smaller in all its parts; expanded flower 9–10 lines across; corona subentire, pure white, $\frac{1}{3}$ – $\frac{1}{4}$ the length of the limb.—*N. Panizzianus*, Parl. Fl. Ital. iii. p. 128, and excellently figured by Mogggridge, Cont. Ment. t. 71.

Parlatore's two other species of this series, *N. Barlæ* and *N. Genuarii*, we have not seen.

Series 3.—*Crown and segments of the limb both yellow.*

Var. 7, *N. italicus*.—Scape slender, distinctly 2-edged, producing

6–10 flowers; expanded flower $1\frac{1}{2}$ –2 in. across; the divisions 8–10 lines long, about equalling the tube, narrowed gradually to a point, slightly imbricated, pale lemon-coloured; crown sulphur-yellow, 2 – $2\frac{1}{2}$ lines deep, distinctly 6-lobed.—*N. italicus*, Bot. Mag. t. 1188. *H. italica*, Haw. Mon. p. 12; Herbert and Kunth, *ex parte*. *N. præcox*, Tenore, Fl. Neap. i. t. 27. *N. subalbidus*, Lois. Fl. Gall. i. p. 236.

Var. 8. *N. chrysanthus*.—6–10-flowered, the flower smaller than in the last (about an inch across), the divisions of the limb more imbricated, but still narrowed to a point, a distinct lemon-yellow; the crown subentire, golden-yellow, about 2 lines deep.—*N. chrysanthus*, De Cand. Fl. Fr. v. p. 323; Gren. and Godr. Fl. Franc. iii. p. 259. *N. italicus*, Herb. and Kunth, *ex parte*. *H. chrysantha*, Haw. Mon. p. 12. *H. Bertolonii*, Jord. Ic. t. 192. *H. chlorotica*, Jord. t. 191 (very pale flower, only 8–9 lines across).

Var. 9. *N. aureus*.—Expanded flower 12–15 lines across, the divisions bright yellow, $\frac{1}{2}$ – $\frac{5}{8}$ in. long, 4–5 lines broad, bluntish, and much imbricated; the crown subentire, about a third the length of the divisions, a deep orange-yellow; the tube exceeding the limb.—*N. Tazetta*, Bot. Mag. t. 925; Red. Lil. t. 17; Reich. Ic. t. 813. *N. aureus*, Lois. Herb. Am. t. 147; Mogggridge, Ment. t. 22. *Hermione aurea*, Jord. t. 194. *H. Tazetta*, Herb. and Kunth, *ex parte*. *H. cupularis*, Salisb. Hort. Trans. i. p. 361. *H. solaris* and *H. latifolia*, Haw. Mon. p. 9.

A crowd of Haworth's species (as *H. sublutea*, *H. perlutea*, *H. flavoola*, *H. deflexicaulis*, and *H. trifida*) appear from the descriptions to range between our varieties 8 and 9. *N. Tazetta*, then, in the broad sense of the term, as here defined, includes all the *Narcissi* with broad glaucescent leaves, and a cup-shaped crown, from a quarter to half as long as the divisions of the perianth.

XII. *N. GRACILIS* (Sabine, Bot. Reg. t. 116).—Bulb ovoid, an inch or more in thickness; leaves 4–6 to a scape, bright green, very convex on the back, not more than $2\frac{1}{2}$ –3 lines broad, equalling the scape. Scape slightly compressed and 2-edged, a foot high, producing 1 or 2, or rarely 3 flowers, about the last week in April near London. Lower pedicels $1\frac{1}{2}$ –2 in. long, about equalling the spathe. Tube 12–14 lines long, exclusive of the ovary, about a line in thickness. Expanded flower $1\frac{1}{2}$ –2 in. broad, pale sulphur-yellow, the divisions obovate cuspidate, spreading horizontally $\frac{2}{3}$ – $\frac{1}{2}$ in. broad. Crown 2 – $2\frac{1}{2}$ lines deep,

cup-shaped, $\frac{3}{8}$ in. broad at the mouth, slightly plicate and crenulate, uniform in texture, a rather deeper yellow than the divisions. Anthers biseriate, sessile, the upper three reaching into the crown.—*N. gracilis*, Herb. Amaryl. p. 316; Kunth, vol. v. p. 732; Sweet, Fl. Gard. ser. 2. t. 316. *N. tenuior*, Curt. Bot. Mag. t. 379. *Helena gracilis* and *H. tenuior*, Haw. Mon. p. 13. *Hermione tegulaeflora*, Salisb. Hort. Trans. vol. i. p. 363.

Well known in cultivation, but never matched with any wild plant. Probably a hybrid between some of the varieties of *N. Tazetta* and *N. poeticus*; it has the leaves and general habit of *N. poeticus* var. *radiflorus*, but the flower is different. It may be the *N. angustifolius* of Willdenow, and if so, that is its oldest name, but it is not the plant figured under that name by Curtis.

XIII. *N. INTERMEDIUS* (Lois. Gall. i. p. 237, t. 7).—Bulb ovoid, an inch or more thick; leaves 3–4 to a scape, subcylindrical, deep glossy green, about equalling the scape, $2\frac{1}{2}$ –3 lines broad. Scape a foot or rather more high, green, subterete. Flowers 2–5, the longer pedicels equalling the spathe. Tube 8–9 lines long, exclusive of the ovary, about a line in thickness. Expanded flower 12–15 lines across; the divisions obovato-cuspidate, lemon-yellow, 5–7 lines long, $4-4\frac{1}{2}$ lines broad, much imbricated. Crown 2– $2\frac{1}{2}$ lines deep, slightly deeper in colour than the divisions, the edge a little plaited and crenulate. Anthers biseriate, sessile, the upper ones protruded into the crown. De Cand. Fl. Franc. v. p. 325; Gren. and Godr. Fl. Franc. iii. p. 258; Moggridge, Cont. Mentone, t. 41.—*Hermione intermedia*, Haw. Mon. p. 7; Kunth, v. p. 751. *N. bifrons*, Gawl. Bot. Mag. t. 1186. *Hermione bifrons*, Herb. Amar. p. 320; Kunth, v. p. 738. *H. bifrons*, *H. primulina*, and *H. bicrenata*, Haw. Mon. p. 78.

Var. *N. radiatus*.—Divisions of the flower oblong-lanceolate, less imbricated; crown 6-lobed.—*N. radiatus*, Red. Lil. t. 459. *N. tripartitus*, Hornem. Hafn. p. 316. *Hermione compressa*, Haw. Mon. p. 7.

A native of Spain, the South of France, and the Balearic Islands. Intermediate between *Tazetta* and the Jonquil; but both this and the last, though easy to know, when living, by their leaves and general habit, are scarcely to be distinguished from *Tazetta* in dried specimens. The three taken together may be known from all other *Narcissi* by the cup-shaped crowns, from a quarter to a third, or in extreme cases nearly half, as long as the divisions of the limb of the flower.

In this paper we propose to treat of the four remaining vernal species of the *Parvicoronatæ* group, which taken together may be known from all other *Narcessi* by their saucer-shaped crowns, from a line to one-eighth of an inch in depth. Of the four, three are quite common in cultivation.

XIV. *N. PACHYBOLBOS* (Durieu, *Revue Bot.* ii. p. 425).—Bulb ovoid, 2 in. or more thick. Leaves 4–5 to a scape, glaucescent, about a quarter of an inch broad, flattish, with a blunt keel. Scape under a foot high, compressed and ancipitous, 5–8-flowered. Longer pedicels about equalling the spathe. Tube pure white, $\frac{1}{2}$ in. long above the ovary. Expanded flower 6–7 lines across, pure white, the segments of the limb not more than $\frac{1}{4}$ in. long, and, consequently, only about half as long as the tube, roundish, much imbricated, cuspidate. Crown not more than a line deep, subentire, pure white. Anthers biseriate, subsessile.—Walpers' *Annales*, i. p. 836; Durieu, *Expl. Alger.* t. 47. fig. 1.

A native of Algeria, not yet, so far as we are aware, in cultivation in England. It comes very near to some of the small varieties of *Tazetta*; even if it were introduced, the flowers are too small for it to be likely to be a popular species. It is said to be slightly scented.

XV. *N. JONQUILLA* (L. *Sp. Plant.* p. 417).—Bulb ovoid, under an inch in thickness. Leaves 1–2 to a scape, deep glossy green, 8–12 in. long, semicylindrical, channelled down the face, about a line in thickness. Scape equalling or shorter than the leaves, slender, subterete, bearing 2–6 fragrant flowers in the latter part of April. Spathe 18–21 lines long, the longer pedicels about the same. Tube 10–11 lines long, exclusive of the ovary. Divisions of the limb a bright full yellow, spreading horizontally when fully expanded, $\frac{3}{8}$ – $\frac{1}{2}$ in. long, slightly imbricated, oblanceolate or obovate cuspidate. Crown saucer-shaped, not more than a line deep, about the same colour as the limb, the edge faintly crenulate, about $\frac{3}{8}$ in. across. Anthers sessile, biseriate, the three upper ones protruded into the crown. *Curt. Bot. Mag.* t. 15; *Red. Lil.* t. 159; *Reich. Ic.* t. 811.—*Quellia Jonquilla*, *Herb.* and *Kunth.* *Jonquilla major*, *J. minor*, *J. media*, and *J. parvicorona*, *Haw. Mon.* p. 7.

This, the well-known Jonquil of the gardens, extends in a wild state from Spain, through the south of France and Italy, to Dalmatia. It has often been confounded, both in books and gardens, with *N.*

juncifolius, but is much more robust in general habit, with larger and more numerous flowers, and a crown considerably shorter in proportion to the divisions of the limb. We have never seen any variation of the colour, which is a beautiful bright yellow. It is, perhaps, the most fragrant of all the species, and is often seen with double flowers in gardens.

XVI. *N. BIFLORUS* (Curt. Bot. Mag. t. 197).—Bulb ovoid, more than an inch in thickness. Leaves about four to a scape, $\frac{3}{8}$ – $\frac{1}{2}$ in. broad, slightly glaucous, flattish, bluntly keeled, often more than a foot long. Scape compressed, with two salient edges, bearing typically two, rarely one or three, flowers about the beginning of May near London. Spathe about 2 in. long, usually exceeding the pedicels. Tube about 1 in. long, exclusive of the ovary; expanded flower 15–18 lines across, the divisions milk-white (not so pure a white as in the next), spreading horizontally when fully expanded, $\frac{3}{4}$ – $\frac{7}{8}$ in. long, $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, obovate, much imbricated, blunt or cuspidate; crown 1– $1\frac{1}{2}$ line deep, less spreading than in *N. poeticus*, yellow, about $\frac{1}{4}$ in. across, the edge conspicuously crispato-crenulate. Anthers sessile, uniseriate at the throat of the tube. Eng. Bot. t. 276; Red. Lil. t. 405; Kunth, Enum. v. p. 733; Reich. Ic. t. 810.—*N. poeticus*, Huds. *N. colturnalis*, Salisb. Prodr. p. 225. *N. triflorus* and *N. dianthus*, Haw. Mon. p. 14.

Though this is said never to perfect its ovules and pollen, it is very common as a wild plant, has become naturalized in abundance in many counties of Britain, and is distributed on the Continent, through France to Switzerland, Italy, and the Tyrol. Grenier and Godron (Fl. France, iii. p. 257) describe an intermediate between this and *Tazetta*, under the name of *Tazetto-poeticus*, with smaller and more numerous flowers than in *N. biflorus*, and a longer, deeper-coloured crown, which is the *N. biflorus*, var. *hybridus*, of De Candolle's 'Flore Française;' and Dr. Henon, who made, during many years, a special study of the French Narcissi, writes as follows:—"The station of Lattes, near Montpellier, is remarkable in that it offers many species mixed in the same meadow (*N. poeticus*, *angustifolius*, *biflorus*, *Tazetta*), as well as a considerable quantity of intermediate forms, varieties, or hybrids. In 1840, along with MM. Dunal, Delile, and Bouchet, I asserted that at this station might be seen all the passages from *poeticus* to *Tazetta*, passing through *biflorus* without any appreciable

line of demarcation. This assertion was strongly criticized; but verification being made on the spot with M. Delille, it was established that the fact was beyond doubt."

XVII. *N. POETICUS* (L. Sp. Plant. p. 414).—Bulb ovoid, about an inch in thickness. Leaves 3–4 to a scape, flat, with a blunt keel, glaucescent, often a foot or more long in cultivation, $\frac{3}{8}$ – $\frac{1}{2}$ in. broad. Scape a foot or more high, compressed and two-edged in the typical plant, producing near London one or very rarely two flowers in the latter part of April. Pedicel generally much shorter than the spathe, which is $1\frac{1}{2}$ –2 in. long; tube white, 12–14 lines long above the ovary, and about a line in thickness; expanded flower 21–24 lines across when expanded, with a distinct and agreeable odour, the divisions a pure snow-white, obovate, blunt or cuspidate, slightly imbricated, 6–9, or sometimes in cultivation even 12 lines broad; crown 1 – $1\frac{1}{2}$ line deep, saucer-shaped, very much crisped, with a bright scarlet edge, the mouth 4 – $4\frac{1}{2}$ lines across; anthers sessile, subuniserial at the throat of the tube.—Eng. Bot. t. 275; Red. Lil. t. 160; Reich. Ic. t. 808.

Very common in cultivation, and extending as a wild plant all through the south of Europe, from France to Greece. The principal varieties are as follows:—

Var. 1, *radiiflorus*.—A more slender plant than the type, with narrower leaves, and obovate divisions of the limb of the flower so much narrowed downwards that they are not at all imbricated in the expanded flower, and also more narrowed at the point. Crown rather narrower, and consequently more erect. Flowers at least a fortnight earlier than the type, generally in the first week in April near London, or even the last in March.—*N. radiiflorus*, Salisb. Prodr. p. 225; Reich. Ic. t. 809. *N. angustifolius*, Ait. Kew, edit. 2, vol. ii. p. 241, and figured by Curtis in the 'Botanical Magazine,' under the name of *N. maialis*, which is afterwards corrected to *angustifolius*. A very handsome plant, truly wild in the Alps of Central Europe, and admitted both by Koeh and Reichenbach as a distinct species.

Var. 2, *stellaris* (*N. stellaris*, Haw. Mon. p. 15; Sweet, Brit. Flow. Gard. ser. 2. t. 132).—A late-flowering form, with the divisions of the limb, as in the last, narrowed at the base, and not imbricated.

Var. 3, *recurvus* (*N. recurvus*, Haw. Mon. p. 15; Sweet, Brit. Flow. Gard. ser. 2. t. 188).—A late-flowering form, with weak recurved leaves, and the divisions of the limb reflexed and crisped towards the edge.

Var. 4, *poetarum* (*N. poetarum*, Haw. Mon. p. 14; *N. poeticus*, var. *grandiflorus*, Herb. and Kunth).—An early form, with the expanded flower $2\frac{1}{2}$ or even 3 in. across, and much imbricated divisions.

Var. 5, *verbenensis* (Herb. Amaryl. t. 37. fig. 2; *N. verbenensis*, Rœm. Amaryl. 240).—A very slender late variety, with oblanceolate, much reflexed divisions, 8–9 lines long, which are yellowish at the base.

The autumn-flowering species, with a star-like limb with narrow acute linear divisions, are three in number. I am not aware that any of them are in cultivation in England now.

XVIII. *N. VIRIDIFLORUS* (Schousb. Moroc. fasc. 1. t. 2).—Bulb small, globose, producing 1–2 slender terete fistulose leaves about a foot long, at the same time as the flower. Scape slender, 1–4-flowered. Spathe equalling or exceeding the pedicels. Flower with a Jonquil odour, the tube 7–8 lines long, the divisions slightly shorter, greenish, linear, very acute, spreading horizontally, not more than a line broad in the lower part. Crown very minute, the same colour as the limb, with six roundish submarginate lobes. Anthers sessile, biseriate at the top of the tube. Sims, Bot. Mag. t. 1687.—*Hermione viridiflora*, Herb. Amaryl. p. 328; Kunth, Enum. v. p. 750. *Chloraster fissus*, Herb. Mon. p. 7; and doubtless also *C. integer* of Haworth, described from a figure of Parkinson's.

A native of Spain and Barbary. It resembles the next in general habit, but may easily be known by its green flowers and subterete leaves.

XIX. *N. ELEGANS* (Spach, Veg. Phan. xii. p. 452).—Bulb roundish, an inch or less in thickness. Leaves one or rarely two, appearing at the same time as the flowers, flattish, finely channelled, a line or less broad, equalling or exceeding the scape. Scape slender, flaccid, 6–12 in. long. Spathe lax, 15–18 lines long. Flowers usually 2–4, rarely 5–6, on pedicels 6–18 lines long, produced in September or October. Tube 7–8 lines long, under a line thick, greenish-white. Divisions of the limb pure white, linear, very acute, 6–8 lines long by $1\frac{1}{2}$ –2 lines broad three-quarters of the way down, narrowed from this to the point and base. Crown yellowish, saucer-shaped, under a line deep, entire or slightly crenulate. Anthers subsessile, biseriate near the summit of the tube.—*Hermione elegans*, Haw. Mou. p. 13; Sweet, Flow. Gard. ser. 2. t. 1; Herb. Amaryl. t. 41. fig. 27; Kunth, Enum. v. p. 748.

H. autumnalis, Rœm. Amar. p. 231. *N. autumnalis*, Link, Linnæa, ix. p. 569. *N. Cupanianus*, Guss. Fl. Sic. Synops. p. 382. *N. oxypetalus*, Boiss. Esp. p. 606.—Var. *obsoletus* (*Hermione obsoleta*), Herb. Amaryl. t. 41. fig. 28. Segments of the limb rather broader and not quite so acute.

A native of Italy, Sicily, and Algiers. Differs from the next by its more robust habit, several flowers, and leaves contemporaneous with them.

XX. *N. SEROTINUS* (L. Sp. Plant. p. 417).—Bulb subglobose, 6–9 lines thick. Leaves solitary or two together, filiform, subterete, usually not appearing till after the scape dies down. Scape usually 1-, rarely 2-flowered, very slender, under a foot high. Pedicel 6–9 lines long, shorter than the spathe. Tube, segments, crown, and stamens, like those of the preceding.—*Hermione serotina*, Haw. Mon. p. 13; Herb. Amaryl. t. 41. fig. 29, 30; Kunth, Enum. v. p. 749. *N. deficiens*, Herb. Bot. Reg. 33. t. 22. fig. 1. *Hermione deficiens*, Kunth, Enum. v. p. 750.

Extends from Spain through the south of Europe to the Barbary States, Greece, and Palestine. Flowers in September and October.

XXI. *N. BROUSSONETII* (Lagasca, Nov. Gen. p. 13).—Bulb ovoid, as large as a hen's egg. Leaves about 4 to a scape, 4–6 lines broad, about as long as the scape. Scape about a foot high, 4–8-flowered. Pedicels 6–10 lines long, shorter than the spathe. Tube 8–9 lines long, exclusive of the ovary, under a line thick, greenish at the base, white upwards. Divisions of the limb subcampanulately erecto-patent, pure white, oblong-lanceolate, about $\frac{1}{2}$ in. long by $\frac{1}{4}$ in. broad, narrowed suddenly to a bluntish point. Crown almost entirely confluent with the apex of the tube. Stamens biseriate, the lower filaments $1\frac{1}{2}$ –2 lines long, their anthers just reaching the top of the tube, the upper filaments $2\frac{1}{2}$ –3 lines long, reaching halfway up the divisions.—*Hermione obliterated*, Haw. Mon. p. 13. *N. obliterated*, Willd. in Schult. Syst. vii. p. 981. *Chloraster obliterated*, Rœm.-Amar. p. 214. *Aurelia Broussonetii*, Gay, Ann. Sc. Nat. ser. 4. tome 9, part 2. p. 96.

A very rare and little-known plant, gathered at Mogadore by Broussonet. I have seen a single dried specimen from the herbarium of Gay at Kew. It is exceedingly well-marked from all the other *Parvicoronatæ* by its nearly obsolete crown, subcampanulate flower, and developed filaments; in fact, it is a plant so distinct in habit and

characters, that M. Gay proposed that it should have a genus to itself. This concludes my review of the known species.

SUPPOSED ALTERNATION OF FUNCTION IN PALMS.

Directly on the appearance of the August number of the 'Journal of the Linnean Society of London' (1869), I read with great interest the paper of Dr. Richard Spruce on the Palms of the Amazon, but I did not take particular notice of § 15 (pp. 94 and 95), containing remarks founded upon observations which I hold to be erroneous, and which are opposed to my own.

[*Alternation of Function in Palms.*—I first ascertained its existence when at San Carlos del Rio Negro, near the debouchure of the Casiquari, in this way. In May, 1852, I found a small plot of ground in the forest covered with plants of a delicate Palm, a species of *Geonoma*, growing about 10 feet high. The plants were all females, and bore young fruits. On revisiting the spot in the same month of the following year, I saw, to my astonishment, the very same plants all bearing male flowers alone! But the mystery disappeared when, on examination, I made out that male and female spadices must have alternated all the way up the stem. Afterwards I found that the same or a similar alternation of function existed in many other Palms, and that plants exercising (*pro tem.*) the male function stood rarely far apart from others exercising the female function. The following are the types of alternation that have fallen under my notice :—

♀ ~ ♂ in *Geonoma discolor* and other species.

♀ ~ ♀ ♂ in *G. paniculigera*, *chelonura*, etc.

♂ ~ ♀ ♂ in *Maximiliana regia* and some other Palms.

It is quite possible that extended observation might disclose the existence of all these modes of alternation in one and the same species; and I suppose that they must all be regarded as *intermediate steps towards that complete dioecy which many species of Palms have already attained.* It is easy to conceive how this change of function may operate as a kind of repose to the plant, whose energies will be less severely taxed when every alternate year (or season) it is relieved from the burden of maturing the fruit. In species that have (apparently) become permanently dioecious, it is curious to note how the

female flowers still stand singly, the male flowers in pairs, on their respective spadices and stems, the missing flowers of the opposite sex being sometimes indicated by scars or by empty bracteoles. In *Lepidocaryum* the flowers are distichous on the ramuli of the spadices, solitary in their receptacles on the female plant, twin on the male. From all this, it is obvious that the specific characters that have been drawn from the flowers standing by ones, twos, or threes, in or on their receptacles, are absolutely null, for they merely indicate sexual conditions, not specific differences.”]

However, when I find Gard. Chron. 1869, p. 1092, and Bot. Zeit. 1869, p. 664, putting that paragraph prominently forward, I can no longer abstain from briefly pointing out what were my own observations on the flowers of *Geonoma*, Willd.

The fact that *Geonoma* is monœcious, and not diœcious, has already been published by me. Of the three flowers deeply imbedded in the rachis, the central one is female, the two lateral male. The latter (*i. e.* males) invariably flower several days, even weeks, before the female; they flower but a single day, and then drop off, very seldom remaining shrivelled up in the foveolæ. Although I have examined hundreds of spadices in their native country and on cultivated plants, I have never observed any essential deviation, never any unisexual spadices. Wherever the latter seemed to exist, the female flower was behindhand in development, but still normal, or the males had done flowering and had already dropped off. The fact that male flowers had been present was proved by the bracteolæ which remained in the foveolæ.

That the *Geonomas* which Dr. Spruce has met with should be so essentially different from other species of the genus I am not inclined to accept, and much less believe in an alternation of the development of diœcious flowers, based upon the statements which Dr. Spruce made with regard to *Geonoma*. *Maximilliana regia* and *Leopoldinea*,* I have not seen in a fresh state. *Chamædorea* (*Nunnezharia*, R. et Pav.) is a strictly diœcious genus; and, moreover, the flowers are never in *threes*, but always isolated. I must therefore hold these observations of Dr. Spruce as a delusion until further proofs shall have been adduced to the contrary.—Hermann Wendland in *Bot. Zeitung*, 1869, p. 791.

* Probably misprint for *Lepidocaryum*.—EDS.

THE COMMUNICABILITY OF VARIEGATION.

In a paper in the Bull. de l'Acad. Royale de Belgique (2nd series, vol. xxviii. p. 434), M. Edouard Morren gives the result of some experiments on this subject. In common with many other botanists, he regards variegation as a result of a diseased condition of the individual plant, and not usually, though sometimes, hereditary.

In experiments made with a variegated *Abutilon* (*A. Thompsoni*), it was found that when this was grafted on other species and varieties of the same genus, the abnormal or morbid state was communicated to the stock, not only the new shoots bearing variegated leaves, but even the old leaves taking on the same condition. This happens if the graft dies; but what is more remarkable, M. Morren found that the insertion of even the petiole of a variegated leaf beneath the bark was sufficient to communicate the change as by a sort of inoculation. Further, this morbid state is capable of indefinite transmission by contagion, the power of inoculation being as great in the communicated cases as in the original. Some species, however, have a greater susceptibility than others.

These facts have been partially known to botanists for some time, but have not before been so clearly demonstrated. (See also report of Meeting of Royal Horticultural Society for March 2nd, in this Journal.)

CAOUTCHOUC.

At a recent meeting of the Society of Arts, Mr. James Collins read a paper on "India-rubber, its History, Commerce, and Supply," which naturally involved the question whether Caoutchouc could be cultivated with profit in any of our tropical possessions. The interest generally felt in the subject was evident from the crowded state of the rooms, and the attentive ear the audience lent to the paper, and the discussion that followed it. Mr. Collins advocated the acclimatization of the different species of the genus *Hevea* (*Siphonia*) in the East Indies, because this was known to yield the best Caoutchouc. But it might be desirable, if any steps be taken in that direction,—will our colonial gardens take the hint?—to make not only a trial with the species indicated, but also with all other plants known to yield that substance.

After all, the superiority of the *Hevea caoutchouc* may be owing in a great measure to the fact that the extraction and preparation of it is better conducted and organized than that of other kinds; and if we should have to resort to cultivation, perhaps it may turn out to be more profitable to grow other Caoutchouc species rather than those of the genus *Hevea*. The chairman (Dr. Seemann), in opening the discussion of the paper, held that the cultivation of these trees might prove remunerative, the price of some kinds of india-rubber having nearly doubled since 1861; and since the trees grew with rapidity, the tapping of them for milk could, under regular treatment, be resorted to every two or three years without destroying their vitality; indeed, a plantation once established would last for years, and require but little care. One thing which rendered Caoutchouc expensive was, that the trees yielding it did not form forests exclusively by themselves as our Beeches, Pines, and Oaks do, but they were scattered in isolated groups, or as individuals amongst other kinds of trees, and much time was necessarily lost by collectors in looking for them, and in removing their camp and workshops from place to place. All this would be in favour of a plantation; but, although it might be cheaper to cultivate caoutchouc than to gather it in the depths of the virgin forests, Dr. Seemann remarked that he had no fear, even with the advancing prices staring him in the face, that there would be a deficiency of supply for some years to come. From the southern parts of Mexico to the lower parts of Brazil, America might be termed a huge virgin forest, through which there was only one regular thoroughfare—the Panama Railroad. The whole of this enormous territory, only partially explored as yet along the course of rivers, abounded in India-rubber trees, belonging to several genera; and every newly made road brought to light fresh supplies. Asia, Africa, and even Australia, would also be able to meet part of the enormous and daily increasing demand, and there were many milk-yielding plants throughout tropical and subtropical regions to which we might look for help: the genus *Ficus* alone consisting of several hundred species.

It appears to us to be simply a matter of prudence to look forward to the time when india-rubber will be all but extinct in countries easily accessible, either by their proximity to the coast or through their river systems; and it is now considered a truism that all plants which man largely requires either for food or manufacturing purposes must

ultimately be cultivated, the supply yielded spontaneously by nature not being sufficient. A glance at the history of this article shows that the demand for it advances at a ratio that makes it impossible to calculate what quantity our manufacturers will require twenty, nay, even ten years hence, to say nothing about the Chinese, who also begin to use it to a large extent. Caoutchouc does not seem to have been known to the ancients, though it abounds in the Eastern hemisphere; and it was reserved for Columbus to discover it in the possession of the American Indians, who had made footballs of it, which arrested his attention. Cortes found the clowns of Montezuma's court dancing in shoes made of it before the emperor and Mexican nobles, and the Spanish conquerors protected themselves against the rain by smearing their cloaks over with it, and thus anticipated the invention of Macintosh. But though many witnesses came forward to vouch for the extraordinary qualities of Caoutchouc, it was only towards the end of the last century that it was recommended for rubbing out pencil marks on paper—hence one of its English names; and it is only within the last thirty years that, through the experiments of Hancock and others, the real value of the substance became fully appreciated, and at the same time its future supply began to be regarded with that anxiety and fear which some think may be removed by calling in the help of the gardener.—*Gard. Chron.* 1870, p. 275.

New Publications.

Fragmenta Phytographiæ Australiæ. Contulit F. DE MUELLER, Ph. et M.D., etc. etc. Vol. VI. Melbourne: 1867–1868. Pp. 276, cum Tab. XLV.–LX.

The colony of Victoria may justly pride itself upon possessing in Dr. Von Mueller an official who, by his industry and scientific accuracy, has conferred upon the Melbourne Gardens a world-wide reputation, and, by the publications emanating from it, a character equal to that of the leading botanical establishments in Europe. We do not at all undervalue the many practical efforts which Dr. Von Mueller has made to benefit directly the land of his adoption, by distributing

an endless number of plants useful to the colonists, by making known such native species as possess qualities either noxious or beneficial, and by publishing instructions eminently calculated to ameliorate the climate of the country; but we think he deserves special praise for his patient and untiring researches into the Flora of Australasia,—researches which, from their very nature, cannot be adequately appreciated in Victoria, but which nevertheless will be of infinite value at a time when progressive civilization and colonization shall have so modified and changed the climate and aspect of the country that the present occupants of the soil will be represented nowhere, except in private and public museums and in the pages of such books as the one now before us. We wish we had it in our power to persuade the good people of Victoria, who are by no means wanting in public spirit, to encourage as much as possible such investigations as Dr. Von Mueller has set on foot among them. The vegetation of Australia is peculiarly interesting, because it is like, if not identically the same as, that which existed in Europe during the Eocene period, and, as such, it is the oldest on the globe, as probably the Australian aborigines are the oldest race of mankind. There can be no doubt that, through the immigration of Europeans to the continent of Australia, the primitive conditions until that event existing have been gradually altered, and many native plants and animals have already become to all appearance extinct. The same process will go on without interruption, until all that was once peculiar to the country will have been replaced by foreign introductions,—foreign people, foreign animals, foreign plants. That being the inevitable destiny of Australian creation, no efforts should be spared to preserve faithful records of what was found in this singular virgin continent when the process of spoliation, as we fear we must in this instance term civilization, was first entered upon.

The present volume contains again many novelties, and figures of some most remarkable plants, among the latter being *Fitzgeraldia mitrastigma* (*Anonaceæ*), *Davidsonia pruriens* (*Saxifrageæ*), and the singular *Casuarina acuararia* (Journ. of Bot. 1867, p. 211), the only species of the genus which has *true* leaves, and which Miquel, in De Candolle's 'Prodromus,' taking objection to the Latinity of the name, has called *C. oxyclada*. Perhaps the most remarkable part of this volume is the paper on *Styphelia*, a genus which the author thinks ought to include, not only *Epacris*, but also a host of other Epacrideous genera, and

which would then be almost as large as *Erica*, and play in Australia the same part as the Heaths do in Southern Africa. It is impossible to say, offhand, how far botanists will follow the author in this (may we say ?) revolutionary change. Bentham, who may be said to have a leaning towards large genera, and may be assumed to have examined the subject with a friendly eye, has nevertheless rejected the change; though he admits (Fl. Austr.) that there are certain intermediate forms which, in a measure, justify Dr. Von Mueller's proposition.

We shall be glad to receive the continuation of this eminently useful work, and wish the author would give us a figure of the Australian Beech (*Fagus Moorei*), which would enable us to compare it with the numerous fossil *Fagi* found in Europe, and which might prove still more strikingly than the facts available till now, that the late Professor Unger was correct in the conclusions which he drew from a comparison of the Eocene flora of Europe and the present flora of New Holland.

Report on the Vegetation of the Andaman Islands. By S. KURZ. Accompanied by a Report on the Forests, and a Map. Calcutta: 1870. Folio, pp. 75.

It is now 1000 years ago, about the year A.D. 800, that our old friend Sindbad the Sailor—by no means that imaginary personage which those acquainted merely with the *popular* version of his seven voyages preserved in the 'Arabian Nights' Entertainments' believe him to have been—landed on some islands in the Indian seas inhabited by pigmies. But the account he gave of his sufferings among them was as little believed as that relating to the gigantic bird of Madagascar, until in our own days several of these dwarfs had actually been captured alive, and three of the *roc's* eggs, if not the bird that laid them itself, had been deposited in our museums. A visit to a group of islands about which the curiosity of the whole world has been kept on a stretch for one thousand years, is something to rejoice over; and we cannot sufficiently thank the Indian Government and Dr. T. Anderson, of Calcutta, for having dispatched an intelligent botanist to Sindbad's Islands of the Pigmies, or, as we now call them, the Andaman group. That the explorer should happen to be one of our esteemed contributors, and that his report should have been placed so promptly into the hands of the public, is an additional source of gratification. Previous to Mr. Kurz's

visit, several attempts had been made to obtain some knowledge of the vegetation. Kyd, in 1791, introduced, probably from Port Cornwallis, several Andaman plants into the Botanic Garden at Calcutta, which were described by Roxburgh in his 'Flora Indica.' Dr. Helfer made large botanical collections when deputed to these islands, but, being killed by the aborigines, his collections were mixed with his Tenasserim plants. A few plants have been gathered by Drs. Playfair and Liebig; and more recently the Rev. C. Parish, of Moulmein, has made some botanical explorations in the group. Mr. Kurz arrived in the islands on the 9th of April last, and explored the neighbourhood of Port Blair, and other parts of the eastern, western, and southern coast. But on the 11th of May, when on the point of entering the interior of South Andaman from Escape Bay, he was seized by the Burman convicts whom the Superintendent of Port Blair had given him to assist in his work, and "was left tied up in the jungles by hand and foot on the ground." These and "subsequent circumstances" (illness?) rendered the carrying out of his proposed excursions through the islands impracticable, and obliged him to return to Calcutta, where he arrived in July last.

The shortness of this excursion, coupled with the unfavourable time of the deputation, in the two hottest months of the year, led to a less productive result than might have been anticipated; but we have now, nevertheless, a much more complete account of the vegetation of this singular group of islands than has ever been presented; and we trust that when such large tracts of the group still remain to be explored, another expedition will be sent there, dispatched at a more suitable season of the year for exploration.

Mr. Kurz commences his report with an account of the geology, climate, and general botanical aspect of the flora, and shows that the vegetation is generally a Malayo-Burmese one. "The peculiarities do not consist in the presence of many new and rare species, but rather in the absence of well-known." There is a total absence of *Magnoliaceæ*, *Onagrariæ*, *Umbelliferæ*, *Vaccinææ*, *Antirrhinææ*, *Labiataæ*, *Polygonaceæ*, *Amarantaceæ*, *Salsolaceæ*, *Cupuliferæ*, *Coniferæ*, *Pontederiaceæ*, *Hypoxideæ*, etc. The absence of *Nymphæaceæ*, *Haloragææ*, *Lentibulariææ*, *Najadeæ*, *Lemnaceæ*, *Hydropterides*, *Ricciaceæ*, and all other freshwater plants, is supposed to be in accordance with the scarcity of water during the dry season. But short-lived water plants possibly

make their appearance on the setting in of the wet season, as they do in other countries with a similar climate. There is a scarcity of *Melastomaceæ*, *Tiliaceæ*, *Gesneraceæ*, *Solanaceæ*, *Urticaceæ*, *Begoniaceæ*, *Aroideæ*, and *Aspidiææ*; and also a great scarcity of annual plants, and of so-called "weeds" beyond Port Blair. Indeed, Mr. Kurz's observations bear out one of the dogmas advanced in these pages (1867, p. 197), that virgin lands have no weeds. "All the weeds enumerated in my list," says the author, "are evidently of late introduction, and therefore cannot be treated as elements of a flora." The number of Phanerogams noticed in his Report is 520 species, which is confessedly a mere approximation to the actual number existing in the islands. Cryptogams are only generally treated here (except Ferns), as they cannot be accurately determined in India; but their present known number is about 345,—*Equisetaceæ*, *Characeæ*, *Hydropterides*, and *Ricciaceæ*, having not yet been found. The Report concludes with a list of all known Andaman plants, to which localities have been added.* The whole publication is an extremely useful preliminary towards a complete Flora of this singular group.

There are two points about which we still require information, and we should be glad if Mr. Kurz could supply it. What vegetable food do the aborigines (who are held to be of Papuan race, and have outriggers to their canoes, not like the Malays, but like the Fijians) make use of? and is it true that they do *not* cultivate any kind of fruit, root, or vegetable?



Kryptogamen-Flora von Sachsen, der Ober-Lausitz, Thüringen und Nordböhmen, mit Berücksichtigung der benachbarten Länder. Zweite Abtheilung. Erste Hälfte (Bogen 1-12). Die Flechten. Bearbeitet von Dr. L. RABENHORST. Leipzig: 1869.

This forms the second part of Dr. Rabenhorst's work on the Cryptogamic Flora of the above districts of South Germany, the first part of which was noticed in this Journal, Vol. I. p. 218. Like every other treatise on Cryptogams written by the distinguished author, it is

* In this list, the author renames Roxburgh's *Panax palmatum*, *Brassaiopsis palmata*, Kurz; but unless it can be shown to be different from *Hedera Hainla* (published 1828), the plant must retain the name of *Brassaiopsis Hainla*, Scem.

characterized by great ability and research, though perhaps objection might be taken to the systematic arrangement of families and genera. It comprehends the first part of the Lichen-flora of a pretty extensive and interesting tract of country, presenting physical features sufficiently diverse to afford a large number and variety of Lichens. Full descriptions of the species are given, with the measurements of the spores, as also synonyms, chiefly, however, those of Continental authors. The classification adopted is into three primary sections, which are again subdivided into various Orders. These are—I. *Lichenes Anomali*, divided into the two Orders of *Mycetopsoræ* and *Phycopsoræ*. II. *Lichenes homæomerici*, divided also into two Orders, *Byssopsoræ* and *Gloiopsoræ*. III. *Lichenes heteromerici*, divided into the three Orders of *Kryopsoræ*, *Thallopsoræ*, and *Podetiopsoræ*. The book is illustrated with numerous engravings, accurately executed, of the spores and other reproductive organs of the more typical species of each family and genus. We can cordially recommend it, whatever exception may be taken to details of the classification, as a valuable contribution, not only to local, but also to general European Lichenology.

Proceedings of Societies.

LINNEAN SOCIETY.—*Feb. 3rd, 1870.*—G. Bentham, Esq., F.R.S., President, in the chair. The following botanical papers were read:—By the President, a Note from M. Correa de Mello on the Flowers of *Myrocarpus frondosus*, placed by Hooker and Bentham among the *Sophoreæ*, but possessing in its æstivation characters intermediate between that tribe and the *Cesalpinia*. Also, a “Revision of the Genera and Species of Capsular Gamôphyllons *Liliaceæ*.” By Mr. J. G. Baker. The author had examined all the living plants in the Royal Gardens at Kew, and the collection of Mr. Wilson Saunders, which he believed to contain nearly all the species now in cultivation; for though these plants were formerly much in request by horticulturists, other and more showy sorts are now the fashion. Hence many species which were once garden flowers are now only to be met with in herbaria. Mr. Baker has consulted the collections of Sir William Hooker, Mr. Bentham, and M. Gay at Kew, the valuable series of the older species described by Solander and others in the British Museum, and the herbarium of Cape species at Trinity College, Dublin. The *Aloineæ* were omitted, having been the subject of a valuable monograph by Prince Salm-Dyck. The remainder were grouped in 26 genera and 220 species, of which half are from the Cape of Good Hope, and about 40 are new. Mr.

Baker gave well-deserved praise to Mr. Salisbury's classification of the Order, but, though always using his names when possible, has only adopted one of his genera.

Feb. 17th.—G. Bentham, Esq., President, in the chair. The following papers were read:—"On the *Commelynaceæ* of Bengal." By Mr. C. B. Clarke, in which a new mode of arrangement was proposed. "On the Tree-Ferns of British Sikkim." By Mr. Scott. Elaborate details were given of the range and altitude of the species, and on their economic uses and structure. The paper was illustrated with numerous figures of the structure of the stems of the twelve species examined. Also, a note from Dr. H. F. Hance to Dr. Hooker on the vegetation of the Pakwan Hills, in the neighbourhood of Canton.

March 3rd.—Dr. J. D. Hooker, Vice-President, in the chair. The following papers were read:—"On Hybridism in *Chinchona*." By Mr. J. Broughton, chemist to the Madras Government; communicated by Mr. J. E. Howard. The author stated that in the Madras gardens young plants, apparently hybrids, were common, as between *C. succirubra* and *C. officinalis*; and that the chemical nature of the bark was intermediate between that of the supposed parents. In the discussion which followed, Dr. Anderson mentioned that *C. Hasskariana* of Miquel was a hybrid between *C. officinalis* and *C. Pahudiana*, produced in the Java gardens; and Dr. Hooker expressed his belief that a very large number of plants considered by botanists as varieties or subspecies would turn out to be of hybrid origin. The paper was illustrated by living and dried specimens supplied by Mr. Howard. Also, a letter to Dr. Hooker, from Sir H. Barkly, Governor of Mauritius, on the Flora and Fauna of Round Island, one of a little group, and distant thirteen miles from Mauritius. The island is three miles in circumference and about three-quarters of a mile across, rocky, composed of tufa, and about 1000 feet at its highest point. Sir Henry was but a few hours on the islet, but collected 29 species of plants, of which half do not occur in Mauritius; of these, the most interesting is a Palm entirely distinct from any yet known, with a remarkable bottle-shaped stem. It is a singular fact that, though no snake is certainly known to inhabit Mauritius, 4 species were collected on Round Island, besides many lizards, including several new kinds of *Scincus*.

March 17th.—G. Bentham, Esq., President, in the chair. Mr. Carruthers exhibited and shortly described the microscopic characters of the stem of the fossil Fern *Osmundites Dowkeri* (see Report of Proceedings of Geological Society), calling especial attention to the silicification of the cell-contents. The following paper was read by Dr. Hooker:—"On the Flora and Fauna of Round Island, near Mauritius," by Sir Henry Barkly. This paper, which was recently read before the Royal Society of Mauritius by his Excellency, described in considerable detail the geology and physical geography, vegetation and fauna, of the island. Of the whole number of plants collected (29), three were Cryptogams, a Moss (*Sphagnum*?), *Selaginella*, n. sp., and *Adiantum caudatum*; the only grass determined was the common Indian *Cymbopogon Schœnanthus*, which is not Mauritian; *Cyperus maritimus* represented the *Cyperaceæ*; *Pandanaceæ* form a prominent feature, besides *P. utilis*, which was probably

planted; near the landing-place there is another fine species, which is perhaps new. The Palms are also a striking portion of the Flora; in addition to the singular species with the bottle-shaped stem (which is to be named *Hyophorbe Barklyi*), *Latania glaucophylla* and another species occur. There is also an Aloe probably undescribed. *Ebenaceæ* are represented by stunted trees of three species of *Diospyros*. There are two trailing *Asclepiads*, a *Terminalia*, and a *Blackwellia*, an introduced *Sonchus*, and *Ageratum conyzoides*. A remarkable feature in the flora is the very large proportion of Endogens, if individuals were taken, this would be at least 99 to 1. As might be anticipated, the genera are essentially Mascarene, but the species are either different ones, or vary considerably from those of Mauritius.

EDINBURGH BOTANICAL SOCIETY.—*February 10th, 1870.*—Sir Walter Elliot, K.S.I., President, in the chair. The following communications were read:—I. "Account of Botanical Excursions made in the Island of Arran during August and September, 1869." By Prof. Balfour. II. "Sketches of the Botany of Lord Howe's Island." By Charles Moore, Esq., Director of the Botanic Garden, Sydney. Communicated by Dr. Cleghorn.* III. "Botanical Notes from Naples." By Professor Allman. IV. Report on the Open-Air Vegetation in the Royal Botanic Garden. By Mr. M'Nab. Mr. J. B. Webster, forester, presented a twig of *Wellingtonia* bearing ten cones, from the plantations of Sir William Verner, Bart., Ireland.

10th March.—Sir Walter Elliot, President, in the chair. Prof. Balfour noticed the death of Prof. Franz Xavier Unger, M.D., which took place suddenly at Gratz on 13th of February last, one of the foreign honorary Fellows of the Society. Mr. Sadler noticed the death of Dr. Alexander Carroll Maingay, who joined the Society on 8th February, 1855. He was particularly fond of cryptogamic botany, and while in Edinburgh, from 1854 to 1858, he re-arranged the collection on *Algæ* in the university herbarium. He contributed several papers to the Society's proceedings, and on taking his degree of M.D. in 1858, he obtained a gold medal for his thesis entitled "A Monograph of the British *Parmeliaceæ*," which was illustrated by drawings and specimens, and contained much original research. He was shot some weeks ago while trying to stay a mutiny amongst the convicts in the jail at Rangoon. The following communications were read:—I. "On the Formation of a Museum of Vegetable Materia Medica." By Dr. William Craig. The author referred particularly to the formation of a complete materia medica museum for the use of students. While admitting the value of the materia medica collection in the university, which was now regularly consulted by students, and also the importance of the herbarium of medicinal and economical plants at the Royal Botanic Garden, which was open to the public, he thought that it would be well if the Society would assist in forming a museum to illustrate completely the British Pharmacopœia by means of herbarium and laboratory specimens. In conclusion, he gave some illustrations as to the mode how such a museum could be carried out.

* Printed at length in 'Journal of Botany,' 1869, p. 299.

II. "On the Fructification of *Griffithsia corallina*, with a Notice of other *Algæ* found in Shetland not mentioned in Edmondston's 'Flora.'" By C. W. Peach, A.L.S. The author, in examining specimens of *Griffithsia corallina*, obtained at the Westroe Outskerries by Miss Jeffreys, observed a circular opening at the lower part of the joints immediately above the whorls of tetraspores. The edge of the opening was quite smooth, not in the least ragged, as if ruptured. This he found constant over all the whorls of tetraspores he examined. He noticed that the granular matter in the joints escaped through these openings, and that while the tetraspores retained their brilliant colour, the joints became literally colourless. He also found favella on some of the specimens, but not both kinds on the same frond. On the lower part of the main stems of some specimens were lateral pointed branches of considerable length, and not jointed; the centres were filled with a dark pigment, which continued into the main stem; they were placed one on each joint alternately. He stated that although he had always kept a good look-out for *Algæ* when dredging in deep water, only three species were got, viz. *Desmarestia viridis*, a *Polysiphonia*, and a *Nitophyllum*; these were found in the inner Haaf at a depth of forty fathoms. He took them from the contents of the dredge, and they were fresh and brilliant in colour, not attached to anything. He concluded by giving a list of fourteen species which he had collected, nine of them being additions to Edmondston's 'Flora,' and three from new localities. The paper was illustrated by drawings and specimens.

III. "On Two new British *Hepaticæ*." By Dr. Carrington.*

IV. "On the Botany of Mamsoul, a High Mountain in Glen Affarie, Inverness-shire." By Dr. Buchanan White. The author gave a general description of Mamsoul and the surrounding district, and noticed the principal plants met with. On Mamsoul he gathered *Luzula arcuata* (new to Inverness-shire) at an altitude of 3000 feet, and not very far below the summit, where also occurred *Cerastium trigynum*, *Cladonia vermicularis* and *Salorina crocea*. He observed *Arctostaphylos alpina*, *Cornus Suecica*, and *Betula nana* in many places. *Tofieldia palustris* on the hills on the south side of Strathglass; *Nuphar pumila* in Glen Cannich; *Subularia aquatica* and *Isoetes lacustris*, very dwarfed, in a stony lake at an elevation of about 2000 feet on Ben Hearag, and of a larger size in pools beside the river Beauty. *Plantago serpentina* was abundant along the roadsides throughout Glen Affarie, and on the banks of the Beauty, in many places, a large, dark blue-flowered Lupin was thoroughly naturalized.

V. "On some recent Additions made to the Flora of Canada." By Mr. John Sadler. Mr. Sadler enumerated the flowering plants, ferns, and mosses which had been recorded as added to the Flora of Canada during the last two years by Mr. Macoun, Mr. D. A. Watt, and others. He particularly noticed those species belonging to the British flora, including *Cystopteris montana*, *Lastrea Filix-mas*, *Lobelia Dortmanna*, *Littorella lacustris*, eight species of *Potamogeton*, and about twenty species of mosses. *Cystopteris montana* was found by Mr. Macoun in July, 1869, on one of the northern bays of Lake Superior, growing abundantly in some of the low woods. Mr. Sadler exhibited specimens of this rare Fern from Glen Lyon in Perthshire,

* This paper is printed in full in this Journal, p. 65.

where he had collected it in August last, growing in three different places, and remarked that while it was recorded as found in low woods in America, in Scotland it always occurs on moist, turfy, more or less exposed cliffs, at a considerable elevation. *Lastrea Filix-mas*, one of our commonest Ferns, was gathered in a single spot by Mrs. Roy, of Royston Park, Owen Sound, near her residence. *Littorella lacustris*, a plant common enough in many of our Scotch lakes and streams, was collected for the first time in America by Mr. Macoun on an island in Gulf Lake. VI. "Report on the Open-air Vegetation at the Royal Botanic Garden." By Mr. M'Nab. Prof. A. Dickson demonstrated some of the stages in the development of the embryo of *Zostera marina*, and exhibited under the microscope specimens of the embryos of grasses as well as those of *Zostera*, and made some remarks upon the *scutellum*, *cotyledon*, adventitious roots, and other parts connected with them. He particularly explained the beautiful embryo of *Zostera* in the embryo-sac with its pyriform suspensor, and pointed out the light that was thrown by this embryo on that of grasses. Miss Beaver, of Coniston, sent a list of the rarer plants found near Clapham, in Yorkshire, by Miss Mariner. Mr. M'Nab exhibited a head of female flowers of *Pandanus odoratissimus*, produced in the Palm-house at the Royal Botanic Garden. The plant has produced female flowers for several years, but never more than two heads at a time, while this year nine have been developed. They are globular at first, and elongate as they arrive at maturity. He also exhibited a portion of the spadix of *Arenga saccharifera*, also now flowering in the Palm-house. This palm is 68 feet high, and has three large clusters near the summit.

ROYAL HORTICULTURAL SOCIETY.—*March 2nd, 1870.*—Scientific Committee: W. W. Saunders, Esq., F.R.S., in the chair. Dr. Masters exhibited, on the part of Messrs. Downie, Laird, and Laing, a number of grafted *Abutilons*, showing the effect of stock on scion, and scion on stock. Thus, *A. megapotamicum* (green) grafted on *A. Thomsoni* (variegated) had become variegated like the stock; *A. Thomsoni* grafted on *A. megapotamicum* had caused the production of variegated shoots from the originally green stock as well as from the scion; *A. Thomsoni* grafted on *A. megapotamicum*, and then pinched back, had the effect of inducing the buds on the stock to break; and these two produced variegated leaves. Another green *Abutilon*, "Duc de Malakoff," grafted on *A. Thomsoni*, also became variegated in consequence. So that the variegated plant, whether used as a stock or as a scion, has the faculty of imparting its variegation to the leaves and buds subsequently produced. Great interest was manifested in these specimens, and Dr. Masters called attention to the remarkable experiments of M. Van Houtte, where the variegation ceased after the accidental removal of the variegated graft, and to a paper of Professor E. Morren's, lately published, recording several cases of this kind and also to the circumstance that the mere insertion of a detached leaf of *A. Thomsoni* into a slit in the bark of a green *Abutilon* was sufficient to inoculate the latter, even though the inserted leaf speedily perished. Dr. Masters stated that, at a future meeting, he would direct attention to other recorded cases of this interesting phenomenon.

A specimen of a curious excrescence from the bark of a *Camellia*, sent by Mr. Mills, of Enys Gardens, Penryn, was then shown. The excrescence had much of the aspect of a *Polyporus*, but seemed to be an excrescence from the bark, from which it was with difficulty separated. In one case two branches had become united together, and the point of union was covered with this shell-like excrescence. None of the members of the committee, nor any of the *Camellia*-growers present at the general meeting, had ever seen anything similar. The only suggestion was that the adventitious growth was the result of some injury to the plant. Dr. Masters undertook to submit the growth to microscopic examination, and report more fully at a future meeting; as also on a curious specimen resembling the "burrs" seen on Birch-trees, but in this case stated to be formed on the roots of a Currant-bush. Dr. Masters further reported as follows on the *Bridgesia spicata* exhibited at the last meeting:—"The peculiar out-growths of this plant are protruded from the young shoots above the axils of the leaves, and above the branch proceeding therefrom. In the fully developed state they are about the size of a large pea, of a yellowish colour, and have a general resemblance to the tufts of hairs found in similar situations in *Pereskia*. In the youngest condition the excrescences occur in the form of small, smooth, conical projections, covered with an outer layer of small oblong cells, the outer walls of which are thickened; subjacent to these are four or five rows of small, spheroidal, densely-packed cells, also cortical in their nature. These overlie a mass of ordinary cellular tissue, the cells of which contain chlorophyll. Running into this conical cellular projection are two rows of small spiral vessels, which converge towards the apex of the cone, and form a loop. These spiral vessels are continuous with those of the vascular circle of the branch, and are surrounded on all sides by oblong, thin-walled cells, whose long diameter is parallel to that of the spiral vessels, and more or less at right angles to the direction of the parenchymatous tissue of the cortex and also of the medulla. The constituent cells of the medulla are spheroidal, and destitute of chlorophyll. Here and there spiral vessels traverse the medulla, quite isolated from the general vascular circle. In the more fully developed excrescences the appearances are similar, except that the outer epidermal cells now show themselves in the form of long cylindrical cells (hairs), some of which are club-shaped at the extremity. Some of these hairs appear to be unicellular, while others show one or two transverse partitions. The hairs in question are rather thick-walled, and contain a few scattered small highly refracting granules (starch?), resembling the granules found in autumn when the leaves have assumed their autumnal tints in consequence of the decay of the chlorophyll. From these appearances the inference seemed to be, that the growths in question were of the nature of adventitious roots covered by hypertrophied epidermal hairs." An *Arum* from Chiswick, with an adventitious leaf attached to the spadix, and white, like the spathe, was then shown. A similar illustration was forwarded some time since by Mr. D. T. Fish.

GEOLOGICAL SOCIETY OF LONDON.—*March 9th*, 1870.—Warington W. Smyth, Esq., F.R.S., Vice-President, in the chair. The following communi-

cation was read :--“ On the Structure of a Fern-stem from the Lower Eocene of Herne Bay, and on its allies, recent and fossil.” By W. Carruthers, Esq., F.L.S., F.G.S. The author described the characters of the fossil stem of a Fern obtained by George Dowker, Esq., F.G.S., from the beach at Herne Bay, and stated that in its structure it agreed most closely with the living *Osmunda regalis*, and certainly belonged to the *Osmundaceæ*. The broken petioles show a single crescentic vascular bundle. The section of the true stem shows a white parenchymatous medulla, a narrow vascular cylinder interrupted by long slender meshes from which the vascular bundles of the petioles spring, and a parenchymatous cortical layer. The author described the arrangement of these parts in detail, and indicated their agreement with the same parts in *Osmunda regalis*. He did not venture to refer the Fern, to which this stem had belonged, positively to the genus *Osmunda*, but preferred describing it as an *Osmundites*, under the name of *O. Dowkeri*. The specimen was silicified, and the author stated that even the starch-grains contained in its cells, and the mycelium of a parasitic Fungus traversing some of them were perfectly represented. Its precise origin was unknown ; it was said to be probably derived from the London clay, or from the beds immediately below. *Discussion*: Mr. W. W. Smyth, in calling on those present for remarks on the paper, commented on the very remarkable manner in which the minutest details of the original plant had become silicified. Mr. Etheridge mentioned the discovery of fossil Fern-stems of somewhat similar character at Bromsgrove. Professor Ramsay suggested the possibility of the fossil having been derived from a bed even higher than the Thanet Sands. He thought the rarity of such delicate structures being perfectly preserved by silicification not so great as might at first sight appear, for in Antigua and elsewhere vegetable forms had been converted into flint as completely and distinctly. Mr. Woodward cited the hot springs in the island of St. Michael as converting portions of vegetables still growing into flint. He had heard of the ends of piles being converted into flints in the course of thirty years, but had not yet seen them. Mr. Jenkins inquired whether the *Osmundæ* from different formations offer any evidence of the climate under which they lived. He thought that where vegetable structures were perfectly preserved in flint, the process of silicification had gone on but slowly ; but this fell more within the province of the chemist than of the geologist. Mr. Hulke suggested the possibility of the Fern having contained a certain amount of silica while still living. Professor Morris referred the fossil to the Thanet Sands. He thought that the silica in fossil coniferous and endogenous wood varied in character, and this might throw some light on the process of conversion. He considered that objects containing phosphate of lime, and those containing carbonate, were subjected to different processes of silicification. Mr. Whitaker was strongly of opinion that the fossil had been derived from quite the upper part of the Thanet Sands. Professor Duncan called attention to the process of silicification as exhibited by the Antiquan corals, in which one highly insoluble mineral had been replaced by another almost as insoluble. Mr. Carruthers, in reply, did not think that anything could be predicated as to climate from extinct species ; if this were attempted, a similar error to that with regard to the climate under

which the fossil elephants were supposed to have lived might be repeated. Existing *Osmundaceæ* contained no silica in their structure. The peculiarity of the fossil under consideration was the preservation of the contents of the cells, even to the starch, which is so readily decomposed. The difficulty of accounting for the replacement of soft vegetable matter by hard mineral silica seemed to him great.

LITERARY AND PHILOSOPHICAL SOCIETY OF MANCHESTER.—*Feb. 8th*, 1870.
—J. P. Joule, LL.D., F.R.S., President, in the chair. The following paper was read:—"On the Natural Ropes used in packing Cotton Bales in the Brazils." By Charles Bailey. We shall print this paper in abstract in our next.

Botanical News.

NEW BOOKS, PERIODICALS, ETC.

The second volume of Mr. Miers's 'Contributions to Botany' has been published. It consists of reprints of the author's thirteen papers, which appeared in the *Ann. and Mag. Nat. Hist.* from 1860-1869, collated and revised, and with 35 illustrative plates. Like everything Mr. Miers writes, these papers are real additions to science. The titles of the papers are:—"On the Calyceraceæ," "On the Bignoniaceæ," "On the History of the Maté Plant," "On Villaresia," "On *Cestoxicum*," "On *Bursinopetalum*," "On *Goupia*," "On *Ephedra*," "On the *Tricuspidariæ*," "On some *Heliotropiæ*," "On *Cortesia* and *Rhabdia*," "On the *Ehretiæ*," and "On the *Cordiæ*."

The first eight fasciuli (41 to 48) of the second volume of Jordan and Fourreau's 'Icones' have reached us. They contain 40 plates (201 to 240 of the entire work), but none of the plants treated of come within the scope of the British flora. They are species of *Urginea*, section *Squilla* (the well-known officinal Squill is subdivided into four), *Saxifraga*, *Hyssopus*, *Hyacinthus* (five species made out of the West European *orientalis*), and *Santolina*.

Part 2 of the third volume of Mr. Wilson Saunders's 'Refugium Botanicum' has appeared. It contains a monograph, by Mr. J. G. Baker, of the sections *Ledebouria* and *Drimiopsis* of the genus *Scilla*, the first containing 28, and the second 4 species. The 24 plates (tab. 169-192), representing various new or little known species of *Liliaceæ*, are by Mr. Fitch, and, it is needless to say, admirable.

At a meeting of the Philadelphia Academy of Natural Sciences in January last, Mr. Thomas Meehan referred to his former observations that the so-called leaves of *Conifera* were but phylloid branchlets, and that the real leaves existed chiefly in the form of adnate scales. In some *Conifera* these adnate leaves had the power of elongating into free foliaceous awns. The Larch was an instance. In *Pinus* this had never been noticed. He now exhibited specimens of *Pinus serotina*, in which the leaf-scales under each fascicle of phylloïdæ had deve-

loped into leafy awns two inches in length, to prove the correctness of his original observation. He further remarked that those adnate true leaves were as different on different species as the leaves of other plants, and afforded excellent specific characters, much better in fact than many derived from the number of phylloide in a fascicle, or even from many points in the cones. Specimens to illustrate this were exhibited.

An interesting paper on "Cross-Fertilization in Compositæ," by Mr. John Duncan, appears in the February number of Hardwicke's 'Science Gossip.'

At a recent meeting of the Norfolk and Norwich Naturalists' Society, the Rev. J. A. Laurence exhibited some fasciated stems of *Ilex Aquifolium*.

The execution of the new plates required for the concluding volume of Dr. Syme's edition of 'English Botany' has been entrusted to Mr. William Sowerby, Secretary to the Royal Botanic Society.

The admirable 'Traité général de Botanique' of MM. Le Maout and Decaisne is, we hear, to be translated into English by Mrs. Hooker, of Kew; the version will have the benefit of Dr. Hooker's supervision, and must surely prove a very acceptable handbook.

Messrs. W. and A. K. Johnston have in view the publication of a series of botanical diagrams to facilitate the teaching of botany in schools.

Dr. Masters delivered, on March 1st and 8th, at the Royal Institution, two lectures on "Plant-life, as contrasted with that of Animals." In the first lecture he contrasted the "mechanism" of plants and animals respectively, and especially alluded to organisms of the lowest type, which seem to have an equal affinity to either kingdom of nature. He stated that "the main differences between plants and animals consist not so much in their mechanism or in the way it acts, as in the results of its action," plants alone having the power of forming from the inorganic constituents of the atmosphere the various substances composing their tissues. After passing in review the processes of vegetable assimilation,—which he considered a process of digestion, and not of respiration, and which is intimately connected with the presence of chlorophyll, analogous in function with the colouring matter of the blood in animals,—of true plant-respiration, and of the circulation of fluids, the lecturer proceeded to show that there was a marked difference between plants and animals in the much greater adaptability of different organs in the former to fulfil the same functions, and various morphological facts were supplied to illustrate this position. Another peculiarity of plants was found in the greater importance of bud-structures; many examples of bud-variation were quoted, the principles of grafting explained, and the influence of the scion on the stock illustrated. This led to the subject of graft-hybridization as a possible cause of the production of bud-variations, and apparent examples of this were given in *Cytisus Adami*, in Pears grafted on Hawthorn, on which a fruit intermediate in form and flavour is sometimes produced, and in Potatoes. The lecturer concluded by an allusion to the ceaseless change of matter, and the dependence of each portion of creation on the others.

A 'Flora of Perthshire' is now in preparation for publication by Mr. John Sadler, Lecturer on Botany in Royal High School, and Assistant to the Pro-

fessor of Botany in the University of Edinburgh, and Dr. Buchanan White, F.B.S.E., President of the Perthshire Society of Natural Science.

The Folkestone Natural History Society, which has lately issued "A List of the Macro-Lepidoptera occurring in the neighbourhood of Folkestone," with copious notes by Dr. Knaggs, has in preparation a list of the Flowering Plants and Ferns of the district, on the same plan.

The Duke of Argyll, Secretary of State for India, has sanctioned the publication of a 'Flora Sylvatica, or Forest Guide for Northern India,' uniform in size and type with the colonial Flora series. The execution of the work has been entrusted to Dr. J. L. Stewart, F.L.S.; it will comprise a quarto volume of plates.

Dr. Stenhouse has published in the 'Proceedings of the Royal Society' (February 24, 1870), notes of some recent investigations made by him on the acids obtained from *Usnea barbata*, *Evernia prunastri*, and *Cladonia rangiferina*. He establishes Hesse's formula of the composition of usnic acid, viz. $C_{15}H_{18}O_7$, and he gives the characters and composition of Sodium usnate and Calcium usnate. From *Evernia prunastri* he obtained usnic acid, identical in composition with that from *Usnea*. The proportion and composition of evernic acid and of tetrabrom-evernic acid are given. Dr. Stenhouse proposes to call the acid he obtained from *Cladonia rangiferina*, in 1848, cladonic acid. He had hoped to subject this to a more careful examination, and procured for this purpose a quantity of this Lichen from the hills in the neighbourhood of Moffat, in Dumfriesshire, collected in the beginning of last December. To his surprise, however, he found that it contained scarcely a trace of cladonic or any similar acid. The quantity of acid, or even its presence in Lichens, may depend upon the period of year when the specimens are gathered.

Dr. Aug. Husemann, of Thur, and Dr. Theod. Husemann, of Göttingen, have conjointly published the first part of a handbook intitled 'Pflanzenstoffe,' for the use of medical men, chemists, pharmaceutists, and pharmacologists. It is published by J. Springer, of Berlin, and D. Nutt, of London, and will be completed in three parts.

Mr. A. Ernst sends us an acceptable reprint of some biographical notes on A. Bonpland, which he read before the Natural History Society of Caracas in November last, and dedicated to his friend Dr. Seemann. These notes are well put together, but might be advantageously enlarged by a perusal of several original letters from Bonpland himself, which Humboldt published in various volumes of the 'Bonplandia,' and by the direct communications relating to the last days of Bonpland by the Prussian envoy, M. von Gülich, printed in the same periodical. Mr. Ernst also forwards to us his edition of Señor Benites' 'Principios para la Materia Médica del País en forma de diccionario,' printed at Caracas in 1869. Señor Benites' shortcomings in botany are less felt from Mr. Ernst adding in this edition a correct list of the species mentioned in this first attempt at a Materia Medica of Venezuela; but it would have been better to expunge the incorrect names altogether than give a corrected list of them in an appendix.

PERSONAL NOTICES.

We regret to have to record the death, on February 13, at Gratz, of Dr. Frank Unger, the well-known Viennese botanist and palæontologist. He was found lying on the floor of his bedroom, and the mode of his death would have been unknown had not the steps necessary for the removal of his brain, which he had directed should be preserved, revealed a fracture of the skull; this injury, together with the fact that his chest of drawers had been forced open, and his papers overhauled, leads to the inference that he was robbed and murdered, though suspicion at present attaches to no one.

We have to announce the death of Dr. Leveillé in his 73rd year. He was well known as a cryptogamist, and had paid special attention to Fungi.

The herbarium of the late Von Martius, which was offered to, and refused by, the Bavarian Government, is still for disposal. It consists 1st, of the general herbarium, containing 60,000 species, represented by 300,000 specimens, nearly half of which are Brazilian; 2nd, of the great collection of Palms; 3rd, a collection of fruits and seeds; 4th, a series of woods; 5th, a collection of drugs and economic specimens, in great part formed by his brother, Theodore Martius, Professor of Pharmacy at Erlangen.

British botany has been publicly honoured in the bestowal of the degree of LL.D. on Mr. John Boswell-Syme, of Balmuto, by the University of St. Andrew's. Professor Swan, to whom we are indebted for this welcome intelligence, thus describes Mr. Boswell-Syme's claims to distinction:—"Mr. Syme is the author of many scientific memoirs on botany and entomology, and the third edition of Sowerby's 'English Botany,' of which nine volumes have already appeared. The multitude of original observations embodied in that great work, and his other contributions to botanical science, have earned for Mr. Syme a first place among British botanists."

Dr. Hegelmaier, of Tübingen, is now in England for the purpose of supplementing his monographs on *Lemnaceæ* and *Callitriche* by examining the herbaria at Kew, the British Museum, and elsewhere.

The chair of Natural History in the Royal Agricultural College, Cirencester, lately made vacant by Professor Thiselton-Dyer's removal to Dublin, has been filled by the appointment of Dr. W. R. M'Nab, of Edinburgh.

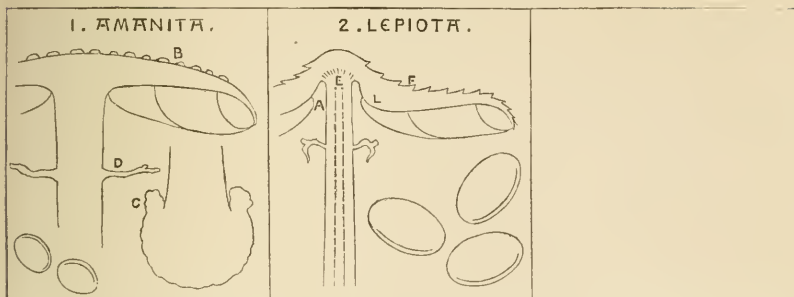
NOTICES TO CORRESPONDENTS.—In order to meet the heavy demands made on our space, we are this month compelled to give an extra half-sheet (8 pages). The assistance we have received in an increased number of Subscribers, and in other ways, has been sufficient to encourage us to trust that the additional expense involved will be met by corresponding support.

COMMUNICATIONS have been received from:—W. G. Smith, Dr. Hance, Dr. Carrington, Dr. Braithwaite, Rev. J. M. Crombie, Professor Thiselton-Dyer, Ralph Tate, James Britten, J. Sadler, Dr. H. Cleghorn, Robert Tucker, Fred. Stratton, Hon. J. L. Warren, James Collins, Charles Bailey, Dr. Masters, C. P. Hobkirk, W. Carruthers, G. C. Churchill, A. Braun, F. Hegelmaier.

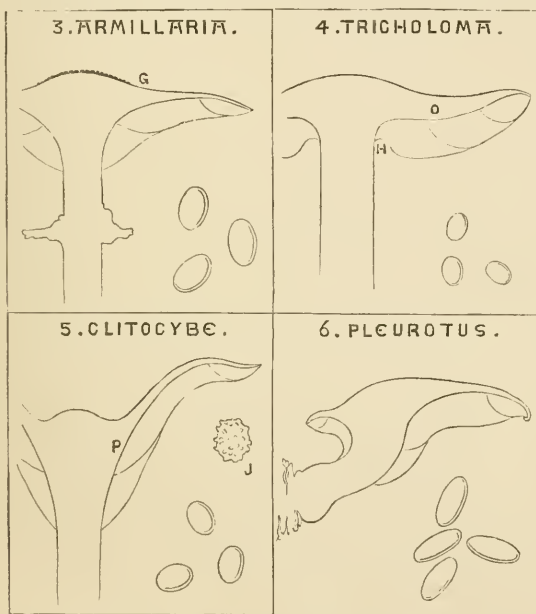
BOOKS, ETC., RECEIVED.—Contributions to Botany, vol. ii.; by John Miers. Note sur les formes du genre *Capsella*; par C. P. Hobkirk.—Pflanzenstoffe; von A. and Th. Husemann.—Report on the Vegetation of the Andaman Islands; by S. Kurz.—Principios para la Materia Médica del País; por José M. Benites.—Amadeo Bonpland; por A. Ernst.—Nature, Nos. 18–21.—Science Gossip for March.—Gardener's Chronicle, Nos. 10–13.

SERIES 1. LEUCOSPORI.—SPORES WHITE.

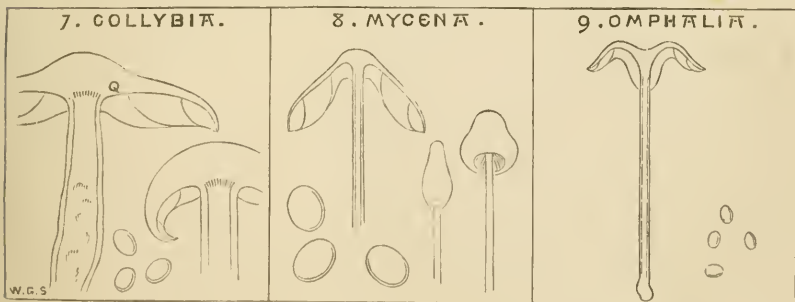
* Hymenophorum distinct from the fleshy Stem.



** Hymenophorum confluent and homogeneous with the fleshy Stem.



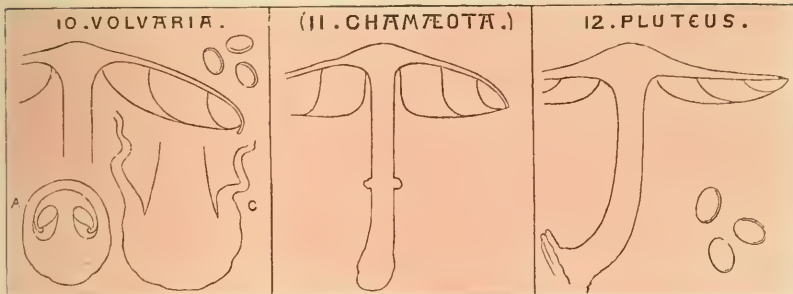
*** Hymenophorum confluent with, but heterogeneous from the cartilaginous Stem.



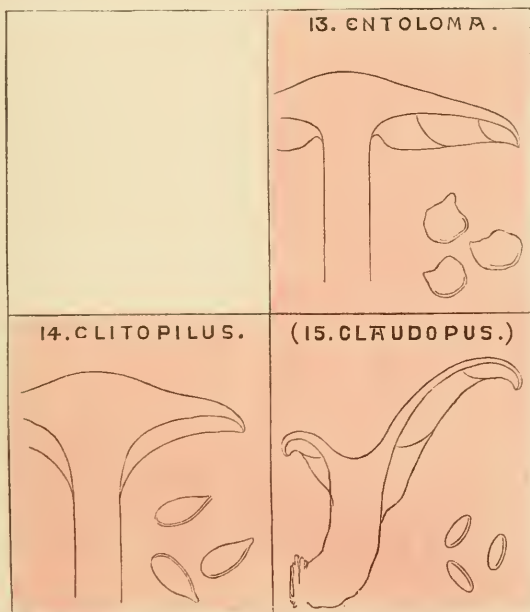
SUBGENERA OF AGARICUS.

SERIES 2. HYPORHODII.—SPORES PINK.

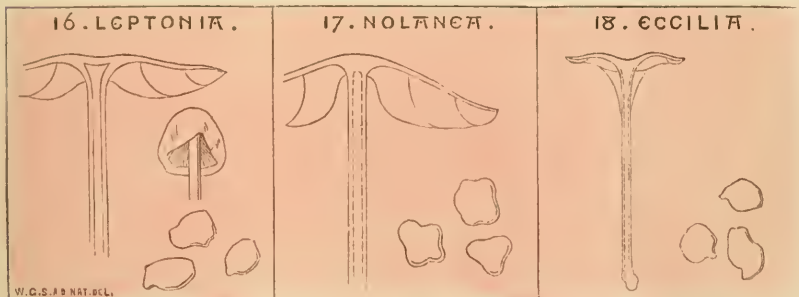
* Hymenophorum distinct from the fleshy Stem.



** Hymenophorum confluent and homogeneous with the fleshy Stem.



*** Hymenophorum confluent with, but heterogeneous from the cartilaginous Stem.



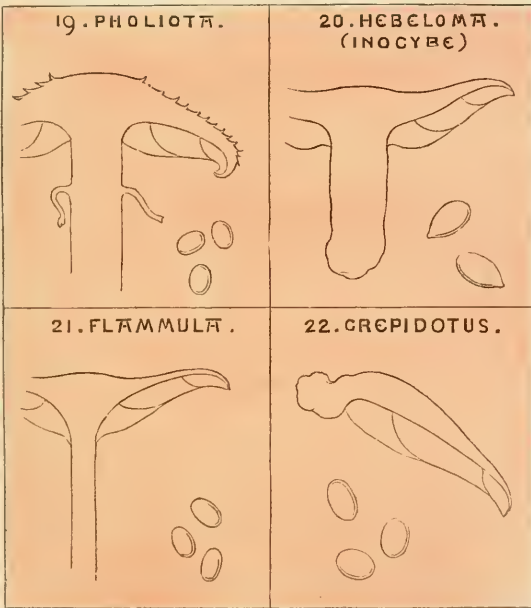
SUBGENERA OF AGARICUS.

SERIES 3. DERMINI.—SPORES BROWN.

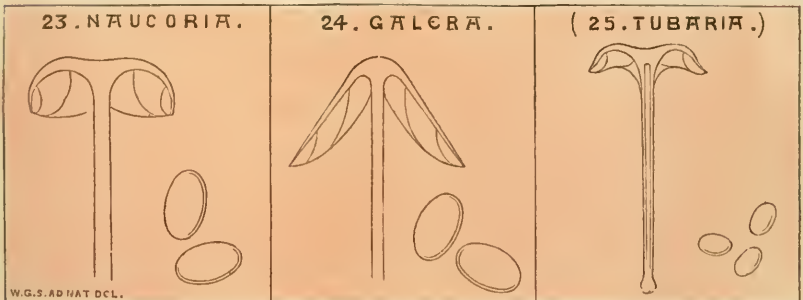
* Hymenophorum distinct from the fleshy Stem.



** Hymenophorum confluent and homogeneous with the fleshy Stem.

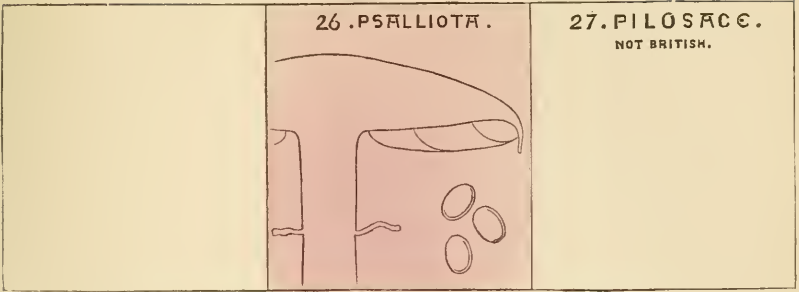


*** Hymenophorum confluent with, but heterogeneous from the cartilaginous Stem.

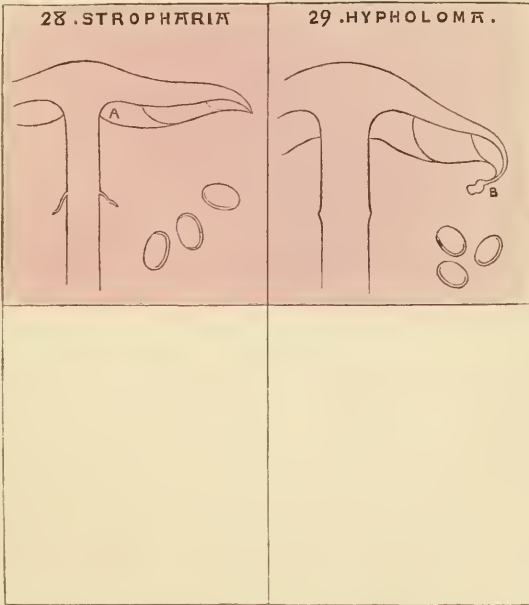


SERIES 4. PRATELLÆ.—SPORES PURPLE.

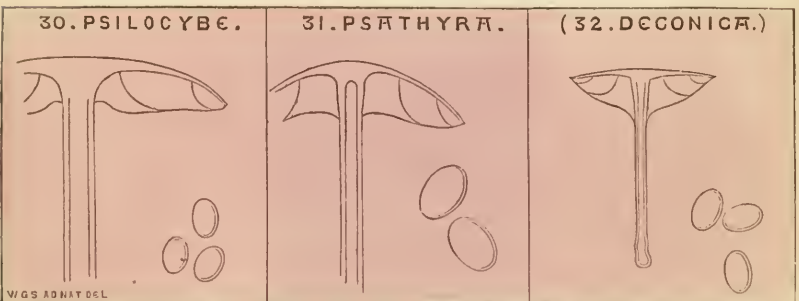
* Hymenophorum distinct from the fleshy Stem.



** Hymenophorum confluent and homogeneous with the fleshy Stem.



*** Hymenophorum confluent with, but heterogeneous from the cartilaginous Stem.



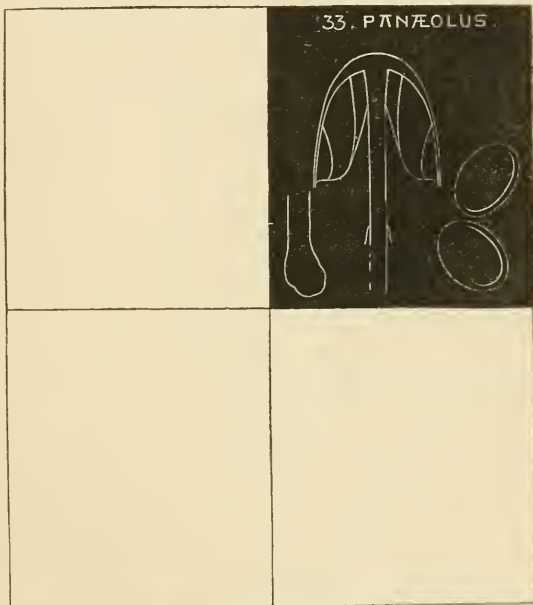
SUBGENERA OF AGARICUS.

SERIES 5. COPRINARII.—SPORES BLACK.

* Hymenophorum distinct from the fleshy Stem.



** Hymenophorum confluent and homogeneous with the fleshy Stem.



*** Hymenophorum confluent with, but heterogeneous from the cartilaginous Stem.



W. G. S. F. D. NAT. D. C. C.

SUBGENERA OF AGARICUS.

Original Articles.

CLAVIS AGARICINORUM :

AN ANALYTICAL KEY TO THE BRITISH AGARICINI, WITH
CHARACTERS OF THE GENERA AND SUBGENERA.

BY WORTHINGTON G. SMITH, F.L.S.

(Read before the Woolhope Club, Hereford, February 22nd, 1870.)

(PLATES C.-CV.)

Contents.—1. General Observations on the *Agaricini*. 2. Analytical Key. 3. Characters of the Genera and Subgenera of the *Agaricini*.

1. GENERAL OBSERVATIONS ON THE AGARICINI.

In a large group of plants like the *Agaricini*, of which we have in this country some seven hundred representatives, all more or less intimately allied, systematic arrangement is of the highest importance. During the last half-century various attempts have been made in this direction, the last and most successful being that of the illustrious Fries, in his 'Monographia Hymenomycetum Suecicæ,' published in 1856. In this work, although the author does not depart materially from the views expressed in his 'Epicrisis' (1836-38), he separates several species of *Agaricus* into two new subgenera (*Inoloma* and *Stropharia*), removes some *Tricholomata* into the genus *Paxillus*, and makes many minor alterations. Since this work was issued, Fries has continued to write on the subject, and has recently established a third new subgenus (*Pilosace*) of *Agaricus*, making thirty in all. The only work in English that gives descriptions of all the British species is the admirable 'Outlines of British Fungology,' by the Rev. M. J. Berkeley (1860),—which has proved invaluable during the last ten years to students here and in America, where Fries' works are rare. As regards the *Hymenomycetes*, Mr. Berkeley in the main adopts the views of Fries, giving descriptions of many new species.

There is perhaps no test of the value of characters so searching as an analytical key, and, as far as I am aware, no one has hitherto attempted to produce one for the Order *Agaricini*. This want I have

here endeavoured to supply. It has been more or less perfectly in manuscript for the last seven years, and has always been used by me in determining new or critical Agarics. At the request of many friends, I am induced to print it; and it only remains for me to say, that the characters given are either taken from the works of Fries or Berkeley, or are from my own notes and observations. When the latter have agreed with those of the above-mentioned authorities, I have not hesitated to use their very words; but I have minutely examined between five and six hundred fresh specimens, ranging over the whole Order, and in every instance I have made careful drawings of the plants and their spores, together with dissections. I have also referred to, and retained copies of, more than a thousand published plates, being nearly every species referred to by Fries or Berkeley. The accompanying outlines have been in every case drawn from nature, and the spores of each species have been uniformly enlarged seven hundred diameters with a camera-lucida.

My ideas of the value and sequence of the genera and subgenera of the *Agaricini* differ very little from those of Fries and Berkeley. Had either of these authors applied the test of an analytical key, I have little doubt that, in regard to those small differences, they would have coincided with me. The five great series of Agarics, termed, from the colour of the spores,—1, *Leucospori* (white spores); 2, *Hyporhodii* (pink spores); 3, *Dermini* (brown spores); 4, *Pratellæ* (purple spores); and 5, *Coprinarii* (black spores),—are of the first importance in discriminating species. It is remarkable that, whilst in the first group we have in this country some two hundred and fifty species, the numbers grow gradually less through the pink, brown, and purple series to black, in which latter there are only sixteen.

After thus dividing the genus *Agaricus*, Fries proceeds to the subgenera; but this I consider too abrupt, as each spore-group naturally divides itself into three sections, thus:—

1. Hymenophorum distinct from the fleshy stem. L, Plate C. fig. 2.
2. Hymenophorum confluent and homogeneous with the fleshy stem. P, Plate C. fig. 5.
3. Hymenophorum confluent with, but heterogeneous from, the cartilaginous stem. Q, Plate C. fig. 7.

The arrangement of the subgenera under these sections is shown in the accompanying table (Plate CV.), and it may be considered in its

TABULAR VIEW OF THE SUBGENERA OF AGARICUS.

	I. LEUCOSPORI.	II. HYPO- RHODII.	III. DERMINI.	IV. PRATELLÆ.	V. COPRINARIÆ.
* Hymenophorum distinct from the fleshy stem.	1. Amanita.	10. Volvaria.			
	2. Lepiota.	11. <i>Chamaeota.</i>		26. Psalliota.	
		12. Pluteus.		27. Pilosace.	
** Hymenophorum confluent and homo- geneous with the fleshy stem.	3. Armillaria.		19. Pholiota.	28. Stropharia.	
	4. Tricholoma.	13. Entoloma.	20. Hebeloma.	29. Hypholoma.	33. Panæolus.
	5. Clitocybe.	14. Clitopilus.	21. Flammula.		
	6. Pleurotus.	15. <i>Claudopus.</i>	22. Crepidotus.		
*** Hymenophorum confluent with, but heterogeneous from the cartilaginous stem.	7. Collybia.	16. Leptonia.	23. Naucoria.	30. Psilocybe.	
	8. Mycena.	17. Nolanea.	24. Galera.	31. Psathyra.	34. Psathyrella.
	9. Omphalia.	18. Eccilia.	25. <i>Tubaria.</i>	32. <i>Deconica.</i>	

(Proposed new subgenera are in italics.)

favour that it displaces from the order generally adopted only two subgenera, *Pleurotus* and *Crepidotus*; the former is usually, but apparently without reason, placed after *Mycena* or *Omphalia*, and the latter after *Galera*. *Pleurotus*, as Fries himself says, is closely allied to *Tricholoma* and *Clitocybe*; it is, in fact, only a *Tricholoma* or *Clitocybe* growing on trees and stumps instead of on the ground. Its proper position, then, undoubtedly is after *Clitocybe*. Its peculiar habit is not sufficient to separate it from this group, as we find a habit precisely the same in *Armillaria*, *Pholiota*, and *Stropharia*. For convenience, it would be well to retain the resupinate species in their present position at the end of the subgenus. In the use of this table it may seem a question whether the sequence of the species should follow the vertical or the horizontal lines; the alliance is certainly greater in the horizontal series. For instance, *Armillaria* is much nearer to *Pholiota* and *Stropharia* than to *Tricholoma*; in the former the *structure* and the *habit* are the same, the spores only are different in colour. A reference to the characters of the subgenera in part 3 of this essay will show that this is true of *all the other subgenera*. I do not, however, propose to adopt this system, though Fries has used it in arranging the *genera* of the *Agaricini*, for after *Agaricus* he places *Coprinus*, wholly disregarding the spores, and depending on the structure, which resembles *Lepiota*; then follows *Cortinarius*, resembling *Armillaria*, *Tricholoma*, and their allies (see table); then *Paxillus*, with the gills decurrent as in *Clitocybe*; and so on, in accordance with *structure* and *habit*, to the end of the Order. Had the genera of *Agaricini* been arranged after the manner of the subgenera of *Agaricus*, the sequence would have been:—White spores: *Russula*, *Lactarius*, *Hygrophorus*, *Nyctalis*, *Paxillus* (*Lepista*), *Cantharellus*, *Marasmius*, *Lentinus*, *Panus*, *Xerotus*, *Schizophyllum*, *Lenzites*. Pink and brown spores: *Bolbitius*, *Cortinarius*, *Paxillus* (*Tapinea*). Black spores: *Gomphidius*, *Coprinus*. It is singular that none of these genera have purple spores, analogous with the *Pratella*. So little value does Fries attach to the colour of the spores amongst these genera, that some of the species of his *Paxillus* have *white* spores, others *red*. Thus, the genus *Marasmius* is so near the subgenus of *Agaricus*, *Collybia*, that it is sometimes very difficult to determine to which group some species belong. Fries himself is often very uncertain; for he has recently put the common *Agaricus* (*Tricholoma*) *personatus*, Fr., into the genus *Paxillus*, partly on account of the gills separating from

the hymenophorum. See remarks under *Tricholoma*, *Lepista*, and *Paxillus*.

I. LEUCOSPORI, *White-spored Agarics* (PLATE C.).—Without doubt the species bearing white spores are much higher in type than the plants producing coloured spores. Most of the former are firm, and many persistent, whilst as we approach the black-spored Agarics, through the pink, brown, and purple series, there is a greater tendency to deliquesce till we reach the small, ephemeral species of *Coprini*, whose entire lives endure but one hour, and whose whole structure may be destroyed by a breath. The spores of the *Leucospori* are mostly oval in shape, sometimes nearly round (in *Pleurotus* they are usually elongated ovals), generally very regular in shape, but sometimes spinulose (showing an affinity to *Russula* and other genera). The spores vary in size; the *Leucospori* producing the largest as well as the smallest known spores; as a rule they are *small* (and thus opposed to the black-spored groups, where, as a rule, they are *large*), generally white, but sometimes dingy, or with a suggestion of yellow, showing an affinity to *Cantharellus*, etc., or pink, and pointing to *Lentinus*. It is worthy of note that no other Fungus is analogous with the species of the "ringed" section of *Amanita*; it stands quite alone in possessing a *volva and ring*. It is also remarkable that, as a rule, none of the *Leucospori* grow on dung or in rank places, whilst in the darker and black-spored groups these habitats are the rule.

II. HYPORHODII, *Pink-spored Agarics* (PLATE CI.).—There is not one quarter so many Agarics bearing pink or salmon-coloured as white spores. The size of the spores varies greatly. A few are very small, others equally large (see Plate CI.), whilst the majority are remarkably irregular in shape, resembling the fragments of granite seen in the roads. Some of the species are edible, as in *Clitopilus* (analogous with the white-spored edible species of *Clitocybe*), whilst others are poisonous, as in *Eutoloma*, reminding us of such dangerous species of *Tricholoma* as *A. sulfureus*, Bull., etc.

In this section blank places for unrepresented subgenera become apparent. Were the study better prosecuted, and the Agarics from all the world known, most, if not all, these species would probably be filled in. The genus *Pluteus* occupies the only space unrepresented amongst the *Leucospori*, Plate C., but it is exceedingly probable that white-spored Agarics exist with gills perfectly *free* from the stem, and

without a ring, though at present none are described.* Weight is added to this opinion by the fact that Fries has lately established a subgenus (*Pilosace*) amongst the *Pratellæ* with these very characters (Plate CIII.). Till then *Pluteus* stood quite alone in structure.

Hitherto no subgenus has been recognized amongst the *Hyporhodii* analogous to *Lepiota* among the *Leucospori*, but such a group really exists. In the 'Commentario della Società Crittogamologica Italiana,' No. 2, September, 1861, there is an Agaric described as a doubtful *Pluteus* under the name of "*A. (Pluteus?) xanthogrammus*, Ces." It greatly resembles *A. (Armillaria) mucidus*, Fr., in aspect, and the stem is furnished with a ring; so that it fills up the vacant space in the *Hyporhodii*. I propose for it the subgeneric name of *Chamæota*. To it also belongs *A. cretaceus*, Fr., *A. echinatus*, Roth, etc. *A. cretaceus*, Fr., should not be referred to as intermediate between *Lepiota* and *Psalliota*. It is singular that, with these unrecognized exceptions, not a single rosy-spored Agaric is described as possessing a stem furnished with a true ring, whilst in the *Pratellæ*, every species in every subgenus has a ring more or less manifest.

Some species of the subgenus *Crepidotus* must be removed to the space in the *Hyporhodii*, analogous to *Pleurotus*, as their spores are rosy, and not brown. To this new and natural group I give the name *Claudopus*. Mr. Berkeley's species of *Pleurotus* (?) with pink spores belongs to this subgenus. When Mr. Berkeley's book was published, ten years ago, no species of the subgenus *Eccilia* were known to be British; now at least three are on our lists.

III. *DERMINI*, *Brown-spored Agarics* (PLATE CII.).—In the *Dermini*, the blanks for unrepresented subgenera are more numerous. There are no British species with the hymenophorum free from the

* Since this paper has been in print, I have received from Mr. Charles H. Peck, of Albany, New York (under date March 30, 1870), an interesting note regarding a critical American Agaric. If his description prove correct, the plant he mentions exactly fills the only vacant space amongst the *Leucospori*. He says, in answer to my inquiries, "I have found what I have classed with the *Lepiota*, a viscid, caespitose species, growing on old stumps close to the ground, having no trace of veil or annulus, a circumstance in which it does not agree with other species of that subgenus so far as known to me." The habitat of this Agaric, leaving out its structural characters, does not agree with any species of *Lepiota*, but is in correspondence with that of *Pluteus*, where the annulus is also absent, and which is probably one of its analogues. The habitats correspond in other analogous subgenera, as in *Lepiota* and *Psalliota*; *Armillaria*, *Pholiota*, and *Stropharia*, etc.

stem; but in *Agaricus* (*Pholiota*) *tersus*, Fr., it is so, and the stem is furnished with a fugitive ring, showing a clear analogy between this species and *Lepiota* (Plate C.), *Chamæota* (Plate CI.), and *Psalliota* (Plate CIII.); neither are any brown-spored Agarics furnished with a volva, unless, indeed, a trace of such a structure is indicated in *Cortinarius* (for *Cortinarius* is certainly allied to *Pholiota* and *Hebeloma*), where many of the species have an adnate volva and arachnoid ring.

Remarks on Fries' new subgenus *Inocybe* will be found under *Hebeloma*. This latter subgenus resembles *Cortinarius* in many respects, even to the lesser groups, into which both are divided, depending on the character of the pileus, whether it is slimy, moist, or squamulose.

The subgenera *Flammula* and *Naucoria* are in a most unsatisfactory condition. They require thorough revision. The species of *Naucoria*, with decurrent gills and depressed pilei (*A. furfuraceus*, P., etc.) I remove to the next position, as analogous in every respect to *Omphalia* and *Eccilia*, and describe under the name *Tubaria*.

IV. PRATELLÆ, *Purple-spored Agarics* (PLATE CIII.).—The affinities and characters of all the subgenera are referred to under their respective headings. I have already said that *Pilosace* is not British. As *A. physaloides*, Bull., has decurrent gills and a pileus at length depressed, I remove it to the space corresponding amongst the *Pratellæ* to *Omphalia* and *Eccilia* amongst the white- and pink-spored species; and name the subgenus *Deconica*.

V. COPRINARIÆ, *Black-spored Agarics* (PLATE CIV.).—There is little to be said about these in addition to the observations under the respective subgenera. *Psathyrella* is very close to *Coprinus*, more so than *Panæolus*. In the *Coprinariæ* the unrepresented spaces are very numerous. I am unable to offer any suggestion as to filling them, unless by cutting up the genus *Coprinus*, the species of which genus differ exceedingly in many points, especially in the attachment of the gills to the stem. *C. comatus*, Fr., is clearly allied to *Lepiota*; the habit, scaly pileus, moveable ring, change of colour when cut, edible qualities, etc., all point in this direction. The characters of some of the others, as those growing on wood, etc., indicate other affinities; but till Agarics are better known these spaces must remain unoccupied.

2. ANALYTICAL KEY TO THE AGARICINI.

In using the following key, the first and most important point to be

determined in naming an Agaric is to ascertain the colour of the spores. The specimens used for study should always be perfectly fresh and, if possible, young, as in many species the characters, especially of the veil and colour, are evanescent. To beginners the habitat also will be found of considerable importance.* The genera are printed in italics, and the subgenera in Roman type. The numbers prefixed to the subgenera will enable the reader to refer at once to the Plates, where the numbers correspond.

I. Spores white, or very slightly tinted.—*Leucospori*.

* Plant fleshy, more or less firm, putrescent (neither deliquescent nor coriaceous).

† Hymenophorum free.

Pileus bearing warts or patches free from
the cuticle 1. *AMANITA*.
Pileus scaly, scales concrete with the cuticle 2. *LEPIOTA*.

† Hymenophorum confluent.

‡ Without cartilaginous bark.

§ Stem central.

|| With a ring 3. *ARMILLARIA*.

|| Ringless.

Gills sinuate 4. *TRICHOLOMA*.
Gills decurrent.

Separating from the hymenophorum 5. *LEPISTA*.

Not separating from the hymenophorum.

Edge acute 5. *CLITOCYBE*.

Edge swollen 11. *CANTHARELLUS*.

Gills adnate.

Plants parasitic on other Agarics 12. *NYCTALIS*.

Not parasitic.

Milky 9. *LACTARIUS*.

Not milky.

Rigid and brittle 10. *RUSSULA*.

Waxy 7. *HYGROPHORUS*.

§ Stem lateral or absent 6. *PLEUROTUS*.

‡ With a cartilaginous bark.

Gills decurrent 9. *OMPHALIA*.

Gills not decurrent.

* Being anxious to procure fresh specimens of new and rare species for an illustrated work on the British Hymenomycetes now in hand, I append my address. Each Fungus should be wrapped separately in thin paper to prevent bruising. Under three-quarters of a pound in weight will travel by *sample post* for 3d. if no letter is enclosed.

12, North Grove West, Mildmay Park, London.

- Margin at first involute 7. COLLYBIA.
 Margin at first straight 8. MYCENA.
- * Plant tough, coriaceous, or woody.
- † Stem central.
 Gills simple 13. MARASMIUS.
 Gills branched 16. XEROTUS.
- † Stem lateral or wanting.
 Gills toothed 14. LENTINUS.
 Gills not toothed 15. PANUS.
 Gills splitting longitudinally 17. SCHIZOPHYLLUM.
 Gills anastomosing 18. LENZITES.
- II. Spores rosy or salmon-colour.—*Hyporhodie*.
- * Without cartilaginous bark.
- † Hymenophorum free.
 ‡ With a volva 10. VOLVARIA.
 ‡ Without a volva.
 With a ring 11. CHAMÆOTA.
 Ringless 12. PLUTEUS.
- † Hymenophorum confluent.
 ‡ Stem central.
 Gills adnate or sinuate 13. ENTOLOMA.
 Gills decurrent 14. CLITOPILUS.
 ‡ Stem lateral or absent 15. CLAUDOPUS.
- * With cartilaginous bark.
 Gills decurrent 18. ECCILIA.
 Gills not decurrent.
 Gills subdeliquescent 3. BOLBITIUS.
 Pileus torn into scales 16. LEPTONIA.
 Pileus papillose, subcampanulate.
 Gills membranaceous, persistent 17. NOLANEA.
- III. Spores brown, sometimes reddish or yellowish-brown.—*Dermiini*.
- * Without cartilaginous bark.
- † Stem central.
 ‡ With a ring.
 Ring continuous 19. PHOLIOTA.
 Ring arachnoid, filamentous or evanescent.
 Gills adnate, terrestrial 4. CORTINARIUS.
 Gills decurrent or acutely adnate, generally epiphytal 21. FLAMMULA.
- ‡ Without a ring.
 Gills adhering to the hymenophorum, and sinuate 20. HEBELOMA.
 Gills separating from the hymenophorum, and decurrent 6. PAXILLUS.
- † Stem lateral or absent 22. CREPIDOTUS.

- * With cartilaginous bark.
 - Gills decurrent 25. TUBARIA.
 - Gills not decurrent.
 - Margin of pileus at first incurved 23. NAUCORIA.
 - Margin of pileus always straight 24. GALERA.
 - IV. Spores purple, sometimes brownish-purple, dark purple or dark brown.—*Pratellæ*.
 - * Without cartilaginous bark.
 - † Hymenophorum free.
 - ‡ With a ring 26. PSALLIOTA.
 - ‡ Ringless 27. PILOSACE.
 - † Hymenophorum confluent.
 - Veil normally ring-shaped on the stem 28. STROPHARIA.
 - Veil normally adhering to the margin of pileus 29. HYPHOLOMA.
 - * With cartilaginous bark.
 - Gills decurrent 32. DECONICA.
 - Gills not decurrent.
 - Margin of pileus at first incurved 30. PSILOCYBE.
 - Margin of pileus at first straight 31. PSATHYRA.
 - V. Spores black, or nearly so.—*Coprinarii*.
 - Gills deliquescent 2. COPRINUS.
 - Gills not deliquescent.
 - Decurrent 8. GOMPHIDIUS.
 - Not decurrent.
 - Pileus striate, gills not variegated 34. PSATHYRELLA.
 - Pileus not striate, gills variegated 33. PANÆOLUS.
- [Part 3, with full characters of the genera and subgenera, will be given in the next three numbers.]

REVISION OF THE NATURAL ORDER BIGNONIACEÆ.

BY BERTHOLD SEEMANN, Ph.D., F.L.S., ETC.

(Continued from Vol. V. p. 371.)

RADERMACHERA, Zoll. et Moritz.

This genus was established in 1855, being first described in Zolinger's 'Systematisches Verzeichniss,' iii. p. 53 (Zürich, 1855), though Bureau (Adansonia, ii. p. 194, Paris, 1861-62) thought *Radermachera* merely a mss. name, which, in that place, he adopted with his definition of the genus given. Miquel (Ann. Bot. Lugd.-Bat. i. p. 198, 1864), overlooking what had been written by both these

authors, renamed the genus *Lagaropyxis*, but becoming aware of the oversight, cancelled his name at a subsequent date (Ann. l. c. iii. p. 53). The founders of the genus only knew one species, viz. *R. stricta*, which they thought might prove identical, as indeed it has done, with Blume's *Spathodea glandulosa* from Java. Bureau (Adansonia, l. c.) added a second species from the Philippine Islands, where it, amongst others, bears the name of "Banaibanaï;" but he overlooked the fact that this plant had been described already by Blanco in his 'Flora de Filipinas,' p. 501, and transferred to De Caudolle's 'Prodromus,' under the name of *Millingtonia pinnata*. A third species was added by Miquel (Ann. l. c. iii. p. 250), founded upon Teijsmann's and Binnendyck's *Spathodea Lobbi*. Finally, I now add as fourth and fifth species, *R. amœna*, Seem. (*Bignonia amœna*, Wall.), and *R. quadripinna*, Seem. (*Millingtonia quadripinna*, Blanco).

The leaves in *S. glandulosa* are stated to be always simply pinnate, whilst *S. pinnata* (*Banaibanaï*) is said to have bipinnate leaves, but according to Blanco's description, they are simply pinnate; and in one of Cuning's specimens from the Philippine Islands they are so, but in the other bipinnate. Most probably in all the species the lower leaves are bi- or even decomposito-pinnate, and the upper tending towards simple pinnate. The tube of the corolla is described as glabrous in the genus, but in *R. amœna* and *R. quadripinna* it is decidedly hairy.

○ RADERMACHERA (gen. Catalpearum), Zoll. et Moritz, in Zoll. Syst. Verzeichn. iii. p. 53; Bureau, Monogr. Big. t. 28, et in 'Adansonia,' ii. p. 194.—*Lagaropyxis*, Miq. Ann. Bot. Lugd.-Bat. i. p. 198, et iii. p. 250. *Millingtoniæ*, *Spathodeæ* et *Stereospermi* sp. Auct.

1. *R. gigantea*, Miq. Ann. l. c. iii. p. 250.—*Spathodea gigantea*, Blum. Bijdr. p. 761; De Cand. Prod. ix. p. 207. *Lagyropyxis gigantea*, Miq. l. c. i. p. 198, excl. syn. *Spathodea Lobbi*. Nomen vernac. Javanicum "Kipadali."—Java (Horsfield! in Mus. Brit.). Also in Sumatra and Borneo, according to Miquel.

2. *R. amœna*, Seem.—*Bignonia amœna*, Wall. Plant. Asiat. Rar. ii. p. 78. t. 183. *B. amara* (ex err. typogr. ?); Loudon, Hort. Brit. p. 483; G. Don, Gen. Syst. iv. p. 222. *Spathodea* (?) *amœna*, De Cand. Prod. ix. p. 208.—Near Segain, and between Ava and Toong-Dong (Wallich! Cat. n. 6513, ex parte).

Said by Wallich (Plant. Rar.) to have been introduced into the Calcutta Gardens from Mauritius, but it is more likely to have come from

Ava, as stated in his 'Catalogue,' where, however, it is mixed with *Millingtonia hortensis* and other *Bignoniaceæ*.

3. *R. Lobbi*, Miq. l. c. iii. p. 250.—*Spathodea Lobbi*, Teijsm. et Binn. in Tijdschrift. Nat. Ned. Ind. xxv. p. 413.—Singapore, Banka, and Sumatra, according to Miquel.

4. *R. glandulosa*, Miq. l. c.—*R. stricta*, Zoll. et Moritz, in Zoll. Syst. Verz. iii. p. 53; Bur. Monogr. Big. t. 23. *Spathodea glandulosa*, Blum. Bijdr. p. 762; De Cand. Prodr. ix. p. 207. *Stereospermum glandulosum*, Miq. Fl. N. Ind. Suppl. i. p. 565. *Lagaropyxis glandulosa*, Miq. Ann. l. c. i. p. 199. Nomina vernacula Jav. teste Blume, "Kilunghit" et "Kipadalli Lalakie."—Java (Zollinger! n. 3141).

✓ 5. *R. pinnata*, Seem.; *R. Banaibanai*, Bur. in Adanson. ii. p. 194.—*Millingtonia pinnata*, Blanco, Fl. Filip. p. 501; (De Cand. Prodr. ix. p. 182. *Bignonia Banaibanai*, Call. Herb. Nomina vernacula Philip. teste Blanco, "Banaibanai" et "Bot-ong manoc."—Philippine Islands (Cuming! n. 1182 et 1577; Callery, n. 50).

"A tree yielding durable timber, and called by some of the Philippine Islanders, in allusion to a certain resemblance of the branchlets to the bones of a fowl, 'Bot-ong manoc.'" (Blanco.) By some typographical error, Bureau leaves out the *i* at the end of his specific name, which I have ventured to add, the native name of the plant being "Banaibanai."

✓ 6. *R. quadripinna*, Seem. Herb. Mus. Brit.—*Millingtonia quadripinna*, Blanco, Fl. Filip. p. 501; De Cand. Prodr. ix. p. 183. Nomen vernac. Philip. teste Blanco, "Bateculin."—Philippine Islands (Cuming! n. 996).

I have retained Blanco's somewhat inappropriate specific name, though the leaves are bipinnate, as in most other species of this genus.

NYCTOCALOS, *Teijsm. et Binn.*

This genus was established in 1862 by Teijsmann and Binnendijk, in Miquel's Journal de Bot. Néerlandaise, i. p. 366, being founded upon a Javanese climber, of which the fruit was at that time unknown. Miquel, who obtained ripe fruit, was able to assign it (Ann. Mus. Lugd.-Bat. i. p. 201) a position amongst the *Eubignoniaceæ*; the valves of the capsule being placed parallel with the septum. Two years later, Dr. F. von Mueller (Frag. Austr. iv. p. 148) obtained from Queensland a singular new *Bignoniaceæ* without fruit, upon

which he founded the genus *Hausmannia*. A close study of the two genera convinces me that they are identical, and must retain the oldest name, *Nyctocalos*. As far as I am aware, there are at present four species known, viz. *N. brunfelsiæflorum*, *N. cuspidatum* (previously described by Blume from sterile specimens, as *Tecoma cuspidata*), *N. Thomsoni*, from Assam, and *N. jucundum*, from Queensland. The two former species differ from the two latter by having 5 fertile stamens, whilst the latter have only 4 fertile and 1 sterile one. Dr. Hooker, in speaking of *N. brunfelsiæflorum* (Bot. Mag. t. 5678), says, that he should like to see a confirmation of the five fertile stamens attributed to it. But after a second species, with 5 fertile stamens, has come to light (both figured by Miquel), there can be no doubt about the correctness of the original description of the stamens given by the founders of the genus. The same thing occurs in *Newbouldia*, where we have a species with 4 and another with 5 fertile stamens; and a similar case in *Diplanthera*, R. Br. (*Bulweria*, F. Muell., *Deplanchea*, Bur.), where we have, in *D. tetraphylla* and *D. Bancana*, 4 fertile stamens and no rudimentary fifth, and in *D. speciosa*, Seem. (*Deplanchea speciosa*, Vieill.) 4 fertile stamens with a rudimentary fifth.

NYCTOCALOS (gen. Eubignoniacearum), Teijsm. et Binn. in Miquel, Journ. Bot. Néerl. i. p. 366 (1862); Miq. Ann. Bot. Mus. Lugd.-Bat. i. p. 201 (1864), et iii. p. 249 (1867). Calyx campanulatus, truncatus, margine extrorsus 5-dentulo. Corolla clongato-infundibuliformis, tubo tereti leviter arcuato; lobi 5, subæquales v. inferiore majore, induplicato-valvati. Stamina 5, omnibus fertilibus, v. 4, didynama, eum quinto sterili, inclusa v. subexserta; filamentis filiformi-subulatis. Antheræ loculis divaricatis v. parallele conjunctis, ab-apice connectivi apiculati pendulis. Discus annularis, integer. Ovarium breviter stipitatum, 2-loculare, ovulis 8-serialiter dispositis. Stylus filiformis; stigma 2-lamellatum. Capsula oblonga, compressa, valvis lignosis, septo tenui valvis parallelo membranaceo-coriaceo, secus margines utrinque 2-serialiter semiinfero, marginicide dehiscens. Semina membranaceo-alata; cotyledones planæ, rotundatæ, utrinque emarginatæ.—Frutices scandentes, glabri, Asiæ et Australiae tropicæ; foliis oppositis, 3-foliolatis, foliolis integerrimis, racemis terminalibus v. axillaribus, paucifloris, floribus speciosis albidis roseis v. purpureis.—*Hausmannia*, F. Muell. Frag. Austr. iv. p. 148 (1864); Benth. Fl. Austr. iv. p. 540.

Stamina 5, omnia fertilia; antherarum loculi parallele conjuncti.

Calycis dentes abbreviati, 3-angulares; corollæ pallide carneo-rubellæ tubus 2-3 poll. *N. brunsfelsiæflorum*.

Calycis dentes lineares, acutissime patuli; corollæ cum levi flavidiore albidæ tubus 6-7 poll. *N. cuspidatum*.

Stamina 4, didynama, cum rudimento quinto sterili; antherarum loculi divaricati.

Corollæ purpureæ tubus 1 poll. *N. jucundum*.

Corollæ albidæ tubus 6-7 poll. *N. Thomsoni*.

* *Eunyetocalos*.

1. *N. brunsfelsiæflorum*, Teijsm. et Binn. in Miq. Journ. Bot. Néerl. i. p. 366; Miq. Choix de Pl. de Buitenz. t. 7; ejusd. Ann. Bot. Mus. Lugd.-Bat. i. p. 201, excl. syn. Blume, ab stirpe Celebica; ejusd. l. c. iii. p. 249. t. 8. fig. A.—Java (Teijsmann).

2. *N. cuspidatum*, Miq. Ann. l. c. iii. p. 249. t. 8. fig. B.—*Tecoma cuspidata*, Blume, Rumph. iv. p. 35 ad sp. sterilia. *N. brunsfelsiæflorum*, Miq. Ann. l. c. i. 366, quoad spec. Celebica.—Moluecas (Zippelius), Celebes (Teijsmann).

** *Haussmannia*.

3. *N. Thomsoni*, Hook. fil. in Bot. Mag. t. 5678.—Mika Hills, near Gowahatty, Assam (Simons). Cultivated at Kew.

4. *N. jucundum*, Seem.—*Haussmannia jucunda*, F. Muell. Frag. iv. p. 148; Benth. Fl. Austr. iv. p. 540. *Campsis Haussmanni*, F. Muell. l. c. Queensland (Dallachy).

ON THE DUMETORUM GROUP OF RUBI IN BRITAIN.

BY THE HON. J. L. WARREN.

(PLATES CVI.-CVII.)

There occurs in this country a widely-distributed group of septal Brambles, which has long proved a severe crux to the students of this difficult genus. This shades off on one side into *cæsius*, on the other it gradually passes into *corylifolius*, while it has also a strange cross-alliance with *fusco-ater* and *infestus*, generally reckoned as Koehlerian Brambles. Its constituent forms may be roughly yet effectually distinguished from the corylifolians by their markedly setose stem and rachis. On no true corylifolians, as I understand this subspecies, are aciculi and setæ anything more than sparse, occasional, distant, and,

for all purposes of practical observation, absent. *Dumetorum*, then, is essentially a glandulose group. Another character of some value in helping us to keep clear of *corylifolius* is the tendency which the sepals of all *dumetorum* Brambles show, some strongly, some faintly, to become erect or at times adpressed. This statement, however, if too rigidly accepted, would make us miss the great lesson of this group, namely, that in certain cases the direction of the sepals is of very little value as a diagnostic character. This point, Mr. Baker observes, *dumetorum* illustrates better than any other Bramble; and he is inclined, applying what may be learnt here, to conclude, that *Balfourianus* and *althæifolius* are simply varieties of *corylifolius*, with adpressed sepals.

In drawing our line on the other side between *dumetorum* and *cæsius*, many immature and ill-nourished forms will occasion us some perplexity. A curious point about *cæsius* is this, that although so common and widely distributed in Britain, it is with us, under all its variations, essentially eglandulose, but this is not the case either in France or Germany. (See *R. serpens* of Grenier and Godr., and *R. cæsius*, var. *hispidus* and *ferox* of Weihe and Nees.) Generally, then, the essential points* of *cæsius*, comparing it with *dumetorum* and *corylifolius*, are its much weaker growth, slender terete always conspicuously bloomy stems, copious very weak subulate prickles, ternate fully developed leaves, leaflets essentially more irregularly toothed and less hairy beneath, sparse corymbose inflorescence, sepals more lengthened out at the point, always adpressed to the fruit, which is of fewer larger grains, and always decidedly pruinose.

In Prof. Babington's 'British Rubi' the two partly or wholly equivalent factors of which our *dumetorum* group is composed, are classed in different sections to each other. They seem, however, so nearly, or even at times inextricably, related, that it is most hard to disjoin them. A fuller view of the group, by adding in such links as *concinus* and *pilosus*, renders this separation doubly difficult. I am free, as I said above, to allow strong Koehlerian affinities in *diversifolius*, but this is only another instance of those puzzling *cross-resemblances* in *Rubi*, which make any mere linear arrangement of their subspecies inevitably fall far short of expressing the whole truth concerning their analogies. There is, indeed, a question whether some forms of

* I owe these remarks to Mr. Baker.

the protean *R. fusco-ater* (Weihe, as the plant is interpreted by Professor Babington) should not follow *diversifolius* into the dumetose group. This may be a consideration for the future; as I am convinced we are still far from finality, and that our group will hereafter receive, even in this country, many new varietal additions. Some of these are now probably before me in Mr. Baker's excellent series, but it is always dangerous in rubiology to describe merely from dried specimens. The golden rule of our Bramble-collecting guild ought to be, *see your individual plant always in its growing state*.

The *dumetorum* group are Brambles of the hedge, and essentially, to adopt Mr. Watson's term, septal. They are not of the wood, or of the open ground; contrast, for example, *R. Borreri* for a heath, or *R. Guntheri* for a wood, form. A good compendious definition of the group as a whole is, that it represents *corylifolius* in the glandulose series.

As contrasted and distinguished from the other *Glandulosi*, through all its series of variations, *dumetorum* may be chiefly recognized—1. By its weak, and consequently trailing, long, nearly round, barren stems, with a decided tendency to be bloomy.* 2. By the irregularly deltoid dentition of the leaflets as in *corylifolius*; the terminal one being round or broad-obovate with a point, the lower four so shortly stalked that they usually overlap a great deal. 3. By the petals 3–4 lines broad. By the flowering beginning at the same time as *corylifolius*, *cæsius*, and *suberectus*, and being continued in a very irregular way, lasting till very late in the year. 4. By the black fruit and carpels more irregularly fertilized, like those of *corylifolius*, and by the drupels fewer and larger than in any other species except *cæsius* and *corylifolius*.

Within this range the principal variation is in—1. Stem armature (enormous variation here in quantity of prickles aciculi and setæ, and whether or no hairs are present on the barren stem and panicle rachis). 2. In the size of leaf and clothing of its underside. 3. In shape of panicle. 4. In sepals, whether erect or adpressed.

Our new provisional arrangement of *dumetorum* may be then thus stated:—

a. concinnus, Baker = *tuberculatus*, Bab. *ex parte*. The Thirsk

* Note here that these two points define the position of this group. The round stem shows a *corylifolius*, the bloom a *cæsius*, alliance.

- plant is so named; see Brit. Rub. p. 283. Mr. Bloxam labels specimens sent by me *R. dumetorum*, β . *tomentosus*.
- β . *tuberculatus* Bab. = *intermedius*, 'Flora of Middlesex,' p. 100. Taking as my type of real *tuberculatus* the plant from Sheen Common, quoted as "Richmond" in 'British Rubi,' p. 283, and excluding the Thirsk plant.
- γ . *pilosus*, R. G. = *hirtus*, Lindl. *vide* Baker.
- δ . *diversifolius*, Lindl. = *diversifolius* of Babington, *ex parte*, and Genevier, and *nemorosus*, δ . *ferox** of Bloxam. This often occurs as *fusco-ater* in old herbaria.
- ϵ . *intensus* = *diversifolius*, Bab. *ex parte*.

Attempt to co-ordinate the views of living rubiologists.

	Prof. Babington.†	Rev. A. Bloxam.	Mons. Genevier.
α . <i>concinus</i> . . .	<i>tuberculatus</i> . . .	<i>nemorosus</i> , β . <i>pilosus</i> . . .	<i>corylifolius</i> .
β . <i>tuberculatus</i> . . .	<i>tuberculatus</i> . . .	<i>tuberculatus</i>	views not known.
γ . <i>pilosus</i> . . .	<i>diversifolius</i> . . .	form of <i>dumetorum</i>	<i>horrefactus</i> ?
δ . <i>diversifolius</i> . . .	<i>diversifolius</i> . . .	<i>nemorosus</i> , δ . <i>ferox</i>	<i>diversifolius</i> .
ϵ . <i>intensus</i> . . .	<i>diversifolius</i> . . .	<i>diversifolius</i>	<i>horrefactus</i> ?

I have provisionally arranged *dumetorum* under these five varietal letters, placing in order first *concinus* as nearest *corylifolius*. It seems that *concinus*, *tuberculatus*, *pilosus*, and *diversifolius* are good and distinct *Rubi* forms, but *intensus* is merely intense *diversifolius*, and hardly deserves a separate letter. I have no doubt that this group will be hereafter increased by many other forms of fully as good varie-

* The real *dumetorum ferox* of R. G. should be searched for in England.

† The first question of any reader of this paper will be under what heads in 'British Rubi' of Professor Babington he is to look for the group here described. The above are mere guesses as to which of Professor Babington's species my varieties fit best. But they are simply the best conclusions a reader of that work is able to come to, and are very possibly erroneous, and carry no kind of authority from the Professor himself. Mr. Bloxam's views, however, I know pretty accurately, from the great personal assistance I have received from him. M. Genevier's verdicts are taken from his labels of specimens in this group in Mr. Baker's possession. Mr. Baker's views are, I may say, substantially mine; or, to put the case more justly, my views are derived from Mr. Baker, without whose continual advice and assistance this paper would never have been put together. I am indebted to him for suggestions too numerous to particularize, and besides general corrections and supervision, many paragraphs are entirely due to him. To Mr. Bloxam I am also indebted for very great assistance and repeated replies to letters on this subject, and for the loan of his excellent dried series of this group. To Rev. W. W. Newbould I am grateful for great help in the collection and preparation of specimens.

tal value as those I have enumerated, but I have thought it safer only to describe at present those forms which I have seen in a growing state, not precluding thereby myself or others from adding hereafter to this group. Indeed, in Mr. Baker's excellent series of *dumetorum* occur some two or three forms, which I believe deserve a separate description, but which I only know from his dried specimens. I also gathered hurriedly at Henfield, Sussex, during last summer, a *Rubus* of this group in many respects new and noteworthy. The present essay is, therefore, the very reverse of exhaustive, and merely a humble and provisional attempt to advance the study, to improve the arrangement, and to catalogue some either new or imperfectly-described members of the *dumetorum* set. The present ambiguity and confusion which envelope this group are the writer's apology for this attempt.

Diagnosis of the Plant as a whole.

R. dumetorum, Weihe et Nees, Rub. Germ. t. 45 A; caule arcuato-prostrato subtereti sæpe cæsiopruinoso glabro vel patentim piloso, aculeis inæqualibus modice robustis supra basin cîte dilatatis sparsis vel numerosis, aculeis et setis glandulosis copiosis vel paucis munito; foliis quinatis, irregulariter dentatis, dentibus deltoideo-cuspidatis, lateralibus late fere imbricatis, terminali rotundato-cuspidato, infra plus minus dense griseo- vel raro albido-pubescentibus; paniculis thyrsoides; petalis latis pallidis vel roseis, sepalis demum reflexis vel ascendentibus apice vix foliaceo-elongatis; stylis et staminibus fere pallidis; fructu drupellis paucis magnis irregulariter maturatis confecto.

Attempted Varietal Diagnosis.

- a. *concinus*; caule subtereti, pilis setis et aciculis raris, aculeis modice validis æqualibus instructo; foliis subtus tomentosis, magis regulariter quam in varietatibus aliis serratis; panicula elongata, thyrsoides; sepalis plerisque reflexis; petalis pallide roseis.
- β. *tuberculatus*; caule subpiloso, aculeis crebris subæqualibus, setis aciculisque inconspicuis parvis et sparsis munito; foliis dupliciter serratis, subtus sparsim et haud tomentosis; panicula aperta haud ad apicem foliosa; sepalis fructui adpressis; petalis roseis.
- γ. *pilosus*; caule hirto et piloso, aculeis aciculis et setis densis inæqualibus minuto; foliis magis argute dentatis quam in varietatibus aliis et subtus magis pilosis; panicula ad apicem foliosa; sepalis fructui adpressis vel reflexis; petalis latis albis.
- δ. *diversifolius*; caule sparsim piloso, aculeis longis rectis com-

pressis inæqualibus, aciculis setisque crebris instructo; foliolis rugosis haud duplicato-serratis, subtus pilosis et viridibus at haud tomentosis; panicula ad apicem foliosa, ramis brevissimis; sepalis erecto-patentibus vel fructui laxè adpressis; petalis latis rugosis albis.

- ε. *intensus*; caule horrido, hirtò, aculeis parvis at densissimis, aciculis setisque; foliolis subtus pilosis haud tomentosis haud duplicato serratis; panicula aperta ramis longis et compositis; petalis albis (?); sepalis fructui haud laxè adpressis, longè attenuatis.

British Synonymy of the plant.

R. hirtus, Lindl. Synop. Brit. Fl. p. 94. *R. Schleicheri* et *dumetorum*, Leight. Fl. Shrop. p. 237. *R. diversifolius*, Lindl. Synop. ed. 2. p. 94=Bab. Man. ed. 5. p. 217, and 6th edition; and 'British Rubi,' p. 217. *R. fusco-ater*, Bab. Synops. p. 29, and editions 1 to 4 of the 'Manual,' not 5, 6, and 'British Rubi.' *R. tuberculatus*, Bab. Fl. Camb. p. 306; 'British Rubi,' p. 280. *R. nemorosus*, Bab. Syn. p. 33, and the earlier editions of the 'Manual' *ex parte*.—The plant distributed by Mr. Bloxam under the name *nemorosus* always this and Leighton's *nemorosus*, var. *ferox*. *R. diversifolius* and *tuberculatus*, Baker's 'North Yorkshire,' pp. 227-228.

Foreign Synonymy.

R. dumetorum, as defined by Weihe and Nees in 'Rubi Germanici,' p. 99, excluding *corylifolius* and some other synonyms, and the *dumetorum* of all German writers also excluding *corylifolius*. *R. nemorosus*, Garcke, Fl. Nord. Deutschl. ed. 6, p. 126 (excluding the synonyms *pallidus*, W. and N., and *Wahlbergii*, Arrh.), but scarcely the *nemorosus* of Hayne as figured Arznc. iii. t. 10, and certainly neither of Arrhenius nor of Godron, both of which, as represented by authentic specimens in the Kew Herbarium, are forms of *corylifolius*. *R. diversifolius*, Genevier, 'Rubi,' p. 41. *R. delectus*, *schistogenes*, and *horrefactus*, Müller. *R. adoleucos*, Chaboisseau.

[The conclusion of this paper, with two plates illustrating the varieties β and δ, will be given in the next number.]

CALLITRICHE TRUNCATA, Guss., AS A BRITISH PLANT.

BY HENRY TRIMEN, M.B., F.L.S.

During his recent visit to London, Dr. Hegelmaier, of Tübingen,

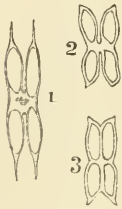
examined the British specimens of *Callitriche*, in the British Museum, and detected amongst them the above-named species.

C. truncata was first described and figured by Gussone, in his 'Plantæ Rariores' (1826), p. 4, and t. ii. fig. 2, from plants collected at Cotrone, in eastern Calabria; neither the description nor the plate are sufficiently accurate for complete identification, but Dr. Hegelmaier has received specimens from Gussone himself. The species was subsequently found in Sicily (Spec. in Todaro Fl. Sic. Exs. n. 623) and Sardinia. In his 'Monographie der Gattung Callitriche' (1804), Dr. Hegelmaier adds Portugal, and he informs me that he has seen specimens also from two or three localities in Algeria, from the island of Veglia in the Adriatic, and from that of Santa Maura in the Ionian group. Wetteren, in Belgium, produces the plant, according to Crépin's 'Manuel,' ed. 2, p. 264, and specimens have been also published in Schultz's 'Herbarium Normale,' cent. 7, n. 658, as *C. autumnale*, L. var. β , Lebel, collected by Dr. Lebel at Carentan, in the department of Manche, Normandy. The *C. autumnalis*, L.?, from the same place, of Brébisson's 'Flore de la Normandie,' ed. 4, p. 284, is almost certainly the same, though *C. truncata* is also recorded in that book from another locality in Normandy.

The English specimens above alluded to were collected by Mr. Borrer, on June 6, 1826, growing "completely under water in a deep ditch between Amberley Castle and Wild Brook," Sussex. The plant was at first thought to be *C. autumnalis*, and under that name it was described and figured in 1829, by W. J. Hooker in Eng. Bot. Supp. 2606, the figure in all respects, as far as it goes, is a very good one. When the true *C. autumnalis* of Linnæus became better understood, it too was, in 1832, admirably figured in E. B. Supp. 2732, from Anglesey specimens, collected by Mr. W. Wilson, who also wrote the description accompanying the plate. He there states that the Sussex plant previously figured is *C. pedunculata*, and E. B. Supp. 2606, has since been constantly quoted by botanical authors as a figure of that common species. Even Dr. Boswell-Syme, in his new edition of 'English Botany,' vol. viii. t. 1274, has retained it to represent *C. pedunculata*, De Cand., and has added to the plate facsimiles of Dr. Hegelmaier's outline-sketches from his 'Monographie,' of the fruit of that plant, the result of much careful dissection and observation. Dr. Syme may, however, have had some mistrust, for with unusual profuseness of illus-

tration he gives a new plate (t. 1273) of *C. hamulata*, Kütz., though expressing a strong opinion that *C. pedunculata* and *C. hamulata* are but varieties of one subspecies.

The character which at once separates *C. truncata* from *C. pedunculata*, and from all Callitriches except *C. autumnalis*, is to be found in the structure of the fruit. In most species the lateral or marginal furrows between the adjacent carpels are shallow, never reaching to as far as halfway to the axis of the fruit; but in *C. autumnalis* and *C. truncata* the furrows are very deep, almost meeting, and so constricting the fruit into halves.



1. *C. autumnalis*.
2. *C. truncata*.
3. *C. pedunculata*.

The accompanying diagrams represent transverse sections of the fruit of (1) *C. autumnalis*, from Anglesey; (2) *C. truncata*, from Sussex, and (3) *C. pedunculata*, from Cumberland, all enlarged about ten diameters. It is, however, but rarely that all the component carpels are equally developed.

From *C. pedunculata* and *C. hamulata*, our plant also differs in being always entirely submerged, in being destitute of the peculiar stellate scales, in having leaves of a deep, clear, pellucid green, and all similar in form, none being ever spatulate, and in the entire want at all times of floral bracts. The submerged leaves of *C. pedunculata* and *C. hamulata* are usually also much longer in proportion to their breadth than in *C. truncata*. In all these points the latter approaches *C. autumnalis*, from which it is distinguished by the carpels not being winged, by the fruit being smaller, and the whole plant more slender and delicate, and by the earlier date of flowering. I can see no difference in the leaves beyond the distinction in size and greenness; the leaves of *C. autumnalis* are not always wider at the base.

Mr. Borrer, with his usual acuteness, noticed several of these points, *e. g.* the want of bracts, and the invariably submerged habit. Mr. J. de C. Sowerby also, who cultivated the plant for two years, was particularly struck with the perfectly achlamydeous character of its flowers, and with the fact, that "the leaves never spread upon, or even reach the surface of the water, whatever its depth may be;" he also described rightly the fruit as wingless, and observed that two or three seeds were often abortive (see his MS. notes on the original drawing for E. B. Supp. 2606, in the British Museum). It is worth

mention, as a further example of Borrer's accuracy, that among his specimens of the Sussex plant, in the Smithian herbarium, now at the Linnean Society, he has labelled one "*C. pedunculata*, DC.: I have it from Sardinia under this name." As *C. truncata* is a common plant in that island (*teste* Hegelmaier), it was probably that species which Borrer received, and rightly identified with the plant from Amberley.

The length of the fruit-stalk, on which some stress has been laid in the genus, appears to be a character of very little importance in distinguishing this subspecies; in Gussone's description, the lower fruits are said to be considerably stalked, and the upper ones sessile; Todaro's Sicilian examples have long fruit-stalks throughout, though shorter to the younger seed-vessels. In the Sussex plants, as was noticed by Borrer and correctly figured in the E. B. figure, all the fruits are shortly stalked, whilst in the Normandy specimens they are very nearly sessile, as is also, I am informed, the case in the plants from Algeria, Veglia, and Santa Maura.

I append a description of the Amberley plant, sufficient to distinguish it from the other British species or subspecies:—

C. truncata, Guss. Plant entirely submerged, without stellate scales. Leaves all similar, sessile, one-nerved, of a clear translucent green, strap-shaped, from $\frac{1}{4}$ – $\frac{1}{2}$ inch long, and about four to six times as long as broad, not wider at the base, truncato-bifid at the apex. Flowers naked. Stigmas reflexed-patent, eaducous or sub-persistent. Fruit shortly stalked, circular in outline, about $\frac{1}{18}$ inch across, furrows between each lateral pair of carpels very deep, reaching to the axis of the fruit, which, when ripe, is thus nearly divided into halves; carpels with a blunt dorsal ridge not keeled or winged.

When we remember how generally submerged aquatics are neglected by collecting botanists, and, in consequence, how rare is a good series of *Callitriche* in herbaria, we need not be surprised that no other English station for *C. truncata* can be given. It is, however, scarcely to be doubted that others exist, and the foreign distribution indicates the neighbourhood of the sea-coast in the south and west of England as their probable situation. According to Sowerby, the flowers are produced in May.

SHORT NOTES.

COUNTY FLORAS AND BOTANICAL BIOGRAPHY.—The isolated paragraphs which appear from time to time in our journals, furnishing notices of the occurrence of plants in different counties, with historical *résumés* of their earliest records, might be superseded by some such course as I proceed to suggest, viz. the issuing of a series of Floras on the 'Flora of Middlesex' type. This Flora appears to me to be a grand step in the right direction, both as to execution and subject. Few counties possibly would yield such ample matter of botanical interest, but all probably have some yet unrevealed stores. One individual, however competent, could not undertake such a series, though how much can be accomplished by one private individual is evidenced in the case of the able writer of the 'Cybele Britannica.' Let a society for the publication of county Floras be formed, all the members to be willing to work at the old sources of information, two or three persons taking the same author; to guard against oversight and errors, let these results be forwarded to an editor (or editors) to recast and arrange. This would do much to put, at any rate, the early information on a satisfactory basis,—new information as to localities is a matter easily provided for; and when the whole of the British counties have been thus gone over, there will be good material at hand for a general account of botanical progress in Great Britain. Another matter which the society might be simultaneously occupied with is the compilation of a botanical biography, or the issuing of lives of the more prominent botanists. In the case of counties for which good Floras already exist, arrangements might be made with the compilers for new editions on the above suggested plan, so as not to infringe upon private interests. Such a work as I have suggested, well carried out, would do much for the advancement of the science, and the promotion of interest in botanical subjects among a far greater number of individuals than is the case at present.—ROBERT TUCKER.

EARLY RECORDS OF THE ISLE OF WIGHT PLANTS.—Dr. Bromfield, in his 'Flora Vectensis,' rarely refers further back than to the third, or Dillenian, edition of Ray's 'Synopsis' (1724), to which is appended the 'Indiculus Plantarum Dubiarum.' The following are noticed as natives of the island by previous writers:—

Crithmum sive fœniculum marinum, Sampire. "About Southampton

and the Isle of Wight," Johnson's Gerarde's 'Herbal' (1633), p. 533; "on the white cliffes on the south side of the Isle of Wight," Johnson's 'Mercurius Botanicus' (1634), p. 31. No early record in Bromfield, p. 212, for *Critimum maritimum*. The 'Flora Vectiana' (1823) says (p. 15) "first noticed by D(awson) Turner." *Mercurialis mas et femina*, G., 332; Ray, 95; *M. spicata sive fœmina*, Diosc. Merc. Bot. p. 50. "Both at Ryde, by the seaside," Merc. Bot. p. 50. Under *Mercurialis annua*, Bromfield (p. 446) refers to Ray. *Galeogonum cubitalis altitudinis, flore luteo*, in the Isle of Wight, Mr. Cole; Merrett, p. 31. Bromfield (p. 362) refers to Ray's 'Indiculus,' where it is suggested that it is what is now called *Bartsia viscosa*, a plant discovered of late years in the island by Mr. A. G. More. (See Bromfield in 'Phytologist,' iii. 634.) *Lychnis marina repens alba*, White Sea Campion, "by Hurst Castle, near the Isle of Wight, and in the sayd Isle in many places by the seaside, and *Lychnis marina repens, flore rubello*, Red-flowered Sea Campion, in some of those places aforesaid, as also about a mile from Southampton in the ground of one Mr. Gouch, a divine; both of them chiefly in the south parts of this land on the most stony banks by the seaside." Parkinson, Theat. Bot. (1640) p. 640. Bromfield, p. 62, has no reference under *Silene maritima*. *Gramen arundinaceum 30 pedes longum*, on the south of the Isle of Wight, by the seaside towards the Point, Merret, p. 49. Bromfield (p. 615) refers to Ray's Indiculus Plant. Dub. for this, which he considers *Phragmites communis*, var. β . *Gramen junceum maritimum exile, Plumostii*, Park. 1270. (*Gramen juncoides exile omniumque tenuissimum Pleymuense montosis udis juxta Plymouth in Cornubiæ finibus oriendum. Lobel stirpium illustrationes, accurante. Gal. How. p. 67.*) "Plentiful where a small dril issueth out betwixt the rocks, near the south-east point in the Isle of Wight," Merrett, p. 55. This, Dr. Bromfield (p. 545) identifies from the figure and description in Parkinson with *Scirpus Savii*, S. et M. *Malva arborea marina nostras*, at Hurst, Parkinson, p. 306, "English Sea-tree Mallow;" Mr. Morgan received it from the Isle of Wight, Merrett, p. 75. Bromfield does not refer to any early notice of *Lavatera arborea* at p. 83. Besides these flowering plants, there are records of *Fucus marinus rotundus (quære, a formâ, Guil., broad nominavit)*, *Ligula marina*, sea-points or laces, on the south side of the Isle of Wight, amongst the rockes, Merc. Bot. p. 36. *Fungus hepatis facie et colore*, as you go

from Sir Robert Dillington's house to the New Church, in the Isle of Wight, Merrett, p. 41. *Fungus pyriformis*, in old pastures not far from Yarmouth, on the north of the Isle of Wight, Merrett, p. 41.—ROBERT TUCKER.

GENTIANA CAMPESTRIS, L., IN ISLE OF WIGHT.—Mr. Watson ('Compendium of the Cybele Britannica,' part 2) retains this as occurring in the Isle of Wight. The record of a supposed habitat, "heathy pasture, between Colwell and Weston, plentifully, W. D. Snooke," and Dr. Bromfield's remarks, will be found in the 'Flora Vectensis,' p. 311. The Doctor never succeeded in finding the plant himself, and thought that some mistake had been made, and that the plant was confounded with his *G. amarella*, var. β . Mr. Snooke may, however, have been correct; for Mr. Watson found the plant in the vicinity of Colwell Heath, where a few specimens were subsequently gathered by Mr. A. G. More. (Mr. H. C. Watson in letters to myself.) Mr. F. Stratton and myself have since, separately and together, often searched for the plant in the vicinity, and have come to the conclusion that, owing to alterations which have been made near the spot, the plant has (perhaps temporarily) vanished. My present object is to draw the attention of any botanist who may be in the neighbourhood of Freshwater Bay to a locality for the plant which I discovered on May 25, 1864. The spot whence I obtained two or three specimens (now in Mr. Stratton's herbarium) was near the old military road across Afton Down, about a mile from Freshwater Gate. I have never met with any specimen at the usual flowering time, when the opposite (or Beacon) down abounds in both forms of *G. amarella*. My station may have been destroyed in the making of the new road which passes close by, but, before giving it up, it would be well to explore the spot about the time of year above given.—ROBERT TUCKER.

POTENTILLA RUPESTRIS.—It may be interesting to the readers of the Journal to know that this plant still exists in the well-known locality, Craig Breidden, Montgomeryshire. I observed it there last summer on the side of the hill leading from the valley betwixt the Breidden and Mol-y-golfa. I also collected on the same hill *Veronica hybrida*, *Sedum Forsterianum*, *Hypericum Androsæmum*, with several other scarce plants. The hill is best approached from Welshpool, and the visitor must be careful, when inquiring the route, to pronounce the word "Bri-then," or he will not be understood.—JAS. F. ROBINSON.

ASARUM EUROPÆUM, L.—I hasten to correct an error in my note (p. 85) on this plant. Beachwood Park, Flamsted, Herts, is the seat of Sir J. Sebright, and the site of an ancient nunnery. Dr. Bull has forwarded me the following note on a new locality for *Asarum* in Herefordshire:—"It grows upon a hedgebank in the ancient forest of Deerfold, and in the parish of Wigmore, Herefordshire, among the roots of old thorns and brambles; and under their shade, it completely covers the bank for a space of thirty or forty yards. It is in a thoroughly wild state, and removed from any habitation, nor is the plant to be found in any of the gardens in the neighbourhood. In a secluded valley, however, a little over a quarter of a mile from it, are the ruins of the nunnery of Lymebrook; and I attribute its introduction to some Sister who used it in her daily ministrations to the sick. In Barton and Castle's 'Medical Flora' it is stated that in the fourteenth and fifteenth centuries this plant had great repute, from the shape of its leaves resembling that of the human ear." *Asarum* has not been before recorded as a plant of the Severn province, and Mr. Watson does not refer to it as having occurred in the Peninsula. In Banks's 'Devonport Flora' it is given as growing at Ham, near Plymouth, on the authority of the Rev. C. T. Collins, and there is a specimen from this locality in Herb. Borrer, labelled "Mrs. Collins's garden at Ham, near Plymouth; plant said to be found wild in an old quarry in the neighbourhood." An old locality for *Asarum* in the West Thames sub-province is given in How's 'Phytologia' (1650), "On Eiusham Common, in Oxfordshire" (p. 12).—JAMES BRITEN.

ROSA SABINI IN FRANCE.—Though so widely dispersed in England, *Rosa Sabini* is known upon the Continent only in the neighbourhood of Geneva, and in the provinces of Namur and Luxemburg, in Belgium. In M. Gay's collection there are three specimens that quite agree with the common English form of the plant, taken from a bush grown in the Luxemburg Garden in 1827, which are accompanied by the following label:—" *Rosa erinacea*, Hardy. Croît spontanément aux environs de Sablet, département de la Sarthe, d'où il a été envoyé par M. Le Meunier de la Flèche. Il est semblable aux *rubiginosa*, mais il n'a pas l'odeur particulière à cette dernière espèce. Les fleurs sont blanches, Hardy." I am not aware that the name *erinacea* was ever published. M. Hardy was the gardener-in-chief of the Luxemburg Palace through many years, and seems, judging from his notes to M.

Gay's specimens, to have had an excellent knowledge of the genus.—
J. G. BAKER.

UNGER'S EXPERIMENTS ON SAP-MOVEMENT.—In the review of the English edition of 'How Crops Grow,' contained in the first number of the present volume (Journ. of Bot. Vol. VIII. pp. 43-45), objection is made to Unger's experiments with white Hyacinths, being adduced in support of Herbert Spencer's view, that the nutrient fluids in plants ascend mainly by the vessels. The discordance between their results is more apparent than real, though this could not be pointed out in the book itself from want of space. Unger found that when white Hyacinths were watered with the diluted juice of the fruits of *Phytolucca decandra*, the course of the fibro-vascular bundles was marked out in red from the absorption of the colouring matter. On examining the bundles themselves, the colour was found to be confined to the wood-cells, and the vessels were destitute of it. Herbert Spencer's experiments gave precisely the same result, as will be seen from the following quotation from his paper:—

"On making longitudinal sections of the part traversed by it, the dye is found to have penetrated extensive tracts of the woody tissue; and on making transverse sections, *the openings of the ducts appear as empty spaces in the midst of a deeply coloured prosenchyma*. It would thus seem that the liquid is carried up the denser parts of the vascular bundles; neglecting the cambium layer; neglecting the central pith, and neglecting the spiral vessels of the medullary sheath. Apparently the substance of the wood has formed the readiest channel." ('Principles of Biology,' vol. ii. p. 538.)

Unger at once arrived at the conclusion that the wood-cells were alone coloured, because they were the only channel which the colouring fluid took; but Herbert Spencer, on comparing a transverse section of the part which the dye had but just reached with one of the lower part in which the dye had remained longest, thought there was ground for believing that the dye had passed up by the ducts and had oozed out of these into the surrounding prosenchyma, the coloration of the surrounding tissue being so much greater in the latter case than in the former. The experiments which led one observer to attribute the ascent of the coloured fluid to the wood-cells, and the other to attribute it to the vessels, were thus precisely similar; the only difference consisted in the mode in which they were interpreted. The old experi-

ments were, no doubt, designedly repeated by Herbert Spencer, to show that they admitted of a different explanation. More direct confirmation of his views was afterwards obtained in other ways. The statement in 'How Crops Grow' (p. 323), that "in the younger parts of plants the course taken by coloured liquids when absorbed (as in Unger's experiment, etc.) proves that they ascend much more readily by the vascular than by the cellular tissues," adopts Unger's facts as identical with Herbert Spencer's, while rejecting, which is quite justifiable, his theoretical explanation of them.—W. T. THISELTON DYER.

New Publications.

Het Geslacht Diplanthera, Banks et Sol. Door Dr. RUD. H. C. C. SCHEFFER. 6 pp.

This is a reprint of a paper dated Buitenzorg, October, 1869, which seems to have appeared, judging from the type, etc., in a recent number of the 'Natuurkundig Tijdschrift voor Nederlandsch Indië,' and which comes to us direct from Batavia. In it the author endeavours to show that the genus *Diplanthera*, of Banks and Solander, whose systematic position had been variously interpreted, is Bignoniaceous. The discovery of a new species (*D. Bancana*, Scheff.) in the Banka islands, and some specimens of the Australian species (*D. tetraphylla*) enabled him to work out the generic character and position of the genus. But the author is unaware that several years ago the Bignoniaceous nature of *Diplanthera* was pointed out by Dr. Seemann, in this Journal; that subsequently Dr. F. von Müller (Journ. of Bot. 1867, p. 212) published a note confirmatory of that view, and that Mr. Bentham, in the fourth volume of his Austr. Flora, p. 540 (1869), gave it the sanction of his authority, and enumerated the genus amongst the *Bignoniaceæ*. But though Dr. Scheffer has thus been anticipated, it is gratifying to find that he has arrived independently at the same results as those that have gone before him in this inquiry. The new species, like the Australian one, has only four fertile stamens, without the rudiment of the fifth—characteristic of the New Caledonian one (*D. speciosa*, Seem.).

A Geographical Handbook of all the Known Ferns, with Tables to show their Distribution. By R. M. LYELL. London: Murray. 1870. 8vo. (Pp. 225.)

In this work the whole surface of the globe is divided into eighteen districts, and a separate Fern Flora for each is given, with an account of the detailed stations for the species known to its authoress on each of the areas. The districts adopted are as follows:—

1. Europe proper.
2. Algeria, Madeira, Canaries, Azores.
3. North, Central, and Western Asia, China, and Japan.
4. Northern India.
5. Southern India, and Ceylon.
6. Eastern Peninsula and Archipelago, Philippine Isles.
7. Tropical Australia, New Guinea, Caroline and Solomon Isles, New Hebrides, New Caledonia.
8. Temperate Australia with New Zealand.
9. Polynesia.
10. Tropical Africa and Isles.
11. Cape Colony and Natal, Tristan d'Acunha.
12. Subarctic, Greenland, Canada, and westerly to the Rocky Mountains.
13. United States and Bermudas.
14. California, New Mexico, and British Columbia.
15. Mexico, Panama, West Indies.
16. Venezuela, New Granada, Ecuador, Peru, Bolivia, Galapagos.
17. Guiana, Brazil, Paraguay, Uruguay.
18. Chili, La Plata, Patagonia, Falkland, Juan Fernandez.

Nothing of the same kind has been before attempted, and the lists have been compiled very carefully, Hooker and Baker's 'Synopsis Filicum' being followed implicitly for special limitation and nomenclature. At the end of the work the species are traced through the eighteen districts in a table, so that at a glance their general distribution is shown.

Proceedings of Societies.

LINNEAN SOCIETY.—*April 7th*, 1870.—G. Bentham, F.R.S., President, in the chair. The following botanical papers were read:—"On some Algæ from the North Atlantic Ocean." By Professor Dickie. These were collected by Dr. Mitchell, R.N. They formed a floating green sheet of great extent, containing fragments of woods, young seedlings, and débris of various kinds, which had evidently been drifted from some distant land. Dr. Dickie described three species, all new. One allied to *Enteromorpha Ralfsii*, which he named *Calonema pellucidum*, *Calonema* being a new genus to include *C. Ralfsii* and *C. pellucidum*. The other two were new species of *Scyzonema* and *Scyzosiphon*. Also, "On Pleiotaxy of the perianth in *Philesia buxifolia*." By Dr. R. O.

Cunningham. Three specimens of this had been collected in the west parts of the straits of Magellan. No instance of plants of this or allied Orders with double flowers are given in Masters's 'Vegetable Teratology.' The normal perianth of six leaves and the six stamens were represented by eighteen perianth-leaves in several whorls on an elongated axis, and three perfect stamens, with an additional one petaloid though antheriferous. The stigma was bifid instead of in three divisions.

At the Meeting on April 21st no botanical papers were read.

Botanical News.

NEW BOOKS, PERIODICALS, ETC.

Dr. Bull, of Hereford, has discovered *Cortinarius russus*, an Agaric new to Britain, in several woods near that town. By the kindness of the Woolhope Field-Club, we hope to be able to give a figure of the plant.

Messrs. Groombridge and Sons have commenced the publication, in monthly numbers, price one shilling, of 'The Flowering Plants and Ferns of Tunbridge Wells and Neighbourhood,' by Richard Deakin, M.D. The work will contain more than 800 engravings, being, we presume, some of those of the 'Florigraphia Britannica,' by the same author, which was published in numbers from 1837-1848.

The tenth volume (Nos. 71-77) of Syme's 'English Botany' is just completed. It contains the Natural Orders *Eriocaulonaceæ*, *Juncaceæ*, and *Cyperaceæ*, and is illustrated by 139 plates (1546-1685). A few of the plates are new, and the old 'English Botany' ones have throughout the *Cyperaceæ* been supplemented by dissections of the fruit, mostly taken from drawings by Dr. Carrington, of Eccles. But even with these additions, they are not up to the requirements of the present day. The next volume will contain the *Gramineæ*, and conclude the work. We hope that the publisher will in future give the full number of plates in each number; the last three have had an average of 14 each, instead of 24, as promised.

Professor Baillon's 'Histoire des Plantes' is still continued. The two last Orders monographed are the *Papilionaceæ* and *Proteaceæ*.

Mr. M. C. Cooke's 'Fourth Century of British Fungi' (dried specimens) is just out, and contains several species new to Britain.

The herbarium of the late Professor von Martius, which was offered to and refused by the Bavarian Government, has been purchased by the Belgian Government for a sum of £1200, to form the basis of a national collection, to be located at Brussels.

A compact and valuable little "Route-map and Index to the more interesting objects in the Royal Gardens, Kew," is about to be issued, under official sanction, by Messrs. Macmillan and Co. It contains an excellent map of the gardens, and index to some of the more interesting plants; and as it is to be

sold for the low price of 2*l.*, it will doubtless have a very large circulation.—*Nature*.

The public rooms of the British Museum will be kept open until 8 o'clock every Saturday and Monday evening during the months of May, June, and July.

Dr. A. S. Donkin, of Durham, is preparing for publication a history of the British *Diatomaceæ*, with plates of all the species.

A new edition is announced of Henfrey's 'Elementary Course of Botany,' to be edited by Dr. Masters. Professor Bentley has on hand a new edition of his 'Manual of Botany.' We also note the publication of Mrs. Loudon's 'First Book of Botany,' revised by D. Woosten.

In the April number of the 'Popular Science Review,' Dr. William Ogle continues his observations on the fertilization of various flowers by insects. In the *Compositæ* he describes the mode in *Matricaria Parthenium*, in which the tufts of hairs at the extremities of the styles are described as pushing out the ripe pollen from the anther-cells on to the corolla, whence it is easily removed on to the stigmas of adjacent florets by insects crawling over the flower-heads. In the *Leguminosæ*, insects settling on the carina or alæ cause their depression, and the consequent liberation of the contained stamens and pistil. The pollen adheres to the under surface of the insect, except in *Phaseolus*, where it is received on its back. The structure of the stamens in the *Ericaceæ* is explained very clearly; in *Erica* the apical pore of each anther-cell is closed by being in contact with that of the adjacent anther, and the horizontal processes of the anthers are levers which when pressed upon rupture the coherent chain of anther-cells, and liberate the contained pollen. This is done by the proboscis of an insect endeavouring to reach the nectariferous disk, and as the flowers are more or less pendulous, the pollen-grains fall on its head. *Vaccinium* and *Arbutus* have very similar arrangements.

Mr. Charles P. Holkirk has published in the Bull. de la Soc. Roy. de Bot. de Belgique, t. viii. pp. 449-458, a short account of the forms of *Capsella Bursa-pastoris*, founded on the examination of those growing in England, and those contained in the Kew herbarium. He describes 6 subspecies: 3 founded on Crépin's 3 varieties, *genuina*, *stenocarpa*, and *bifida*, all of which occur in England; and the other 3, which have not been noticed in this country, *C. rubella*, Rent., usually considered a species by Continental authors; *C. gracilis*, Gren., thought by M. Baroux (see 'Billotia,' 1869, p. 114) to be a hybrid between *C. Bursa-pastoris* and *C. rubella*; and *C. hispida*, a new subspecies founded on Persian specimens in the Kew herbarium.

The Rev. J. B. Reade, in the April number of the 'Popular Science Review,' has shown that the various beautiful markings on Diatoms, which have been usually considered by microscopists to be angular in outline, are caused by hemispherical elevations of the surface.

A botanical section has been formed in connection with the Hants and Winchester Scientific and Literary Society; Mr. Frederick J. Warner, of 3, Clifton Terrace, Winchester, is the Hon. Secretary to the section. Winchester College, not to be behind our other public schools, has recently established a Natural

History Society; and a Field Club has been formed at Newbury, for the investigation of the natural history and antiquities of West Berks and North Hants. We trust that, by the united exertions of these bodies, a Flora of Hampshire may ere long be produced; considerable material for which already exists, both in print and in MS., the latter among Dr. Bromfield's papers in the library of Kew.

At the meeting of the Royal Irish Academy on the 11th April, Dr. David Moore described two cases of heterogamy. In one, a female flower was produced at the end of a male raceme of *Carica Papaya*, and this formed a fruit, which, however, fell off in ripening; in the other, a plant of *Nepenthes Distillatoria* raised from seed in the Glasnevin gardens, produced male and female flowers in the same raceme.

An attempt is being made to cultivate Tea in California, and as many as 27,000 trees have been imported.

A drawing of a specimen of *Oreodoxa regia*, a Cuban Palm, was recently exhibited at the Académie des Sciences, which divided into nine branches at the summit of the stem. Dr. Pulney Andy, in the twenty-sixth volume of the 'Linnean Transactions,' has described and figured examples of branching in *Borassus flabelliformis* and *Cocos nucifera* in Southern India, and states that as many as twelve branches have been observed in the former.

This month (May) the various botanical lecturers connected with the medical schools of London commence their courses. The present occupants of the chairs of botany in London are:—King's College, Professor R. Bentley, F.L.S.; University College, Professor D. Oliver, F.R.S.; Guy's Hospital, Mr. C. Johnson; St. Thomas's Hospital, Dr. J. W. Hicks; St. Bartholomew's Hospital, Rev. G. Henslow, M.A., F.L.S.; St. George's Hospital, Dr. Child; St. Mary's Hospital, Dr. H. Trimen, F.L.S.; London Hospital, Mr. J. G. Baker, F.L.S.; Middlesex Hospital, Dr. S. Cobbold, F.R.S.; Charing Cross Hospital, Dr. R. Braithwaite, F.L.S.; and Westminster Hospital, Mr. A. W. Bennett, M.A., B.Sc., F.L.S.

Some apology is needed to the members of the Botanical Exchange Club, many of whom are subscribers to this Journal, for the delay in issuing the parcels this year. The Curator, Dr. Boswell Syme, has had his time so fully occupied with the work of describing the *Glumiferae* for 'English Botany,' as to find insufficient leisure hitherto to make up the return parcels, but, we are informed, will do so as soon as possible.

NEW BOOKS.

Mr. William Bull's catalogue of new and rare plants for 1870 has just been issued, filling 172 closely printed pages! Independent of the extensive collection of purely florists' flowers which this list contains, there is an extremely valuable and interesting number of plants of the highest botanical interest, many of them hitherto known only from mere scraps in herbaria, many again never seen by European botanists until raised by Mr. Bull.

Mr. Augustus Mongredieu has published (Murray) a handsomely got up

volume on 'Trees and Shrubs for English Plantations,' with numerous illustrations.

For want of room we must to-day confine ourselves to congratulating Mr. W. Robinson on his 'Alpine Flowers for English Gardens' (Murray), and their illustrations, but we shall have much pleasure in reverting to the volume on a future occasion.

PERSONAL NOTICES.

- The 'Times' states that Dr. Schenk, Professor of Botany at Leipzig, has been converted to Protestantism.

The reported death of the Abyssinian traveller, W. Schimper, turns out to be untrue. Professor Alexander Braun, of Berlin, has just had a letter from Schimper himself, dated Jan. 15, 1870, in which he speaks of being fully occupied with literary and geographical work.

Died, on the 22nd of March, Dr. Max. Ferdinand Kummer, keeper of the herbarium and botanic gardens at Munich. We have a few descriptive papers from his pen.

The *Conversazione* of Mr. Bentham, as President of the Linnean Society, came off with great *éclat*. The handsome rooms of Burlington House were set off to great advantage, by the collection of rare and beautiful plants which the Royal Gardens at Kew, and the nurseries of Messrs. Veitch and Bull have liberally supplied. It was a select flower show. Mr. Wilson Saunders had sent a curious collection, illustrating what has been called "Mimicry" (*Vide Journ. of Bot.* 1868, p. 213, *seq.*), and by Mr. Leo Grindon, 'Echoes of Plant Life.' There were besides drawings, microscopes, curious fruits (from Kew), and other objects of interest. Among the guests were many of the most distinguished men of science and literature.

NOTICES TO CORRESPONDENTS.—Those subscribers who have not yet paid their subscriptions are requested to do so at once to the publishers, Messrs. Taylor and Co.

COMMUNICATIONS have been received from—Professor Thiselton-Dyer, Dr. Braithwaite, James Britten, J. Sadler, Robert Tucker, Hon. J. L. Warren, J. Robinson, James Collins, M. C. Cooke.

BOOKS, ETC., RECEIVED.—Miquel's Contributions to Flora of Japan and Contributions to the Knowledge of the *Cycadææ*.—Popular Science Review and Science Gossip for April.—Gardener's Chronicle, Nos. 14-17.—Nature, Nos. 22-25.—Alpine Flowers for English Gardens. By W. Robinson, F.L.S. (Murray).—Trees and Shrubs for English Plantations. By Augustus Mongredu (Murray).—Sketches of Modern Paris. By A. Ebeling (Bentley).—Gardeners' Monthly. Edited by Thomas Meehan, Jan.-April.—W. Bull's Catalogue of New, etc. Plants.

CORRIGENDA.—P. 83, l. 19, for "R. Syn." read "R. Syn. i." ; p. 92, l. 13, for "Braithwaite" read "Braithwaite."





W.G. Smith del. et lith.

Rubus dumetorum W. & N. var. *S diversifolius*, Lind.

W. West imp.

Original Articles.

ON THE *DUMETORUM* GROUP OF RUBI IN BRITAIN.

BY THE HON. J. L. WARREN, M.A., F.L.S.

(PLATES CVI., CVII.)

*(Concluded from page 154.)**Detailed descriptions of the Varieties.*

R. dumetorum, *a. concinnus*, Baker.—Stem arcuate-prostrate, nearly round, rather glaucous and faintly pilose, with fairly strong but rather narrow, long, subpatent not numerous, and rather distant equal prickles with compressed bases and a few setæ and aciculi. Stem might pass for *corylifolius* at first glance, the height of the prickles usually exceeding the breadth of their bases; prickles themselves longer than those of *diversifolius* in proportion to the stem breadth; stem, as compared with *diversifolius*, singularly free from aciculi and setæ. Leaves ternate, or a few quinate. Petiole with only 2 to 6 falcate prickles. Stipules narrowly lanceolate; terminal leaflet broadly obovate or almost rhomboidal, cuspidate, or acuminate, subcordate, often rather narrowed to its base; intermediate leaflets obovate-acuminate, narrowed to their bases, shortly stalked, scarcely overlapping the terminal leaflet owing to its often elongated petiolule; basal leaflets sessile, obovate-oblong, imbricate. All leaflets thick, coriaceous, green or grey-felted beneath, finely and almost simply deltoid-serrate-dentate, of a dark heavy green above, much lighter coloured beneath. Leaflets generally smaller and neater than in *diversifolius*, and quite *corylifolius* in character. The petiolule of the terminal leaflet generally longer in proportion to its leaflet than in *diversifolius*, and at times about half its length. Flowering-shoot nearly round at its base, faintly angular towards its apex, not quite so setose or aciculate as *tuberculatus* or nearly so setose as *diversifolius*, clothed with faint, close pubescence, and rather slender, few, long, equal, subpatent prickles, not declining as in *diversifolius*, much fewer and more remote, but nearly of one size and with less elongated tubercular bases; setæ and aciculi very sparse and inconspicuous. Whole flowering-shoot, both in armature, leaf-character, and inflo-

rescence closely *corylifolius*, whereas the dense setæ and aciculi of *diversifolius* remove it much further from *corylifolius*. Leaves ternate; terminal leaflets obovate or oblong-ovate, acuminate, narrowed to their base; basal leaflets unequal, ovate-acuminate, externally lobed: all in character much as the stem leaflets, thick, flat, and grey- or green-hairy-felted beneath. Panicle less leafy to the apex, and more open than *diversifolius*; axillary branches and their peduncles longer, more racemose in growth, and more divaricate. Sepals ovate-attenuate, hairy, densely felted, hardly aciculate, generally reflexed, or faintly adpressed to the mature fruit. Petals pale pink, smaller, narrower, and much flatter than *diversifolius*, obovate, clawed, fairly broad, but not overlapping. Anthers salmon-coloured or golden-yellow, shorter than the styles (but longer than the styles in *diversifolius*). Filaments white; styles greenish; fruit of few (7-14) drupels, smaller than in *diversifolius*, and rather more evenly ripened.

The whole plant a smaller, *neater*, more felt-leaved, and less prickly form than *diversifolius*, many steps nearer *corylifolius*. The growing leaflets are strangely concave. Those of γ convex if anything.

Stations:—Trout Hall, Plumley, Cheshire, whence I have described the plant, and general in that district. The brilliancy of the anthers may be only local here. Twycross, Leicestershire, sent me by Mr. Bloxam as *R. dumetorum*, γ . *tomentosus*, R. G. North York, common,—this being solely the plant intended in “North Yorkshire” by the name *tuberculatus*, and the plant referred to under this name by Prof. Babington in ‘British Rubi,’ p. 283. A form also of this with incise or lobate-serrate leaflets from Gormire, North Yorkshire.

Rubus dumetorum, β . *tuberculatus*, Bab. (Plate CVI.); stem arcuate-prostrate, bluntly angular, sulcate; prickles subpatent, stout, strong, broad-based, fairly many, not confined to stem-angles; aciculi and setæ fewer than in any var. except *concinus*; the primary prickles being nearly equal, the secondary prickles few, the transition into setæ and aciculi is much more abrupt than in *diversifolius*; stem also clothed with faint not conspicuous pubescence; leaves quinate as often as ternate, not usually ternate (the case in Cheshire *diversifolius*); terminal leaflet broadly obovate-acuminate or cuspidate, cordate; intermediate leaflets obovate-acuminate, imbricate; basal leaflets ovate, nearly sessile, slightly imbricate; all leaflets fairly thick, coriaceous, finely coated with hairs but hardly felted beneath, doubly and rather irregularly

dentate-serrate, toothing more lobate than *diversifolius*, and coarser and much less regular than *concinuus*; terminal petiolule equalling one-third of its leaflet, bearing 7 or 8 falcate prickles; stipules linear-lanceolate, pilose. Flowering-shoot stout and rather flexuous as compared with *diversifolius*, armed with fairly numerous thick but rather short and tolerably equal declining or subpatent prickles, more distinct and fewer than in *diversifolius*; rachis clothed with rather dense but not conspicuous pubescence, and very short setæ and aciculi; but the intermediate-sized prickles of *diversifolius* are notably absent; leaflets ternate or often quinate, in character as the stem ones, but narrower in form and more decidedly sublobate or doubly dentate-serrate towards their tips, especially the terminal leaflets, all hair-coated and green but hardly felted beneath, thick, coriaceous, and fairly flat above; panicle more thyrsoidal and open than in *diversifolius*, less leafy to the top, and the axillary branches longer and more corymbose; sepals ovate-cuspidate or ovate-attenuate, dense-felted within, erect-patent, or faintly clasping the mature fruit; petals broad-obovate, wrinkled, overlapping, rose-coloured; anthers and filaments rich yellow; styles greenish; fruit of 10-12 equally ripened drupels, smaller, less cæsan, and less unequally matured than *diversifolius*.

The rose-coloured petals, equal prickles, want of intermediate armature, the thicker leaflets, the more double serrature of the leaflets of stem and panicle, separate this without much difficulty from *diversifolius*. From *concinuus* (to which it is much more nearly allied) the more declining and less notably subpatent prickles of the rachis, occurring nearly half as many again upon any given inch of it, the comparative sparseness of the leaf-felting, the stouter habit and armature, and larger, coarser, general size of the individual bushes, the shorter petiolule of the terminal leaflet and the consequently more decided imbrication of the intermediate leaflets, the more straggly panicle, and generally untidy aspect of the plant, the more deeply and unequally serrate toothing of the leaflets, the deeper rose, not light pink, of the petals, sufficiently distinguish it.

This is the *intermedius* of my notes in the 'Middlesex Flora,' (p. 100) and I have now little doubt that Professor Babington's *tuberculatus* includes much, perhaps all, of this variety of *dumetorum*. I fancy it is better to restrict an already published name, than to invent a new one, so I have abandoned my name "*intermedius*." I had merely adopted

the name '*intermedius*,' from the doubt whether the name *tuberculatus* would not also be extended to *concinuus*, which I hold of sufficient varietal distinctness. It is fairly common, though rather off the type, all round London, *e. g.* in the Kilburn hedges, Middlesex. Most typical from Sheen Common, Surrey, where Mr. Baker observed it first, this being the Richmond plant quoted by Prof. Babington for *tuberculatus* in 'British Rubi,' p. 283. Mr. Bloxam sends an excellent and characteristic specimen from Atherstone, Warwickshire, though he tells me that *concinuus* only occurs just round Twycross, Leicestershire. Both at Kew and in Mr. Bloxam's set there are excellent specimens sent by Lees as "*R. dumetorum*, W. and N., var. *glabratus*," and gathered near Worcester. In Cheshire I have never seen it yet. It is noteworthy how near to what used to be called *R. Wahlbergii*, Bell Salt., and I suppose now would be named *R. althæifolius*, Host., this plant at times comes.

R. dumetorum, γ . *pilosus*, W. and N.; stem arcuate-prostrate, bluntly angular; prickles subpatent, long, rather slender, from compressed bases, numerous, scattered, passing gradually into many and conspicuous setæ and aciculi, and the whole stem clothed with pubescence; leaves quinate or ternate; terminal leaflets broadly obovate-acuminate or almost orbicular-cuspidate, subcordate; intermediate leaflets obovate-lanceolate, acuminate, rather unequal-sided, rather imbricate; basal leaflets ovate, imbricate, subsessile; all finely and hardly doubly deltoid-serrate-dentate (but in shade specimens notably so), thick, coriaceous, clothed beneath with very dense green felt; stipules lanceolate, glandular-hairy; petioles rather long in proportion to the leaf; flowering-shoot stout, stiff, and nearly straight, faintly angular, armed much as *diversifolius*, but much *hajrier*, with long unequal subpatent or declining prickles, and very numerous setæ, aciculi, and hairs; leaves ternate; terminal leaflet obovate-acuminate, often rather oblong-obovate; basal leaflets unequal, ovate, externally lobed, all evenly or doubly serrate-dentate, green, felted beneath, thick, coriaceous; panicle nearly to the top leafy; axillary branches longer and more distant than *diversifolius*, very corymbose in their growth, many-flowered; sepals ovate-cuspidate or attenuate, laxly clasping the fruit or erect-patent, setose, felted; peduncles dense-felted and short-aciculate; petals white, broadly obovate, very large and overlapping, as in *diversifolius* (three-eighths of an inch some-

times broad); filaments white; styles white; fruit of 12-16 drupels, evenly ripened and rather smaller than *diversifolius*.

This is the only member of the *dumetorum* group with distinctly setose-hairy stems. I have named it *pilosus*, as it approaches nearer than any other English Dumetose Bramble to the R. G. plate. Mr. Baker identifies it with the *hirtus* of Lindley, but to me this admits of some doubt. It can only be confounded with *diversifolius* in our series. I suspect it would be in most herbaria labelled *fusco-ater*, to which of our five varieties it comes the nearest. Hedge, near Barnet Common, Herts. Good and typical here, but I find since writing my notes in 'Middlesex Flora,' common enough a little off the type all round London. Haslemere, Surrey; Mr. Baker. Sussex, typical from Faircocks and Slate Houses, Henfield, in Borrer's herbarium. "Between Freshwater and Yarmouth, Isle of Wight," a remarkable plant, but I have little doubt this variety (J. G. Baker). Brierley, West York, and probably from Easterside, near Hawnby, York, both from J. G. B. It is a variable plant. Shade-grown specimens are more weakly armed, with narrower, deeply incise-serrate leaflets, much less tomentose beneath than the type.

Rubus dumetorum, δ . *diversifolius*, Lindl. (Plate CVII.); stem arcuate-prostrate, obscurely angled, striate, with a decided bloom, and often reddish-violet tinged; aciculi and setæ numerous, frequent, very unequal, with long compressed bases, often exceeding their height, but their bases often enlarged, and the prickles often both strong and slender, on the same stem, subpatent or declining; primary prickles shade off gradually into aciculi, and those into setæ; also a few hairs; all the prickles scattered at random over and not confined to the angles of the stem; leaves ternate or quinate; stipules linear-lanceolate; terminal leaflet obovate-acuminate or oblong-obovate, subcordate; petiole equalling one-third of its length, with 7 or 8 prickles; intermediate leaflets oblong-obovate acuminate; basal leaflets obovate-acuminate, sessile, imbricate; all leaflets *thin, rugose*, dull green above, hairy and lighter green, but not white or grey-felted beneath, all fairly evenly dentate-serrate, but generally doubly so towards the leaf-tip; toothing coarser and less even, however, on an average than in *concinuus*. Basal overlap intermediate leaflets; intermediate the terminal leaflet. Both are rather narrowed to their bases. The terminal leaflet only subcordate. Flowering-shoot straight, stout, thick, sulcate,

rather hairy, very setose and aciculate; prickles strong, unequal, declining, or a few deflexed; leaves ternate; terminal leaflet obovate-acuminate, decidedly narrowed to its base; basal leaflets sessile, externally lobed, all as the stem-leaflets, but rather thicker in texture and rather softer-hairy beneath, still neither coriaceous as regards the one, nor felted as regards the other, all rugose, dull green above; panicle short, close, leafy to the top; axillary branches short, thick, 5- or 7-flowered each; leaves usually exceeding the axillary branches in length; but the 2 or 3 lowest branches sometimes elongate and become secondary panicles, repeating the characters of the main axis of inflorescence; sepals ovate or ovate-lanceolate, faintly aciculate, generally patent or laxly adpressed to the immature or partly ripened fruit, but when the fruit swells to its utmost, they are driven back from want of room and seem reflexed, and when the flower first falls, they are truly reflexed. The same immature fruit has at times its separate sepals in different stages of patency, adpression or reflexion; fruit of a few, say 6-10 drupels, which are large, and, when fully ripe, often the size of a large pea each, a good many smaller drupels abort; *petals* broad, oval, large, scarcely clawed, generally overlapping, crumpled, uneven, erose, white, jagged, convex if anything; anthers cream-coloured; filaments white; styles nearly the same tint as the anthers; styles shorter than the anthers; anthers ultimately fuscous ash-colour.

This is a clearly-marked variety, which has been well known in Britain since Leighton first called attention to it some thirty years ago. It is Prof. Babington's old *fusco-ater*, and certainly in the main what he now calls *diversifolius*, although he may bestow the name casually on other forms. It is abundant in Shropshire, whence I have seen specimens, *e. g.* from Wellington (Mr. Bidwell), all the same thing. It is very common in Yorkshire, and a well-marked plant there, being the form solely intended in "North Yorkshire," under the name *diversifolius*. In Northumberland and Durham it is much less frequent, but the localities given in Baker and Tate's Flora for *diversifolius* all belong to this form. It is the most prevalent hedge Bramble all round Knutsford, Cheshire. I have described and illustrated the plant from specimens at the Black Pit, Tabley. It is rare to find a perfectly quinate leaf on the Cheshire plant, but in Salop and York such leaves seem more frequent. Mr. Briggs also sends it, though rather weak, from Paslinch Lane, Yealmp-ton, Devon. I have never seen it round London. *R. du-*

metorum, var. *ferox*, R. G. t. 45 A, is a quite different form, which I have never seen in Britain. Of course the name *ferox* belongs properly to this latter, and the name *diversifolius* (by the way, a thoroughly bad one) belongs of right to this form, not to the next, No. 5. *R. Schleicheri*, Leight., is merely a weak shade-drawn form of this, with an oblong terminal leaflet.

Rubus dumetorum, *ε. intensus* (Blox.); stem nearly round, arcuate-prostrate, sulcate, deep red, thickly armed with very numerous, crowded, unequal setæ, aciculi, subpatent and declining prickles, all passing gradually into each other, and occupying nearly every portion of the stem. As compared with *diversifolius*, any given inch of barren stem will contain half as many again prickles, setæ, and aciculi; as would be the case also with any given inch of the panicle rachis; leaves ternate or quinate; stipules filiform, apparently narrower than *diversifolius*; terminal leaflet broadly obovate, acuminate or cuspidate; the petiolule bearing 20–30 prickles, equal one-third of its length; intermediate leaflets obovate-acuminate, rather overlapping; basal leaflets obovate-acuminate, hardly sessile, slightly imbricate, all faintly hairy, dull green above, soft, hairy, but not felted, lighter green beneath, doubly, but not very unevenly dentate-serrate; flowering-shoot stout, nearly straight, slightly angular above, densely and intensely setose, aciculate, and armed with very frequent stout, subpatent and declining prickles; leaflets ternate, large, about equalling the upper branches, exceeded by the lower; terminal leaflets broadly obovate-cuspidate, subcordate; basal leaflets obovate-acuminate, strongly lobed externally; all in texture as those of the stem, but rather more coarsely doubly dentate-serrate; panicle very compound, long, leafy, with long, rather divaricate, many-flowered, axillary branches and branchlets; the axillary branches often bearing as many flowers as a whole weak panicle of *diversifolius*; peduncles longer, more slender, more divaricate than in that variety; sepals ovate-attenuate, erect-patent, or clasping the fruit, decidedly more drawn out at end than *diversifolius*, and often strongly aciculate, which this hardly ever is; petals large, uneven, crumpled, overlapping; their colour not noted, nor that of the styles or filaments at the late time (October) when I saw this form growing; fruit of few (7–12) unequally ripened largish drupels.

This form, as nearest allied to *cæsius*, I have placed last; *concinus*, as nearest to *corylifolius*, comes first. It was originally observed

and distributed from Cadeby, Leicestershire, by the Rev. Andrew Bloxam, under the name *diversifolius*, Lindl., to which it is nearly allied. Mr. Bloxam showed it to me growing a few years back in Gallows Lane, near Twyercross. I have never seen it, except from his immediate neighbourhood. It differs from *diversifolius* only, I believe, in being an intenser, more open, and compound-paniced form. The stem- and rachis-prickles are denser but smaller, and rather less variable in length. The sepals are more markedly attenuate and clasp the fruit in a more cæasian way than *diversifolius*. I believe this is a form of much less varietal value than the other four members of my *dumetorum* group.

Concluding Note.

One word of caution to conclude with. The botanist must not expect every dumetose form which he gathers to fit in exactly with one of our five described varieties. Next, dangerous as all conclusions, drawn from dried specimens only, always are in rubiology, such are trebly hazardous in the *dumetorum* group. Last, never gather a weak or ill-grown example, as such are peculiarly deceptive; and get, if possible, fruited, not merely flowering, panicles.

EXPLANATION OF PLATES CVI. AND CVII.

PLATE CVI.—*Rubus dumetorum*, W. and N.; var. β . *tuberculatus*, Bab. From specimens collected by J. G. Baker at Sheen Common, Surrey.

PLATE CVII.—*Rubus dumetorum*, W. and N.; var. δ . *diversifolius*, Lindl. From specimens collected by Hon. J. L. Warren at Black Pit, Tabley, Cheshire.

CLAVIS AGARICINORUM :

AN ANALYTICAL KEY TO THE BRITISH AGARICINI, WITH
CHARACTERS OF THE GENERA AND SUBGENÈRA.

BY WORTHINGTON G. SMITH, F.L.S.

(*Read before the Woolhope Club, Hereford, February 22nd, 1870.*)

(*Continued from page 145.*)

3. CHARACTERS OF THE GENERA AND SUBGENERA OF THE
AGARICINI.

ORDER AGARICINI.—Hymenium inferior, spread over easily-divisible gills or plates radiating from a centre or stem, which may be either simple or branched.

Genus I. AGARICUS, Linn. Syst. Nat. (1735).—Spores of various

colours; gills membranaceous, persistent, with an acute edge; trama floccose, confluent with the inferior hymenium. Fleshly fungi, putrifying, and not reviving when once dried, hence differing from such genera as are deliquescent, coriaceous, or woody.

Series I. LEUCOSPORI, Fr. *Epicr.* p. 3.—*Spores white.*

Subgenus 1. AMANITA, Persoon, *Syn. Meth. Fung.* p. 246 (Plate C. fig. 1).—Veil universal at first, completely enveloping the young plant, distinct and free from the cuticle of the pileus; pileus convex, then expanded, not decidedly fleshy; stem distinct from the hymenophorum,* ringed or ringless, furnished with a volva, free and lax, connate with the base, or friable and nearly obsolete; gills free from the stem.—*HAB.* On the ground, mostly in woods and uncultivated places.

This subgenus is remarkable for the great development of the veil, which at first entirely envelopes the young plant in a thick clothly wrapper; as the fungus reaches maturity, the veil is naturally ruptured, and part of it remains in scattered and easily removed patches on the pileus (B), and part forms a more or less complete cup or volva at the base (c); when there are no fragments on the pileus, the veil has been ruptured in one place, and the whole mass remains at the base; this is often the case in *Agaricus phalloides*, Fr. Some of the species have the stem furnished with a ring (D), which is part of the veil, whilst three species are ringless (or more properly, *the ring is adherent to the stem*). In some species the veil is thick and greatly developed, whilst in others it is thin and friable, and both volva and patches are evanescent; the higher forms of *Amanita* stand alone; from the stem being furnished with a *volva* and *ring*. Some of the species are edible, others highly poisonous.

Amanita corresponds with the pink-spored *Volvaria*, Plate CI. fig. 10. The species figured is *Agaricus (Amanita) muscarius*, L., spores $\cdot 00032'' \times \cdot 00025''$.

Subgenus 2. LEPIOTA, Fr. *Syst. Myc.* vol. i. p. 19 (Plate C. fig. 2).—Veil universal, and concrete with the cuticle of the pileus breaking up in the form of scales (F); pileus never compact, often very thin, the flesh always soft and threadlike, and not only distinct from the stem, but often separated above into a peculiar cup; stem distinct from the hymenophorum,* generally hollow, full of threadlike fibres, rather sub-

* Some exceptions may be found to nearly every character amongst Agarics, and this one of a free hymenophorum has two exceptions, one in a variety of

cartilaginous than fleshy, different in texture from the flesh of the pileus (hence it is easily removed, leaving a cup or socket at its point of juncture with the pileus E), furnished with an annulus, which is at first continuous with the cuticle of the pileus, often moveable, sometimes evanescent; volva none; gills free, hence not sinuate or decurrent.—HAB. On the ground, mostly in rich grassy places, and more often in fields than woods.

Lepiota corresponds in structure with *Chamaeota*, Plate CI. fig. 11, and *Psalliota*, Plate CIII. fig. 26; the sections of both subgenera change colour, and they have a common habitat. *Coprinus* is allied to this subgenus. Several species of *Lepiota*, as *A. clypeolarius*, Bull., *A. cepastipes*, Sow., and *A. cristatus*, Fr., appear in hothouses all the year round. *Lepiota* is readily recognized by its *free gills*, annulated stem *without a volva*, and generally scaly pileus. Nearly all are autumnal and edible. The species figured is *Agaricus (Lepiota) procerus*, Scop. Spores $\cdot 0006 \times \cdot 00035$."

Subgenus 3. ARMILLARIA, Fr. Syst. Myc. vol. i. p. 26 (Plate C. fig. 3).—Veil partial, in infancy attaching the edge of pileus to the upper part of stem, and often forming flocci on the pileus (a); pileus generally fleshy; stem homogeneous and confluent with the hymenophorum, furnished with a ring (sometimes absent in abnormal specimens), below the ring the veil is concrete with the stem, often forming scales upon it similar to the scurfy scales on the pileus; gills broadly touching or running down the stem.—HAB. On the ground or on stumps of trees.

This subgenus corresponds with *Pholiota*, Plate CII. fig. 19, and *Stropharia*, Plate CIII. fig. 28; it is also allied to *Tricholoma*, *Clitocybe*, and *Collybia*, amongst the white-spored Agarics. Fries subdivides *Armillaria* into groups, depending on their relations to one or other of these subgenera. The species figured is *Agaricus (Armillaria) melleus*, Vahl. Spores $\cdot 00035'' \times \cdot 00023''$.

Subgenus 4. TRICHOLOMA, Fr. Syst. Myc. vol. i. p. 36 (Plate C. fig. 4).—Veil absent, or if present, floccose and adhering to the margin of pileus; in *A. acerbus*, Bull., the margin of pileus extends beyond

Agaricus (Lepiota) granulosa, Batsch, where the gills are *adnate* (or even having a decurrent tooth), and the other in an *Amanita* which I have described under the name of *Agaricus adnatus*, where the same condition obtains. The presence of the annulus, too, is not without exception; it is often fugitive, and must then be sought for in young specimens; and it is absent from the first sometimes in *Agaricus (Armillaria) melleus*, Vahl.

the gills, exactly as in *A. separatus*, L. (Plate CIV. fig. 33); pileus generally fleshy; stem homogeneous and confluent with the hymenophorum, central and subfleshy, without either ring or volva, and with no distinct barklike coat; gills sinuate, *i. e.* with a sinus (or small sudden curve) near the stem (11).—HAB. All the species grow on the ground, the larger in hilly woods, and the smaller in pastures.

Tricholoma corresponds with *Entoloma*, Plate CI. fig. 13; *Hebeloma*, Plate CII. fig. 20; *Hypholoma*, Plate CIII. fig. 29; and *Panaeolus*, Plate CIV. fig. 33. Most of the species grow in the autumn, some very late, but a group of which *A. gambosus*, Fr., is the type, is strictly *vernal*, and the species constituting it have long been considered special delicacies; the greater number of the remaining species are also edible, and have a pleasant odour like that of new flour, but a few are rank and suspicious, of which *A. saponaceus*, Fr., is an example. This very large subgenus has been subdivided by Fries in the following manner:—1. Pileus viscid. 2. Pileus flocculose. 3. Pileus rigid. 4. Pileus silky. 5. Pileus spotted or minutely cracked. 6. Pileus spongy. 7. Pileus hygrophanous. In *Hygrophorus*, *Lactarius*, and *Russula*, the general structure is much the same as in *Tricholoma*, but they form well-marked genera. *Hygrophorus* is distinguished by its *waxy* nature; *Lactarius* by its *milky* gills and flesh; and *Russula*, by its rigid brittle gills generally in one series and vesiculose flesh. The species figured is *Agaricus (Tricholoma) terreus*, Schæff. Spores $\cdot 0002'' \times \cdot 00013''$.

Subgenus 5. CLITOCYBE, Fr. Syst. Myc. vol. i. p. 78 (Plate C. fig. 5).—Pileus, generally fleshy in the disk, obtuse, plane or depressed, hygrophanous or not hygrophanous; stem confluent and homogeneous with the hymenophorum, elastic, with an outer coat, covered with minute fibres; gills acutely adnate, or decurrent. The fibrillose outer coat of *Clitocybe* (and sometimes of *Tricholoma* and *Pleurotus*) must not be confounded with the truly fibrous bark of *Collybia*, *Mycena*, *Omphalia*, and their analogues.—HAB. All are terrestrial.

Clitocybe corresponds with *Clitopilus*, Plate CI. fig. 14, and *Flammula*, Plate CII. fig. 21. The species are generally small, though some are very large; many possess an agreeable odour, but few only are known to be edible. Most of the species appear late in the autumn or in early winter. In *Cantharellus* the gills are strongly decurrent, but they are reduced to thick veins or folds. The species of *Hygro-*

phori, with decurrent gills, can be easily separated from *Clitocybe*, by their waxy nature; and *Lepista* is known by the decurrent gills separating from the hymenophorum. The species figured is *Agaricus* (*Clitocybe*) *geotropus*, Bull. Spores $\cdot 00028'' \times \cdot 0002''$, they sometimes have a slight tendency to become echinate; spines are greatly developed in the var. *subinvolutus*, Batsch, a single spore of which is shown at J.

Subgenus 6. PLEUROTUS, Fr. Epicr. p. 129 (Plate C. fig. 6).—Veil evanescent, or none; pileus fleshy in the larger species, with a smooth or ragged margin from the remains of the veil; substance either compact, spongy, slightly fleshy, or membranaceous; stem mostly lateral or wanting, when present, confluent and homogeneous with the hymenophorum; gills with a sinus or broadly decurrent tooth.—HAB. Most of the species grow on wood, a few only on the ground.

Pleurotus corresponds with *Claudopus*, Plate CI. fig. 15, and *Crepidotus*, Plate CII. fig. 22. The species are large, handsome, and polymorphic, but some are small and resupinate; they generally appear late in the year, and return, year after year, to the same habitat more frequently than terrestrial fungi: all are harmless and some edible. All become putrid when old, and never coriaceous or woody; in this they differ from *Panus*, *Xerotus*, *Schizophyllum*, and *Lenzites*. The species figured is *Agaricus* (*Pleurotus*) *spongiosus*, Fr. Spores $\cdot 0004'' \times \cdot 00018''$. The elongated shape is characteristic of many species of this subgenus.

Subgenus 7. COLLYBIA, Fr. Epicr. p. 81 (Plate C. fig. 7).—Pileus at first convex, with an involute margin; stem with a cartilaginous bark, of a different substance from the hymenophorum, but confluent with it; gills adnate or slightly attached (not decurrent).—HAB. Most of the species are epiphytal. Usually small and tough, lasting far into the winter; few only are known to be edible, as *A. fusipes*, Bull, *A. esculentus*, Wulf., etc. *Marasmius* is closely allied to *Collybia*.

Collybia corresponds with *Leptonia*, Plate GI. fig. 16; *Naucoria*, Plate CII. fig. 23; and *Psilocybe*, Plate CIII. fig. 30. The species figured is *A. (Collybia) fusipes*, Bull. Spores $\cdot 0002'' \times \cdot 00013''$; the small section shows young plant of *A. (Collybia) maculatus*, A. and S., to show involute margin of pileus.

Subgenus 8. MYCENA, Fr. Syst. Myc. vol. i. p. 140 (Plate C. fig. 8).

—Pileus more or less membranaceous, generally striate, with the margin always straight, and at first pressed to the stem (never involute), expanded, campanulate, and generally umbonate (not depressed as in *Omphalia*); stem externally cartilaginous, tubular, not stuffed when young, confluent with the hymenophorum, but heterogeneous from it; gills never decurrent, though some species have a broad sinus near the stem.—HAB. Mostly epiphytal.

Most of the species are small, beautiful, and inodorous, but some which have a strong alkaline odour are probably poisonous; none are known to be edible. They appear after rain in summer and autumn.

Mycena corresponds with *Nolanea*, Plate CI. fig. 17; *Galera*, Plate CII. fig. 24; *Psathyra*, Plate CIII. fig. 31; and *Psathyrella*, Plate CIV. fig. 34. The species figured is *Agaricus (Mycena) polygrammus*, Bull. Spores $00035'' \times 00026''$. Two forms of a young *A. (Mycena) epipterygius*, Scop., are given on the plate, to show the margin of pileus adpressed to the stem.

Fries, in his 'Monographia Hymenomycetum,' alters the sequence of *Mycena* and *Omphalia* as given in his 'Epicrisis,' and places *Omphalia* first. The arrangement of the 'Epicrisis' seems to me more natural, as *Mycena* is certainly intermediate between *Collybia* and *Omphalia*, the gills being adnate in the former and decurrent in the latter.

Subgenus 9. OMPHALIA, Fr. Epicr. p. 119 (Plate C. fig. 9).—Pileus generally from the first umbilicate, afterwards funnel-shaped, almost always membranaceous or submembranaceous and hygrophalous, margin incurved or straight; stem cartilaginous and tubular, when young often stuffed, confluent with the hymenophorum, but heterogeneous from it; gills truly and considerably decurrent.—HAB. Generally epiphytal, and mostly peculiar to hilly regions, preferring a damp, woody situation, and a rainy climate.

Omphalia corresponds with *Eccilia*, Plate CI. fig. 18; *Tubaria*, Plate CII. fig. 25; and *Deconica*, Plate CIII. fig. 32. The species, though small, are many of them beautiful; their properties are not known, and they endure changes of temperature like the hygrophalous species of *Clitocybe*. *Omphalia* is naturally divided into two groups, one, *Collybariæ*, approaching *Collybia* in the involute margin of the pileus, but differing in the deeply decurrent gills and umbilicus, and the other, *Mycenariæ*, pointing to *Mycena* in the straight margin of the pileus, at first adpressed to the stem, but differing in the nature

of the gills and pileus. The species included in the last three subgenera might more conveniently be classed in four, thus:—Margin of pileus at first incurved, gills adnate,—*Collybia*; margin of pileus at first incurved, gills decurrent,—*Omphalia*, *Collybariæ*; margin of pileus at first straight, gills aduate or sinuate,—*Mycena*; margin of pileus at first straight, gills decurrent,—*Omphalia*, *Mycenariæ*. Under this arrangement various analogous species amongst the *Hyporhodii*, *Dermiini*, and *Pratellæ*, now so unsatisfactorily placed in such subgenera as *Naucoria*, etc., would fall naturally into proper positions. The species figured is *A. (Omphalia) fibula*, Bull. Spores $\cdot 00013'' \times \cdot 0008''$.

(To be continued.)

ON THE WORLD-DISTRIBUTION OF THE BRITISH CARYOPHYLLACEÆ.

BY J. G. BAKER, ESQ., F.L.S.

Having lately had occasion to go carefully through the Kew collection of *Caryophyllaceæ*, for the purpose of making a selection from Gay's herbarium, to add to it, I have kept a copy of Watson's 'Compendium' open on the table before me, and noted down in it any stations of which it seemed to me worth while to take account, in further illustration of the world-distribution of the British species. In the present paper I propose to report these, with a few comments on the alliance or synonymy of some of the plants; and I thought it would be interesting in doing this,—the Order being one of those in which the British species are, as a rule, marked off from one another by clear lines of demarcation, and one of those in which, as compared with other Natural Orders, our British species are the most widely diffused over the surface of the globe,—to enumerate all of them, and on the foundation of Mr. Watson's sketch of their distribution in the 'Compendium,' with these few additional data superadded, to arrange them in groups according to their distribution over the world.

The figures therefore prefixed to the names indicate the general geographical range of the species, and mean as follows:—

- I. That the species reaches the south temperate zone.
- II. That it reaches the north temperate zone in America, and is not specially montane or boreal.
- III. That it reaches decidedly into the north temperate zone in Asia.

IV. That it reaches the east of Europe, but stretches barely, if at all, beyond the limits of the continent in that direction.

V. That it does not reach the eastern half of Europe.

VI. That it is essentially boreal, but reaches America and the mountains of Central Europe.

VII. Like the last, but not reaching America.

VIII. Boreal, but not reaching the mountains of Central Europe.

IX. Alpine, but not boreal.

The groups from one to five, it will be noted, are made up of plants that have no boreal or montane tendency, each stage of increase in the number marking a decided step in the restriction of general range. Groups VI. to IX., on the other hand, are made up of the plants distinctively boreal or montane in their general area of dispersion.

ENUMERATION OF SPECIES.

IV. *Dianthus prolifer*.—Crimea, *Munro!* Teneriffe, *Webb!* Reported from the Caucasus by Bieberstein, but does not seem to reach further east. *D. velutinus*, Guss., with a range from Spain to Greece, scarcely more than a variety, using the term here as throughout the paper, on the same scale as in Syme's 'English Botany.'

IV. *Dianthus Armeria*.—Given by Boissier as Caucasian, but not known further east. *D. pseudo-armeria*, Bieb., from Tauria and Caucasus, probably a variety.

V. *Dianthus cæsius*.

IV. *Dianthus deltoides*.—Bosnia, *Sendtner!* Not included by Boissier in his 'Flora Orientalis.'

III. *Saponaria officinalis*.—Reaching eastward to the Caucasus, Ural, Tiflis, *Steven!* and Kurdistan, *Olgum!*

II. *Silene inflata*.—Very rare in N. America. To be reckoned native there or introduced?

V. *Silene maritima*.—Madeira, *Mandon, 316!* Desertas island! *S. Thorei, Duf.*, from the West of France, apparently a variety.

I. *Silene gallica*.—Now spread as a weed over all temperate regions. The gunpowder weed of the Cape, so called from its seeds, Australia, *Adamson!* Neilgherries, *Wight!* Monte Video, *Capt. King!* South Brazil, *Sello!* Chili, *C. Gay!* etc.

III. *Silene nutans*.—Reaches through Siberia to Japan, *Miquel!* and to Algeria, fide *Rohrbach*.

II. *Silene noctiflora*.—California, *Barclay!* British Columbia, *Douglas!* Perhaps should be regarded as an alien for America.

III. *Silene conica*.—The plant intended from Hindostan, probably *S. conoidea*, which is much more eastern in its range than *conica*, and frequent in N. India.

VI. *Silene acanthis*.

VI. *Lychnis alpina*.—Gathered by the Moravian missionaries in Labrador.

III. *Lychnis Viscaria*.

III. *Lychnis Flos-cuculi*.—The South European *L. Cyrilli*, Richt. a variety.

II. *Lychnis diurna*.—The Austrian *L. nemoralis*, Heuff., only a slight variety.

III. *Lychnis vespertina*.—*L. divaricata*, Reich., and *L. macrocarpa*, Boiss. et Reut., appear to form together a third subspecies, with a range through S. Europe and N. Africa, the distribution of which is in the Floras much mixed up with that of the other two.

I. *Lychnis Githago*.—Cape and Australia; probably introduced recently.

IV. *Mænchia erecta*.—*M. octandra*, a variety only.—Including this it reaches Greece, *Von Heldreich!* Tangiers, *Broussonet!* and Armenia.

IV. *Sagina maritima*.—*S. stricta* of Fries, though kept as distinct by Nyman and Grenier, seems absolutely the same as Don's plant. The English name has priority over the Scandinavian one by a few years, but it seems most probable that the *S. filiformis* of Pourret, in the third volume of the 'Memoirs of the Toulouse Academy,' bearing date 1788, is the same. The Japanese and Chinese *S. maxima*, A. Gray (= *S. sinensis*, Hance), differs from this principally by its more robust stature.

I. *Sagina apetalata*.—Reaches Chili, *Bridges!* *Philippi!* and Australia (Melbourne, *Adamson!*).

V. *Sagina ciliata*.—Identical not only with the French *S. patula*, but also the German *S. depressa*, Schultz, Suppl. Fl. Starg. p. 10 (1819). Reaches eastward to Lombardy and Ischia.

I. *Sagina procumbens*.—A plant of the Andes, extratropical South America, and Australia.

VI. *Sagina saxatilis*.—Reaches the Himalayas, *Royle!* *Edgeworth!* etc. Gay afterwards placed his Asturian *Spergula sabuletorum* as a variety

here. *S. glabra*, Willd. (including the commonly cultivated *S. pilifera*, De Cand.), appears to be a subspecies, distinguished by its larger petals.

VIII. *Sagina nivalis*.—How far distinct from the last?

VI. ? *Sagina subulata*.—Drummond's plant from the Rocky Mountains is *S. saxatilis*, but Dr. Lyall gathered the true *subulata* in the same region in the Cascade Mountains, 49° N. lat. Less decidedly boreal in its general dispersion than *saxatilis*.

II. *Sagina nodosa*.

I. *Spergula arvensis*.—Now universally diffused as a weed in temperate regions; Neilgherries, Ceylon, Abyssinia, Cape Colony, Australia, etc.

II. *Honckeneja peploides*.—Most or all the arctic specimens are *H. oblongifolia* of Torrey and Gray, distinct from our plant as a subspecies or well-marked variety.

I. *Spergularia marina (marginata)*.—Systematic value of the forms in the genus difficult to appreciate. My own inclination, at present, using the English botany scale, is to regard *S. media* as a variety of *rubra*, and *S. rupicola* and *marginata* as subspecies. To this I refer with confidence specimens from Afghanistan, *Griffith!* Chili, *Bridges!* New Zealand, *Colenso!* Van Diemen's Land, *Gunn!* and of Kindberg's plants, regard *marinum*, *arenarium*, *macrothecium*, and *glandulosum* as synonyms or varieties.

V. *Spergularia rupicola*.

I. *Spergularia media*.—May be safely placed as south temperate. Falkland Islands, *Dr. Hooker!* South Africa, *Drége!* but, as just indicated, I fail in drawing any clear line between this and maritime forms of *rubra*. Of Kindberg's plants, *medium*, *salinum*, and *neglectum* may be safely joined under this head.

I. *Spergularia rubra*.—Cape, *Burchell!* Uruguay, *Gibert!* Andes of Ecuador, *Spruce, 5444!*

VIII. *Arenaria norvegica*.—Seems to bear the same kind of relation to *ciliata* that *rubella* does to *verna*. Not a plant of the Alps, Jura, or Pyrenees. Gathered in Spitzbergen by Captain Sabine. *A. gothica*, Fries, appears to be a third subspecies, with a very restricted range.

I. *Arenaria serpyllifolia*.—Australia, but probably introduced recently. Frequent in India and all through temperate Asia to Japan; both the type and variety *leptoclados*.

III. *Arenaria tenuifolia*.

II. *Arenaria verna*.—Our plant widely spread in Siberia, *Gebler!* *Turczaninow!* etc. The N. American *A. propinqua*, Richardson, seems quite identical with our plant. It has a range from Kamtehatka and Greenland to the Rocky Mountains. The Arctic *A. Rossii* comes in between this and *rubella*, so that, in high latitudes, the range of forms is connected very closely.

VIII. *Arenaria rubella*.—The Scandinavian *A. hirta*, Hartm., appears to be a variety with a more robust habit and more hairy stems than the Scotch specimens, and I fail to separate from this the Swiss *A. verna*, var. *subnivalis*, of Hegetschweiler.

VI. *Arenaria uliginosa*.—Behring's Straits, *C. Wright!* Rocky Mountains, *Drummond!*

III. *Arenaria trinervis*.—*M. pentandra*, Gay, a variety frequent in the south of Europe. The Greenland plant probably *M. lateriflora*.

III. *Holosteum umbellatum*.

II. *Stellaria nemorum*.—Reaches all through Siberia to Manchuria, and reappears in N.W. Mexico, *Seemann!* though apparently not known northward.

I. *Stellaria media*.—Now a common weed everywhere in temperate regions.

III. *Stellaria Holostea*.

I. *Stellaria glauca*.—Widely spread in Australia, with several varieties. The Greenland plant probably *S. longipes*, which is extremely like *glauca* in habit, but differs in the seeds.

III. *Stellaria graminea*.—Reaches North China.

II. *Stellaria uliginosa*.

VI. *Stellaria cerastoides*.—Gathered by the Moravian missionaries in Labrador.

III. *Cerastium aquaticum*.—Reaches Formosa, *Oldham!* Japan and Loohoo, *Wright!* and frequent in the north-west Himalayas.

I. *Cerastium glomeratum*.—South Africa, *Drège!* Monte Video, *Isabelle!* Australia, *Adamson!* New Zealand, *Coleuso!*

I. *Cerastium triviale*.—Chili, *C. Gay!* Falkland Isles, *Dr. Hooker!* Cape Colony, *Sutherland!* Sandwich Isles, *Hillebrand!* Tristan d'Acunha, *M'Gillivray!*

IV. *Cerastium semidecandrum*.V. *Cerastium tetrandrum*.

IV. *Cerastium pumilum*, Curt.—Evidently identical with *C. glutinosum*, Fries, and *C. obscurum*, Chaub., a plant diffused through Europe, with a large number of synonyms. May be extra-European. Compare with it the Cape *C. capense* of Sonder.

I. *Cerastium arvense*.—The Chilian and Patagonian plant identical with the English. It has a wide dispersion in extratropical S. America, reaching down to Tierra del Fuego.

VI. *Cerastium alpinum*.

VI. *Cerastium latifolium*.

IX. *Cherleria sedoides*.—Tyrol, *Gander!* Smith's plant, so named from Mount Parnassus, according to Boissier, is *Alsine trichocalycina*.

Placing together the species of the same general type of dispersion, we obtain, therefore, the following result:—

1. *Groups not distinctively boreal or montane.*

1. Species common to the north and south temperate zones, 14.—*Silene gallica*, *Lychnis Githago*, *Sagina apetala*, *S. procumbens*, *Spergularia arvensis*, *Spergularia marina*, *S. media*, *S. rubra*, *Arenaria serpyllifolia*, *Stellaria media*, *S. glauca*, *Cerastium glomeratum*, *C. triviale*, *C. arvense*.

2. Species dispersed through the north temperate zone, both in the Old and New World, 8.—*Silene inflata*, *S. noctiflora*, *Lychnis diurna*, *Sagina nodosa*, *Houckeueja peploides*, *Arenaria verna*, *Stellaria nemorum*, *S. uliginosa*.

3. Species dispersed through the north temperate zone, in both Europe and Asia, 13.—*Saponaria officinalis*, *Silene Otites*, *S. nutans*, *S. conica*, *Lychnis viscaria*, *L. Flos-cuculi*, *L. vespertina*, *Arenaria tenuifolia*, *A. trinervis*, *Holosteum umbellatum*, *Stellaria Holostea*, *S. graminea*, *Cerastium aquaticum*.

4. Species dispersed throughout Europe, 7.—*Dianthus prolifer*, *D. Armeria*, *D. deltoides*, *Mænchia erecta*, *Sagina maritima*, *Cerastium semidecandrum*, *C. pumilum*.

5. Species restricted to the western half of Europe, 5.—*Dianthus cæsius*, *Silene maritima*, *Sagina ciliata*, *Spergularia rupicola*, *Cerastium tetrandrum*.

2. *Groups distinctively boreal or montane.*

6. Species common to Northern Europe, Northern America, and

the mountains of Central Europe (usually also to northern Asia), 8.—*Silene acaulis*, *Lychnis alpina*, *Sagina saratilis*, *S. subulata*, *Arenaria uliginosa*, *Stellaria cerastoides*, *Cerastium alpinum*, *C. latifolium*.

7. Like the last, but not reaching America, 0.

8. Boreal, but not reaching the mountains of Central Europe, 3.—*Sagina nivalis*, *Arenaria norvegica*, *A. rubella*.

9. Plants of the mountains of central, but not of Northern Europe, 1.—*Cherleria sedoides*.

Total number of species, 59, out of which 12 are characteristically boreal or montane.

Passing these data in review, the following, it seems to me, are some of the most noteworthy points for consideration which they suggest.

1. The wide area of dispersion which the species, taking them as a whole, possess. Nearly one in four of them takes rank in the first group; less than one in four is confined to Europe; and the five which are least widely dispersed, are spread over a wide area on the continent. (In considering this point, it should be remembered that 22 species out of the 59 are annuals, and the other 37 all herbaceous perennials, and that the Natural Order furnishes an extreme instance of what has just been alluded to, and consequently is not fairly typical for the British flora, taking it as a whole.)

2. That these 59 species can be traced over such a wide area of dispersion (more than half of them, be it remembered, are cosmopolitan for the north temperate zone, and this zone includes in round numbers half the land-area of the globe) without losing their distinctive individuality (meaning by this, that allowing a very small margin, I feel confident, that, casual errors excepted, any one who has written on botany in Britain would, upon examination of the specimens, accept the plants here regarded as identical, as being really and absolutely so throughout their range as stated, and not refer them even to different subspecies or varieties).

3. That out of the 14 species, common to the north and south temperate zones, 8 are annuals, most of them being common weeds of cultivated ground, that 2 others are maritime plants, but that with regard to, at any rate, 3 out of the rest, *Cerastium arvense*, *Sagina procumbens*, and *Stellaria glauca*, there can be no reasonable ground for suspicion that they owe their area in the southern hemisphere to human intervention.

4. That out of the 15 species additional to the above 14, which belt the world in the north temperate zone (groups 2 and 6, with *Cerastium latifolium* omitted), 1 only (*Silene noctiflora*) is an annual weed of cultivated ground, the other 14 (with doubt attaching to *Silene inflata* for the New World) are all plants that there is no reasonable chance that human agency has interfered to disseminate.

5. That 12 of the species belong to a set of plants that descend only to low levels in high latitudes, and in Britain and through Central Europe are found only in mountainous places, usually at a considerable elevation above the level of the sea. Note the wide general area of dispersion which under these very peculiar circumstances these plants nevertheless attain, 7 of the species reaching all round the world. This is a point which it would be interesting to have illustrated in full detail, but to do this would stretch this paper out beyond reasonable bounds.

6. That we cannot, upon consideration of the dispersion of the species in Britain and through the rest of the world, see that the fact of our insular position makes any appreciable difference in our flora. Britain has no species confined to it, and possesses boreal and non-boreal species, dispersed through it in the same way in which it might be expected they would be if it formed part of the Continent, without any German Ocean intervening.

7. The remarkable correlation that exists between the dispersion of the species in Britain and over the whole globe. The species of groups 6, 8, and 9 (with the half exception of *Sagina subulata*) are all "Highland" or "Scottish" in their type of distribution through Britain; and for the non-boreal species, the sequence of the species, arranging them according to their frequency, corresponds to a large extent. This point also it would be interesting to follow out in detail.

Finally, looking back upon the whole matter, whether we believe that each of these 59 species has always kept its individuality intact, and been dispersed from a single centre, or whether we hold that the types have been materially changed through bygone ages, what a vista for reflection upon the length of time and amount of change in the physical condition of the world needful to account for such a condition of things as we see at the present time spread before us does such a muster roll of facts as this open out!

SHORT NOTES.

ON THE FERTILIZATION OF THE PRIMROSE (*Primula vulgaris*, Huds.).—In an article in the ‘Journal of the Linnean Society’ (vol. x. Botany, pp. 437–454), “On the Specific Difference between *Primula veris*, Br. Fl., *P. vulgaris*, Br. Fl., and *P. elatior*, Jacq.,” etc., the distinguished author, Mr. Darwin, when treating of the less obvious differences between the Cowslip and the Primrose, observes, “The Cowslip is habitually visited during the day by humble bees (viz. *Bombus muscorum* and *hortorum*, and perhaps by other species), and at night by moths, as I have seen with the *Cucullia*. The Primrose is never visited (and I speak after many years’ observation) by the larger humble bees, and only rarely by smaller kinds; hence its fertilization depends almost exclusively on moths.” The conclusion the writer arrives at, that the fertilization of the Primrose depends almost exclusively on moths, is, I venture to think, far from correct; indeed, observations made in the neighbourhood of Plymouth prove it to be so,—so far, at least, as that locality is concerned. I give the following facts in support of this assertion:—We have here a bee (*Anthophora acervorum*) that often visits the Primrose; and only during the past week I have seen several of these insects on its flowers, and on Thursday last (April 7th) caught two in the act of gathering from them. There is also a very small bee (*Andrena Gwynana*) that seems to get a vast quantity of pollen from Primroses, for I have seen it on those flowers with the posterior tibiæ loaded with golden masses. The brimstone butterfly (*Gonepteryx Rhamni*) also visits them, as I have witnessed this spring. We have another insect that seems to obtain most of its food from Primroses at this season of the year, visiting them perhaps more frequently than either of the bees or the butterfly; it is a dipterous one (*Bombylius medius*). Repeatedly have I watched it inserting its long proboscis into the tube of the corolla, much in the manner of the gayer humming-bird hawk-moth (*Macroglossa stellatarum*) when gathering from a Honeysuckle-bush or a bed of Verbenas. On the 7th of this month I saw three of these insects hovering over Primroses, and caught one of them as it was probing a flower. I am pleased to find Mr. Shuckard, in his ‘British Bees,’ to some extent supporting my opinion that the fertilization of the Primrose does not depend almost exclusively on moths, for he says, when treating of

British bees in general, "Amongst the early-blooming flowers most in request with the bees, and which therefore seem to be great favourites, we find the Chickweed, the Primrose, and the catkins of the Sallow." (Brit. Bees, p. 14.)—T. R. ARCHER BRIGGS.

DR. BROMFIELD'S HERBARIUM.—At p. 88 of this volume I have stated that there are two herbaria, collected by the late Dr. Bromfield, in existence, one being at Kew. I find, however, that this herbarium is not preserved there as a distinct collection. There appears to be a considerable number of Dr. Bromfield's specimens laid into the general collection, but the vast extent of the latter practically precludes their examination. The only herbarium of British plants at Kew is that of the late Mr. Borrer, which was left upon the condition that it should remain intact.—FRED. STRATON.

BROMUS SEROTINUS, *Beneken*.—In the report of the Botanical Exchange Club for 1867 (Journ. of Bot. Vol. VI. p. 71), it is stated that Herr von Nechtritz, of Breslau, recognized specimens of "*B. asper*," from Derbyshire, as this plant, and that plants from North Yorkshire must be referred to the same subspecies. It appears that *B. serotinus* is the plant usually called *B. asper* by British botanists, and that the restricted *B. asper* is a plant of great rarity in this country; indeed, the only English specimen of typical *B. asper* I have seen, is one in Sowerby's herbarium at the British Museum, collected at Camberwell, Surrey, where it may perhaps have been an introduction. A paper on the synonymy and characters of these plants will shortly appear in this Journal.—HENRY TRIMEN.

CALLITRICHE TRUNCATA.—A slight error in my paper on this plant (p. 155) requires correction. Dr. Hegelmaier has seen the species from only one locality in Algeria;—Bona, where it was collected by Steinheil.—HENRY TRIMEN.

BOTANICAL TERMS.—As improvements in botanical terminology appear to me by no means unimportant, I suggest the following:—The old terms 'monosepalous' and 'monopetalous,' as applied to a calyx and corolla, the parts of which are more or less united at the base, are now generally discarded in favour of 'gamosepalous' and 'gamopetalous,' under the impression, I presume, that the former convey to the mind an incorrect idea. The new terms have, however, always seemed to me almost as objectionable; inasmuch as the prefix 'gamo-' implies, etymologically, a sexual union. At the same time, the terms

'polysepalous' and 'polypetalous,' which are at least equally incorrect, are retained. In the stead of these, I would propose the adoption of terms similar to those applied to the pistil, where we use 'apocarpous' and 'syncarpous' to express the separation or union of its constituent carpels. The terms 'aposepalous,' 'synsepalous,' 'apopetalous,' and 'synpetalous,' would at once convey their meanings, and would carry out the principle of uniformity in etymology.—ALFRED W. BENNETT.

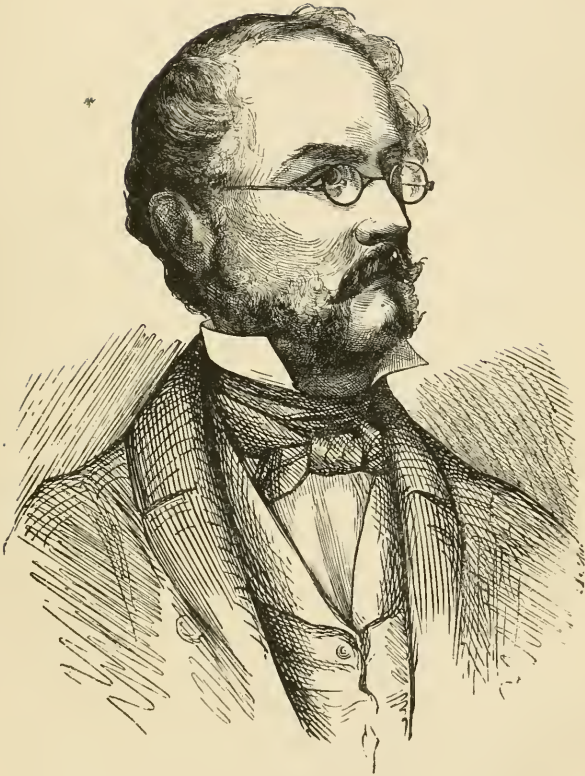
COUNTY NATURAL HISTORY SOCIETIES.—Mr. Tucker's suggestions in the last number of the Journal, p. 158, will, probably, for some time to come, not be adopted in their entirety. No small amount of capital would be required to carry on such an undertaking. But every one must admit that the uniform systematic Floras which the plan would produce, would be of far greater value than the publication of independent works. In the meantime would not much good be likely to ensue from the formation in each county of a botanical or natural history society? In many counties such societies already exist, and have a more or less beneficial influence; but in others there is nothing of the kind, and individual workers plod on, very much needing the stimulus and pleasant association which such clubs afford. If these county societies could all have some common basis of action, so much the better, and especially if they could be connected with a metropolitan or central society.—FRED. STRATTON.

TRIFOLIUM GLOMERATUM, L., IN IRELAND.—I collected this in May, 1869, near the town of Wicklow, where it grows along with *T. subterraneum* (found there by A. G. More, Esq. in 1868), *T. scabrum*, *T. ornithopodioides*, and other species of *Trifolium*.—DAVID MOORE.

OBITUARY OF DR. FRANZ UNGER.

(TAB. CVIII.)

A singular mystery surrounds the death of one of our most distinguished fellow-workers. On the morning of February 13th last, F. Unger was found, a lifeless corpse, in his own house at Graz, the body bearing several wounds, and there being marks of blood about the room, more on the floor than in the bed. As the sad news spread rapidly abroad, the wildest conjectures as to the cause of death were indulged in, conjectures which the coroner's inquest by no



PROFESSOR FRANZ JOSEPH ANDREAS UNGER.

means dispelled. In the beginning of February Unger had caught a cold, and was advised to keep his bed a few days; but he had already arranged with his physician that he should get up on the day when he was found dead, and therefore this slight illness could in no way be accepted as an explanation, though it has been conjectured that in an attempt to leave his bed during the night, he hurt himself by a fall on the floor, and died from the effects of some spasms, after succeeding in regaining his bed. But this conjecture has found slight acceptance. It has been stated that no valuables were missing in his death-room,—Unger being a man living in considerable affluence,—but his papers had been overhauled; and this fact, or supposed fact, was at once connected in the popular mind with the position the deceased had taken up towards the so-called Ultramontane party in Austria. Though brought up by clerical tutors, Unger had so far emancipated himself from the trammels of his early education, that about the year 1856, when the Concordat was attempted to be enforced in Austria with all the vigour the law allowed, he incurred the serious displeasure of the Ultramontanes by the freedom with which he had handled certain scientific subjects in his “Botanical Letters.” He was openly denounced and preached against from the pulpit as a man who corrupted the youth of the empire by false teaching; and attempts were even made to deprive him of his professorship at the University of Vienna, which he then occupied. The strongest possible pressure was brought to bear upon the Government to prohibit one of the Vienna theatres putting his far-famed ‘Ideal Views of Primitive Nature’ (republished by Hardwicke in this country) upon the stage; and it was only by the direct intervention of a personage of the highest rank that this novel mode of popularizing the results of abstruse science was finally permitted. A man of Unger’s stamp, enjoying a world-wide reputation of the soundest kind, a keen observer and a bold speculator, a man of genius, endowed at once with the caution of a Robert Brown and the daring of a Huxley,—such a man was certainly a formidable antagonist, who would speak out, regardless of all consequences, and who naturally had as many ardent admirers as he had deadly haters. When at the end of last year he delivered his annual address, as President of the Natural History Society at Graz, he boldly advocated freedom of inquiry on *all* subjects which can possibly interest man individually or collectively. This doctrine gave great offence to some

members of the Society, who could not forgive their President for not making an exception in favour of religious belief, and they consequently left. But no sooner was this known than a large number of persons of the town, naturalists and not naturalists, joined the Society. It was a demonstration full of significance, which found its echo elsewhere. But it was the last time that Unger was to frighten his antagonists; six weeks later he was a corpse. Science, too, has its martyrs.

Unger, his full name was Franz Joseph Andr as Nicolaus, was born on the 30th of November, 1800, on the farm of Amthof, near Leutschach, in Styria, his father being a native of Carinthia, where his family had for generations carried on the business of brewers, and his mother, a gentlewoman from Marburg, of considerable property. At the age of ten, Unger was sent to school at a Benedictine Convent in Graz, where, notwithstanding his repugnance to the institution, he had to stop until 1816. He there attended a course of philosophical lectures, and after that, at the request of his father, who wished him to qualify himself for administering the family estates, he studied law, but at the same time attended to Natural History lectures of Dr. L. von Vest. In 1819, he, fortunately for us botanists, made the acquaintance of A. Sauter, of Salzburg, the well-known botanist, to whose influence it is especially due that Unger followed in his wake. Having studied medicine at Vienna, and in 1822 at Prague, he made in 1823 a tour to Northern Germany, pushing as far as the island of R gen, and making the acquaintance of Oken, Carus, Rudolphi, and others. At that time, the darkest days of the Metternichian period, it was criminal for any Austrian to travel abroad without special permission. Unger had dispensed with that permission, and no sooner did he show his face again at Vienna, to complete his medical studies, than he was put in prison, where he was kept for nine months; but during this time he was able to occupy himself with philological and philosophical studies, dramatic attempts, and investigations of Invertebrate animals; he was even allowed to make occasional botanical excursions to the Prater and Botanic Gardens, always accompanied by a guard. Having in 1825 regained his freedom, he reopened communication with his numerous scientific friends, especially with Dr. Eble,—for whose work, ‘The Hair of Organic Nature,’ he supplied the drawings of the vegetable hair,—and with Dr. Sauter, who introduced him to Dr. Diesing, and also to

Jacquin. About this time he became acquainted also with a botanist who afterwards attained a world-wide fame, and ended miserably, Stephen Endlicher, then amanuensis at the Imperial Library of Vienna.

The first literary notice concerning Unger is contained in a letter of Trattinick's to the Ratisbon 'Flora' (1825, p. 681), in which it is stated that the *cond. med.* F. Unger has discovered a new *Clypeolaria* on *Thuja*. In 1826, Unger made observations on the zoospores of *Ectosperma (Vaucheria) clavata*, which Nees von Esenbeck, then President of the Imperial L. C. Academy, undertook to publish (1827) in the 'Nova Acta.' These organs had perhaps previously been observed, but Algologists doubted the fact, or had almost forgotten it. The impression which they made upon the youthful mind of Unger will be fully understood by those who can call to mind their own on observing for the first time the singular phenomenon they present. Many of the observations of the paper are still sound, such as the genesis, exodus, movements, and germination of the spores; but that Unger should have regarded the "*schwärm-spore*" as "sporidia of an Alga converted into an Infusorium," and the germinating spore "as an Infusorium converted into a plant," will be readily understood when it is remembered that the influence of Okenism was then as much felt as Darwinism is at the present day, and exercised a powerful spell upon men of much maturer judgment than young Unger. Moreover, these papers, and those published some time afterwards in which he defended the animal nature of sporidia of Algæ against the attacks of Agardh, especially after the important discovery made at Graz (1843) of the *cilia* of the spore,—until then held to be a peculiarity confined to the animal kingdom,—are important, because they directed the attention of botanists to the study of the fructification of Algæ, and opened the road to our present knowledge of those singular organs.

In 1827 Unger passed his examination as Doctor of Medicine, and wrote, as his inaugural thesis, an anatomico-physiological paper on Mollusca, full of Okenian speculations, but already indicating the direction in which his mind was bending. About this time died Unger's father, who previously, by the dishonest repudiation of the public debt of Austria, had lost the greater part of his fortune. Unger was thus forced into the medical career, practising until 1830 at Vienna. But he continued, notwithstanding, his scientific studies, devoting himself to vegetable pathology, especially as connected with the ap-

pearance of Fungi, which he declared to be secondary phenomena, brought about by the process of decomposition of the leaves, "a proof of the victory which ever-changing life has achieved over death."

In 1830 Unger removed to Kitzbühel, in the Tyrol, where, through Sauter's influence, he obtained a government situation. There he continued his investigations on "Exantheme," and established a "phytopathological clinicum,"—a garden for the express reception of all kinds of diseased plants, and of which his work, published in 1832, 'Exantheme der Pflanzen,' gives an account. The splendid alpine flora by which he was surrounded, an intimate acquaintance with miners, and a study of the geological and geognostic conditions of the neighbourhood, especially the coal beds of Häring, culminated in his 'Influence of Soil on the Distribution of Plants,' and brought about a decided leaning towards those palæontological investigations with which so much of the solid fame he afterwards enjoyed was associated. During his stay here, papers on morphological and anatomical subjects appeared at frequent intervals, and his discovery of the spermatozoids in the antheridia of *Sphagnum* made his name respected in every centre of science.

In 1835 he was appointed Professor of Botany at Graz, vacant by the death of Heyne. Whilst holding this chair, he published a number of well-known treatises on Anatomy and Physiology; and also some still more important palæontological ones on newly discovered localities, which teemed with fossil plant-remains, for instance, Radoboj. "The aspect presented by our present vegetation is the result not only of climatic, physical, and chemical causes, but also of conditions previously existing." "In order to understand the vegetable kingdom in its present scope, it is necessary to trace the course of its development." Starting from these premises, new at that time, he sketched out a history of the vegetable kingdom, which, if we except the violent catastrophes by which the vegetation of the different geological periods were supposed to be destroyed, finds still general acceptance.

Continuing his study of fossil plants, and giving repeatedly *résumés* of the then known materials (Synop. Pl. Foss., et Gen. et Spec. Pl. Foss.), he conceived the idea of, and published, 'Ideal Views of Primitive Nature,' which have frequently been imitated by others, but scarcely ever been excelled.

It would lead us too far to follow Unger through the numerous

publications which now began to appear on these and other subjects ; and we must refer our readers to the complete list of his writings given at the end of this article. Enough it is to say that, after the death of Endlicher, Unger, who had previously refused the chair of botany at Giessen, was appointed Professor of Physiology at the University of Vienna, which post he occupied until he resigned it in 1866. In that year he returned to Graz in order "to make room for younger men." During this period, he made journeys to Scandinavia and to the East, in which latter he was accompanied by the veteran explorer, Theodore Kotschy. Though having given up his professorship, he still continued to publish the results of his investigations, and as late as the beginning of this year, he presented to the Vienna Academy two valuable papers. His popular lectures were models of what such lectures should be. His "Sunken Islands of Atlantis" (Journ. of Bot. 1865, p. 12), and "New Holland in Europe" (Journ. of Bot. 1865, p. 39) have been translated into almost every European language; and when the editor of this Journal asked permission to insert them in these pages, Unger not only cheerfully granted it, but also sent over to this country the woodcuts and electrotypes by which they were to be illustrated. That the career of a man, still so vigorous in body and intellect, should have been cut short in the mysterious way it has been, is a matter of deep regret to all well-wishers of science, and is peculiarly felt in an age like ours, when intellectual giants are few and far between.

The following is a list of his writings, which we have borrowed, together with other facts, from Mr. H. Leitgeb's obituary of Unger ; the abbreviations signifying, L. = Linnæa ; Fl. = Ratisbon 'Flora;' B. Z. = Botanische Zeitung ; N. A. = Nova Acta Nat. Cur. ; S. B. = Sitzungsberichte of the Vienna Academy ; D. = Denkschriften (Transactions) of the Vienna Academy :—

1827.

Die Metamorphose der *Ectosperma clavata*. N. A. vol. xiii. p. 2. Beobachtung der Bildung, des Austritts und der Keimung der Schwärmspore.

Anatomisch-phys. Untersuchung über die Teichmuschel. Inaug.-Diss. Wien.

1829.

Beiträge zur speciellen Pathologie der Pflanzen. Fl. no. 19, 20. Resultate sechsjähriger Beobachtungen.

1830.

Ueber die Metamorphose von *Ectosperma clavata*. Fl. no. 36.

Wiederholte Behauptung der thierischen Natur der "Sporidie" gegenüber den Einwendungen Agardh's.

1831.

Ueber den rothen Schnee der Alpen. Bote für Tyrol. October-Heft.

1832.

Ueber Zahlenabänderung in den Blüthentheilen von *Chryso-splenium alternifolium*. Fl. no. 11.

Ueber Form und Zweck der sogenannten Poren in Zellgewebswandungen. Fl. no. 37. Bestätigung der Beobachtungen H. v. Mohl's.

Die Pflanze als Wirbelgebilde dargestellt von Dr. —r. Fl. no. 10, u. 11. Naturphilosophische Spekulation.

Ueber die Bewegung der Molecüle. Fl. no. 45.

Ueber das Einwurzeln parasitischer Gewächse. Isis 1833. Ein Vortrag, gehalten bei der Naturforscher-Versammlung 1832.

1833.

Die Exantheme der Pflanzen. Wien, Gerold. Erweiterte Beobachtungen und Vertheidigung der früheren Ansichten.

Algologische Beobachtungen. N. A. vol. xvi. (1. Lebensgeschichte der *Ulva terrestris*; 2. Ueber *Palmella globosa*; 3. *Nostoc sphaericum*, Agdh. Andeutung über Beziehung zwischen Algen und Flechten.)

1834.

Die Anthere von *Sphagnum*. Fl. no. 10. Entdeckung der "Samenthierchen" bei *Sphagnum*.

Ueber Bridel's *Catoptridium smaragdinum*. Fl. no. 3. Ist der Vorkern von *Schistostega osmundacea*. Das Leuchten ist Folge "der Reflexion und Refraction" des Lichtes.

1835.

Beiträge zur Kenntniss der parasitischen Pflanzen. I. Thl. Wiener Mus. d. Naturgesch.

1836.

Ueber den Einfluss des Bodens an die Vertheilung der Gewächse. Wien, Rohrmann. Die chemische Zusammensetzung des Bodens ist das bestimmende Element für das Vorkommen. Unterscheidung von bodensteten, -holden, -vagen Pflanzen.

Ueber das Studium der Botanik. Ein Vortrag. Graz, Tanzer.

Ueber die Bedeutung der Lenticellen. Fl. no. 37, u. 38.

Ergebnisse einer 1836 unternommenen Reise durch Unter-Steiermark. Steierm. Zeitschrift. Jahrg. 3. Hft. 1. Zoologische und botanische Beobachtungen.

Beiträge zur Flora Steiermarks. Steierm. Zeitschrift. Jahrg. 3. Hft. 2.

1837.

Die Schwierigkeiten und Annehmlichkeiten des Studiums der Botanik. Ein Vortrag. Graz.

1837.

Betrachtungen über die Natur der Pflanzen, welche die Oberfläche der Erde in ihren verschiedenen Entwicklungsperioden bedeckten. Von A. Brongniart. Uebersetzt und mit Anmerkungen versehen. Steierm. Zeitschrift. Jahrg. 4. Heft 2.

Zur Pflanzengeographie. Vortrag, gehalten bei der Naturforscher-Versammlung in Prag 1837. Fl. No. 40. Vertheidigung der früheren Ansichten über die Abhängigkeit der Pflanzen von der Unterlage.

Ueber die Samenthiere der Pflanzen. Vortrag, gehalten bei der Naturforscher-Versammlung in Prag 1837. Fl. 1838. No. 40. Beobachtung der "Samenthierchen" (und deren Mutterzellen) bei mehreren Laub- und Lebermoosen.

Weitere Beobachtungen über die Samenthiere der Pflanzen. N. A. vol. xviii. Ausführung des Vortrages. Beobachtung der Wimper bei den Samenfüden von *Marchantia*.

Mikroskopische Beobachtungen. N. A. vol. xviii. p. 2. (1. Neuere Beobachtungen über die Moos-Anthere und ihre Samenthierchen; 2. Ueber *Oscillatoria labyrinthiformis*, Ag.)

1838.

Aphorismen zur Anatomie und Physiologie der Pflanzen. Wien, Beck. Erste Idee eines Pflanzensystems auf anatomischer Grundlage.

Geognostische Bemerkungen über die Badelhöhle bei Peggau. Steierm. Zeitschrift Jahrg. v. H. 2.

Reise-Notizen vom Jahre 1838. Steierm. Zeitschrift. Jahrg. 5, H. 2. Geologischen u. botanischen Inhalts, Süd-Steiermark betreffend.

1839.

Anatomische Untersuchung der Fortpflanzungstheile bei *Riccia glauca*. L. Bd. xiii.

Die Andritzquelle bei Graz in Bezug auf ihre Vegetation. L. Bd. xiii.

Fossile Insekten. N. A. vol. xix. (erschienen 1842). Aus der von Unger aufgeschlossenen Lagerstätte bei Radoboj.

Eine ausführliche Besprechung von Meyen's "Neues System der Pflanzenphysiologie." Fl. Lit. ber.

1840.

Ueber den Bau der Calamiten. Vortrag bei der Naturforscher-Versammlung in Erlangen 1840. (Amtl. Ber. p. 117.) Fl. no. 41 u. 42.

Ueber den Bau und das Wachstum des Dicotyledonen-Stammes. Petersburg.

Beiträge zur vergleichenden Pathologie. Wien, Beck. Sendschreiben an Prof. Schönlein.

Ueber Krystallbildungen in den Pflanzenzellen. Ann. d. Wiener Mus. Bd. 2.

1840.

Beiträge zur Kenntniss parasitischer Pflanzen. Ann. d. Wiener Mus. Bd. ii. Anatomie einheimischer

und exotischer phanerogamer Parasiten.

Naturhistorische Bemerkungen über den Lindwurm der Stadt Klagenfurt. Steierm. Zeitschrift. Jahrg. 7. Heft 1. Zurückführung der Drachensage auf den Fund eines fossilen Rhinoceros-Schädels.

Ueber ein Lager vorweltlicher Pflanzen auf der Stangalpe in Steiermark. Steierm. Zeitschrift. Jahrg. 7. H. 1.

1841.

Chloris protogaea. Leipzig, Engelmann (1841-1847).

Genesis der Spiralgefäße. L. Bd. xv.

1842.

Ueber die Untersuchung fossiler Stämme holzartiger Gewächse. Neues Jahrb. f. Min. u. Geogn. p. 149. Ausführliche Angabe der Untersuchungsmethode.

Versuche über Ernährung der Pflanzen. Fl. no. 16. Betreffend die Aufnahme humussaurer Salze.

Trifolium repens anomalum. Fl. no. 24. Beschreibung einer Monstrosität.

Die Heuschreckenzüge in Steiermark. Steierm. Zeitschrift. Jahrg. 9. H. 1.

In Georg Gf. zu Münster's "Beiträge zur Petrefactenkunde." Das 5 Heft.

1843.

Die Pflanze im Momente der Thierwerdung. Wien, Beck. Entdeckung der Cilien an den Schwärmsporen von *Vaucheria*.

Grundzüge der Botanik, v. U. und Endlicher. Wien, Gerold.

Einiges zur Lebensgeschichte der *Achlya prolifera*. L. Bd. xvii.

Graz. Ein naturhist.-statist.-topographisches Gemälde. (Nebst Karte.) Graz.

1844.

Ein Wort über Calamiten und schachtelhalmähnliche Gewächse der Vorwelt. B. Z. no. 28-30.

Ueber das Wachstum der Internodien. B. Z. no. 23. Wichtige

- Daten über merismatische Zellbildung.
- Ueber *Lanosa nivalis*. B. Z. no. 33.
- Ueber merismatische Zellbildung bei der Entwicklung des Pollens. Wien.
- Ueber Zuckerdrüsen der Blätter. Fl. no. 41.
- 1845.
- Synopsis Plantarum Fossilium. Lipsiæ, Voss.
- Ueber das Flimmerorgan der Vaucheria. Fl. no. 40.
- Ueber fossile Palmen. Martius, Genera et Spec. Palmarum. Heft 8.
- 1846.
- Grundzüge der Anatomie und Physiologie der Pflanzen. Wien, Gerold.
- 1847.
- Botanische Beobachtungen, i.-iv. B. Z. Beobachtungen von Pilzen an Coniferen und an der Kartoffel. Bildung der Jahresringe. Inter-cellularsubstanz.
- Beschreibung und Erklärung einiger Antholysen von *Primula Chinensis*. N. A. vol. xxii. (erschienen 1850). Beobachtung des Ueberganges der Samenknospe in Antheren und Carpelle.
- 1848.
- Die fossile Flora von Parschlug. Steierm. Zeitschrift. Jahrg. 9. Heft 1.
- Zur Aufnahme von Farbstoffen bei Pflanzen. D. Bd. 1.
- Beiträge zur Lehre von der Bodenstetigkeit gewisser Pflanzen. U. u. Hruschauer. D. Bd. 1.
- Rückblick auf die verschiedenen Entwicklungsnormen beblätterter Stämme. D. Bd. 1.
- Pflanzen-Missbildungen. D. Bd. 1.
- Die Lias-Formation in den nordöstlichen Alpen von Oesterreich. Jahrb. f. Min. u. Geogn.
- 1849.
- Blätterabdrücke aus dem Schwefelblötz von Swosowice in Galizien.
- In "Naturwissenschaftl. Abhandlungen" herausgeg. v. W. Haidinger. Pflanzenreste aus dem Salzstocke von Wieliczka. D. Bd. 1.
- Ueber einige fossile Pflanzen aus dem lithographischen Schiefer von Solenhofen. In "Palæontographica," von Dunker und Meyer. Bd: ii. Cassel.
- Mikroskopische Untersuchung des atmosphärischen Staubes von Graz. S. B. Bd. iii.
- Botanische Beobachtungen, v.-vii. B. Z. no. 17-19. Ueber den Kaiserwald bei Graz. Die Entwicklung des Embryo's *Hippuris vulgaris*. Paläontologisches.
- 1853.
- Genera et Species Plantarum Fossilium. Vindobonæ, Braumüller.
- Die fossile Flora von Sotzka. D. Bd. 2.
- Die Gattung Glyptostrobus in der Tertiärformation. S. B. Bd. 5.
- Bevorwortung der an der Hochschule in Wien begonnenen Vorträge über "Geschichte der Pflanzenwelt." Wien, Beck.
- Commissionsbericht über eine botanische Durchforschung Oesterreichs. S. B. Bd. 5.
- 1851.
- Die Urwelt in ihren verschiedenen Bildungsperioden. Wien, Beck. 14 landwirthschaftliche Darstellungen mit Text.
- Die Pflanzenwelt der Jetztzeit in ihrer historischen Bedeutung. D. Bd. 3.
- Ein Fischrest in den Tertiärablagerungen von Parschlug. S. B. Bd. 7.
- Ueber die im Salzberge zu Hallstadt vorkommenden Pflanzenrümer. U. u. Hruschauer. S. B. Bd. 7.
- 1852.
- Versuch einer Geschichte der Pflanzenwelt. Wien, Braumüller.
- Botanische Briefe. Wien, Gerold.
- Iconographia Plantarum Fossilium. D. Bd. 4.
- Ueber Saftbewegung in den Zellen von *Valisneria spiralis*. S. B. Bd. 8.

Ueber *Vaucheria clavata*. S. B. Bd. 8.

Linné's Museum in Hammarbä. S. B. Bd. 9.

Nehmen die Blätter dunstförmiges Wasser aus der Atmosphäre auf? S. B. Bd. 9.

Bemerkungen über versteinerte Holzstämme. S. B. Bd. 9.

1853.

Nachträgliches zu den Versuchen über Aufsaugung von Farbstoffen. S. B. Bd. 10.

Versuche über die Luftausscheidung lebender Pflanzen. S. B. Bd. 10.

Ursprung des von den Pflanzen ausgeschiedenen Stickgases. S. B. Bd. 10.

Die Pflanzen und die Luft. Rede bei der feierl. Sitzung der Akademie (Almanach 1854).

Einiges über die Organisation der Blätter von *Victoria regia*. S. B. Bd. 11.

Notiz über ein Lager Tertiär-Pflanzen im Taurus. S. B. Bd. 11.

Ein fossiles Farrenkraut aus der Ordnung der Osmundaceen. D. Bd. 6.

1854.

Beiträge zur Physiologie der Pflanzen. S. B. Bd. 12. (1. Bestimmung der in den Intercellulargängen enthaltenen Luftmenge; 2. Ueber den Einfluss der atmosphärischen Luft auf die mit ihr eingeschlossenen grünen Pflanzentheile; 3. Versuche über die Function der Luftwurzeln der Pflanzen.)

Beiträge zur Kenntniss der niedersten Algformen nebst Versuchen ihre Entstehung betreffend. D. Bd. 7.

Die fossile Flora von Gleichenberg. D. Bd. 7.

Zur Flora des Cypridinenschiefers. S. B. Bd. 12.

Ueber eine fossile *Pinus Cembra*. Verh. der zool.-botan. Gesellsch. Bd. 4.

1855.

Anatomie und Physiologie der Pflanzen. Wien, Hartleben.

VOL. VIII. [JUNE 1, 1870.]

Bemerkungen über einige Pflanzenreste im Thonmergel des Kohlenflötzes von Prävali. S. B. Bd. 18. Die organischen Einschlüsse des Cypridinenschiefers des Thüringerwaldes. U. u. Richter. S. B. Bd. 18.

Beitrag zur Paläontologie des Thüringerwaldes. D. Bd. 11.

1856.

Ueber fossile Pflanzen des Süßwasserkalkes, etc. D. Bd. 14.

Beiträge zur näheren Kenntniss des Leithakalkes. D. Bd. 14.

1857.

Beiträge zur Physiologie d. Pflanzen. S. B. Bd. 25. (4. Studien über sogenannte Frühlingssäfte der Pflanzen; 5. Zur näheren Kenntniss des Honigthau's; 6. Oeffnen und Schliessen der Spaltöffnungen.)

Das System der Milchsaftgefäße in *Alisma Plantago*. D. Bd. 13.

Der "Stock im Eisen" der Stadt Wien. S. B. Bd. 26.

Botanische Streifzüge auf dem Gebiet, der Culturgeschichte. 1. Nahrungspflanzen der Menschen. S. B. Bd. 23; 2. Die Pflanze als Erregungs- u. Betäubungsmittel. S. B. Bd. 24.)

1858.

Beiträge zur Physiologie d. Pflanzen. S. B. Bd. 28. (7. Ueber die Allgemeinheit wässriger Ausscheidungen und deren Bedeutung für das Leben der Pflanzen.)

Einiges über das Wachstum des Stammes und die Bildung der Bastzellen. D. Bd. 16.

Der versteinerte Wald bei Cairo. S. B. Bd. 33.

Botanische Streifzüge auf dem Gebiete der Culturgeschichte. (3. Die Pflanze als Zaubermittel. S. B. Bd. 33; 4. Die Pflanzen des alten Aegyptens. S. B. Bd. 38.)

1859.

Sylloge Plantarum Fossilium. I. D. 19.

1850.

- Die versunkene Insel Atlantis. Ein Vortrag. Wien, Braumüller. (Journ. of Bot. 1865. p. 12.)
 Die physiolog. Bedeutung d. Pflanzencultur. do.
 Die Pflanzenreste der Lignitablagerung bei Schönstein. S. B. Bd. 41.

1861.

- Beiträge zur Physiologie der Pflanzen. S. B. Bd. 43. (8. Ueber den anatomischen Bau des Moosstammes; 9. Ueber kalkausscheidende Organe der *Saxifraga crustata*; 10. Wachsausscheidungen an einigen Pflanzentheilen; 11. Honigthau in Afrika; Neue Untersuchungen über die Transpiration der Gewächse. S. B. Bd. 44.)
 Neu-Holland in Europa. Ein Vortrag. Wien, Braumüller. (Journ. of Bot. 1865, p. 39.)

1862.

- Wissenschaftliche Ergebnisse einer Reise in Griechenland u. den ionischen Inseln. Wien, Braumüller. (Journ. of Bot. 1864, p. 390.)
 Ueber die Structur einiger reizbarer Pflanzentheile. B. Z. no. 15.
 Sylloge Plantarum Fossilium. II. D. 22.
 Botanische Streifzüge auf dem Gebiete d. Culturgeschichte. (5. Inhalt eines alten ägyptischen Ziegels an organischen Körpern. S. B. Bd. 45.)

1863.

- Bewegungserscheinungen an Staubfäden von *Centaurea*. B. Z. no. 49.
 Beobachtungen über den schwer vergänglichen Schaum des Meeres an den Küsten von Paphos und Cypern. S. B. Bd. 47.

1864.

- Beiträge zur Physiologie der Pflanzen. S. B. Bd. 50. (13 Studien zur Kenntniss des Saftlaufes der Pflanzen.)
 Bericht über die Möglichkeit von

Pfahlbauresten in den ungarischen Scen. S. B. Bd. 50.

- Ueber einen in der Tertiärform sehr verbreiteten Farn. S. B. Bd. 49.
 Botanische Streifzüge auf dem Gebiete d. Culturgeschichte. (6. Der Waldstand Dalmatiens einst u. jetzt. S. B. Bd. 50.)

1865.

- Die Insel Cypern. U. u. Kotschy. Wien, Braumüller. (Journ. of Bot. 1865, p. 224.)
 Sylloge Plantarum Fossilium. III. IV. D. Bd. 25.
 Ueber einige fossile Pflanzenreste aus Siebenbürgen. S. B. Bd. 51.

1866.

- Grundlinien der Anatomie und Physiologie d. Pil. Wien, Braumüller.
 Die Insel Curzola und Laeroma. Oesterr. Revue. Heft 2.
 Die Insel Cypern einst und jetzt. Ein Vortrag. Graz.
 Steiermark zur Zeit der Braunkohlenbildung. Ein Vortrag. Graz.
 Notiz über fossile Hölzer aus Abyssinien. S. B. Bd. 54.
 Die fossile Flora von Kumi auf Euboea. D. Bd. 27.
 Botanische Streifzüge auf dem Gebiete der Culturgeschichte. (7. Ein Ziegel der Dashurpyramide, etc. S. B. Bd. 54. Journ. of Bot. 1866, p. 272.)
 Das Paradies. Ein Vortrag. Wien, Braumüller.

1867.

- Beiträge zur Physiologie d. Pflanzen. S. B. Bd. 56. (14. Ueber die Ausfüllung alternder und verletzter Spiralgefäße durch Zellgewebe.)
 Kreidpflanzen aus Oesterreich. S. B. Bd. 55.
 Die Pflanze als Todtenschmuck und Grabeszier. Ein Vortrag. Wien, Braumüller.
 Botanische Streifzüge auf dem Gebiete der Culturgeschichte. (8. Die organischen Einschlüsse eines Ziegels der alten Judenstadt Ramses. S. B. Bd. 55; 9. Der Rosmarin und

- seine Verwendung in Dalmatien. S. B. Bd. 57.)
1868.
- Beiträge zur Physiologie d. Pflanzen. S. B. Bd. 58. (15. Weitere Untersuchungen über die Bewegung des Pflanzensaftes.)
Fossile Flora von Radoboj. D. Bd. 29.
Ueber geologische Bilder. Mitth. d. naturwiss. Ver. f. Steierm. Bd. 1. H. 5.
1869.
- Die fossile Flora von Szántó in Ungarn. D. Bd. 30.
- Geologie der europäischen Waldbäume: Laubhölzer. Mitth. d. naturwiss. Ver. f. Steierm. Bd. 2. H. 1.
Ueber Anthrazit-Lager in Kärnten. S. B. Bd. 60.
1870.
- Ueber Lieschkolben der Vorwelt. Zur Sitzung der Akademie am 7. Januar eingesendet.
Geologie der europäischen Waldbäume: Nadelhölzer. Erscheint in den Mittheilungen des naturw. Ver. f. Steierm. Bd. 2. Heft 2.

Reports.

THE LOCAL FIELD-CLUBS OF GREAT BRITAIN.

BY JAMES BRITTEN, F.L.S.

IV. HIGH WYCOMBE NATURAL HISTORY SOCIETY.

This Society was established in April, 1865, for the encouragement of the study of natural history, and the investigation of the natural objects of the district within a radius of five miles from the parish church. The fostering of a taste for science among the members was the principal object aimed at; and, with this view, an attempt has been made, attended with a fair amount of success, to render the meetings popularly, rather than abstrusely, scientific. The President, the Rev. T. H. Browne, F.G.S., F.R.M.S., etc., has filled that post since the formation of the Society; the first Secretary was Mr. H. Ulyett (now of the Folkestone Natural History Society), who left the town in 1866, since which time the writer of this notice has occupied the position. The other officers are a treasurer, and three members of committee. The number of members is about 70; the annual subscription 2s. 6d.

In July, 1866, the first number of a quarterly magazine, in connection with the Society, was issued, in which were published original

papers, reports of the meetings, and notes on the natural history of Buckinghamshire and the adjoining counties. This has been continued up to the present time, but will conclude with the number for June, 1870. The subscription is 2s. per annum. Botanical papers have been contributed by Messrs. M. C. Cooke, Robert Holland, W. G. Smith, and the Secretary, those by the latter being exclusively devoted to the flora of the district. The last number contains extracts relative to Buckinghamshire plants from some of the older botanists, from Gerarde (1597) to Hill (1770). Besides this serial, the members rendered considerable assistance to their fellow-member. Mr. Clark-Kennedy, in the compilation of his work on 'The Birds of Berks and Bucks.' A list of Buckinghamshire plants, and a paper on "Local Museums," complete the brief list of publications.

Meetings are held monthly, by invitation, at the houses of members during the winter; at these an exhibition of objects takes place, papers or lectures are delivered, and there is usually a large attendance. The session terminates with a *conversazione* in the town-hall, to which friends of the Society are invited. It was originally intended to have a field-meeting, at least monthly, during the summer; but this portion of the programme is not now carried out. This must be attributed to a defect in this as well as in other similar societies,—the lack of working members. The natural history of the Wycombe district, however, has been fairly investigated, owing to the energy of a few; the birds, lepidoptera, and phanerogamic plants, having received the largest share of attention.

An interesting feature in this Society is the co-operation of a few of the working chaimakers; two of whom have made themselves fully acquainted with the flora of their immediate neighbourhood,—one having added several rare plants,—while another has brought together a good collection of local lepidoptera. It is no uncommon thing in the north of England for artisans to interest themselves in natural history, but it is comparatively rare in the south.

The establishment of a local museum has been proposed, but has not yet been set on foot. The treasurer's report for the year ending April, 1869, is satisfactory.

Proceedings of Societies.

EDINBURGH BOTANICAL SOCIETY.—April 14th, 1870.—Sir Walter Elliot, K.S.I., President, in the chair. The following communications were read:—

I. “On the Flowering and Fruiting of *Aucuba Japonica*.” By Mr. P. S. Robertson. The author had observed that recently introduced female plants of *Aucuba* from Japan, grown in a coalpit, came into flower in January and February, while the male, grown in the same circumstances, never came into flower till the middle of March. Yet he had every year obtained a crop of young seedlings from the seeds produced, although the female flowers were quite shrivelled up before the male ones expanded. He found that the common spotted variety, long grown in this country, does not flower till May or June, although grown in the same house or pit with the others, and only begins to open its flowers when the males are getting past; yet it never fails to bear abundance of berries with perfect seeds. He thought that in this case the pollen must lodge for some time in the scales of the unexpanded flower-buds, or reaches the pistil before the flower opens, but he was at a loss how to account for the fertilizing of the early flowering varieties. This year he had forced on the flowering of the male plants by placing them in strong heat, and had all the varieties of the male and female plants in full flower at very nearly the same time, and accordingly anticipates a much larger production of berries than in former years, when the plants were left to the ordinary course. He exhibited a branch bearing numerous berries containing perfect seeds; yet when that plant came into flower, there had not been a male plant in the house where it grew for upwards of a month previous. [What proof is there that the male variegated *Aucuba* and the female *Aucuba* which bears fruit are the same species?—ED.] Mr. Sadler stated that the pollen had been collected and kept in paper until the female flowers were ready for fertilization, when it was applied, and fruits with perfect seeds had been invariably secured. He thought that by grafting the male plant on the female, or *vice versa*, the two sexes might be made to expand their flowers nearly at the same time.

II. “Remarks on *Grimmia pruinosa*, Wilson’s MSS.” By Mr. William Bell. Mr. Bell stated that the specimens of the Moss which he now exhibited were collected in April 1869, on Arthur’s Seat, and that after careful examination by Mr. Sadler and himself, he had come to the conclusion that it was very different from any described in ‘*Bryologia Britannica*.’ He had seen specimens of the same Moss in the University herbarium, collected by Dr. Greville in the Queen’s Park in 1847, named in Mr. Wilson’s handwriting, “*Schistidium confertum*, var. *incanum*.” Mr. Wilson, in reply to a letter from Mr. Bell, stated that Dr. Greville sent him specimens in 1856, and that it is *Grimmia pruinosa*, Wilson’s MSS., founded by him on specimens found by Mr. Howie on Largo Law, Fife, in 1864, subsequent to the publication of the ‘*Bryologia*.’ Dr. Greville was the original discoverer, having collected it twenty-three years ago. Mr. Wilson is undecided whether this Moss, or that known to British Muscologists as *Schistidium confertum* or *Grimmia conferta*, be the typical *conferta*. Mr. Bell thought that if the genus *Schistidium* is to be retained (practically a matter of

indifference), *Grimmia anodon* and *G. pruinosa* will naturally fall into it; but if *Schistidium* be set aside, which perhaps would be of advantage in the section with capsules sessile-peristome, perfect in order would come *Grimmia maritima*, *G. apocarpa*, and *G. pruinosa*, as well as *G. conferta*, which seems to have a less perfectly developed peristome than any of the preceding. In the group with the peristome entirely wanting would come *G. anodon*, which, with sessile capsules, has yet more characteristics in common with *Grimmia* proper than any of the others. III. "Remarks on *Böhmeria nivea*." By Mr. Sadler. Mr. Sadler exhibited raw and prepared fibre of *Böhmeria*, as well as manufactured articles of dress from it, and drawings and dried specimens of the plant. It was attracting attention, because the Government had offered £5000 for the invention of a machine capable of separating the fibre from the bark and stem in an inexpensive manner; the working expenses of the prepared fibre not to exceed £15 per ton, and to be of such a quality as to realize not less than £50 per ton in the English market. This offer was made in February last, and one year given to competitors. It was stated in all the newspapers about three weeks ago that such a machine had been invented in Bombay. The Government ought to contradict this, as it had stopped intending competitors. Mr. Sadler described *Böhmeria nivea*, and referred to the other fibre-yielding plants belonging to the same Order. He exhibited a scarf manufactured from the fibre of the common Nettle (*Urtica dioica*), which yielded a fine and soft but not a lasting fibre. The *Böhmeria* is known as "Rheea," "Ramie," "Ma" or "Chu-ma," "Chinese Grass," and "Chinese Nettle." IV. "Memorandum on Ipecacuanha." By Clements R. Markham, Esq. Communicated by Dr. Cleghorn. V. "Report on the Open Air Vegetation in the Royal Botanic Garden." By Mr. M'Nab. VI. "Demonstration on the Embryos of *Nymphaea alba* and *Phœnix dactylifera*." By Professor Dickson. Dr. Dickson had nothing new to bring forward on the embryo of *Nymphaea*, and would merely exhibit preparations showing the different parts of the seed, viz.: integuments; perisperm; endosperm (vitellus); and dicotyledonous embryo, with rudimentary radicle and well-developed plumule exhibiting two leaves, an older and a younger one. Regarding the embryo of the Date, Dr. Dickson remarked that, so far as he had seen, the representations of it in the books were very erroneous; the slit of the cotyledon being indicated in one representation by a *transverse* cleft or fissure near its upper part; in another by a *longitudinal* slit near its upper part. Dr. Dickson found that the slit of the cotyledon is longitudinal, and is always situated near its base. In shape the embryo is pretty definite, and may be described generally as conical. The cone, however, is compressed laterally, and is somewhat curved towards its apex; in fact, resembling a short somewhat flattened horn. The position of this conical body is definite as regards the mesial plane of the seed; its long axis being nearly horizontal; the compression lateral; and the curvature such that the concavity is towards the apex, the convexity towards the base of the seed. The position of the slit, however, is very variable, though always longitudinal and situated near the base of the cotyledon; it may be either on the concave, on the convex, or on one of the lateral aspects. In fact, the slit may occur on any portion of the circumference near the base. This variability is noteworthy, since it would

appear that the position of the cotyledon or cotyledons is, as a rule, constant as regards the mesial plane of the seed.* It is to be presumed that the condition in *Phoenix* depends on the developing embryo lying sometimes in one way, sometimes in another, in a cavity of a definite shape which it ultimately fills and moulds itself to. It is of course to be understood that the embryo here is usually unsymmetrical, *i. e.* its morphological mesial plane usually does not coincide with the mathematical mesial plane of the conical body. Dr. Dickson hopes to extend his observations, and to publish some analyses of the embryo. VII. Miscellaneous Communications. 1. Professor Balfour read a letter from Mr. G. Daunt, of San Paulo, Brazil, in which were enclosed the seeds of the Lizard plant, a supposed snake antidote. 2. Mr. C. W. Peach exhibited some remarkably distinct natural prints of *Desmarestia aculeata* and *D. viridis*, on pieces of rock from Stromness. 3. Mr. Adam White, who had lately paid a visit to Ben Ledi, in Perthshire, gave some account of the spring vegetation on that mountain, and particularly noticed some of the rarer Mosses he had observed. 4. A letter was read from Mr. Frere, of Roydon Hall, Diss, transmitting specimens of light different "Dogwoods" from the Government powder works at Waltham Abbey for examination. Mr. Sadler stated that he had examined these woods, and found them all to be that of *Rhamnus Frangula*. A nurseryman in Edinburgh had lately received a large quantity of the plants of *Cornus mascula*, as the powder "Dogwood." He was not aware, however, that the wood of this species was ever used for powder charcoal, and thought that the plants must have been sent by mistake. The wood of *Rhamnus Frangula* was easily distinguished from that of *Cornus*, from its becoming yellow when moistened, and having coloured medullary rays, and alternate branches.

LINNEAN SOCIETY.—*May 5th.*—G. Bentham, F.R.S., President, in the chair. The following letters were read. By the President from Dr. Ernst, of Caracas, on the Incense plant, called *Trixis neriifolia* by Humboldt and Bonpland; Dr. Ernst proposed to make it a distinct genus, to be called *Libanothamnus*. By Dr. Hooker, from Dr. Kirk, of Zanzibar, on the Copal Resin of the district. Dr. Kirk found large masses on some trees remarkable for their size. The resin, specimens of which were exhibited, had much the appearance of amber, and, like it, contained fragments of plants, insects, and *débris*. Specimens were also dug up from the earth in spots where there are at present no copal-bearing trees, which must have lain buried for centuries.

Botanical News.

The last-published part (vol. xxvi. part 4) of the 'Linnean Transactions' contains Mr. Carruthers' valuable monograph of the fossil *Cycadeæ* from the secondary rocks of Britain, and Professor Williamson's paper on a new type of fossil *Cycadeæ*. Professor Babington's long-expected Flora of Iceland

* Hofmeister, Handbuch der Physiol. Botanik, Allgemeine Morphologie der Gewächse, pp. 620-1.

appears in the last number of the 'Journal' of the same Society, and will be noticed in our pages. The anniversary meeting was held on May 24th, when Mr. Bentham, the President, delivered an address on matters connected with the permanence of species and palæontology.

Dr. Hooker's 'Students' Flora of the British Islands' has just appeared (Macmillan, 10s. 6d.), and forms a small octavo volume of 504 pages.

The following botanists have been elected Foreign Members of the Linnean Society:—Dr. Charles Naudin, of Collioure, Pyrenees, and Signor Roberto di Viviani, Professor of Botany at Padua.

We are glad to hear that the Council of the Royal Society have recommended Dr. Maxwell T. Masters for election as a Fellow of the Society.

Dr. Hooker, of Kew, and Dr. Thompson, have been elected Examiners in Botany at the University of London.

We understand that a well-known London publisher is about to issue an English translation of Professor Baillon's 'Monographies.'

The first sheet of Messrs. W. and A. K. Johnston's 'Illustrations of Botany' is published.

Rev. E. O'Meara is engaged on a Catalogue of Irish Diatomaceæ, in the form of a report to the Royal Irish Academy.

The remainder of the herbarium of the late Nathaniel B. Ward, Esq., F.R.S., etc.,—consisting of plants from (1) India, by Wallich, Griffith, Royle, Campbell, Hayne, etc.; (2) Tranquebar, an old series collected by the Moravian Brethren in the last century; (3) Cape of Good Hope, by Roxburgh, Rutherford, Tredgold, etc.; (4) Valparaiso, M. Antoin; (5) British Guiana, M. Martin; (6) Australia and New Zealand, by Cunningham, Hooker, Mylne, Maitland, etc.; (7) North America, by M'Nab, Watson, Douglas, Sullivan, Gardner, etc.; (8) South America, by Gardner, Miers, Cuming; (9) Peru; (10) European, by Woods, W. Christy, Prior, etc.; besides a quantity of Ferns and a few other Cryptogams,—is for disposal. Any of the sets may be had at the rate of 5s. per hundred, of Dr. Miller, Bethnal House, Cambridge Road, E., one of Mr. Ward's executors.

We are glad to see that 'The Moss Flora of Sussex' is published.

Dr. John Torrey and Prof. Asa Gray have just published in the Proceedings of the American Academy, a "Revision of the *Eriogonææ*." They recognize seven genera, Bentham's *Mucronea* being suppressed, and *Lastarriæa* (formerly not recognized as a member of this group, from its having no involucre) admitted; and they enumerate 115 species, all natives of America.

NOTICES TO CORRESPONDENTS.—A number of communications are delayed by want of space, although it will be observed that we give an extra half-sheet (eight pages). Communications have been received from Prof. A. Gray, T. R. A. Briggs, Dr. Stirton, Dr. D. Moore, Dr. Braithwaite, Prof. Thiselton-Dyer, F. Stratton, J. Britten, A. W. Bennett, etc.

CORRIGENDA.—From an accident, the proof of Mr. Tucker's "Short Note" on Isle of Wight plants (pp. 158-160) was not corrected. Beside some errors in punctuation, the following misprints occur in it:—P. 159, l. 8, for "*Galæogonum*" read *Crataegonum*; l. 25, for "*Plumostii*" read *Plimostii*; l. 27, for "accurante Gal." read accurante Gul.; l. 36, for "*quare*, a formâ, Guil. broad" read quem a formâ Guil. Broad. On p. 164, l. 36, for "*Scyzonema* and *Scyzosiphon*" read *Spermosira* and *Schizosiphon*. On p. 167, l. 37, dele "*New Books*."

Original Articles.

ON A FORM OF *SALIX ARBUSCULA*, L., IN IRELAND.

BY D. MOORE, PH.D., F.L.S., ETC.

This Willow, one of the least of the British kinds, is here considered to belong to the somewhat protean *S. Arbuscula*; but other good authorities, to whom specimens have been sent, incline to refer it to *S. Myrsiniles*. Although not agreeing well with one or other of these species, it certainly is more characteristic of the former, in having the catkins stalked and bracteated; the leaves smooth, of a shining green, and exstipulate; the styles of the ovaries deeply cleft, and the stigmas bifid. It, however, differs from the forms described in Floras, in having the *germens quite glabrous* (excepting occasionally one or two scattered hairs near the base of the style), in its short *naked* pedicels to the ovaries, and in its truncate glands, as well as in the much smaller size and general appearance. Our plant has been cultivated since the autumn of 1866, and appears in perfect health, producing abundance of female catkins, yet none of the branches are more than four inches long. In its native habitat only the points of the branches with two or three leaves on each were visible above the moss and stones among which it grew. The plant agrees better with the figure of *S. Arbuscula*, in Salicet. Woburn. t. 138, which was drawn from a Swiss specimen, than with any other figure with which I have compared it; but in the description of that plant the germen is stated to be *downy, ovate, and sessile*. The figure in Wahlenberg's Fl. Laponica, t. 16, f. 2., which Andersson, in his 'Monographia Salicum,' quotes as *forma minor*, has also *downy* germen. In general appearance our plant bears much resemblance to *Salix Grahami*, Baker (Journ. of Bot. vol. v. p. 157. t. 66), but this latter has very downy pedicels. Mr. Baker informs me that there are examples in the late Mr. Borrer's collection at Kew, which were gathered by Mr. Ball on the Sow of Athol, which exactly agree with our plant, excepting that the pedicels of the former are downy.

The locality where the plant grows is on the top of Muckish mountain, county Donegal, and it was collected in September, 1866. It

possesses a good deal of interest, affording as it does, one other instance of the true alpine flora which just reaches the north-west of Ireland, and is found in no other part of the island. Mr. Watson, in 'Cybele Britannica,' table of summary of distribution, p. 212, quotes *S. Laponum* and *S. Myrsinites* as natives of Ireland, which, I fear, are mistakes; certainly, no specimens of these plants exist in any known Irish herbaria, nor have I ever heard it stated on good authority that they have been found in Ireland. I have many times looked on the shores of Lough Neagh, where the late Mr. Templeton is supposed to have found *S. Stuartiana*, without seeing anything of it. *S. fusca* and most of its varieties abound there, and also on the mountains near Belfast.

 REVISION OF THE NATURAL ORDER BIGNONIACEÆ.

BY BERTHOLD SEEMANN, PH.D., F.L.S., ETC.

(Continued from page 149.)

NEWBOULDIA, *Seem.*

I have already stated, Journ. of Bot. 1863, p. 225, that the original two species of *Spathodea* represented different generic types, and why I retain the name of *Spathodea*, not for *S. lævis*, but *S. campanulata*, making *S. lævis* the type of a new genus, far removed from *Spathodea* as restricted by me.

NEWBOULDIA (gen. Eucatalpearum), Seem. Journ. of Bot. I. (1863), p. 226; Bureau, Monogr. Big. t. 15. Calyx oblongus, line irregulariter fissus. Corolla subinfundibuliformis, 5-loba, lobis obovatis obtusis, æstivatione imbricatis. Stamina 4, didynama, cum quinto sterili. Antheræ glabræ, 2-loculares, loculis parallelis. Stylus elongatus; stigma 2-lamellatum. Ovarium cylindricum, sessile, ∞-ovulatum, ovulis 4-seriatim dispositis. Discus glandulosus, obscure 5-gonus. Capsula siliquæformis, compressa, loculicide dehiscens, 2-ocularis, septo coriáceo valvis contrario. Semina ∞, ad quodque septi latus 1-serialia, membranaceo-alata, inferiora superioribus incumbunt.—Arbor Africæ tropicæ, foliis alteruis v. ternato-verticillatis imparipinnatis, foliolis ovato-oblongis serratis, paniculis terminalibus corymbosis multifloris; corollis albido-roseis, purpureo-maculatis v. purpureis; calycibus corollis capsulisque glanduloso-punctatis.—*Bignoniæ* et *Spathodeæ* sp. Auct.

1. *N. laevis*, Seem. ; Bureau, Monogr. Big. t. 15.—*Spathodea laevis*, Beauv. Fl. Owar. i. p. 48, t. 29 ; De Cand. Prodr. ix. p. 208 ; Hook. Bot. Mag. t. 4537 ; Vent. Choix, n. 40, in adn. *S. adenantha*, Don, Gen. Syst. iv. p. 222 ; De Cand. Prodr. ix. p. 207. *S. Jenischii*, Sonder in Hamburger Gartenz. iv. p. 370 ; Bot. Zeit. vi. p. 792 ; Walp. Ann. iii. p. 89. *S. speciosa*, Brongn. in Lem. Herb. Gen. Amat. iv. (2nd ser.) t. 70, et in Lem. Hort. Univ. v. 357 (1844), cum icon. ; De Cand. Prodr. ix. p. 563 ; Morren, Ann. de la Soc. d'Agricult. v. p. 213. t. 260 ; Van Houtt. Fl. des Ser. (1st ser.) vi. p. 309, cum icon. ; Lem. Jard. Fleuriste, i. t. 51. *Bignonia glandulosa*, Schum. Guin. p. 274. *Spathodea pentandra*, Hook. Bot. Mag. t. 3681. (Erroneously identified by Steudel with *Calosanthos Indica*, Bl., an Eubignoniaceous genus.) Nomen vernac. Guineëense, “ Nabadi,” teste Schum.—Sierra Leone (Afzelius ! Barter ! n. 2173, Th. Heesch, teste Sonder) ; Banks of Gambia (Whitfield !) ; Senegambia (Don ! n. 818) ; Guinea (teste Schum.) ; Oware, near Buono Pozzo (teste Beauv.) Cultivated in Europe.

“ A small tree ” (Barter). Largest leaves, including petiole, 1–1½ feet long. Leaflets from 2–6 inches long, 1–3 inches broad. Exact native country unknown.

Sometimes the corolla (which is either of a uniform purple colour, or pale pink with purple blotches and dots) has six lobes by excess, and, in that case, there are five fertile stamens of unequal length and a rudiment of a sixth.

MUENTERIA, Seem.

MUENTERIA (gen. Jacarandearum), Seem. Journ. of Bot. III. (1865) p. 329. t. 36 et 35.

1. *M. stenocarpa*, Seem. l. c. t. 36.—*Spathodea stenocarpa*, Welw.—Distr. of Golungo Alto (Welwitsch ! n. 482, 483) ; between lat. 14° and 19° S. of African continent (Livingstone !)

2. *M. tomentosa*, Seem. l. c. t. 35. *Spathodea tomentosa*, Benth. in Hook. Niger Fl. p. 462 ; Walp. Ann. iii. p. 89.—Golungo Alto (Welwitsch ! n. 485) ; Fernando Po (Th. Vogel ! Mann !) ; banks of the Niger (Barker ! n. 555, ex parte) ; Senegambia (Don ! n. 877) ; Senegal (Heudelot ! n. 877, in Mus. Brit.).

3. *M. lutea*, Seem. ; arborea ; foliis oppositis, 4–6-jugis cum impari, ramisque puberulis demum glabris, foliolis (impari except.) sessilibus

vel vix petiolulatis oblongis, acuminatis denticulatis vel integerrimis; racemis terminalibus paniculatis, multifloris; calyce extus tomentello; corolla subinfundibuliformi (pallide lutea, intus sulphurea rubro striata), glabra, lobis denticulatis glandulosis; filamentis glabris; ovario . . . ; capsula ($1\frac{1}{2}$ ped. long, $\frac{1}{2}$ poll. lat.) siliquæformi, compressa, tenuissime ferrugineo-tomentella (v. s. sp.).—*Spathodea lutea*, Benth. in Hook. Niger Fl. p. 461; Walp. Ann. iii. p. 89.—Fernando Po (Th. Vogel! n. 60, Ansell! Barter! n. 555, ex parte); Nupé (Barter! n. 1310).

“Tree 30 feet high” (Barter). Largest leaves 1– $1\frac{1}{2}$ feet long, including petiole. Leaflets 4–5 inches long, 1–2 inches broad.

4. *M. Zanzibarica*, Seem.; arborea; foliis oppositis vel alternis, pinnatis, 2–3-jugis cum impari, foliolis (impari except.) brevipetioulatis subovalibus vel obovatis subobtusis vel breviter acuminatis mucronatis integerrimis vel serratis lepidotis glabris, subtus albidis, hinc inde glandulosis; paniculis terminalibus axillaribusque multifloris; pedunculis pedicellis calyceibus bracteis ovariisque minute lepidotis; calyce nervis obscuribus; corolla subinfundibuliformi, lobis obtusis denticulatis, apice glanduloso, utrinque glabra; stylo glabro, stigmatis lamellis ovalibus, obtusis, integerrimis; capsula late lineari (3 poll. long.), glabra (v. s. sp.).—*Spathodea Zanzibarica*, Bojer, in De Cand. Prod. ix. p. 208; Klotzsch, in Peters' Reise nach Mossambique (Botanik), p. 191. *S. tenuifolia*, Bojer, in lit. ad De Cand. *S. acuminata*, Klotzsch, in Peters' Reise n. Moss. (Botanik), p. 191. Nomen vernac. Mossamb. teste Peters, “Mupeseva.”—Geogr. Distr. Zanzibar (Bojer, teste De Cand.); Mozambique (Forbes! in Herb. Hook. et Mus. Brit.; Peters! in Herb. Berol.).

The leaflets, the largest of which measure $4\frac{1}{2}$ inches in length, 2 inches in width, are like those of *M. lutea*, either quite entire or serrate.

5. *M. puberula*, Seem.; fruticosa; foliis oppositis, pinnatis, 2–3-jugis cum impari, foliolis subsessilibus parvis oblongis serratis apice attenuato-emarginatis, utrinque puberulis, supra saturate, subtus pallide viridibus, petiolis semiteretibus undique puberulis; racemis axillaribus erectis puberulis sæpe inferne foliosis folium æquantibus; calyceibus elongatis incurvis, utrinque attenuatis sparsim puberulis et minute lepidotis, nec apice hamatis—*Spathodea puberula*, Klotsch, in Peters' Reise, n. Moss. p. 92.—In rocky places, Rios de Sena (Tette); Mozambique (Peters! in Herb. Berol.).

CLAVIS AGARICINORUM:

AN ANALYTICAL KEY TO THE BRITISH AGARICINI, WITH
CHARACTERS OF THE GENERA AND SUBGENERA.

BY WORTHINGTON G. SMITH, F.L.S.

(Read before the Woolhope Club, Hereford, February 22nd, 1870.)

(PLATES C.-CV.)

(Continued from page 182.)

Series II. HYPORHODII, Fr. Epier. p. 138.—Spores pink or approaching salmon-colour or lilac.

Subgenus 10. VOLVARIA, Fr. Syst. Myc. vol. i. p. 277 (Plate CI. fig. 10).—Spores regular in shape, oval or pip-shaped, pink or salmon-colour; veil universal, forming a perfect volva (A and c), distinct from the cuticle of pileus; stem distinct from the hymenophorum; gills free, rounded behind, at first white, then pink, soft, liquescent.—HAB. Gardens and hot-houses, and in woods and on manured ground, growing on rotten wood and damp ground; one species is parasitic on a white-spored Agaric, *Agaricus nebularis*, Batsch.

The different species of *Volvaria* are very closely allied; some appear in spring and early summer, others later in the year; they are almost all tasteless, and none are known to be edible. *Volvaria* corresponds with *Amanita* (Plate C. fig. 1). Their peculiar habitat, viz. rotten wood, manured ground, etc., and their liquescent gills show some affinity with *Coprinus* and *Bolbitius*, but the species of the latter genera have no true volva, and differ in several other respects.

The specimen figured is *Agaricus (Volvaria) volvaceus*, Bull. Spores $\cdot 0002'' \times \cdot 00013''$.

Subgenus 11. CHAMEOTA, subgen. nov. sp. *Psalliotæ*, Fr. (Plate CI. fig. 11).—Spores pale rose; stem distinct from the hymenophorum, furnished with a fugitive ring; gills free.—HAB. On the ground, or on decayed wood.

Corresponds in structure with *Lepiota* (Plate C. fig. 2), and *Psalliota* (Plate CIII. fig. 26). The species described under the name of "*A. (Pluteus?) xanthogrammus*, Ces.," in 'Commentario della Società Crittogamologica Italiana,' n. 2, September, 1861, appears to exactly

fill this place. From my examination of *A. (Psalliota) cretaceus*, Fr., and *A. (Psalliota) echinatus*, Fr., I am disposed to place them also here. The species figured is *A. (Chamaeota) xanthogrammus*, Ces.

Subgenus 12. PLUTEUS, Fr. Epicr. p. 140 (Plate CI. fig. 12).—Spores generally regular in shape, but in some species approaching the irregularity of *Entoloma*, pink or salmon-colour, more or less bright; some approaching in colour the spores of Genus 6, *Pavillus*, others to subgenus 21, *Flammula*; veil none; pileus of the same nature with the stem and gills, smooth, silky, or wrinkled; stem ringless and without a volva, distinct from the hymenophorum; gills free, at first white, then yellowish, at length pink, very crowded, almost cohering, sometimes subliquescens.—HAB. The species almost always grow on, or close to, the trunks of trees.

The characters of this subgenus agree with those of *Volvaria*, with the exception of the volva, which is absent in *Pluteus*. Fries appears to think it is doubtful whether the pellicle of the pileus, always fibrous, flocculose, or pruinose, should not be considered as an universal concrete veil, which would give an analogy with *Lepiota*, Plate C. fig. 2. He has recently established a new subgenus of purple-spored Agarics (see Plate CIII.) under the name of *Pilosace*, with (excepting the spores) precisely the characters of *Pluteus*. *Pluteus* and this new subgenus *Pilosace* are undoubtedly allied, but, strangely enough, they have no known representatives amongst either the white.* or brown-spored groups. The species of *Pluteus* appear in spring, early summer, or late in the autumn. They are tasteless, and none edible. The species figured is *Agaricus (Pluteus) cervinus*, Schæff. Spores $\cdot 00023'' \times \cdot 00018''$.

Subgenus 13. ENTOLOMA, Fr. Epicr. p. 143 (Plate CI. fig. 13).—Spores extremely irregular in shape, salmon colour, pink, or more or less approaching bright red or brown; veil, as in *Tricholoma* and *Hebeloma*, "potential rather than definite;" pileus, with a margin at first incurved, never at first umbilicate, fleshy or thin according to the species, viscid, smooth, hygrophanous, dry, silky, or flocculose; stem fleshy-fibrous, sometimes almost waxy, continuous with the hymenophorum, and homogeneous with it; gills sinuated, as in *Tricholoma*, etc., almost free, or more or less adnate, sometimes parting from the stem.—HAB. All are terrestrial.

* Since this was in print a probable representative has been found amongst the *Leucospori* (see page 141).

Allied to *Tricholoma*, Plate C. fig. 4, but, with few exceptions, the species of *Entoloma* are much thinner and often brittle. Many possess the odour of new flour, but none are edible, and some highly poisonous. They appear in summer after heavy rains. Besides corresponding with *Tricholoma*, *Entoloma* agrees in structure with *Hebeloma*, Plate CII. fig. 20, and *Hypholoma*, Plate CIII. fig. 29. The species figured is *Agaricus (Entoloma) sinuatus*, Fr. (*A. fertilis* of Berkeley's 'Outlines'). Average size of spores $\cdot 00035'' \times \cdot 00025''$.

Subgenus 14. CLITOPILUS, Fr. Epicr. p. 148 (Plate CI. fig. 14).—Spores salmon-colour, in some species very pale, almost white, pip-shaped, somewhat irregular spheres or altogether irregular as in *Entoloma*, fig. 13; pileus viscid, smooth or pruinose, dull white, cinereous or brownish, generally fleshy; stem fleshy or fibrous, confluent with the hymenophorum and homogeneous with it; gills decurrent, never sinuated.—HAB. All are terrestrial.

With the exception of the gills, most of the characters correspond with *Entoloma*. The odour of the species is more or less mealy; some, however, are oily, some tasteless, others edible. *Clitopilus* is closely allied to *Clitocybe*, Plate C. fig. 5, and differs from *Entoloma* precisely as *Clitocybe* differs from *Tricholoma*. *Clitopilus* agrees more or less with *Flammula*, Plate CII. fig. 21. The species figured is *Agaricus (Clitopilus) prunulus*, Pers. Spores $\cdot 00045'' \times \cdot 0002''$.

Subgenus 15. CLAUDOPUS, subgen. nov. sp. *Pleuroti* and *Crepidoti*, Fr. (Plate CI. fig. 15).—Spores pink, or pale lilac; stem lateral or none, when present confluent and homogeneous with the hymenophorum; gills sinuate or decurrent.—HAB. on wood or the ground.

Claudopus corresponds with *Pleurotus*, Plate C. fig. 6, and *Crepidotus*, Plate CII. fig. 22, only differing in the colour of the spores. Mr. Berkeley's fine species, *Agaricus (Pleurotus) eosmus*, *A. (Crepidotus) byssisedus*, P., and other species fall naturally into this subgenus. The spores of *A. prunulus*, Pers., are often quite as pale in colour as those of *A. eosmus*, B., and those of *A. (Clitopilus) popinalis*, Fr., are paler; indeed, the tint here (if present) is so faint as to be scarcely perceptible. The species figured is *A. (Claudopus) eosmus*, B. Spores $\cdot 0003'' \times \cdot 00013''$.

Subgenus 16. LEPTONIA, Fr. Syst. Myc. vol. i. p. 201 (Plate CI. fig. 16).—Spores salmon-colour, irregular in shape; pileus less campanulate than *Nolanea*, and never truly fleshy, cuticle always torn

into scales, disk umbilicate, and often darker than margin, which is at first incurved; stem rigid, with a cartilaginous bark, often dark blue, confluent with the hymenophorum, but heterogeneous from it; gills not decurrent, but often with a small tooth or sinus, separating from the stem, variable in colour, at first dirty white, yellowish, greenish, grey, or blue.—HAB. Dry hills, and sometimes marshy places, or stumps, in July and August.

Most of the species grow in clusters, are small, and of an elegant colour; most common in rainy seasons. Structurally the same as *Collybia*, Plate C. fig. 7; *Naucoria*, Plate CII. fig. 23; and *Psilocybe*, Plate CIII. fig. 30; and bears the same relationship to *Clitopilus* as *Collybia* to *Clitocybe*. The species figured is *Agaricus (Leptonia) incanus*, Fr. Average size of spores '00034". The small sketch, showing incurved margin of pileus, is *A. (Leptonia) chalybæus*, P.

Subgenus 17. NOLANEA, Fr. Syst. Myc. vol. i. p. 204 (Plate CI. fig. 17).—Spores salmon-colour; pileus submembranaceous (as in *Leptonia* and *Eccilia*), subcampanulate, and papillose, not umbilicate, at first straight and pressed to the stem, not incurved as in *Leptonia*; stem cartilaginous, fistulose, sometimes stuffed, confluent with, but heterogeneous from the hymenophorum; gills not decurrent.—HAB. Generally terrestrial, growing on grassy hills, and in wet places in woods.

The species are thin, slender, inodorous, and brittle (but some very tenacious), growing in summer and autumn. *Nolanea* corresponds with *Mycena*, Plate C. fig. 8; *Galera*, Plate CII. fig. 24; *Psathyra*, Plate CIII. fig. 31; and *Psathyrella*, Plate CV. fig. 34. Fries, in his 'Monographia,' has not reversed the sequence of *Nolanea* and *Eccilia* to make them accord with *Omphalia* and *Mycena* amongst the *Leucospori*. *Leptonia*, *Nolanea*, and *Eccilia* are very nearly allied by many characters. The species figured is *Agaricus (Nolanea) pascuus*, P. Average size of spores '0003".

Subgenus 18. ECCILIA, Fr. Syst. Myc. vol. i. p. 207 (Plate CI. fig. 18).—Spores salmon-colour; pileus generally umbilicate, disk homogeneous, margin at first incurved, as in *Leptonia*; stem hollow, confluent with, but heterogeneous from the hymenophorum; gills truly decurrent.

Corresponds with *Omphalia*, Plate C. fig. 9; *Tubaria*, Plate CII. fig. 25, and *Deconica*, Plate CIII. fig. 32. The species figured is *Agaricus (Eccilia) Parkensis*, Fr., for specimens of which I am indebted to Mr. C. E. Broome. Average size of spores '00027".

Series III. DERMINI, Fr. Epier. p. 160.—*Spores various shades of reddish-brown, brown, red, or yellowish-brown.*

Subgenus 19. PHOLIOTA, Fr. Syst. Myc. vol. i. p. 240 (Plate CII. fig. 19).—Spores sepia-brown, bright yellowish-brown, or light red; stem confluent and homogeneous with the hymenophorum, furnished with a ring, persistent, friable, or fugacious.—HAB. All the British species grow on stumps except five, which grow on the ground principally in damp, mossy places.

A few species are said to be edible, but they cannot be recommended. *Pholiota* is analogous to *Armillaria*, Plate C. fig. 3, and *Stropharia*, Plate CIII. fig. 28. There is some danger of confusing *Pholiota* with *Cortinarii*, but attention must be paid to the spidery veil and the *rust-of-iron* tint of the spores in the latter, and the habitat of the former. The species figured is *Agaricus (Pholiota) squarrosus*, Müll. Spores $\cdot 00022'' \times \cdot 00017''$.

Subgenus 20. HEBELOMA, Fr. Syst. Myc. vol. i. p. 249; with which I include *Inocybe*, Fr. Monogr. Hymen. Suec. vol. i. p. 334 (Plate CII. fig. 20).—Spores for the most part clay-coloured, or in *Inocybe* ferruginco-fuscous; veil of a different texture from the pellicle of the pileus, or in *Inocybe* homogeneous with the fibres of the pileus; pileus fleshy, pelliculose, damp, subviscous, or (in *Inocybe*) fibrous; stem confluent and homogeneous with the hymenophorum, fleshy-fibrous, ringless; gills sinuato-adsnate.—HAB. All terrestrial.

All the species are gregarious, and many so similar in appearance as to be with difficulty distinguished from each other. Some are scentless, several smell like rotten pears, and many have a disgusting odour and are poisonous; none are esculent. Fries, in his 'Monographia Hymenomycetum Sueciæ,' has introduced a new subgenus after *Hebeloma*, which he names *Inocybe*, distinguished by the pileus being *silky-fibrous*, and having a few other unimportant characters; but I do not see how such a subgenus can stand, unless, indeed, a similar corresponding subgenus be founded after *Tricholoma*, *Entoloma*, and *Hypholoma*, for all these subgenera have numerous species exactly corresponding with the silky pileus, etc. of *Inocybe*. I therefore prefer to keep to his old views as expressed in the 'Epicrisis,' and keep *Inocybe* as a section of *Hebeloma*. *Hebeloma* corresponds with *Tricholoma*, Plate C. fig. 4, *Entoloma*, Plate CI. fig. 13, *Hypholoma*, Plate CIII. fig. 29, and *Panæolus*, Plate CIV. fig. 33. The species figured is *Agaricus*

(*Hebeloma*) *fastibilis*, Fr. A very common species, closely allied to *A. crustuliniformis*, Bull. Spores $\cdot 0004'' \times \cdot 0003''$.

Subgenus 21. FLAMMULA, Fr. Syst. Myc. vol. i. p. 250 (Plate CII. fig. 21).—Spores in most species purely ferruginous, occasionally approaching yellow ochre, always bright in colour; veil filamentous, often obsolete; pileus fleshy, and, as the subgenus is at present constituted, very variable. It may be,—1, covered with an inseparable and fibrillose cuticle; 2, covered with a more or less viscid and *separable* cuticle; 3, moist, and with *no separable* cuticle; 4, neither pelliculose nor viscid, and broken up more or less into scales or fibrils; stem fleshy, fibrous, confluent, and homogeneous with the hymenophorum; gills adnate, acutely adnate, or decurrent.—HAB. On the ground or on wood.

Fries says the natural affinity of *Flammula* is with *Pholiota*, Plate CII. fig. 19, but I consider all true *Flammulae* should correspond with *Clitocybe*, Plate C. fig. 5, and *Clitopilus*, Plate CI. fig. 14. I suspect some of the species of *Flammula* that approach *Pholiota* in structure might with propriety be removed to that subgenus, and *Flammula* proper be restricted to species with more or less decurrent gills. Most of the species are tasteless or bitter, and none edible. They appear in late autumn or early winter. Some species of *Paxillus* may be mistaken for *Flammulae*, but attention must be paid to the gills separating from the hymenophorum and other characters in *Paxillus*. The species figured is *Agaricus (Flammula) sapineus*, Fr. Spores $\cdot 00028'' \times \cdot 0002''$.

Subgenus 22. CREPIDOTUS, Fr. Syst. Myc. vol. i. p. 272 (Plate CII. fig. 22).—Spores dark or yellowish-brown; veil none; pileus excentric, dimidiate, or resupinate; flesh soft; stem lateral, or wanting, when present, confluent with and homogeneous with the hymenophorum.—HAB. Most of the species grow on wood, a few on moss.

The species are very irregular and variable. They mostly appear late in the autumn, and none are known to be edible. *Crepidotus* corresponds with *Pleurotus*, Plate C. fig. 6, and *Claudopus*, Plate CI. fig. 15. As at present constituted, the species of this subgenus produce spores very variable in colour; some, being truly pink, find a fitting place amongst the *Hyporhodii*; other species having spores so intensely dark, that I suspect they will ultimately have to be removed to the *Pratellæ*. The species figured is *Agaricus (Crepidotus) mollis*, Schæff. Spores $\cdot 00025'' \times \cdot 00022''$.

Subgenus 23. NAUCORIA, Fr. Syst. Myc. vol. i. p. 260 (Plate CII. fig. 23).—Spores various shades of brown, dull or bright; veil absent, or attached to the edge of the pileus in young plants in the form of minute flakes; pileus convex and at first incurved, smooth, flocculent or squamulose; stem cartilaginous, confluent with, but heterogeneous from the hymenophorum.—HAB. Terrestrial or epiphytal.

No subgenus includes so many dissimilar species as this. In size, structure, the nature of the veil, and the colour of the spores, they differ exceedingly. *Naucoria* corresponds with *Collybia*, Plate C. fig. 7; *Leptonia*, Plate CI. fig. 16; and *Psilocybe*, Plate CIII. fig. 30. The species figured is *Agaricus (Naucoria) semiorbicularis*, Bull. Spores $\cdot 0005'' \times \cdot 00032''$.

Subgenus 24. GALERA, Fr. Syst. Myc. vol. i. p. 264 (Plate CII. fig. 24).—Spores ochraceo-ferruginous; veil often wanting, when present fibrous and fugacious; pileus more or less campanulate, margin straight, at first adpressed to the stem; stem cartilaginous, fistulose, confluent with but heterogeneous from the hymenophorum; gills adnate, or with a decurrent tooth exactly as in *Mycena*, Plate C. fig. 8. *Galera* also corresponds with *Nolanea*, Plate CI. fig. 17; *Psathyra*, Plate CIII. fig. 31; and *Psathyrella*, Plate CIV. fig. 34. The most typical species is perhaps *Agaricus sphagnorum*, Pers., with broad gills and decided sinus, but from its rarity I prefer to figure the common *A. tener*, Schæff.—HAB. The greater number of species are terrestrial.

The species are not numerous, and most are slender and brittle, appearing in the autumn. The species figured is *Agaricus (Galera) tener*, Schæff. Spores $\cdot 00054'' \times \cdot 0003''$.

Subgenus 25. TUBARIA, subgen. nov. sp. *Naucoria*, Fr. (Plate CII. fig. 25).—Pileus generally depressed, at first with an incurved margin; stem cartilaginous, hollow, confluent with but heterogeneous from the hymenophorum; gills decurrent.

As in *Eccilia*, there are very few known representatives of this position, either British or foreign, and the note appended to *Omphalia* applies equally to *Eccilia*, *Tubaria*, and *Deconica*. As at present constituted, some species of *Omphalia* are never depressed, but have a pileus more or less hemispherical or even obscurely umbonate from the first; the same applies to *Deconica*. The analogous species of *Tubaria* falling to this place are given in the list.

The species figured as a type is *A. (Tubaria) furfuraceus*, P.; it is

strictly analogous, both in structure and habit, with *Omphalia*, Plate C. fig. 9; *Eccilia*, Plate CI. fig. 18; and *Decouica*, Plate CIII. fig. 32. Spores $\cdot 0003'' \times \cdot 00016''$.

Series IV. PRATELLÆ, Fr. Epicr. p. 212.—*Spores various shades of brownish-purple, dark purple, or intense brown.*

Subgenus 26. PSALLIOTA, Fr. Epicr. p. 212 (Plate CIII. fig. 26).—Spores dark brownish-purple, dark brown, reddish-purple, or pale slate; veil universal, concrete with the cuticle of the pileus, and fixed to the stem, forming a ring; pileus fleshy; stem distinct from the hymenophorum, furnished with a ring; gills free, and rounded behind, at first white, then pink, afterwards intense purple-brown.—HAB. All are terrestrial, mostly growing in rich pastures and on matted ground.

Most of the species appear in the autumn, and several are valued for their esculent properties. *Psalliota* corresponds with *Lepiota*, Plate C. fig. 2, and *Chamæota*, Plate CI. fig. 11. The species figured is *A. (Psalliota) campestris*, L. Spores $\cdot 00032'' \times \cdot 0002''$.

Subgenus 27. PILOSACE, Fr. (Plate CIII. fig. 27).—Agrees in structure with *Pluteus*, Plate CI. fig. 12, and has the hymenophorum distinct from the ringless stem; there are no British representatives.

Subgenus 28. STROPHARIA, Fr. Monog. Hymen. vol. i. p. 409 (Plate CIII. p. 28).—Spores intense bright purple-brown, brown or slate-colour; veil, if present, universal, superficial, scaly, or viscid; stem confluent and homogeneous with the hymenophorum; gills adnate, not free and rounded behind, as in the last (*Psalliota*).—HAB. Terrestrial or epiphytal.

Formerly included under *Psalliota*, but now separated by Fries on account of the generally different habit, different attachment of the gills, and other characters. The species, of which none are edible, have somewhat various habits, but most are epiphytal, as are their analogues. *Stropharia* corresponds with *Armillaria*, Plate C. fig. 3, and *Pholiota*, Plate CII. fig. 19. The species figured is *Agaricus (Stropharia) aruginosus*, Curt. Spores $\cdot 00025'' \times \cdot 0002''$.

Subgenus 29. HYPHOLOMA, Fr. Syst. Mycol. vol. i. p. 287 (Plate CIII. fig. 29).—Spores brownish-purple, sometimes intense purple, almost black; veil woven into a spidery fugacious web which adheres to the margin of the pileus, B. (not properly ring-shaped round the stem);

pileus with an inseparable pellicle; stem confluent and homogeneous with the hymenophorum.—HAB. Generally stumps.

Most of the species are gregarious and not edible. *Hypholoma* corresponds with *Tricholoma*, Plate C. fig. 4; *Entoloma*, Plate CI. fig. 13; *Hebeloma*, Plate CII. fig. 20; and *Panaeolus*, Plate CIV. fig. 33. The species figured is *Agaricus (Hypholoma) lacrymabundus*, Fr. Spores $\cdot 0003'' \times \cdot 0002''$.

Subgenus 30. *PSILOCYBE*, Fr. Syst. Mycol. vol. i. p. 289 (Plate CIII. fig. 30).—Spores purple, purple-brown, or slate-colour; veil obsolete (or in a few species fugacious, when present not forming a distinct ring); pileus glabrous, at first incurved; stem cartilaginous, ringless, confluent with but heterogeneous from the hymenophorum.—HAB. All grow on the ground.

The species are almost all gregarious, caespitose, inodorous, with fugitive colouring, and not edible. Fries divides the subgenus into two groups, the *tenacious* and the *fragile*. *Psilocybe* corresponds with *Collybia*, Plate C. fig. 7; *Leptonia*, Plate CI. fig. 16, and *Naucoria*, Plate CII. fig. 23. The species figured is *Agaricus (Psilocybe) spadiceus*, Schæff. Spores $\cdot 0003'' \times \cdot 0002''$.

Subgenus 31. *PSATHYRA*, Fr. Epic. p. 231 (Plate CIII. fig. 31).—Spores dark purple-brown, approaching slate-colour; veil universal, fibrous, or absent, not forming a ring; pileus submembranaceous, conical or campanulate, margin at first straight and adpressed to the stem; stem fistulose, ringless, cartilaginous, fragile, confluent with but heterogeneous from the hymenophorum.—HAB. On the ground or rotten wood.

All are slender and hygrophanous, with fugitive colouring, and closely allied to the *fragile* species of the last subgenus. *Psathyra* agrees with *Mycena* (Plate C. fig. 8), *Nolanea* (Plate CI. fig. 17), *Galera* (Plate CII. fig. 24), *Psathyrella* (Plate CIV. fig. 34). The species figured is *Agaricus (Psathyra) corrugis*, Pers. Spores $\cdot 0005'' \times \cdot 0003''$.

Subgenus 32. *DECONICA*, subgen. nov. sp. *Psilocybis* Fr. (Plate CIII. fig. 32).—Pileus thin, plane, at first incurved; veil obsolete or adhering to the margin of pileus, not forming a ring; stem cartilaginous, hollow, confluent with but heterogeneous from the hymenophorum; gills decurrent.

The typical species figured is *A. (Deconica) physaloides*, Bull.; it is

analogous with *Omphalia* (Plate C. fig. 9), *Eccilia* (Plate CI. fig. 18), and *Tubaria* (Plate CII. fig. 25). Spores $\cdot 00034'' \times \cdot 0002''$.

Series V. COPRINARIÆ, Fr. Epicr. p. 234.—*Spores black*.

Subgenus 33. PANÆOLUS, Fr. Epicr. 234 (Plate CIV. fig. 33).—Veil, when present, interwoven, sometimes wanting; spores black, oval, plain, lemon-shaped, or echinulate; pileus somewhat fleshy, viscid when moist, shining when dry, not becoming purple or brown, *never striate*, the *margin exceeding the variegated gills*.—HAB. Almost all grow on dung, often near towns, in summer and autumn.

This and the following subgenus differ from all the preceding in their *black spores*, and occupy an intermediate position between *Agaricus* and *Coprinus*, agreeing with the latter in the colour of the spores, but joined more properly to the genuine Agarics by the *gills not deliquescing*. Although the veil may be entirely absent in some species, yet they are so allied that they cannot be well separated. It is, however, difficult to place this subgenus in proper connection with the foregoing, but I consider its nearest ally to be *Hypholoma*, Plate CIII. fig. 29, and the subgenera in corresponding places on the preceding plates, principally on account of the nature of the veil; and the margin of pileus exceeding the gills as in *Agaricus* (*Tricholoma acerbus*, Bull; some of the species are, however, allied to *Psalliota*, Plate CIII. fig. 26, and its congeners on the previous plates, with which it agrees well in several characters, such as the habitat, manured ground, etc.; this subgenus (like several others) would probably bear subdivision, which is not at present advisable. *A. phalænarum*, Fr., is said to be edible. The species figured is *Agaricus* (*Panæolus*) *separatus*, L. Spores $\cdot 0006'' \times \cdot 0004''$.

Subgenus 34. PSATHYRELLA, Fr. Epicr. 237 (Plate CIV. fig. 34).—Spores black, oval, plain or echinulate; veil inconspicuous, not interwoven, generally absent; pileus membranaceous, striate, margin straight, adpressed to the stem, *not exceeding the gills*; stem confluent with but heterogeneous from the hymenophorun; gills aduate or free.

The species are all very slender, and the only other subgenus with black spores (*Panæolus*, fig. 33) is readily distinguished by the characters of the pileus; it agrees in every point with *Psathyra*, Plate CIII. fig. 31, except the colour of the gills being never brown or purple, and the spores black. It also agrees, more or less, in structure with

Mycena, Plate C. fig. 8; *Nolanea*, Plate CI. fig. 17; *Galera*, Plate CII. fig. 24, and also appears to be allied to Genus III. BOLBITIUS, which, however, is at once distinguished by its coloured spores. The species figured is *Agaricus (Psathyrella) disseminatus*, P. Spores $\cdot 0003'' \times \cdot 0002''$.

(To be concluded in the next number.)

SHORT NOTES.

GENTIANA CAMPESTRIS, *Linn.*—Mr. Tucker, when recording recently an Isle of Wight station for *Gentiana campestris* (p. 160), speaks of having found his specimens on May 25, 1864, and I, to my surprise, discovered, on May 17th last, plants of this Gentian in flower in the neighbourhood of Plymouth. They occurred in two enclosed peaty pastures, a few miles from Plympton, on the borders of Dartmoor, in spots where the vegetation showed that the surface had not been broken for some years past, though a comparison with the neighbouring unenclosed land proved it to be not in its original state. In one of these pastures I noticed seven specimens of the Gentian, and these, with one exception, had each one or more flowers open, and most of them had buds also. One had white flowers, and furnished the only instance in which I have seen this variety in Devon. In the other pastures were four specimens, all in flower. In the former were many plants of *Botrychium Lunaria*, Sw., and two of *Orchis Morio*, L. The appearance of the Orchis there greatly surprised me, as, about Plymouth, I had previously seen it only on limestone; and even on this soil it is very local and uncommon in south-west Devon. *Gentiana campestris* is a rare plant in this district, as in addition to the station given above, I have seen it in only two other localities; on Roborough Down, and by the side of a road near Bickleigh. The former of these was recorded as a station for it, more than forty years ago, in Jones and Kingston's 'Flora Devoniensis,' and the latter I discovered a few years since, but at both I have seen the plant only in the autumn, and, on searching them (on May 19th last), could not discover a single specimen at either place.—T. R. A. BRIGGS.

VIOLA PAILLOUXII, *Jord.*—I have for some time been of opinion that the cornfield Pansy, of South Buckinghamshire, differed sufficiently from *Viola tricolor* and *V. arvensis*, Murray, to be worthy of

notice; and as Mr. J. G. Baker, who has kindly assisted me in comparing with his set of Jordan's specimens, concurs with me in identifying it with *V. Paillouxii*, Jord., a brief note upon its occurrence may be of interest. From true *V. arvensis*, as generally understood by British botanists, it may at once be distinguished by the size of the flowers, which are about $\frac{1}{2}$ in., sometimes more, across; while from *V. tricolor* it differs in the colour of the blossoms, the lower petal being yellow, the others usually cream-coloured, the two upper rarely slightly tinged with blue. This is pre-eminently the cornfield Pansy of the district, being abundant in cultivated ground, and especially luxuriant in clover-fields. *V. arvensis* is not unfrequent, but *V. tricolor* is rare, and uncertain in its appearance. Grenier and Godron (Fl. de France, i. 183) unite *V. Paillouxii* with *V. Sagoti*, Jord., as a variety of *V. tricolor*, and describe it as having "Ses pétales presque aussi larges que longs, et dont les deux supérieurs sont contigus par leurs bords;" this is the case in the fresh specimens now before me. *V. Sagoti* and *V. Paillouxii* seem to be scarcely separable even as forms; but it is with the latter, judging from Mr. Baker's specimens, that the Buckinghamshire Pansy is the more closely connected. I hope to collect specimens this summer for distribution through the Exchange Club, and shall be glad then to learn the opinion of other botanists upon the plant.—JAMES BRITTEN.

ERYSIMUM REPANDUM, L.—I found about half-a-dozen specimens of this plant, a native of the South of Europe and the Orient, in a grassy road between Acton and Turnham Green, in May last.—JAMES BRITTEN.

Reports.

RECENT ADDITIONS TO OUR MOSS FLORA.—PART II.

BY R. BRAITHWAITE, M.D., F.L.S.

(PLATE CIX.*)

POLYTRICHACEÆ.

1. *Atrichum angustatum*, Br. and Sch. vol. iv. *Polytrichum angustatum*, Bridel, Musc. Suppl.—Dioicous; male plants in separate

* This Plate will accompany the next portion of these Reports.

tufts, resembling *undulatum*, but smaller and more slender. Leaves narrower, with denser areolation, and a very narrow border, serrate only at apex, and with more numerous lamellæ. Capsule narrow, cylindraceous, straight or a little arched, purple; lid shining, dark purple, shortly rostrate.—Shady banks. Doune, in fruit (M'Kinlay).

2. *A. tenellum*, Br. and Sch. Bry. Eur. vol. iv. *Catharinea tenella*, Rohling, Ann. Wetter. Gesell. vol. iii. p. 234.—Dioicous. Stem short, dense leaved. Leaves elongate-lanceolate, scarcely undulate, smooth beneath, curled when dry; margin toothed in the upper half; lamellæ few, colour dull green. Capsule on a yellowish or pink pedicel, subcernuous, very short, oblong, fuscous; lid large, long beaked; calyptra scarcely hairy, persistent.—Sandy places and dried-up pools. Loch Goil head. Killin, Perthshire.

3. *A. crispum*, James in Sulliv. Ic. Musc. p. 73, tab. 46. *A. laxifolium*, Wilson, ms. (Plate CIX. fig. 1.).—Dioicous; much more slender than *A. undulatum*, with simple stems. Lower leaves small, somewhat spatulate; upper much larger, oblong-lanceolate, slightly undulate, border thickened, toothed; nerve reaching apex, scarcely lamellate; areolation larger, hexagonal or rounded. Capsule obovate-oblong, suberect or inclined, wide-mouthed; teeth very short, somewhat irregular; pedicel red.—Rowley Moor, near Heywood, Lancashire (Dr. Wood). Oakmere, Cheshire (Wilson). Sides of streams in the Saddleworth district. Rattle Brook, Dartmoor (Mr. Brent). The male plant only has been found in Britain; the fertile one has the leaves longer and more crisped, and was detected in New Jersey by James, and distributed in Sullivant and Lesquereux's 'Musci Boreali-Americani.'

1. *Polytrichum strictum*, Menzies, Trans. Linn. Soc. vol. iv. p. 77, tab. 5, fig. 1.—*P. juniperinum*, β . *strictum*, and γ . *alpestre*, Br. and Sch. Bry. Eur.,—is again raised to specific rank, having the stems more slender, very tenacious, densely matted, branched, closely interwoven with whitish tomentum. Leaves straight, erecto-patent, imbricated when dry, shorter and narrower, pale glaucous-green. Capsule shorter, cuboid, acutely angled, rufous-orange; calyptra brownish or white.

BUXBAUMIACÆ.

1. *Buxbaumia indusiata*, Bridel, Bry. Univ. vol. i. p. 331.—Resem-

bling *B. aphylla*, but the capsule is more erect, and not flattened on the upper surface, of uniform texture and yellowish-green colour, covered with a soft membrane, which ruptures on the upper surface, the margins rolling back, somewhat like the indusium of a Fern; annulus narrow.—Rotten trunks, and on the ground, principally in pine woods. Pannaich, near Ballater, 1847 (Mr. Cruickshank). Craigendinnie Hill, Aboyne, 1867 (Dr. Dickie and Mr. Roy).

DICRANACEÆ.

1. *Seligeria tristicha*, Bruchand Schimper, Bry. Eur. vol. ii. *Weisia tristicha*, Bridel in Schrad. Journ. Bot. p. 116, and Spec. Musc. p. 116. *Grimmia trifaria*, Web. and Mohr, Bot. Taschen. 1807. *S. trifaria*, Lindberg.—Monoicous; resembling *S. pusilla*, but the leaves in three ranks, straight, lanceolate-subulate, rather obtuse, short, the narrow nerve occupying the whole point; cells small, firm, lowest pellucid, upper dingy. Capsule somewhat spherical, with a swollen neck, truncate when dry, and the lid has fallen, yellowish-brown. Lid large, orange, with a long oblique acute beak.—Dripping calcareous rocks. Blair Athol. Glen Tilt and Ben-y-Gloe (Rev. J. M. Crombie).

2. *S. paucifolia*, Carruthers; Seem. Journ. Bot. Vol. IV. p. 39. *Bryum paucifolium*, Dickson, Pl. Crypt. Brit. fasc. 4. *S. calcicola*, Mitten; Seem. Journ. Bot. Vol. IV. p. 194. *S. subcernua*, Schimper, Musc. Europ. Novi, fasc. 1.—Monoicous, very small, gregarious, pale green. Stem very short, simple. Leaves crowded, erecto-patent, lowest minute, lanceolate, upper from a narrow oblong base, longly subulate, quite entire; nerve faint at base, gradually stronger, and occupying nearly all the subula; cells rectangular, hyaline; male flower at base of female. Capsule elliptic, somewhat inclined, small mouthed; lid with a long beak.—Near Wetherby, Yorkshire, on bricks (Dickson, 1801). On chalk nodules, Sussex Downs (Mitten). Professor Schimper, after an examination of Dickson's original specimens, confirmed the correctness of Mr. Carruthers' diagnosis, otherwise Mr. Mitten's name would stand, for certainly Schimper's reason for superseding it is not admissible.

3. *S. acutifolia*, Lindberg, ms.—Monoicous, very dwarf, deep green. Uppermost and perichaetial leaves from a sheathing base, abruptly narrowed into a very sharp pointed, fragile, crenulate, setiform subula, consisting of the nerve. Capsule on a very short seta, small, with the

orifice scarcely appearing above the tips of the perichæatial leaves, thin walled, pale and pellucid, shortly pyriform; teeth of peristome short; beak of operculum very short, scarcely oblique. β . *longifolia*; plants larger; capsule considerably exserted; beak longer and more oblique.—Buxton, Derbyshire, collected by Mr. Wilson in 1831. In a communication to the Linnean Society (Jan. 20th, 1870, which will be printed in the next number of that Society's Journal), Professor Lindberg thus characterizes a new *Seligeria*, having leaves like those of *paucifolia*, but in fruit resembling *S. pusilla*. The typical form is Scandinavian, and the variety β only has been found in this country.

1. *Dicranella fallax*, Wilson, ms. (Plate CIX. fig. 2.)—Dioicous, closely resembling *D. varia*. Leaves more distant, with impressed wings and less elongated setaceous points, and a more dilated, flattened nerve, uppermost subsecund. Capsule nearly symmetric, erect or subcernuous, with a shorter conical lid.—Banks. Fruiting in March and April. Anglesea (Wilson). Cotterall Wood (Mr. Hunt). Parkgate, Cheshire (Miss Jelly).

2. *D. curvata*, Schimper, Syn. Musc. Eur. p. 75. *Dicranum curvatum*, Hedwig, Spec. Musc. p. 132.—Resembling *D. subulata*. Stems short, bi- or tripartite. Leaves less elongated, with a shorter base, falcato-setaceous, obsoletely denticulate at apex; the perichæatial scarcely sheathing, diaphanous. Capsule on a brown peduncle, erect or a little curved, ovate-oblong, equal, more distinctly striated; lid with a broader base and a shorter, less curved beak.—Sandy banks. Llanberis (Wilson).

3. *D. heteromalla*, Sch., var. *sericea*, Sch. Syn. Musc. Eur. p. 76. *Dicranodontium sericeum*, Schimper, Musc. Eur. Novi, fasc. 1.—Plants taller. Leaves diverging almost on all sides, pale green or yellowish, often strongly and remotely toothed; entirely according with the typical form in structure. Fruit has been found in the Riesengebirge by Wichura; the capsules being rather long, and at last almost erect.—Soccoth Hill, Arrochar (McKinlay).

Ditrichum, Timm.—This genus was established on *D. pusillum*, by Timm, in 1788, in his 'Floræ Megapolitanæ Prodromus' (p. 216), which thus has four years' priority of Hedwig's *Didymodon pusillus*, and eight years over Schrader's *Trichostomum tortile*, of which it has been improperly made a variety instead of standing as the type; Hampe in the 'Regensburg Flora,' 1867, therefore withdraws his genus *Leptotrichum*,

in favour of *Ditrichum*. Besides the following British species, *D. pallidum* and *D. vaginans* are European.

1. *D. tenue*, Hampe, Flora, 1867, p. 182. *Trichostomum tenue*, Hedwig, Sp. Musc. (Plate CIX. fig. 3.)—Dioicous, dwarf, branched. Leaves from an erect base, patent or secund, narrowly lanceolate, uppermost lanceolate subulate; perichætical sheathing for half their length, quite entire. Capsule oblong, erect, or a little curved; lid conic, rostrate. β . *glaciale*; in long, broad tufts, with broader, erecto-patent leaves.—Canlochan and Mael Girdy, 1863 (Rev. J. M. Crombie). Clova (Mr. Fergusson). Tall, barren tufts, referred by Mr. Wilson to var. β .

2. *D. pusillum*, Timm. 3. *D. homomallum*, Hampe. 4. *D. flexicaule*, Hampe. 5. *D. glaucescens*, Hampe. 6. *D. subulatum*, Hampe (Plymouth, Mr. Holmes, 1868).

1. *Oncophorus strumifer*, Bridel, Bryol. Univ. p. 395. *Dicranum strumiferum*, Ehart. *Cynodontium polycarpum*, β . *strumiferum*, Sch. Syn. Musc. Eur. p. 62.—This is again to be restored to the rank of a species, as it differs from *O. polycarpus* in the capsule being more or less cernuous, constantly strumose at base, with a compound annulus, and in the leaves having papillæ only on the upper surface. I do not see how the name *Cynodontium* can be retained for these species, since it was established by Hedwig for *C. capillaceum* and *C. inclinatum* in 1801, which Professor Schimper in 1845 formed into the genus *Distichium*, and transferred the name *Cynodontium* to *Dilymodon Bruntoni*. As *O. polycarpus* and *O. strumifer* formed a part of Bridel's genus *Oncophorus*, and differ sufficiently in leaf-structure to be separated from *Dicranum*, I think it will be in accordance with the law of priority, to retain that genus, and leave *Cynodontium* for the species on which it was founded.

1. *Blindia acuta*, Br. and Sch., var. *trichodes*, Braithw. ms. *Dicranum trichodes*, Wilson.—This quite accords with *B. acuta*, in habit and in structure of leaf; the leaves, however, are longer and more falcate. Wet rocks near Bolton (J. Whitehead).

1. *Dicranum glaciale*, Berggren, Acta Univ. Lund. 1865. *D. arcticum*, Schimper, Musc. Eur. Novi, fasc. 3. *D. Starkii*, β . *molle*, Wilson, Bry. Brit. p. 74.—Monoicous, in wide tufts, without radicular tomentum, yellowish-green above, brownish below, erect, 2–5 in. high. Leaves erecto-patent, straight, glossy, lowest minute, lanceolate, nerveless, upper oblong at base, lanceolate-subulate, deeply concave, with the

margins inflexed, quite entire, basal angles auricled, orange; nerve narrow, compressed; perichæcial leaves sheathing, suddenly narrowed into a long subula. Capsule cernuous, cylindraceous, more or less incurved, strumose, not striate. Annulus simple; lid rostrate.—Alpine rocks. Ben Nevis (Wilson). Cairn Taggart and Loch-na-Neem, Clova (A. O. Black and Fergusson). Ben-y-Gloe (Rev. J. M. Crombie). Much more robust than *D. Starkii*, with more rigid, broader based leaves, almost tubular in the upper part, and a thicker walled capsule. Frequent in Greenland and Labrador. (Figured in 'Science Gossip,' vol. iii.)

2. *D. viride*, Sch. Musc. Eur. Nov. fasc. 3. *Campylopus viridis*, Sulliv. and Lesqx. Ic. Musc. p. 28, t. 17. *D. thraustum*, Schimper, ms.—Dioicous, in dull green, densely cushioned tufts, with ferruginous tomentum. Stem dichotomous, fasciculate leaved by those at the apex of the innovations forming a coma. Leaves ascending from a patent oblong base, lineal-lanceolate, subulate, quite entire, highly fragile, so that only the youngest can be found perfect. Nerve semiterete, broadish at base, running out into the concave subula. Areolation rectangular, highly chlorophyllose, laxer at base, and in the middle of it hyaline. Capsule erect, oblong; lid with a long beak.—Abbots Bromley, Staffordshire, on old oak rails, 1864 (Rev. A. Bloxam).

The above species was at first referred by Mr. Wilson to *D. strictum*, Schleicher, and afterwards to *D. fragilifolium*, Lindberg, but by Prof. Lindberg to *D. viride*. All three form a natural group of closely allied species; and after careful comparison with American specimens from Sullivant, with which ours quite accord in habit, I think both must be referred to one species, though, in the British examples, the upper cells are not so distinctly quadrate as in the American ones, from the cell walls being less incrassated. In neither do I find the beautiful chlorophyllose contents observable in the Finland specimens, distributed in Rabenhorst's 'Bryotheca,' n. 1061, and so well figured by Schimper (Musc. Eur. Novi, fasc. 3, tab. 1); nor are the longitudinal rows of hyaline cells, in the centre of the basal wing, so well defined as in that figure. In *D. fragilifolium* all the cells are narrower, and more elongated, with thin walls, and the nerve is broader.

3. *D. longifolium*, Ehrhart, Dec. Crypt. n. 114.—Dioicous, laxly tufted, soft, silky, pale or glaucous-green, ascending, repeatedly dichotomous. Leaves long, falcato-secund, lanceolate at base, becoming very

longly subulate, strongly serrulate above on the dorsum and margin; nerve thin, very broad, occupying all upper part of leaf; cells at base small, parallel, narrow, the alar cells lax, brownish. Perichaetial leaves very long, with a broadly sheathing convolute base. Capsule on a slender pedicel, elongato-cylindrical, erect, not striate, fuscous. Lid longly subulate, oblique, pale.—Granite rocks in the subalpine region. Maidenbower Crag, Dumfries, with *Grimmia patens* (Herb. Kew). Ben Lawers (Dr. Stirton). Clova (Fergusson). Mael Girdy (Rev. J. M. Crombie).

4. *D. circinatum*, Wilson, Bry. Brit. p. 76. *D. Dickieanum*, Wilson, ms. *D. asperulum*, Mitten. *Dicranodontium aristatum*, Schimper, Musc. Eur. Novi, fasc. 1.—Dioicous, in loose, irregular, deep green tufts. Stem repeatedly dichotomous, geniculate or ascending, 3 to 6 inches long, with radicles proceeding from the base of the leaves. Leaves very long, secund, arcuate, from an oblong, sheathing base, decurrent at angles, longly subulate, concave; nerve flattened, occupying $\frac{1}{2}$ of base, and all the subula, which is denticulate; base laxly areolate in the middle, with narrower cells at margin. Fruit unknown.—Ben Voirlich (Dr. Greville). Ben Nevis (M'Kinlay). Clova (Rev. J. Fergusson). Lennox Castle, Campsie (M'Kinlay). Loch Maree, etc. (Mr. Hunt). I have tried in vain to separate these, so far as British specimens are concerned; the Campsie specimens named *D. asperulum*, have caducous leaves, but this may be due to a drier habitat. *D. aristatum* has the upper half of basal margin incurved and sharply serrated, but I have not seen any agreeing in the back of the subula, with Schimper's figure, in which it is represented covered over with prominent points. It is possible we have not the true species, as Molendo states that his specimens are different. Mr. Mitten refers *D. circinatum* to *D. (Thysanomitrium) nucinatum*, of Harvey, in Hooker's Ic. Pl. Rar., which if correct, will remove it to the genus *Campylopus*.

D. albicans, Bruch and Schimper, Bry. Eur. *D. enerve*, Theden in Hartm. Skand. Flora.—Recorded by Mr. Mitten as a native, on authority of specimens from the late A. O. Black, which, though reputedly from Clova, are now believed to have been Swiss.

D. elongatum, Schwgr.—Mr. Hardy has published this in his 'List of Mosses of the Eastern Borders,' on authority of specimens collected at Hedgehope, one of the Cheviots. Having been kindly favoured with some of these, I feel bound to refer them to *D. fuscescens*, of which they are a form, with more entire leaves than usual.

(To be continued.)

New Publications.

The Student's Flora of the British Islands. By J. D. HOOKER, C.B., M.D., etc. etc. London: Macmillan and Co. 1870. (Pp. 504.)

It is only three years ago that Professor Babington published the last edition of his 'Manual,' and a second edition of Mr. Bentham's 'Handbook' bears date 1866; Dr. Boswell-Syme's great descriptive 'English Botany' is nearly completed, and there is still a demand for older and less standard books. Yet we have here another claimant for public favour in the already well-trodden path. Dr. Hooker tells us in the preface that the object of his book "is to supply students and field botanists with a fuller account of the plants of the British Islands than the manuals hitherto in use aim at giving;" and, with the view of carrying out this object, he has made use of most of the available sources of information. The last edition of the 'London Catalogue' being taken as a basis for the "number and kinds of plants composing the British Flora proper," very good descriptions—to a great extent original, but compared throughout (except in the Grasses) with Boswell-Syme's—have been added. The indications of area and range of altitude in these islands are extracted from Mr. H. C. Watson's well-known publications (though expressed in the manner adopted by A. Gray, in his 'Manual of the Botany of the Northern United States'), and from Moore and More's 'Cybele Hibernica;' whilst the extra-British distribution, though in part independently worked out, has been largely supplemented by Mr. H. C. Watson's 'Compendium of the Cybele Britannica.' Dr. Hooker has added estimates of the number of genera in the Orders, and of species in the genera (compiled chiefly from the Kew herbarium), the utility of which would be considerable, if we could be sure that such grades were intended to have the same value when applied to the plants of the world as is given to them in the 'Student's Flora.' The scientific names are all accented, and there are also short indications of the affinities of the natural families, and usually of the etymology of the generic names. Though none of these points are novelties in a British Flora (unless the affinities be so), yet all have not been hitherto combined in a single manual, nor presented in so well-digested a manner; the result of so

uniting them is a most useful and comprehensive text-book. In the critical genera *Rosa*, *Rubus*, and *Hieracium*, Dr. Hooker acknowledges Mr. Baker's assistance. Professor Oliver and General Munro are also thanked for help.

The arrangement of the Natural Orders is the one usually adopted, with, however, some modifications; an excellent synopsis is prefixed to the Flora. The chief deviations from the grouping commonly in use in English manuals are these: *Portulacææ*, *Paronychiacææ* (including *Scleranthus*), *Tamariscinææ*, *Ilicinææ*, and *Empetracææ*, are placed in the *Thalamifloræ*; *Acerinææ*, *Droseracææ*, and *Cornacææ* are found with the *Calycifloræ*; and *Loranthacææ* is grouped with the *Apetalææ*. In this last subdivision we also find *Euphorbiacææ* and *Ceratophyllum*, whilst *Callitriche* is retained in the *Haloragææ*, an Order Dr. Hooker thinks nearer to *Saxifragææ* (in which he includes *Parnassia* and *Ribes*) and *Rhizophoreææ* than to *Onagrariææ*. In several of these points the 'Student's Flora' differs from Mr. Bentham's 'Handbook;' and it is somewhat remarkable that neither author, in their British manuals, should have employed the polypetalous subdivision *Disciflorææ* of their 'Genera Plantarum.' The monocotyledonous Orders require a further grouping; a student would certainly not be able, by the present conspectus, to discover a *Lemna* or a *Typha*, for he would scarcely look under *Petaloidææ* for them.

Many of the small genera are reduced to sections of larger ones, and some of the latter are still further divided into subsections more or less natural. *Ranunculus auricomus* and *R. sceleratus* are strange companions. Not a few species of the 'London Catalogue' become subspecies in the 'Flora,' but in British botany Dr. Hooker seems far less inclined to mass together distinct forms than is Mr. Bentham. All the subspecies and varieties in the 'London Catalogue' and Syme's 'English Botany' are noticed under the superspecies, and briefly characterized in well-chosen terms. One is a little astonished at finding such critical plants as *Ranunculus Lenormandi* and *Arabis ciliata* ranking as full species, whilst all the other *Batrachium*s (except *hederaceus*) are massed under *Ranunculus aquatilis*, and all the *Arctium*s under *A. Lappa*.

The nomenclature of the species has had much care bestowed upon it, and several changes of name have resulted, partly from the abolition of small genera, but also from the adoption of earlier appellations. The

leading synonyms are usually given, but no figures are quoted; and a marked feature of the book is the almost total absence of any reference to other published matter. Very few English names are given, and those only such as are in common use. The following are some of the principal alterations from the nomenclature of the 'London Catalogue':—*Cardamine flexuosa*, With., for *C. sylvatica*, Link. *Potentilla salisburgensis*, Hänke, for *P. alpestris*, Hall. *Poterium officinale*, Hook. f., for *Sanguisorba officinalis*, L. *Carduus pycnocephalus*, Jacq., for *C. tenuiflorus*, Curt. *Crepis hieracioides*, W. and K., for *C. succisaefolia*, Tausch. *Myosotis lingulata*, Lehm., for *M. caespitosa*, Schultz. *Scrophularia alata*, Gilib., for *S. Ehrharti*, Stev. *Lanium hybridum*, Vill., for *L. incisum*, Willd. *Statice auriculæfolia*, Vahl, for *S. bivervosa*, G. E. Smith. *S. reticulata*, L., for *S. caspia*, Willd. *Rumex acutus*, L., for *R. pratensis*, M. and K. *Atriplex laciniata*, L. Herb., for *A. arenaria*, Woods. *Spiranthes Romanzoviana*, Cham., for *S. gemmipara*, Lindl. *Epipogium Gmelini*, Rich., for *E. aphyllum*, Sw. *Eleocharis parvula*, Hook., for *Scirpus parvulus*, R. and S. *Agrostis australis*, L., for *Gastridium leudigerum*, Gaud. There is much to be said for and against most of these changes, and we may return to the subject on another occasion.

Dr. Hooker has not committed himself to any original opinions on the vexed question of what are indigenous and what naturalized species in this country, but is contented to adopt the views expressed by the 'London Catalogue' as it stands; the only deviation from this is the admission, as was done by Mr. Bentham ('Handbook,' p. 81), of *Claytonia perfoliata*. The selection of this species is remarkable, and our two leading botanists must have met with it much more frequently than the writer of this, who, in a rather extensive course of investigation round London, has only once seen it, and that in a spot where it has since become extinct. *Allium carinatum*, L., is also added as a native, on the faith of the Newark locality (see Journ. of Bot. Vol. V. p. 314, and Vol. VI. p. 69); this has since been found by Dr. Boswell-Syme in Perthshire, but is perhaps an introduction. An appendix gives a list of about 230 species "excluded" on various grounds. This is not an altogether satisfactory portion of the Flora, though the short sentence affixed to each species is usually happily worded. Some are potentially a portion of our indigenous vegetation, though probably extinct, e.g. *Echinophora spinosa* and *Vicia lavigata*, both

stated to be "never confirmed," but of which specimens exist in several of the older herbaria. *Silene italica* is probably native at Dartford; and other species, such as *Trifolium stellatum*, *Melilotus parviflora*, *Nardosmia fragrans*, and *Amaranthus retroflexus*, are now, in different ways, so well naturalized in England, that they are better placed in the body of the text, though distinguished by different type from the bulk of the Flora. A third class might be well omitted altogether, being undoubted errors, and the mystery once surrounding them entirely dissipated, e. g. *Buffonia* and *Typsa minor*.

The following extracts contain matter of interest to British botanists:—

Barbarea præcox. "I suspect it is a cultivated form of *B. vulgaris*" (p. 23).

Draba rupestris. "The Ingleborough plant, gathered by Sir W. Hooker and referred to by Syme (Eng. Bot. i. 103), is a small state of *D. incana*" (p. 32.)

Lythrum Salicaria. "Of those growing by the Thames at Kew, the long-styled is glabrous, slender, with small narrow leaves and bright flowers; that with very short styles is a large, coarser, very pubescent plant, with dull purple flowers" (p. 147).

Hedera Helix. "The so-called Irish Ivy, with broad, rather fleshy leaves and 8-rayed stellate hairs, is a doubtful native of Ireland. Var. *Hodgensii*, another doubtfully native Irish form, has deeply 5-7-lobed leaves and 12-15-rayed scaly hairs" (p. 172).

Carduus heterophyllus. "*C. Carolorum*, Jenner, is a hybrid with *C. palustris*" (p. 193).

Cuscuta Trifolii, Bab. "Does not seem entitled to subspecific rank. Mr. E. T. Bennett has sent me, from Hazlemere, specimens of the two forms grown upon Heath, one with pink flowers and reddish anthers, and the other (*Trifolii*) with white flowers and yellow anthers, the scales in both three-fourths the length of the corolla-tube" (p. 246).

Orobanchè major, L. "*O. Rapum*, Thuill. I take this to be the *O. major* of Linnaeus, who states that it is parasitic, especially on *Leguminosæ*, and quotes for it the *Rapum genistæ* of Lobel. There are no specimens in Linn. Herb." (p. 275).

Pinguicula grandiflora. "Apparently a subspecies; the Irish is an extreme form; alpine and Pyrenean intermediates are numerous" (p. 297).

Salicornia radicans, Sm. "Erroneously referred to *Arthrocnemum fruticosum* by Moquin-Tandon in DC. Prod. . . *S. megastachya*, Woods, with tubercled hairless seeds . . . is possibly an *Arthrocnemum*" (p. 321).

"*Salix Grahami*, Borr. ms. (Baker in Seem. Journ. Bot. 1867, p. 157, t. 66), is a plant only known from female specimens cultivated in the Edinburgh Bot. Garden, said to have been brought by Professor Graham from Frouvyn in Suther-

land (Baker and Syme are mistaken in supposing that any of Borrer's specimens are indigenous). It appears to me to be a form of *S. Myrsinites* . . . and not at all allied to *S. polaris* or *herbacea* . . . The Eng. Bot. figures of the ovary and scale are very incorrect" (p. 341).

Carex saxatilis, L. "I cannot escape the conviction that this totally different-looking plant . . . is an alpine form of *C. vesicaria*, to which var. *Grahami* forms a passage" (p. 421).

From these passages it will be seen that the author has investigated many disputed points, and arrived at conclusions of his own. A general and extended search through published information would have rendered the book more uniformly exact, and saved the author from such errors as the repetition of the Guernsey "*Diplotaxis viminea*" (p. 31), which is known to have been nothing but small *D. muralis*. Of a similar nature is the statement (p. 396) that *Wolffia arrhiza* occurs in Hants (a misprint for Kent in the Compendium Cyb. Brit., whence it is copied into the 'Student's Flora,' though corrected in this Journal, Vol. VII. p. 368); and this (p. 475), that *Pæonia* has been known on Steep Holnes Island since Ray's time, when there is no record that it was discovered there till 1803 by Mr. Wright (see Eng. Bot. 1657).

But though a minute criticism is able to detect some small errors of this sort (which can be readily weeded out for a second edition), the general style of the book is very accurate. The 'Student's Flora' is a decided advance on its predecessors in the same line; its author has, by bringing into conjunction the best features in them, whilst, at the same time, getting rid of a great amount of irrelevant and useless matter with which some text-books were encumbered, created as it were a new starting-point for future British Floras. The simple language and clear, terse style of the book render it very well adapted to the class for whom it was specially written; and we cannot but express a hope that leisure will be found in the author's busy life to carry out his original design, as novel as valuable, of a physiological and morphological record of the British flora.

A Revision of the Flora of Iceland. By CHARLES C. BABINGTON, M.A., F.R.S. (In the 'Journal of the Linnean Society, Botany,' vol. xi. pp. 282-348.) 1870.

A revised catalogue of Icelandic plants was still a real *desideratum*

in botany; and fortunately the work has been here taken in hand by a botanist of matured experience, who had himself visited that island before devoting his attention to its flora, and who has long been practically familiar with most of its plants in a living condition, as identical species native also in the British Islands. Add to these advantages a careful examination of the scattered and not very accessible literature relating to his subject, and it will be apparent that Professor Babington must have been better prepared to execute the work, than any other English botanist is at all likely to be prepared for a critical examination into the results of the learned Professor's labours. So far as an opinion may be given under the less practical advantages, this 'Revision' will be thankfully accepted by botanists, as much the best and most reliable Flora of Iceland which has yet come before them. Even with all the pains taken to ensure completeness and accuracy, the author of the 'Revision' has overlooked a valuable paper by Rottböll, read before the Copenhagen Society so early as 1766 and 1767, and published in its Transactions in 1770. This, which includes figures and descriptions of about 20 new or rare Icelandic plants, is a paper much too good in itself to have been willingly left unnoticed.

After discarding from the list many species which had been recorded as Icelandic plants by other botanists and travellers, the plants admitted into the revised Flora, although not always with full trust, now number up to 467 flowering plants and Ferns; cellular plants not entering into the list. The rejected species are rather inconveniently spread through the general catalogue, being retained in their technical places; but being distinguished by the absence of prefixed numerals in the series, and by the usual angular enclosures, they are thus made separable enough, though not actually separated. These interpolated rejections count up to about threescore; say, to eleven per cent. of presumed errors, without any very rigorous weeding out.

The author seldom ventures to explain decidedly his own grounds or reasons for rejecting or for accepting species. - Among the doubtful plants, either way, his selection appears to have been guided chiefly by their presumed climatal adaptations, or their known distribution elsewhere in Northern Europe; occasionally, too, on other considerations, as the credibility of the evidence or the likelihood of misnomers. Though the question is simply one of fact either way, "Does this species grow in Iceland, or does it not?" yet the fact must rest on tes-

timony which may itself be insufficient to convince, or be suggestive of error. Differences of opinion are inevitable under such circumstances; and probably we might have rejected some of the plants which Professor Babington retains in the list; while in very few instances should we have kept in the plants which are discarded by him. *Digitalis purpurea*, *Geranium phœum*, *Sedum album*, *Hedera Helix*, *Salix purpurea*, and some others seem little likely to be really native in Iceland. But perhaps the most remarkable case of acceptance and rejection, is that of our two Heaths, the *Erica cinerea* and *E. Tetralix*. Both are on record for Iceland, testified by different observers, and said to be found in different localities, *Tetralix* in the "lava districts," and *cinerea* "in various places." The former is accepted into the regular Icelandic list, while the latter is rejected; no reason being assigned in either case. Both occur in the more southern parts of Norway; both extend to Shetland; and they ascend our Highland mountains to nearly equal elevations, *Tetralix* rather the higher. But the *cinerea* alone occurs in the intermediate group of Faroe Isles, and thus comes geographically nearest to Iceland; yet it is the rejected species. Likely enough Professor Babington had himself some reason for making a distinction between them which seems almost whimsical while unexplained.

A correct Flora of Iceland was highly desirable, because the geographical position of that island gives it an intimate relation with certain phyto-geographical and phyto-geological theories about the migrations of arctic plants southwards, and their gradual re-migration northwards, during and subsequent to the glacial period in geologic history. It is a sort of link or stepping ground, too, between Scandinavia and boreal America; and the affinities of its flora, scanty though it be in number of species, have considerable interest through that intermediate position. It has not been within the author's plan to enter upon these matters, which might have unduly expanded his 'Revision' into a volume, instead of it being kept to the dimensions of an article in a Society's journal.

But the author does slightly touch upon the geographical relations of the flora treated, by presenting to his readers a separated "List of Icelandic Plants not Natives of Britain;" and in that list he specially adds to the name of each plant enumerated the words "Scandinavian," "European," "Arctic and Lapland," or other brief intimation

of habitat elsewhere, all of them *easterly*; while the close proximity of Greenland seems only to have suggested the unexpressed notice so often made conspicuous in the streets of London, "No connexion with the establishment next door." As the lines used for the list of non-British plants are none of them full length, the further addition of the words "Greenland" or "America" might have been made to show *westerly* range likewise, and without adding a single line to the length of the paper. The author himself tells us that Iceland is 600 miles from western Europe, that is, from Scandinavia and Britain, but only "60 miles from the ice-bound coast of Greenland."

The "List of Icelandic Plants not Natives of Britain" includes 62 names. It appears to have been rather hastily copied out, as it enumerates two which *are* natives in Britain, and omits several which are *not* natives of this island, if Professor Babington's own 'Manual of British Botany' is to be received in evidence. Thus, it is strange to see the author of that 'Manual' placing *Draba muralis* and *Sedum villosum* among plants which are "not natives of Britain." To the following nine names, all excluded from the list of non-British plants (and thus treated as if all belonging to plants certainly native to this country), we will add the evidences afforded by the most recent edition of the 'Manual':—*Archangelica officinalis*, "not a native;" *Peucedanum Ostruthium*, possibly introduced [sign of]; *Carum Carui*, little or no claim [enclosure for]; and *Antennaria alpina*, *Salix glauca*, L., "not of Sm.," *Kobresia scirpina*, *Carex microglochin*, *C. chordorrhiza*, *C. loliacea* not in the 'Manual.' We leave the Professor himself to reconcile the 'Revision' and 'Manual' one with the other.

The Faroe group is a halfway habitat between Scotland and Iceland, wanting the snow-clad mountains of the latter. Few only of the 62 (or 69) Icelandic plants which are non-British extend to Faroe. *Ranunculus glacialis*, *R. nivalis*, *Arabis alpina*, *Kœnigia islandica*, *Salix glauca*, *Kobresia scirpina*, are included in the list of Faroe plants, as given by Professor Martins; with two or three others which are neither British nor Icelandic. As enumerated in the list by Professor Martins, the plants of Faroe amount to 293; the total surface of the islets being far less than that of Iceland.

The Greenland flora also is small, by comparison with the flora of Iceland, notwithstanding the wide extent of that dreary land, reaching southward to the latitude of the Shetland Isles; thus being in imme-

diate northerly succession to our own flora, only placed to the westward. According to Dr. Hooker's very useful tabular summary of the Arctic flora, the plants of Greenland are barely 300. Among these, upwards of 200 are plants found in Iceland. Of the other 100 or less, only about a score are American, not native in Europe. It is curious thus to find the line of severance between the American and European floras in that narrow space of 60 miles between Iceland and Greenland. By climate and flora, the former is an outlier of Europe. By the same test, America begins with Greenland.

This is not the place to go into critical details about the species, but we will venture to extend our notice by one extract, selected on double grounds; partly, because it relates to a plant likely soon again to stimulate discussion among English botanists; partly, as an example of those strange inadvertencies which will sometimes escape an author's correction while reading his proofs:—"5. RANUNCULUS REPTANS, L." . . . "Baring-Gould records *R. Flammula*; but his specimens and written information showed that he really gathered *R. reptans*. The authority which he followed considered them to be forms of one species. Apparently that idea has arisen from small states of *R. Flammula* being mistaken for the *R. reptans*. The plants seem to be abundantly distinct. Good figures of *R. reptans* will be found in the title-page of Sibthorp's 'Flora Scotica,' etc. Of course our author intended to write *Lightfoot's* 'Flora Scotica.'

Botanical News.

The Report for 1869 of the Curator (Dr. Boswell-Syme) of the "Botanical Exchange Club" is in the hands of the printer, and will shortly be issued to the members.

We are glad to see, from the "Report of the East Kent Natural History Society," that the collection of material for a Flora of their district is being vigorously carried on.

The Report for 1869 of the Director (Dr. R. Schomburgk) of the Adelaide Botanic Gardens, contains some valuable information on economic species suitable for cultivation in South Australia.

We have received the First Annual Report of the "American Museum of Natural History," lately established in Central Park, New York. The Committee have purchased, amongst other collections, those of Prince Maximilian of Neuwied, consisting of more than 600 specimens of vertebrata; and a selec-

tion from the Verreaux and Vedray collections in Paris. It does not appear that the formation of a herbarium is part of the scheme.

Dr. Wirtgen, of Coblenz, is about to publish a third edition of his 'Herbarium Ruborum Rhenanorum,' which is to consist of 100 specimens, and is offered at the low price of 16s.

We learn that a new edition of Dr. Prior's work on the 'Popular Names of British Plants' is in active preparation.

The Report of the Rugby School Natural History Society for 1869 contains the following additions to the flora of the district:—*Ranunculus trichophyllus*, *Barbarea intermedia*, *Lactuca muralis*, *Linaria Pelisseriana* (as a casual), and *Ophioglossum vulgatum*. New localities are given for *Erodium cicutarium*, *Valerianella dentata*, and *Campanula hybrida*.

The volume of 'Transactions of the Woolhope Naturalists' Field Club' for 1869, just issued, is all that such a periodical should be. In botany, besides Mr. Worthington Smith's "Clavis Agariciorum," which has appeared in our pages, there are papers by Dr. Bull, Mr. Lees, and the Rev. A. Gray, and many short notices of localities. The volume is illustrated with photographs of two celebrated Oaks, and with coloured drawings of *Saponaria Vaccaria*, found in a field of vetches by C. G. Martin, Esq., near Widemarsh Common, Hereford, and of several Fungi.

Mr. J. Collins, Curator of the Pharmaceutical Society's Museum, has been elected a Corresponding Member of the "Société de Pharmacie" of Paris.

Died, on the 2nd of November, 1869, Armand Thielens, a zealous Belgian botanist, and contributor to the Bulletin de la Soc. Bot. de Belgique.

The 'Botanische Zeitung' publishes an obituary of J. D. W. Bayrhammer, a well-known Cryptogamic botanist, who was born at Frankfort-on-the-Maine, and died at Lorch, December 17th, 1868. He commenced life as a printer; went to Greece, where he set up a printing press on the island of Chios, but in consequence of the Turko-Grecian war returned to Germany, where he published several papers on Mosses, Lichens, and other Cryptogams.

Died, on the 28th of April, Prince Anatol Demidoff, well known as a liberal patron of science, and by his travels in Southern Russia, the botanical results of which were published by Leveille and A. Brongniart. A catalogue of his gardens was published by Planchon, under the name of 'Hortus Donatensis.'

The 'Times' records the death, at the age of 75, of Baron Charles von Hügel, Austrian Plenipotentiary at the court of Belgium, and well known as an Australian explorer and founder of the Horticultural Society at Vienna. The sad event took place on the 2nd of June, at Brussels. Baron von Hügel was author of 'Botanisches Archiv der Gartenbaugesellschaft des Oesterreichischen Kaiserstaates,' Wien, 1837; and of 'Orchideensammlung in Frühjahr 1845,' Wien, 1845, which enumerates 1080 species; and some of the plants collected by him in Australia in 1833 were enumerated and the new species described by Bentham, Fenzl, Schott, and Endlicher, in the unfinished 'Enumeratio Plantarum quas in Nov. Holl. collegit C. L. B. de Hügel,' Vienna, 1837.

COMMUNICATIONS have been received from T. R. A. Briggs, A. Britten, Hon. J. L. Warren, H. C. Watson, J. Sadler, H. F. Hance, G. C. Churchill, J. Boswell-Syme, Rev. J. M. Crombie, W. G. Smith, etc.



Original Articles.

IS THERE A SECOND EUROPEAN HYDROCOTYLE?

BY BERTHOLD SEEMANN, PH.D., F.L.S.

In publishing my revision of the *Hederaceæ* I was compelled to omit *Hydrocotyle*, as several species of that genus had been so insufficiently described, that nothing but an inspection of authentic specimens could set the matter to rights. One of these was the European *H. pleiantha*, Cesati, in *Linnaea*, xi. p. 313. From the description it would seem to be a form intermediate between *H. vulgaris*, L., and *H. verticillata*, Thunb.; and as none of the specimens of these two species which I had an opportunity of examining furnished any characters which would obliterate the boundary between the two, I was naturally anxious to see authentic specimens of *H. pleiantha*. Professor Caruel, of Florence, the distinguished author of the 'Flora of Tuscany,' was good enough to send me specimens which he believed to be Cesati's *H. pleiantha*; but all of them proved to be mere forms of *H. vulgaris*. In April last I was fortunate enough to obtain from Baron V. Cesati himself, who is now Director of the Botanic Gardens at Naples, an authentic specimen of his *H. pleiantha*; and, in sending it to me, he pointed out that in the diagnosis of the leaves the words "minutissime denticulati" should be substituted for "perfine denticulati." This specimen and the diagnosis published establish the identity of *H. vulgaris*, L., and *H. pleiantha*, Ces., and also show that there is, as far as *H. pleiantha* is concerned, no transition between the European *H. vulgaris* and the American, African, and Australasian *H. verticillata*.

I have gone closely into the question of identity between *H. verticillata* and *H. vulgaris*, and have examined every specimen contained in the public herbaria of this country. The conclusion arrived at is that, though the two species are close together, they do not coexist in the same geographical area, and have several distinguishing characters. *H. vulgaris* has the petioles generally hairy towards the top, *the leaves never more than 9-nerved*, the fruit generally emarginate at base, and, when approaching maturity, covered with purplish or blood-red blotches and dots. *H. verticillata* has leaves always 11-nerved, gla-

brous petioles, and uniformly brown fruit, never emarginate at base. The leaves of even the most luxuriant specimens of *H. vulgaris* never have more than 9 nerves.

The geographical range of the two species is very different. *H. vulgaris*, notwithstanding its name, is a very local plant, not found out of Europe. I have seen it from Scotland (Gillies!), England (Leighton!, Sowerby!, E. Forster!), Wales (Newbould!), Jersey (Newbould!), France (Billot! n. 2853), Germany (Seemann!), Switzerland (Herb. Mus. Brit.), and Tuscany (Savi! Cesati!). Babington enumerates it in his Icelandic list. *H. verticillata*, on the contrary, has a wide range, being spread over three continents. I have seen specimens from the Cape of Good Hope (Wallich!, Roberts!, Lind!), Virginia, Carolina, Massachusetts, and California (Mitchell!, Beyrich!, Green!, Chamisso!), Jamaica (Swartz!), Gibbs' Land and New South Wales (R. Brown!, F. Mueller!). The United States Exploring Expedition collected it also in the Sandwich Islands.

The conclusions which my materials and study of *Hydrocotyles* allow me to draw are—

1. That *H. pleiantha* and *H. vulgaris* are identical.
2. That Europe has only one species of *Hydrocotyle*, viz. *H. vulgaris*.
3. That *H. vulgaris* is specifically different from *H. verticillata*, Thunb. (*interrupta*, Mühl.), and does not coexist in the same geographical area with *H. verticillata*.
4. That *H. vulgaris* is limited to the European continent; and
5. That *H. verticillata* is spread over the three continents of America, Africa, and Australasia.

DE NOVA PYGEI SPECIE.

AUCTORE HENR. F. HANCE, PH.D.

Pygeum oxycarpum, sp. n.; arbor 70–80-pedalis, ramis brunneo-cinereis ruguloso-striatis, ramulis compressiusculis, stipulis glabris linearibus caducis, foliis petiolo $\frac{1}{2}$ – $\frac{3}{4}$ -pollicari utrinque paulo infra limbi insertionem glandula conspicua depressa (altera vel utraque

nunc obsoleta) prædito suffultis coriaceis glaberrimis elliptico-oblongis basi obtusiusculis apice acuminatis margine anguste spinuloso-serratis supra saturate viridibus splendentibus venisque obscure elevatis infra pallidioribus magis opacis venisque primariis teneris utrinque 7-8 ante marginem arcuato-confluentibus paulo prominulis 5-7 poll. longis 2-3 poll. latis, racemis axillaribus 1-3-nis petiolo 2-3-plo longioribus densifloris floribus adhuc inexpansis amenta immatura referentibus bracteis orbiculatis sericeis deciduis obvallatis, rachi crassa tomentosa, pedicellis crassis calyci æquilongis, floribus 5 lin. diametro, calycis cyathimorphi lobis ovatis obtusis ciliatis, petalis orbiculatis glabris parce ciliatis lobis calycinis duplo longioribus, staminibus circ. 30 biseriatis disci intus lutei margini sublibero insertis filamentis filiformibus antheris luteis, ovario glabro, stylo crasso tubum calycinum vix superante stigmatate capitato, fructu glaberrimo oblique ovoideo-oblongo acuto pollicari ante plenam maturitatem tantum coriaceo tunc vero carne tenui atro-purpurea prædito putamine cartilagineo vasibus anastomosantibus haud prominulis percursu secus faciem leviter sulcato.

In silva juxta cænobium buddhicum, infra verticem montium Pakwan, urbem Cantonem supereminens, floriferum ineunte Octobri 1869, fructiferum Martio, Aprili 1870, invenerunt Sampson et Hance. (Exsicc. n. 16424.)

Arbor procera, nobilissima, ampla foliorum lucidissimorum coma superbiens, innumerisque florum racemis suavem *Cratægi* nostratis odorem late spargentium exornata. Folia aquæ fervidæ immersa odorem olei amygdalarum essentialis halant: druparum caro parca sapore amaricato dulciculo cerasorum silvestrium gaudet; nucleorum gustus amygdalis amaris simillimus.

Species valde notabilis, foliis serratis fructuque vere drupaceo a ceteris congeneribus discedens, transitum directum in *Prunorum* genus molitur, limitesque bina inter genera vix non obliterat: diu profecto dubius hæsi numne potius eam *Laurocerasorum* agmini adnumeraverim; sed, omnibus rationibus ad trutinam revocatis, putamen cartilagineum lancem magis *Pygeam* versus deprimere ceuseo.

= *Prunus oxycarpus* Max. =

ON A NEW FORM OF MYOSOTIS FROM SUSSEX.

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

I have known for many years that there was a *Myosotis* in Sussex of the *Fugaces* group, that differed both from *M. collina* and *M. versicolor*. I received specimens of it about fifteen years ago, under the name of *M. stricta*, but soon found that neither did it coincide with that species. This year Mr. Mitten has again drawn my attention to the plant, and has taken the trouble to visit the locality where it is found, Danny sandfield, near Hurstpierpoint, and has sent me, at two different times, a box of living specimens in various stages of growth, along with living plants, for comparison, of *M. collina* and *M. versicolor*, with both of which he has compared it through a long course of years. There are good specimens in Mr. Borrer's collection at Kew, gathered in 1845, which are labelled, with marks of quotation, "*stricta*?" As I cannot make out that the plant has any name already, I propose to call it *Myosotis collina*, var. *Mittenii*, and give the following description, which is taken from Mr. Mitten's two batches of living, and from Mr. Borrer's dried specimens:—

Rootstock none. Stems caespitose, in luxuriant examples 5 or 6 produced from the crown of the root, $1\frac{1}{2}$ –2 inches high in the flowering stage, stretching out to 5 or 6 inches finally, the grey hairs dense towards the base, all erecto-patent. Leaves moderately grey-hispid on both surfaces, the lower ones under an inch long, oblong-spathulate with a distinct haft; those of the stem shorter, oblong, nearly or quite sessile. Raceme 6–12-flowered, reaching down nearly to the base of the stem, the lowest flower, or frequently the two lowest, with distinct leaf-like bracts, in the final stage 2–3 inches long, the lowest flowers 6–9 or even 12 lines apart. Pedicels in the fruiting stage erecto-patent or a little curved, quite as long as the calyx, the hairs all adpressed. Upper flowers nearly sessile. Calyx $1-1\frac{1}{4}$ line deep, the linear teeth twice as long as the campanulate tube, the grey bristles of which are all patent or the lowest deflexed. Corolla not more than half a line across when expanded, very pale blue with a yellow throat, the tube slightly exerted, slightly longer than the expanded limb. Fruit calyx open, under an eighth of an inch long.

The general habit and vestiture is quite that of *M. collina*, from which this form differs principally by its smaller, paler corolla, with

a slightly exerted tube, and by the raceme reaching lower down upon the stem, and having 1 or often 2 of the flowers bracteated. *M. versicolor*, which our plant resembles closely in its corolla, has a raceme decidedly separate from the leaves, shorter pedicels, narrower, sharper leaves, and a longer calyx with less spreading hairs. *M. stricta* may readily be known from both the other species by its much shorter pedicels, the lowest of which are not more than a third of the length of the calyx in the fruiting stage, and ascend with much uniformity, so as to give the whole inflorescence that regularity and rigidity of habit from which the plant takes its name. There is a plant from Portugal, under the name of "*Myosotis chrysantha*, Welwitsch, Herb.," in the Kew collection, which comes very near the Sussex one, but it has shorter pedicels, a shorter calyx, with more copious spreading bristles, and a bright yellow flower, as large as in the ordinary form of *M. collina*.

A NEW PITCHER-PLANT FROM CENTRAL AMERICA.

(*MARCGRAVIA NEPENTHOIDES*, Seem.)

BY BERTHOLD SEEMANN, PH.D., F.L.S.

Marcgravia nepenthoides, Seem., n. sp.; foliis fertiliis ramorum brevipetiolatis ovato-ellipticis attenuatis basi acutis, supra venis obscuris, subtus venis prominulis; racemis terminalibus, umbellatis, pendulis, 25-floris; pedicellis 5 interioribus ("bracteis" auct.) erectis cucullatis flores steriles gerentibus, cucullis obovatis; pedicellis 20 exterioribus patentissimis, flores normales nutantes gerentibus; sepalis lunulatis, obtusissimis; corolla conica; staminibus circiter 25; ovario 10-12-loculari. Mountains of Chontales, Nicaragua (Seemann! n. 9).

As long as the *Marcgravia*s preserve their sarmentose habit, they have a peculiar set of leaves and never flower; but on advancing in age they assume quite a different habit and look, producing non-rooting branches, and often becoming erect shrubs or even trees, and in that stage they flower freely. The species here described attains 20 feet in height, and has quite a bushy crown, bearing numerous pendulous umbelliferous racemes, which have as many as 25 pedicels, the inner five of which form pitchers about the size of those of *Cephalotus*, but much more fleshy and substantial, and of a green colour, blotched with dull reddish-brown, bearing on the apex abortive flowers, and

proving that these flower-bearing organs are not bracts, as has been assumed, but abnormal pedicels. The twenty other pedicels are normally developed and bear normally-developed flowers, calyx and corolla being of light green colour. Moreover, whilst the five central pitcher-bearing pedicels are pendulous, the outside ones are horizontally protruding. Nothing can be more singular than the appearance of these racemes—pitchers on the pedicels instead of on the leaves, as in *Cephalotus* and *Nepenthes*; nothing more singular than the change of the plant from the sterile stage to the fertile. So much were the early botanists puzzled by this, that they referred the plants when sterile to the Ferns,—even Aublet describing *M. umbellata* under the name of *Polypodium minimum* (as is evident from the authentic specimens of Sloane and Aublet at the British Museum). The form of the pitchers in my *M. nepenthoides* is unlike the long clavate one of *M. umbellata*, and comes nearest to *M. Wrightii*, Seem., from Cuba (*M. umbellata*, Griseb. Plant. Wright. p. 167, non. Linn.), but both species differ in leaf, and the rachis of the raceme is more elongated in the Cuban species than in *M. nepenthoides*. The whole genus awaits revision, there being many foreign elements mixed with it in herbaria and systematic works; for instance, *M. cuneifolia*, Gardn., belonging to *Norontia*, and some sterile specimens to *Rubiaceæ* and *Tanacetium*.

In the Chontales mountains, all three genera of *Marcgraviaceæ* are represented—*Marcgravia*, *Norontia*, and *Ruyschia*,—where they are generally met with on the outskirts of forests. *M. nepenthoides* I have met frequently about the Javali Mine, and collected it even on the top of Peña Blanca, the highest peak of these mountains, conjectured to be about 2500 feet above the sea-level.

CLAVIS AGARICINORUM:

AN ANALYTICAL KEY TO THE BRITISH AGARICINI, WITH
CHARACTERS OF THE GENERA AND SUBGENERA.

BY WORTHINGTON G. SMITH, F.L.S.

(Read before the Woolhope Club, Hereford, February 22nd, 1870.)

(Concluded from page 223.)

Genus II. COPRINUS, Fr. Epier. p. 241.—Spores black; margin of pileus straight, at first adpressed to the stem; stem confluent with

or distinct from the hymenophorum; gills at first coherent, and sprinkled with a micaceous scurf, soon deliquescing into a black fluid, trama none.—HAB. Fat and rank places, often on dung, but sometimes on decaying wood.

Readily distinguished by its deliquescent habit.

Genus III. BOLBITIUS, Fr. Epier. p. 253.—Spores coloured; pileus yellow, becoming moist; stem hollow, confluent with the hymenophorum; gills becoming moist, but not deliquescent, at length losing their colour and becoming powdery.—HAB. Dung or rank earth near towns.

A very natural but small genus, intermediate between *Agaricus* and *Coprinus* on one side, and *Coprinus* and *Cortinarius* on the other; it resembles *Coprinus* in its mode of growth, and ephemeral existence; the species have no known use.

Genus IV. CORTINARIUS, Fr. Epier. p. 255.—Spores rusty ochre, resembling in colour peroxide of iron; veil universal, of a different texture from the pileus, and consisting of arachnoid threads: a similar veil is found in *Agaricus*, but it is there either entire, partial, or continuous with the cuticle of pileus; stem confluent with the hymenophorum; gills adnate, membranaceous, persistent, cinnamon-coloured and powdery, trama floccose.—HAB. Woods and fields.

This genus, the most natural amongst the *Agaricini*, is readily distinguished by its peculiar habit, but is badly defined by artificial characters; the species are variable in size and changeable in colour: when old, they present a different appearance from their young state, and are very different when dry to when fresh. It has been divided as follows:—

Subgenus 1. PILEGMACIUM, Fr. Epier. p. 256.—Pileus with a continuous pellicle, viscid when moist; veil (and consequently the stem) dry, not glutinous.

Subgenus 2. MYXACIUM, Fr. Epier. p. 273.—Pileus glutinous; veil (and consequently the stem) viscid, polished when dry.

Subgenus 3. INOLOMA, Fr. Epier. p. 278.—Pileus fleshy, subcompact, perfectly dry, with no viscid pellicle, silky with scales, or innate fibres, not hygrophanous; stem bulbous. The species handsome and easily distinguished.

Subgenus 4. DERMOCYBE, Fr. Epier. p. 283.—Pileus thin, but fleshy, with no viscid pellicle, entirely dry, not hygrophanous, at first clothed with a superficial down, then glabrous; stem thin, somewhat stuffed, equal or attenuated, not bulbous; gills changeable in colour.

The species are polymorphous and defined with difficulty, in consequence of the changeable colour of the gills.

Subgenus 5. TELAMONIA, Fr. Epicr. p. 291.—Pileus moist, hygrophanous, at first glabrous or sprinkled with the arachnoid superficial fibres of the veil, thin or moderately compact in the disk; stem peronate, and annulate from an inferior veil. Mostly large and handsome.

Subgenus 6. HYGROCYBE, Fr. Epicr. p. 303.—Pileus generally thin, glabrous, hygrophanous, but not viscid, enticle rigid, not fibro-lacinate; stem rigid, subcartilaginous without, never annulated or sealy.

Genus V. LEPISTA, gen. nov.; *Lepista*, *Paxilli* sect. Fr. Epicr. p. 315.—Spores (as well as the whole plant) dirty white; pileus fleshy, with an involute margin gradually increasing indefinitely; stem always central, continuous with the horny hymenophorum; gills fragile, persistent, decurrent, membranaceous, entire, with a sharp edge, supported by the horny hymenophorum.—HAB. All the species are terrestrial.

I have followed Fries' later views in transferring some *Tricholomata* to this position, on account of the absence of a true trama, etc.; as *Tricholoma* is analogous to *Entoloma*, I have sought for the corresponding absence of a trama in the latter subgenus, and from my own notes I find it partially absent in *Agaricus* (*Entoloma*) *placenta*, Batsch., and *A.* (*Entoloma*) *nidorosus*, Fr. Certain species also occur in the analogous subgenera *Hebeloma* and *Hypholoma* with the trama partially absent, as *A.* (*Hebeloma*) *lanuginosus*, Fr., and *A.* (*Hypholoma*) *lacrymabundus*, Fr.; the character also pertains to some species of *Coprinarii*.

The value of the trama as a character has not been properly studied, and in future its presence or absence should be invariably given in all descriptions of Agarics. Nylander and Hoffman affirm its presence in *Paxillus involutus*, Fr.; and there certainly appears to be a floccose trama present in *P. pannuoides*, Fr., a species which may be as readily mistaken for a *Cantharellus* as *P. porosus*, Berk., for a *Boletus*.

Genus VI. PAXILLUS, Fr. Gen. Hymen. p. 8, *ex parte*.—Spores (as well as the whole plant) ferruginous; pileus fleshy, seldom entire, generally more or less dimidiate, entirely lateral or sessile, with an involute margin, and gradually increasing indefinitely; stem continuous with the hymenophorum; gills tough, soft, persistent, decurrent, anastomosing behind, branching, or forming spurious pores as in *Boletus*, with a sharp edge, separating from the fleshy hymenophorum, owing

to the absence of a trama.—HAB. Generally on trunks of trees, saw-dust, etc., but some are terrestrial.

Genus VII. *HYGROPHORUS*, Fr. *Epicr.* p. 320.—Spores white; veil, when present, universal; stem confluent with the hymenophorum; gills sharp-edged, trama similar in substance to that of the pileus.—HAB. On the ground, mostly late in the autumn, some in the summer.

Most of the species are handsome and easily recognized. From *Agaricus* this genus differs in the trama, the substance of which is similar to that of the pileus; from *Lactarius* and *Russula* by the trama not being vesicular, but subfloccose, and intermixed with granules; and from its nearest ally, *Cantharellus*, by the sharp-edged gills. This genus is also distinguished by the hymenophorum being changed into a waxy mass, and at length detached from the trama. Many species are sapid and edible. In *Cortinarius*, *Pavillus*, and *Gomphidius*, the spores are coloured, and the gills lose their colour.

Genus VIII. *GOMPHIDIUS*, Fr. *Epicr.* p. 319.—Spores large, fusiform (often spuriously uniseptate, according to Fries), greenish-grey, becoming black; veil universal, glutinous, terminated on the stem by a floccose annulus; pileus continuous with the stem, fleshy, convex, at length top-shaped; stem confluent with the hymenophorum; gills strongly decurrent, somewhat branched, soft, mucilaginous, often spreading in a continuous membrane.—HAB. Growing on the ground, chiefly in Pine woods, solitary, subpersistent.

Principally distinguished by the mucilaginous nature of the gills. Nearly allied to *Cortinarius*, but at once distinguished by the shape and colour of the spores, and from all the dark-purple and black-spored Agarics by the compact pileus, etc. Properties unknown; none edible.

Genus IX. *LACTARIUS*, Fr. *Epicr.* p. 333.—Spores white or very pale yellow, generally echinate; veil none, but in some species the margin of pileus is bearded or pubescent; pileus fleshy, of a floccose or vesiculose (not fibrous) texture, at length depressed in the disk, margin at first involute; stem fleshy, not corticate, often hollow when old, confluent with the hymenophorum; gills milky, in nearly all the species at first white, often changing to sulphur-colour, red, or violet on exposure to the air, subdecurrent, unequal, with an acute edge, trama subvesiculose.—HAB. All grow on the ground.

This genus is nearly allied to *Russula*, but easily distinguished by

the milky gills. The species vary greatly in taste, being mild, aromatic, bitter, or acrid and burning. *Lactarius* includes delicate and excessively poisonous species.

Genus X. *RUSSULA*, Fr. Gen. Hymen.—Spores white or very pale yellow, generally echinate; veil entirely obsolete; pileus fleshy, convex, then expanded, and at length depressed; stem stout, polished, not corticate, generally spongy within, confluent with the hymenophorum; gills nearly equal, milkless, rigid, brittle, with an acute edge, sometimes dropping water, trama vesiculose.—HAB. On the ground in late summer and autumn.

This genus agrees with *Lactarius* in size and some other characters, but differs in the absence of milk, and the gills being nearly equal, or in one series. Odour none, or unpleasant. A few species are edible, but most are noxious.

Genus XI. *CANTHARELLUS*, Adans. Fung. Ord. V.—Spores white; veil entirely absent; pileus fleshy or membranaceous; stem confluent with the hymenophorum, or absent; gills decurrent, folded, more or less thick and swollen, branched, trama floccose.—HAB. Growing on the ground, or on rotten wood, moss, etc.

This genus holds an intermediate place between *Agaricus* and *Craterellus*, some species being close to one, some to the other genus. Some are said to be poisonous, others edible.

Genus XII. *NYCTALIS*, Fr. Gen. Hymen.—Veil universal, floccosopruirose; pileus in the British species fleshy and pruinose or pulverulent; stem confluent with the hymenophorum; gills broad, simple, unequal, thick, fleshy, juicy, or subgelatinous, edge obtuse, not descending on the stem.—HAB. The British species are small and parasitic on other Agarics.

This genus consists of fleshy putrescent Fungi. Some species grow in subterranean passages.

Genus XIII. *MARASMIUS*, Fr. Gen. Hymen.—Spores white, subelliptical; pileus tough, fleshy, or membranaceous; stem central (in one species absent), confluent with the hymenophorum, but of a different texture; gills thick, tough, and coriaceous, confluent at the base, generally distant, and rarely decurrent, with a sharp entire edge.—HAB. Epiphytal, growing on decayed leaves or the roots of grasses, etc.

This genus, closely allied to *Collybia*, commences the series of Agarics that are not putrescent, but which dry up with drought, and

come to life with rain. This biological character is of great importance; for by its neglect species nearly related have been widely separated. The texture of all the species is tough, distinguishing them from the preceding. The species are mostly small and slender. Some are edible, others have an offensive, fœtid, or alliaceous smell.

Genus XIV. *LENTINUS*, Fr. El. p. 45.—Spores white; pileus fleshy, coriaceous, tough, hard, and dry; stem hard and often obsolete, when present continuous and the same with the hymenophorum; gills tough, simple, unequal, thin, edge acute, generally toothed; trama none.—HAB. On stumps, rarely on the ground.

A natural but very polymorphic genus, distinguished from *Pleurotus* by its tough and fleshy substance.

Genus XV. *PANUS*, Fr. Epier. p. 396.—Spores white; pileus unequal-sided or lateral, tough, fleshy, at length coriaceous, but not woody, drying up, but reviving with moisture; stem the same with the hymenophorum; gills thinner than in the last genus, tough, at length coriaceous, unequal, with an entire acute edge; trama floccose.—HAB. On stumps.

All the species are tough (at first softer), never woody; drying up in decay.

Genus XVI. *XEROTUS*, Fr. El. p. 48.—Spores white; pileus membranaceous; stem confluent with the hymenophorum, which descends into and forms a trama; gills dichotomous, foldlike, coriaceous, adnato-decurrent, with an obtuse entire edge; in the single British species branched and very distant.—HAB. The British plant grows in peat-mosses.

This genus, which is chiefly tropical, resembles a coriaceous-membranaceous *Cantharellus*, with narrow gills.

Genus XVII. *SCHIZOPHYLLUM*, Fr. Observ. Mycol. vol. i. p. 103.—Spores white; pileus not fleshy, dry, sessile; gills coriaceous, branched, split longitudinally at the edge, with the two divisions revolte or spreading, joined to the pileus by a tomentose pellicle.—HAB. Rotten wood.

An easily recognized but very aberrant genus of the *Agaricini*.

Genus XVIII. *LENZITES*, Fr. Gen. Hymen.—Spores white; pileus coriaceous, dimidiate, sessile; gills coriaceous, firm, unequal, simple or branched, and anastomosing behind, edge obtuse or acute, trama floccose; often spuriously porous.—HAB. On stumps, rails, etc.

Chiefly tropical, where the species become woody, with us they are only coriaceous. Allied to *Trameles* and *Dædalea*, amongst the *Poly-porei*.

SHORT NOTES.

LEPIGONUM NEGLECTUM, *Kindberg*, AS AN INLAND PLANT.—This occurs, associated with *Sclerochloa distans*, Bab., in great plenty in the old-fashioned pavement roads of Tabley Park, situated about a mile and a half south-west of Knutsford, and about fifteen miles inland from the nearest point of the Mersey at Frodsham. *Lepigonum neglectum* follows on the road for half a mile, *Sclerochloa distans* accompanies it in patches for about two furlongs. Ordinary *Lepigonum rubrum*, Fr. grows here also, but flowers on an average a fortnight earlier than its allied species. When in bloom, side by side, as I have often seen them here, the decided white patch at the petal's base, and the fewer stamens, distinguish *L. neglectum* at a glance. In its later stage, its fleshier habit and relatively shorter peduncles are alone amply sufficient to avoid any confusion with *L. rubrum*. I must mention that here, in the vicinity of the rock-salt beds of Northwich, the cheapest way of killing "weeds" is by sowing the roads with coarse salt. Naturally the *Sclerochloa* and *Lepigonum*, instead of being exterminated, thrive greatly under this process, and have these roads pretty much to themselves. The occasional occurrence inland of *Sclerochloa distans* is a well-known fact, and it would be well worth stating, side by side, all the fairly numerous records of its occurrence away from the coast which our local Floras supply. *Lepigonum neglectum* is much more strictly littoral, but has occurred (*L. medium*, Fr.) in Worcestershire, by the canal from the salt-works at Droitwich, with other semi-maritime species.—J. L. WARREN.

PRIMULA TIROLENSIS, *Schott*.—In Wood's 'Tourist's Flora' (p. 202), the following locality is given for this species (under the name of *P. Allionii*), "Fiume, Koch." As the species is not given in Schlosser's 'Flora Croatica' (1869), I was led to look at Koch's 'Synopsis,' where at p. 510 (ed. 3), is the following station, "Monte Castellazo di Paneveggio in Fiemme." It thus appears that Wood's "Fiume" is a misprint for this latter name. Indeed, so far as I am aware, the species is only known to grow in three stations, all within

fifteen miles of one another; this Val di Fiemme, Monte Castellazo, the Monte Cività, where I have myself collected it, and the Val Caldiera, near Borgo, east of Trient.—G. C. CHURCHILL.

SISYRINCHIUM BERMUDIANA, L., A NATIVE IN IRELAND.—Dr. Perceval Wright has recently paid a visit to Woodford, Galway, and has satisfied himself that the *Sisyrrinchium*, which is there abundant over several square miles of country, is a native of the district. There seem, indeed, to be no very good reasons for the suspicion of being an alien which has attached to the plant; yet Mr. Bentham is the only author on British botany who has considered it a native species (see his 'Handbook,' ed. 2, preface, p. vii. and p. 466). H. C. Watson, in his 'Cybele Britannica' and 'London Catalogue,' Babington in his 'Manual,' and Boswell Syme in 'English Botany,' all speak doubtfully of its claims to be an Irish native, and Dr. Hooker, in the recently-published 'Students' Flora,' follows the 'London Catalogue,' and brands it as introduced. Even the authors of the 'Cybele Hibernica' are cautious not to speak decidedly on the point, though they quote the opinion of Mr. Lynam, the original discoverer of the plant, that there is no probability of its cultivation in the neighbourhood. Dr. Wright has promised to give some details in a future number; the settling of the question in the affirmative would be of importance in relation to the connection between the American and Irish floras.

LUZULA ARCUATA IN ABERDEENSHIRE.—At p. 129 of this volume, in a report of Dr. Buchanan White's paper on the botany of Mamsoul, read before the Botanical Society of Edinburgh, it is stated that the above-named plant was new to Aberdeenshire. This is not the case; it was collected on that mountain in July, 1836, by the Rev. Dr. Gordon, Mr. Stables, and the late Mr. Anderson, and recorded in the 'Flora of Moray.' The information was sent to Mr. Watson at the time, and the species is duly entered as a native of the county in the 'Cybele Britannica.'—JOHN ROY.

LEEFE'S 'SALICTUM EXSICCATUM.'—The second fasciculus of this set of dried specimens of Willows has been distributed. Its contents are as follows, the specimens being nearly all of them from the author's salicetum at Creswell, near Morpeth, where he now resides:—26. *S. Borreriana*, Smith; a long-leaved form of *S. bicolor*, Ehrh. 27. *S. acuminata*, the true plant of Smith, female flowers and leaf. A handsome plant, clearly known to few, the alliance of

which is very close with *Smithiana*. Flowering catkins (pistillate) two inches long by three-eighths of an inch thick; scales very shaggy and ovary densely villose; style equalling the simple stigmas; full-grown leaves, 4 inches long by 15–16 lines broad, narrowed gradually from the middle to both ends, very glaucous beneath. 28. *S. pentandra*, male and leaf. 29. *S. alba*, var. *cærulea*, male and leaf. 30. *S. cæsia*, Vill. et Koch. (*S. myrtilloides*, Forbes, non L.), female (not British). 31 and 32. Typical *fragilis*, male and female in flower and leaf. 33. *S. pontederana*, Schl., female and leaf. 34. *S. vitellina*, female and leaf. 35. *S. petraea*, And., female and leaf. 36. *S. hastata*, female and leaf. 37. *S. lanceolata*, Smith, female and leaf; “brought from Essex.” The variety with glabrous ovaries so common about the lower part of the Thames. 38. *S. laurina*, Smith, female and leaf. The proper place of this form is evidently midway between *phycifolia* and *cinerea*. 39. *S. tenuior*, Borrer, female and leaf. 40. *S. Russelliana*, Smith, female and leaves. This is evidently just the ‘English Botany’ plant, and a mere form of *fragilis*, with no claim to rank as a distinct variety, and quite different from *S. viridis* of Fries, of which we have not seen any British specimens, but which should be looked for carefully. Laying Mr. Leefe’s specimens by the side of the originals of Fries in his ‘Herbarium Normale,’ the following are the most obvious points of difference:—*Russelliana*, full-grown leaves 4 inches long; pistillate catkin, when expanded, 2 inches long; pedicel slightly exceeding the gland; ovary 4–5 times as long as thick, the style and stigma a little longer; scale ligulate, about 4 times as long as broad: *S. viridis*, full-grown leaf, 3 inches long; pistillate catkin, when expanded, 15–18 lines long; pedicel equalling gland; ovary not more than three times as long as thick; scale obovate, scarcely ever twice as long as broad. *S. viridis* seems to be widely dispersed in Germany, and to be the *Russelliana* of many German authors and collectors. It would not be far from the mark to say that it is a plant with the leaves of *fragilis* in combination with the pistil of *alba*. 41. *S. amygdalina*, L., male catkins and leaves of a form of *triandra*, with leaves glaucous beneath, and about $4\frac{1}{2}$ times as long as broad. 42. *S. Davalliana*, Sm., female in two stages of flower. 43. *S. nigricans*, male and leaves. 44. *S. bicolor*, Ehrh., female and leaves. 45. *S. hippophaifolia*, female and leaves. 46. *S. oleifolia*, female and leaves. 47. *S. Arbuscula*, L. (*S. venulosa*, E. B.), female

and leaves. 48. *S. purpurea*, Sm., male and leaves. 42. *S. triandra*, Curt.; a small narrow-leaved form of *triandra*, with leaves not all glaucous below. 50. *S. rotundata*, Forbes; a form of *nigricans* with broad, subcordate leaves. 51. *S. crassifolia*, Forbes; another variety of *nigricans* with obovate leaves. 52, 53. *S. latifolia*, Forbes; another form of *nigricans*, near No. 50. The third fasciculus will be issued shortly, and will contain several curious forms.

POISONING BY *ENANTHE CROCATI*.—Mr. W. G. Smith has communicated an account of a fatal case of poisoning at Staplehurst, Kent. A carter ate some of the roots whilst at work, supposing them to be wild parsneps; in about another hour he became unconscious and convulsed, and death occurred in half an hour, and before medical aid could be obtained. The man had fed his horse with roots of the same plant, and the animal also expired about two hours after eating them. Specimens of the plant were sent up to Mr. Smith for identification. It is worth notice that he observed the juice to be yellow.

POTAMOGETON ZOSTERIFOLIUS, *Schum.*, AND *P. ACUTIFOLIUS*, *L.*—Any botanist who knows of existing localities for either of these species within a day's excursion of London, will greatly oblige the editors by communicating them to this Journal.

A NOTE FOR THE 'MIDDLESEX FLORA.'—*Juncus compressus*, *Jacq.*, *Poa compressa*, *L.*, *Melilotus leucantha*, *Koch*, *Reseda Luteola*, *L.*, *Hypericum hirsutum*, *L.*, *Erythraea Centaurium*, *Pers.*: six species more or less local in Middlesex, are at present in flower at Shepherd's Bush. They grow in two adjoining and now abandoned brickfields, which occupy part of the angle which the Uxbridge Road makes with Wood Lane, just to the north of St. Stephen's Church. The survival and concurrence of these six plants at the very edge of the bricks and mortar of advancing London is worth record. In one or two years their station must be built over. One of the chief interests of a metropolitan Flora is to supply data which mark the gradual extension of a great city.—J. L. WARREN.

POTTIA PALLIDA, *Lindb.*, A NEW BRITISH MOSS.—Mr. Holmes, of Plymouth, has found near that place a species of *Pottia*, which he sent me under the name of *P. Wilsoni*, but which is at once distinguishable from that species by its smooth calyptra, though resembling it in having octofarious leaves and an excurrent nerve. I have no doubt it is *P. pallida*, *Lindberg*, hitherto only found on the coast of Spain, and differing

from all our other species by the obtusely rounded apex of leaves. In the lax areolation of its leaves it comes near to *P. crinita*. It will be figured in the series now in progress for this Journal.—R. BRAITHWAITE.

FLORA OF THE ISLE OF WIGHT.—As I am not aware that the following plants have been recorded as occurring in the Isle of Wight, it may be proper to give the localities in which I have noticed them, namely, *Camelina fetida*, Fries, growing with *Linum usitatissimum*, in a field of Vetches and Oats at Pan, near Newport, July, 1870. My specimens from Pan are almost destitute of leaves, but the pods are well developed, and agree exactly with the descriptions of *C. fetida*, Fries, and also with specimens of that plant in Billot's 'Flora Gallie et Germanie Exsiccata.' I may point out that the descriptions and plates of the two plants in Syme's 'English Botany' do not quite agree. *C. eu-sativa* is said to have a well-marked dorsal nerve, whilst in the figure the pods have no dorsal nerve at all. On the other hand, *C. fetida* is said to have a very indistinct dorsal nerve, whilst the dorsal nerve is most distinctly marked in the figure. *Enothera odorata*, Jacq., on the sandhills of the Spit at St. Helen's, Isle of Wight, July 14, 1870; numerous plants. The only localities hitherto recorded for this plant in Britain seem to be Burnham and Weston, in Somersetshire; Lavia, Plymouth, Devon; St. Helier's, Jersey; and St. Aubin's Bay (Syme, 'English Botany,' vol. iv.), and the site of an old garden, Clifden Road, Twickenham. (Trimen and Dyer's 'Flora of Middlesex.') *Setaria glauca*, Beauv., arable field, Alverstone, near Whippingham, Mr. J. Pisto; November, 1869.—FRED. STRATTON.

Reports.

REPORT OF THE CURATOR OF THE BOTANICAL EXCHANGE CLUB FOR THE YEAR 1869.

In sending out this Report of the Botanical Exchange Club, I must offer an apology to the members for its very late appearance. The parcels were received by me from Mr. Baker in the end of January. At that time the recent sudden death of Mr. J. E. Sowerby, who had had charge of the plates for the third edition of 'English Botany,' had brought upon me a large addition to my usual labours in connection with that work, which greatly delayed the examination and redistribution of the club parcels; but I can assure the members of the Club

that I have not altogether sacrificed their convenience to the claims of 'English Botany,' for as yet I have not found time to write the description of a single grass for the concluding volume of the book.

Thalictrum minus, L., *maritimum*. I have sent to all the members desiring it specimens of the flower and fruit of this plant, collected at Kirkcaldy, Fife. In the third edition of 'English Botany' I divided *T. minus*, L., into *T. eu-minus* (with two varieties, *maritimum* and *montanum*) and *T. flexuosum*, Beruh. This is certainly wrong; *T. maritimum*, *T. montanum*, and *T. flexuosum* must stand in the same rank. Whether they should be considered as subspecies or as varieties, is a question I do not yet feel able to determine. *T. maritimum* I have in cultivation, both from roots and from seed. I should feel much obliged to botanists who would furnish me with ripe seed of *T. montanum* and *T. flexuosum*, which, I may mention, must, to ensure germination, be sown in the same autumn in which it ripens.

Ranunculus peltatus, Fries, form approaching *R. pseudo-fluitans*, Bab. A few specimens, which I believe to show a transition from one form into the other, were sent to those supposed to be interested in Batraehian *Ranunculi*. They were collected in a rapid stream running into Loch Leven, a little to the north of the South Queich river. At the mouth of this stream, in the still waters of the loch, the normal form abounds. I visited the locality in the end of May this year, and found the *Ranunculus* had disappeared from the stream, no doubt washed into the loch by the winter floods; and at the mouth of the stream I could find nothing but the ordinary *R. peltatus*.

Ranunculus reptans, L. Of this plant I collected on the shore of Loch Leven sufficient specimens to supply all the members who asked for it, where it grows in company with *Littorella*, *Scirpus acicularis*, and *S. palustris*. In this situation it is very constant in appearance, but my faith in its distinctness, even as a subspecies, is considerably shaken by the following circumstances:—In the sandy pastures by the side of the loch *R. Flammula*, var. *pseudo-reptans*, abounds; and in ditches by the side of cultivated fields the normal form of *R. Flammula*. At the end of May in the present year I find that the whole of the ground where *R. reptans* grows is under water. Can it be that *R. pseudo-reptans* is a depauperate, and *R. reptans* an inundatal form of *R. Flammula*? I have several pots of *R. reptans* subjected to different treatment, but hitherto the plant has not appeared, although, on disturbing the earth, I find the roots still alive,—the only exception being a pot submerged in a tank, in which case a few tufts of small radical leaves have appeared.

Ranunculus acris, var. *vulgatus*. A large supply of this plant has been sent from Wiltshire by the Rev. T. A. Preston; from Somerset and Gloucester, by Mr. J. F. Duthie; and from Cheshire, by the Hon. J. L. Warren. These specimens exhibit a complete transition from a horizontal rhizome, 4 or 5 inches long, to a nearly perpendicular one,

of less than half an inch in length; and as in the leaves, flowers, and carpels they present no tangible nor constant difference, it seems impossible to separate *R. Steveni*, with a creeping rhizome (to which the form *R. vulgaris*, Jord., must be referred), from *R. Boreanus*, Jord., to which *R. tomophyllus* belongs. In *R. acris*, therefore, we have the very unusual feature of some forms possessing a distinctly creeping rhizome, while in others the rhizome does not creep, and dies rapidly off towards the base. Both Mr. Preston and Mr. Duthie have been good enough to send me living plants with creeping rhizomes, by observing which I hope to ascertain whether or no the direction and persistent vitality of the rhizome continues permanent under cultivation, or whether it be a feature depending on peculiarity of soil or on certain conditions of climate. All the specimens I have yet seen with a creeping rhizome have come from the western counties of England, while, strange to say, M. Lloyd states that all the *R. acris* of the west of France is *R. Boreanus* with a premorse rootstock. A few days ago Mr. Preston sent me specimens of *R. vulgaris* with an elongate rhizome, but with the stems either perfectly glabrous or furnished with a few adpressed hairs.

Ranunculus parvulus, L. "From wet ground adjacent to a pond on a heath in the parish of Worplesdon, Surrey. This state of *R. Philonotis* ought to have been entered in the 'London Catalogue of British Plants' as a subvariety under *R. hirsutus*. It differs more from the type, whether called *R. Philonotis* or *R. hirsutus*, than do many other varieties which have been admitted into the 'Catalogue.' Indeed, the first-sight appearance of this dwarf or depressed form is so unlike the tall and upright state usually seen in cornfields, that a young botanist might well overlook their specific sameness."—H. C. WATSON.

Papaver dubium, L. I have contributed a few examples of a plant which seems intermediate between *P. Lamottei* and *P. Lecoqii*, having the much-divided leaves and bright scarlet flowers of the latter, and the permanently white sap of the former. Unfortunately, I was unable to procure the capsules, from the grain being cut when I went to look for them. This form occurred both near Burutisland and Kirkealdy. In the latter station it was associated with normal *P. Lamottei*, which there was much more abundant than the supposed intermediate form.

Cochlearia danica, L. "King's Quay, Isle of Wight. There are only two previously recorded stations in the Isle of Wight, viz. Freshwater and Bembridge."—FRED. STRATTON.

Nasturtium sylvestre, R. Br. var. In September, 1869, I gathered some specimens of *Nasturtium sylvestre* on the banks of the Tay below Perth which were remarkable for their very short silicles; perhaps, however, this was owing to arrested development of the later flowers, and certainly in many of the silicles the seeds were abortive, though

not in all. There can be little doubt that it was specimens of *N. sylvestre* in this condition which at one time were believed to be *N. anceps*. It is now universally admitted that the true *N. anceps* has not occurred in Britain.

Matthiola incana, R. Brown. "Whether or not this plant is indigenous at Compton, Isle of Wight, is perhaps a matter of doubt. Evidence of the non-existence of the plant there many years ago may be drawn from the fact that no mention is made of it by any of the older botanists who visited the locality, although 'Rocke Sampier' is constantly noted by them as a plant growing 'in the white cliffs on the south side of the Isle of Wight.' It is not probable that so conspicuous a plant as *Matthiola incana*, growing in the same localities as *Crithmum maritimum*, would have been either overlooked or not considered worthy of being noted. The first notice of this plant as occurring in the Isle of Wight appears to be that given by Dr. Bromfield in his 'Flora Vectensis,' and there the principal station is represented to be at Steephill, the Compton station being recorded as an additional one. In 1868, I do not believe the plant existed at Steephill,* but on the cliffs east of Ventnor the plant was very abundant in that year, though, from the fact of the gardens of the houses extending to the edge of the cliff, great doubt would attach to the character of the station. At Compton this is not the case; the nearest house or garden is at Compton Farm, nearly half a mile from the shore. There are some slight differences between the plants from these two stations, which is possibly due to the fact that the cliffs at Compton are very pure hard white chalk; those east of Ventnor, a soft crumbling chalk marl. The leaves of the plants at Compton are much more densely clothed with hairs than those of the Ventnor plants, and the flowers of the latter are of a bright rose colour, whilst those of the former have generally more of a purple tint."—FRED. STRATTON.

Brassica campestris, L. "The wild state of the common Turnip, from hedgebanks and ditch-sides in fields adjacent to the Thames, on the Surrey side of the river, opposite to Sunbury; growing also in plenty on the Middlesex side of the river. As collectors observe this plant mostly in spring or summer, after the grass-green and hispid radical-leaves have faded away, they have usually misnamed it as *Brassica Napus*. Hence, the desirability of distributing examples in their late autumnal and winter state. Full explanations of my views on this species may be seen in this Journal, Vol. VII. p. 346."—H. C. WATSON.

Viola lactea, Sm. "From a disused brick-field, on a heath-covered waste, by the left side of the road from Bagshot to Ascot Station, just within the county of Berks. New to the sub-province of West-Thames."—H. C. WATSON.

Pyrus scandica, Bab. Mr. T. R. Archer Briggs contributes a large

* It grew at Steephill in 1866.—H. TRIMEN.

supply of specimens from the neighbourhood of Plymouth. These, like the other Devonshire specimens I have seen, resemble the *Sorbus Mougeoti*, Soyer and Gand., having the leaves less deeply lobed at the base than at the middle; but they differ from authentic Continental specimens, in having the leaves firmer, more glossy above, and with the lowest lobes more acute and more spreading. In the leaves, indeed, the Devonshire specimens show an approximation towards *S. latifolia*, Pers.

Pyrus fennica, Bab. Under this name Mr. A. Craig Christie has sent for distribution specimens from the Isle of Arran. These are precisely identical with the genuine Scandinavian form of *S. scandica*. Do both *P. scandica* and *P. fennica* grow wild in Arran, or are the Arran specimens which have leaves with the lower pinnae separate *P. scandica*, var. *pinnatifida*, of Fries? In the second edition of the Nov. Fl. Suec. p. 139, Fries mentions this variety, and refers to it the *P. pinnatifida* of Smith, and says it is to be carefully distinguished from *Sorbus hybrida* (*P. fennica*). The plant referred to by me as *P. semi-pinnata*, Roth, in the third edition of 'English Botany,' is the true *Sorbus hybrida*, L. fil., and the *S. fennica*, Fries, as proved by Norwegian specimens collected by the late Professor Blytt, received by me since the third volume of the book mentioned was written. After seeing these specimens I have no doubt that the plant I described as *P. fennica* is really *P. scandica*, var. *pinnatifida*. Fries says of it, in the 'Summa Vegetabilium Scandinaviæ' (p. 170), that it is everywhere confounded with *S. fennica*, but certainly truly distinct by the fruit; for the fruits of *S. fennica* are acid, and in appearance very similar to those of *S. aucuparia*.

Hieracium sp. Mr. J. Ward sends cultivated specimens of a *Hieracium* from Orme's Head, which are probably a very abnormal form of *H. pallidum*. They have the petioles much longer and the leaves narrower and more attenuated at each end than in any specimens of *H. pallidum* which I have seen, but in other respects they resemble that species, which is very variable in its foliage.

Centaurea nigra, L. var. "In the Isle of Wight specimens of *C. nigra*, L., now before me, there appear to be four states or varieties having more or less distinct characters. 1. There are plants having broad leaves, heads without ray-florets, and phyllaries not only concealed by their appendages, but with these appendages also concealed by the dense filamentous fringe. This form has some of the upper leaves, particularly those at the junction of the branches, somewhat auricled at the base, and almost entire, or with but few teeth. The form seems to be a very rare one in the Isle of Wight; I have met with it in one locality only, a moist meadow near the salt-water river Medina. 2. A plant very like No. 1, but having generally rayed heads, with less densely hairy phyllary-appendages, and leaves less broad, with no auricles at the base of the upper ones, and very faintly

dentate. This form grows on heathy pasture, with clay and gravel underneath. 3. Growing with No. 2, are plants having heads always rayed and phyllary; appendages scarcely concealing the phyllaries, and with much shorter fringe; the leaves very narrow and hardly dentate. The same form grows also on the chalk as at Bowcombe. 4. On the chalk downs grows a plant generally diminutive, but occasionally becoming tall and branched. A great portion of the phyllaries is not covered by the appendages, the latter being small, with very short fringes, the phyllaries are also much more loosely set. The leaves of this form are usually broader in proportion than those of Nos. 2 and 3. I have sent a few examples of Nos. 2, 3, and 4, but of No. 1 I have not been able to obtain a sufficient number of specimens."—FRED. STRATTON.

Aster longifolius, Lam. In an excursion made to Perth in September, in which I had the benefit of the guidance of Mr. John Sim, he pointed out to me the *Aster* which had been sent to Prof. Babington, and pronounced by that botanist to be *A. salignus*, Willd. (See Journ. of Botany, Vol. V. p. 369.) The plant grows in great abundance over the couple of miles of bank which we traversed, and Mr. Sim assured me that it extended much further down the river-side. As I stated in my last report, *A. salignus* is a doubtful plant, but if the Tay-side plant be *A. salignus*, that name is one of the numerous synonyms of the American *A. longifolius*, Lam. Professor Babington is doubtless right in considering the Tay-side plant distinct from the Derwent-water *Aster*, sent to the Club last year by Miss Edmunds. Along with *A. longifolius* there grow on the banks of the Tay several other species of *Aster* in small quantity, among which are *A. puniceus*, L., *A. prenanthoides*, Muhl., and a broad-leaved species which I believe to be *A. Novi-Belgii*, L., but which Mr. H. C. Watson inclines to call an abnormal growth of *A. brumalis*, Willd., a plant which according to Torrey and Gray is not certainly known to exist in North America, and is perhaps derived from *A. Novi-Belgii*.

Erythraea pulchella, Fries. "This condensed form grows in the salt marshy ground near King's Quay, Isle of Wight, the plants this year occupying a considerable space of ground, and standing up rather thickly together, with no other form of *Erythraea* intermixed with them, though both *E. Centaurium* and the ordinary form of *E. pulchella* grow in similar ground adjoining."—FRED. STRATTON. Mr. Stratton's specimens of *E. pulchella* are much more condensed than in the normal form, but very much less so than those collected by Mr. H. C. Watson in Guernsey.

Rumex conspersus, Hartm. (?) In August and September I collected specimens of a *Rumex* identical with the plant found by the late Dr. Walker-Arnott, in Kiross-shire, which, when the ninth volume of 'English Botany' was published, was thought, both by Mr. H. C.

Watson and myself, to be *R. conspersus*, Hartm. Whether the Scandinavian *R. conspersus* be a species or not I do not know, but I am convinced that Dr. Walker-Arnott was right in considering the Kinross-shire plant a hybrid between *R. obtusifolius*, L., and *R. domesticus*, Hartm.; it is only found in company with these two species, and very few of the fruits of each panicle come to maturity, so that the fruit-panicle bears but few fruits with enlarged petals, the greater number remaining undeveloped.

R. crispo-obtusifolius? Under this name I have sent out specimens of a *Rumex* extremely similar to *R. pratensis*, Mert. and Koch, but differing in having but few of the fruits in each panicle coming to maturity; in the enlarged petals being rather larger and less highly coloured; and varying by the enlarged petals approximating more to those of *R. obtusifolius* on the one hand, and more to those of *R. crispus* on the other. It occurs near Balmuto, wherever these two species grow together; and I suppose it to be a hybrid between them, and not identical with the English *R. pratensis*. The Scotch specimens from Aberdeen and Musselburgh which I referred to *R. pratensis* in the third edition of 'English Botany,' are identical with the Fife plant, which, if not a hybrid, may be a sub-barren state of *R. obtusifolius*. I should be much obliged if any botanist would send me thoroughly ripe seeds of *R. pratensis* from England, in order that I may cultivate that species along with the supposed hybrid.

Quercus pedunculata, Ehrh., var. *angustifolia*. "Distributed in order to correct a former misnomer. As mentioned on the labels, specimens of *Q. Cerris*, the Turkey Oak, were inadvertently connected with the labels intended for this variety under date of 1867."—H. C. WATSON.

Iris Pseudacorus, L., var. *genuina*. *I. Pseudacorus*, Bor., occurs at Otterston Loch, Fife. I have sent out a few specimens, but from the difficulty of drying flowers of *Iris*, they will prove of little use for comparison with the var. *acoriiformis*, so common in the neighbourhood of London.

Allium carinatum, Fries, non Sm. An *Allium* growing by the side of the Tay below Perth, pointed out to me by Mr. John Sim, is this species; but as the Tay-side is a perfect nursery of aliens, its occurrence there is not sufficient to entitle it to a place in the British flora,—though, from its numerous head-bulbs, it will probably prove a permanent inhabitant, and, if so, in after years it may be allowed to enter the list as a naturalized species. On the Newark locality, see Report for 1867. The exerted stamens and dark reddish-purple flower at once distinguish the true *A. carinatum* from the flat-leaved varieties of *A. oleraceum*.

A. paradoxum, Don. Mr. A. Craig Christie sends a specimen of this from Benny Craig Woods, near Edinburgh. The plant readily establishes itself by its head-bulbs, and, after undergoing a sufficient term of probation, it will probably be recognized as a naturalized plant, like *A. carinatum*.

Hyacinthus non-scriptus, L. (*Endymion*, Bab. Man.). "Garden examples, to show the variation of elongate and leaf-like bracts. The original bulb from which these garden plants have been derived, was found in Claygate, Surrey, in the year 1838; and the variation has proved constant in the garden, the leafy bracts varying from 1 to 3 inches in length, according to soil and season."—H. C. WATSON.

Elodea canadensis, Rich. (*Anacharis*, Bab.). "Examples with the leaves so close and imbricate as to make the plant look like a *Lycopodium* at first glance. They were brought from Fleet Pond, Hants, in September, 1869. Apparently, the lowering of the water-level, so as to leave the plants exposed to air, more or less outside the surface of the water, had been the chief cause of their compact growth. In this state they were remarkably brittle, and broke much both during and after the drying process."—H. C. WATSON.

Potamogeton decipiens, Nolte. Mr. Charles Bailey sends a specimen of this plant from the canal at Navan, collected in 1868. Unfortunately, he was not aware at the time he gathered it that it was a plant new to the Irish flora, and so brought away only two specimens.

Potamogeton Louchites, Tuckerm.? Mr. Charles Bailey also sends a few specimens of this plant from the river Boyne, near Navan; some of them are in fruit, and the nuts accord well with the description of those of the American plant, being larger, deeper, and more distinctly keeled than in *P. heterophyllus*, and the peduncles are much longer than those of the last-named species; but the submerged leaves of Mr. Bailey's specimens are much more like those of *P. heterophyllus* than those of Dr. D. Moore's specimens collected in the same river. The floating leaves of both plants bear a striking resemblance to those of *P. polygonifolius*, but the nuts are totally dissimilar, and the branched stems of the plant I suppose to be *P. Louchites* form a sufficient means of distinguishing it when barren, and the peduncles thickened upwards when in flower.

Potamogeton heterophyllus, Schrad. "This was not believed to be a native of Cheshire until I found it at Achmere; and it is apparently a rare plant in the county."—J. F. ROBINSON.

Juncus glaucus, Sibth., var. *pseudo-diffusus*. I have sent out, under this name, specimens of a plant abundant on the shores of the Firth of Forth, between Aberdour and Burntisland. It is a sterile or substerile form of *J. glaucus*, of which it has the striated glaucous stems and interrupted pith, but the flowers are much greener, the capsules smaller, and the seeds almost always abortive. It is probably to this form that all the Scotch specimens supposed to be *Juncus diffusus* belong.

Juncus nigritellus, Don. On the shore of Loch Leven a depauperate form of *J. lamprocarpus*, Ehrh., occurs, confined to the sandy portions of the shore which are covered with water as late even as the end of May. Amongst these, the smaller specimens have the leaves terete, but in the larger they are compressed. Last autumn I brought a

number of roots of the small specimens with terete leaves, and placed them in a flower-pot. At the present date (June) the plants are 3 to 4 inches high, but all of them have compressed leaves. The perianth-leaves in this plant, as I have mentioned in 'English Botany,' vary much in the shape of their apices, the three inner leaves being sometimes obtuse and sometimes acute. The acute form is, no doubt, that which commonly occurs in the small states; but it is by no means confined to such, and certainly does not always coexist with terete leaves.

Juncus bufonius, var. *fasciculatus*. I have sent out specimens of this plant from the shores of Loch Leven; it is the form *J. bufonius* assumes when growing in sandy places which are inundated in winter, but become perfectly dry in summer.

Cladium Mariscus. "Achmere, near Frodsham. Although this has been observed in Mid-Cheshire, it has never, so far as I am able to ascertain, been recorded from West Cheshire."—J. F. ROBINSON.

Carex paniculata, var. *pseudo-Bönnighauseniana*. Miss E. Jones sends from Denbighshire a *Carex* which, at first sight, has precisely the appearance of *C. Bönnighauseniana*, except that the bracts are much shorter; the fruit is precisely the same as that of normal *C. paniculata*. From my recollection of Mr. H. C. Watson's depauperate *C. paniculata*, I think Miss Jones's specimens simulate *C. Bönnighauseniana* even more closely than Mr. Watson's.

Aira uliginosa, Weihe. "Abundant about Fleet Pond, in North Hants, September, 1869. New to England. Full explanations about the plant and locality have been given in this Journal, Vol. VII. p. 281."—H. C. WATSON. Mr. A. G. More also sends specimens from Galway, so that all the members of the club have been supplied. No doubt, when the plant is better known, it will be discovered in other localities. At present, Fleetpond, Hants, Mr. H. C. Watson; Cawston Decoy, Norfolk, Mr. Bryant, 1776 (*teste* Trimen in Journ. of Bot. 1869, p. 352); Forfarshire, G. Don and J. M'Kay; Loch of Drum, Aberdeen, Herb. Mus. Brit. (*teste* Trimen, *loc. cit.*); and near Roundstone, Connemara, A. G. More,—are the only stations in which the plant is known to have been gathered. Hudson, from his description of *Aira setacea*, and from saying that the plant is common on *sandy* heaths in Yorkshire and Lancashire, evidently confounded *A. uliginosa*, Weihe, with *A. flexuosa*, Auct., though his description of *A. setacea* is, no doubt, partly taken from *A. uliginosa*, Weihe.*

* Dr. Boswell Syme here refers to the second edition of Hudson's 'Flora Anglica.' The original description of *A. setacea* in the first edition was made from specimens of the grass since called *A. uliginosa*, collected at Stratton Heath, Norfolk, the only locality there given for the plant. In the second edition Hudson reduced his species to a variety of *A. montana* (now considered a state of *A. flexuosa*), and the localities Yorkshire and Lancashire are probably intended to apply to the whole species, as Hudson then understood it. The description appended, however, is a very good one of the plant

Asplenium Trichomanes, L., var. *anceps*. "Garden examples, the roots originally from South-West Surrey, in lanes about Churt and Bowler Green. This is scarcely other than an enlarged form of *Trichomanes*, although it seems inseparable from the *Asplenium anceps* of Madeira and other Atlantic islands. The great brittleness of the stipes prevented the attachment of the labels to the specimens."—H. C. WATSON.

Chara alopecurioides, Del. "This plant is not to be found in the 'Salt pans,' properly so called, at Newtown, Isle of Wight. It grows only in the large reservoir into which the sea flows, and from which the water is admitted or pumped into the 'pans.' The 'pans' are completely dried up during the early spring and in the late autumn, and from their nature I do not think it possible that the *Chara* could grow in them."—FRED. STRATTON.

J. BOSWELL SYME.

June 10th, 1870.

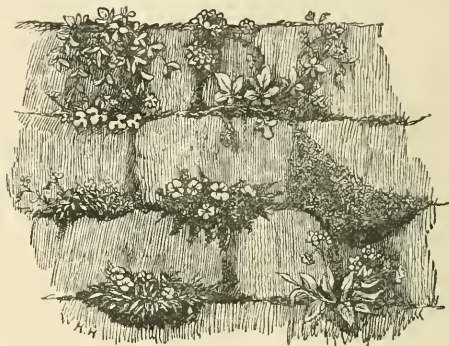
New Publications.

Alpine Flowers for English Gardens. By W. ROBINSON, F.L.S.
London: Murray. 1870. (Pp. 392.)

There is no apology necessary for noticing this excellent book; though it does not profess to be a botanical treatise in the strict sense, yet the information it contains is, as far as it goes, scientifically good, as well as practically useful. The object of the author is to show that the cultivation of "Alpines" is not surrounded with any very great difficulty, if cultivators will abandon the notion of so-called "rock-works," and endeavour to place the plants in a situation like their native habitats, plenty of soil and moisture being necessities of their existence. About a hundred pages are occupied with general principles of cultivation and details of what to avoid. The success of the system advocated by Mr. Robinson is shown by its results, which can be, to some extent, judged of from the woodcuts with which his book is illustrated. Some of these have been reduced from photographs,

under discussion, which indeed is likely enough to be found in both the counties given by Hudson. Hudson's later views cannot affect the undoubted claim of the name *A. setacea*, Huds. ed. 1, to priority over *A. uliginosa*, Weihe.—H. TRIMEN.

and are good examples of their kind, and some are extracted from other books. We have been kindly permitted to use a few here.

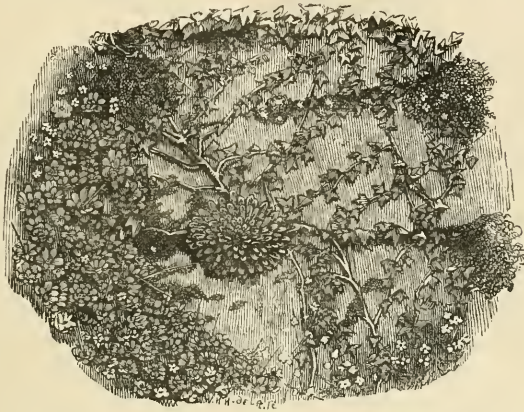


It is not very clear what constitutes an "alpine" plant in the horticultural sense of the term. Mr. Robinson, in the alphabetical enumeration of species which occupies some 250 pages of his book, includes a number of plants which have little in common but their beauty, and some of which are restricted natives of low grounds. Under each species is a short account of its appearance, scarcely to be called a description, indications of its place of growth, and directions for its successful cultivation. It would have added to the usefulness of this



enumeration if the Natural Family to which the species belongs had been added in each case. The account of the *Drabas* was written by Mr. J. C. Niven, of Hull, and that of the genus *Cyclamen* by Mr. James Atkins, of Painswick. As the latter has cultivated these plants for many years, and studied them also in our herbaria, it may be useful to give a list of those mentioned in the book before us:—1. *Cyclamen Coum*, including *C. vernum* of Sweet; 2. *C. ibericum* (*C. Atkinsii* is a hybrid of this with the last); 3. *C. europæum* (including

C. anemonoides, *Clusii*, *littorale*, and *Peakeanum*); 4. *C. hederæfolium* (probably including *C. græcum*), this is the so-called British species; 5. *C. verum* (including *C. repandum*).



Selections of species suitable for different horticultural purposes are given in an appendix, and an excellent index concludes the book; there is also a well-written account of a short tour in the Swiss Alps, undertaken to collect the flowers of which the author is so great a lover. We congratulate him on having produced a very satisfactory volume about them.

The Cultivation of the Cinchonæ, or Peruvian Bark Trees in Java. By K. W. VAN GORKOM, Superintendent of the Plantations (with Notes by C. HASSKARL). Translated from the German. Printed for Her Majesty's Stationery Office. London: 1870. Pp. 62.

As early as 1829 Reinwardt, De Vriese, Blume, and others called the attention of the Dutch Government to the desirability of cultivating the *Cinchonæ* in Java, in order to counteract the anticipated failure of the supplies of South American Barks through the reckless destruction practised by the *cascañeros* (bark gatherers),—a destruction amply confirmed by Weddell and Delondre. Mulder suggested even an expedition to South America, and Textor was actually engaged for the purpose but in consequence of his unexpected death the matter fell through. In 1851 De Vriese, who took a lively interest in econo-

mic botany, obtained a plant of *Chinchona Calisaya*, grown from seed brought home by Weddell. This plant arrived in Java in April, in 1852, but died in the Buitenzorg Gardens, not before, however, M. Teysmann had taken a cutting, now a full-grown tree at Tjiboddas, and the parent of a numerous progeny.

The scheme of direct introduction from South America met with a powerful advocate in M. Pahud, the Minister of State for Holland, and who, in 1852, sent out M. Justus Charles Hasskarl, a botanist who had been some time in Java, but was unacquainted with South America, to collect plants and seeds of the valuable species. Hasskarl landed at Callao, in Peru, in December, 1852, and set out in the search of the *Chinchonæ* forests. Unfortunately, however, through not knowing the distribution of these trees accurately, he stumbled upon a district lying between the "Grey Bark" and "Calisaya Bark" regions, which contained no valuable species. The bulk of his collection consisted of what was supposed to be *Chinchona ovata*, Weddell, but which now is known by Howard's name of *C. Pahudiana*. After undergoing numberless hardships, and overcoming great obstacles, Hasskarl arrived in Java in December, 1854, with some live plants and seeds, and, together with M. Teysmann, undertook their cultivation. Misled by the large size of the trees of *Liquidambar Altingiana* at Tjiboddas, they selected this place for the scene of their operations, but unfortunately the ground was part of a volcanic range traversing Java from east to west, having an altitude of 4400 feet, but only about six inches of soil. The plants languished here till 1855, being exposed to the full blaze of the sun, in a thin soil, and attacked by Fungi from the dead and rotting roots of felled Storax-trees. Great numbers died. In June, 1856, Hasskarl was relieved from his duties by M. Pahud, then Governor-General of Netherland Indies, and was succeeded by Junghuhn, with whom were associated Dr. J. E. de Vrij, a chemist of eminence, and eight overseers. Dr. Hasskarl has been much blamed for the comparative ill success of his labours in Java, but in undertakings of such difficulty as this, success is oftentimes achieved only at the expense of repeated failures. The British Government had the advantage, in the persons of Mr. Markham and Dr. Spruce, of the services of two travellers to whom the country and its people were well known. M. Gorkom bears testimony to the patience and zeal of Hasskarl; he is even of opinion that if the principles laid down by Hasskarl and Teysmann

had been continued by Junghuhn, the cultivation in Java would by this time have proved remunerative. On taking charge of the cultivation, Junghuhn found only about seventy plants of any value. He moved the plantation to the Malawar Mountains, and in 1857 *C. Calisaya* and *C. Pahudiana* blossomed, both producing fruit the year following.

At present there are cultivated in Java *C. Calisaya* and *C. succirubra*, from seed collected by Hasskarl, but for the most part from plants and seeds given by the Indian Government; also *C. micrantha* and *C. Condaminea* from the same source, and *C. lancifolia* and *C. Pahudiana*, collected by Hasskarl. The cultivation of the latter is no longer particularly attended to, it being generally agreed to be of little or no value. There are besides these several varieties of *C. Calisaya*, *C. succirubra*, and *C. Condaminea*. The elevation found to answer best in Java is 1600 metres (5250 feet), at a temperature of 17° C. (62° F.). M. Gorkom thinks forest land is the best for purposes of cultivation, avoiding steep declivities on the one hand, and too extensive plains on the other. If planted in the dense shade of the forest, the trees form no bark of any thickness, and from the excess of moisture prematurely die. In the full blaze of the sun they become shrub-like, and thereby forming, as a rule, no good stems. M. Gorkom advocates slight shade during at least the first eighteen months; this he provides by planting trees which can be removed as thought necessary, and by light Bamboo baskets made so as to cover the plants, thus shielding them from the solar heat, though not intercepting rain. He does not favour Mr. M'Ivor's system of "mossing" the bark, that is, of partial decortication, being of opinion that such a delicate operation could not be entrusted to natives without a certainty of injury resulting therefrom. He sees no cause why any discouragement should be felt because great results are not yet apparent, but that courage should be derived "from the certainty that we are on the right path, and indulge in the well-founded hope that the persevering efforts of various succeeding Governments—efforts which have aroused a sympathetic feeling in the educated world in general, and amongst scientific men in particular—will end in a glorious success."

On the whole this pamphlet, which has more of a practical than scientific character, is chiefly intended for those who contemplate Chinchona cultivation. The author's original wish was to compile a

manual on the subject, the *Chinchona*, but, finding practical instructions based on admitted facts which could be imparted so very few, he substituted the present pamphlet, in which he has brought together all the facts arising from his own practical knowledge and the statements of others. The first 10 pages are taken up with a brief history of the causes which led to the cultivation in Java; pages 11 to 36, with the conditions of growth, soil, temperature, etc.; and the remainder chiefly with statistics. The Supplement (pp. 11) embraces three Tables. From Table A. we learn that, on March 31st, 1869, there were 840,653 plants of *C. Calisaya*; 39,512 of *C. succirubra*; 59,149 of *C. Condaminea*; 812 of *C. lancifolia*; and 409 of *C. micrantha*. The number of *C. Pahudiana* is not given; it was last stated to be 900,000, but many plants have since died. Table B. gives the measured rate of growth of different species; and Table C. the result of chemical analyses of the barks.

Proceedings of Societies.

LINNEAN SOCIETY.—*June 2nd.*—G. Bentham, Esq., President, in the chair. The following botanical communications were read:—By Mr. Hanbury, On the “Red Dates” and “Black Dates” exported in large quantities from China. These were stated to be a species of *Zizyphus*. Also, a letter from Professor Bell, of Selborne, Hants, giving a probably native locality for *Tulipa sylvestris* in Selborne Park. A specimen in flower was exhibited, and the plant stated to grow at Alton, in one or two neighbouring localities, where, however, it but seldom flowers. Also, by the Rev. J. M. Crombie, on “New or Recently-discovered British Lichens.” Twenty-four species were enumerated, viz. *Spilonema scoticum*, *Pyrenopsis homœopsis*, *Lecanora hypophaea*, *Lecidea mæstula*, *L. subturgidula*, *L. tenera*, *L. deducta*, *L. spododes*, *L. parissima*, *L. leptostigma*, *L. lithophiliza*, *L. interludens*, *L. mesotropa*, *L. sarcogniza*, *L. aphanoides*, *L. melaphana*, *L. inserena*, *L. postuma*, *L. præcavenda*, *L. Crombiei*, *L. commaculans*, *L. symphorella*, *Rimularia limborina*, *Endocarpon Crombiei*. The following new varieties were also described:—*Parmelia lanata*, var. *subciliata*; *Lecanora umbrina*, var. *prosechoides*; *L. varia*, f. *livens*; *L. ventosa*, var. *subfestiva*; *Lecidea lapicida*, var. *lithophiloides*; *L. ocellata*, var. *præponens*.

June 16th.—G. Bentham, Esq., President, in the chair. The following botanical papers were read:—“On Petalody of the Sepals in *Serapias*.” By J. T. Moggridge. The two lateral sepals in a flower of *S. Lingua* were found semi-belliform. Dr. Masters stated that no other similar instance had been recorded. “On the Fungi of Ceylon.” By the Rev. J. M. Berkeley and Mr.

C. E. Browne. "Notes on British *Gerania*." By Mr. F. P. Balkwill: drawings and a short account of their fertilization. "A Memoir on the Spermogones and Pycnides of Crustaceous Lichens." By Dr. Lauder Lindsay. Illustrated with figures. Mr. Balkwill exhibited a dried specimen and drawing of a monstrous specimen of *Plantago lanceolata*, showing the not unfrequent change of bracts into leaves.

Botanical News.

If mycophagy does not become the fashion, it will not be the fault of its advocates. Last month we called attention to Dr. Bull's papers in the Woolhope Club's Transactions, and now the indefatigable Mr. W. Robinson has published a book urging further cultivation of Agarics, 'Mushroom Culture, its Extension and Improvement' (Warne), which, besides embodying the cream of most of the various recent publications on the subject, is illustrated by some excellent figures by Mr. Worthington Smith, who possesses, as our readers are aware, an extensive knowledge of the structure and qualities of the objects which his pencil so faithfully portrays.

We think it right to call special attention to the paper by Dr. Bastian, printed in Nos. 35, 36, and 37, of 'Nature,' and we look to the cryptogamists especially to examine the organisms produced in the fluids experimented upon, and determine their real nature; figures of such bodies must always be unsatisfactory. *A propos* of figures and 'Nature,' the illustrations to Mr. Jackson's papers on Coffee and Tea, in Nos. 33 and 37, are so insufficient and below the standard of the present time as to degrade the periodical. It is better to abstain from illustrations, unless some conveying accurate information are forthcoming.

It is with great satisfaction that we see the new part (vol. ii. part 3) of Willkomm and Lange's 'Prodromus Floræ Hispanicæ,' which concludes the gamopetalous Orders.

The English translation of Baillon's Memoirs on the Natural Orders of Plants has been entrusted by Lovell Reeve and Co. to Mr. N. M. Hartog, and will be revised by the author. The first volume is to contain the Orders *Ranunculaceæ*, *Dilleniaceæ*, *Magnoliaceæ*, *Anonaceæ*, *Monimiaceæ*, and *Rosaceæ*, and will be published in the autumn; the whole book is estimated to extend to eight volumes, the price of each to be 25*s.*, or to subscribers to the whole, 21*s.*

Dr. M. T. Masters' new edition of Henfrey's 'Elementary Course of Botany' is published.

Mr. Jackson, of the Kew Museum, has published a useful paper in the 'Gardener's Chronicle,' on the germination of Palms. This is properly described in none of the text-books of botany commonly in use, though well understood by botanists. The peculiarity consists in the end of the cotyledon remaining in the seed, whilst its stalk is pushed out, carrying with it the radicle, which germinates in the usual manner at a little distance from the seed.

In the double Cocoa-nut *Lodoicea*, the protruded end of the cotyledon is as much as 12 or 18 inches long. The sheath or socket at the base of the stem of this Palm, which attracted a good deal of attention in 1864 at the Linnean Society and elsewhere, is shown to be not peculiar to it, though more developed than in other species, and to be formed by the vascular bundles of the rudimentary and early leaves.

The lately published part (vol. xxvii. part 2) of the 'Transactions of the Linnean Society' contains the following botanical papers:—On three new genera (*Rhaphithamnus*, *Phelloderma*, and *Diostea*) from Chile and its adjacent regions, and on the genera *Gatzia* and *Espadea*, both by G. Miers; on the genus *Boswellia*, with descriptions and figures of three new species (*B. Carterii*, *B. Bhau-dajiensis*, and *B. Frereana*), by G. Birdwood, M.D. (which gives an exhaustive history of the literature of Frankincense); on some species of *Agaricus* from Ceylon, by Rev. M. J. Berkeley and C. E. Broome; on the similarity between the genus *Draparnaldia* and the confervoid filaments of Mosses, by J. B. Hicks, M.D.; and notes on the Lichens of St. Helena, on *Sphaeria tartaricola*, Nyl., a new British Fungus, and the Lichens of Ceylon collected by G. H. K. Thwaites, Ph.D., all by the Rev. W. A. Leighton.

Dr. P. Magnus, of Bremen, has published as his inaugural dissertation 'Contributions towards a knowledge of the genus *Najas*,' appropriately dedicated to Professor Alexander Braun, and accompanied by illustrations.

Dr. Seemann has left England for Nicaragua, and will be absent for some months.

The new series of the 'Pharmaceutical Journal' has been entrusted to the editorship of Dr. B. H. Paul.

Among the awards recently made by the Académie des Sciences, we find the following: Prix de Physiologie Expérimentale, to M. Famintzin, for his researches in vegetable physiology; Prix Desmazières divided between M. H. Hoffmann, of Giessen, for his Memoir on Bacteria, and M. Rabenhorst, for his Flora Europæa Algarum; and honourable mention of M. Strasburger, of Jena, for his observations on the fecundation of Ferns; Prix Thore to M. Bonnet, for his researches on the Truffle.

The Belgian Academy offers a prize for 1871, for an essay on the position in the vegetable kingdom of the genus *Lycopodium*, and of four allied genera.

The Rev. W. M. Hind, of Pinner, Middlesex, has presented his large British Herbarium to Trinity College, Dublin. The specimens have been fastened down, and incorporated with the British collection in the Herbarium of the College, and all original memoranda carefully retained. There are some interesting Irish species in Mr. Hind's herbarium, of which we are promised a notice shortly.

COMMUNICATIONS have been received from Dr. F. Müller, Dr. H. F. Hance, W. G. Smith, Hon. J. L. Warren, Dr. Perceval Wright, J. Roy, Rev. J. M. Crombie, Dr. R. Braithwaite.

CORRIGENDA.—In Dr. Hance's paper, p. 75, foot-note, lines 2, 4, and 5, "vol." and "p." should be omitted; the references are to book and chapter. On p. 76, l. 24, for "shape" read "style."

Original Articles.

CORTINARIUS (PHLEGMACIUM) RUSSUS, Fr.

BY H. G. BULL, M.D.

(PLATE CX.)

This very striking fungus is a recent addition to British mycology. It was exhibited by me at the first Fungus Exhibition held at South Kensington in 1868, and it has been found in several places in Herefordshire each succeeding year. An excellent coloured representation of it is given in the volume of the 'Transactions of the Woolhope Naturalists' Field Club' for 1869, and the sketch here given is from the same drawing.

The following are the botanical characters of this fungus:—

Pileus.—Fleshy, convex, then flattened, obtuse, viscid, glabrous at the disc, fibrous at the margin, brittle, uniformly red; *veil* tender, fugacious.

Gills.—Obtusely adnate, scarcely perceptibly rounded, or with a slight decurrent tooth, crowded, veined, of a red peroxide of iron colour, similar to the pileus.

Stem.—Stuffed, thin, hollow, not bulbous, often curvato-ascending, soft, streaked with fine silky fibres, somewhat pruinose at the apex. Flavour not bitter, but nauseous.

Spores.—Brown, $\cdot 00032'' \times \cdot 0002''$.

It grows solitarily, or in small patches in Herefordshire woods, and has been gathered several times in Haywood Forest and Dinedor Wood, near Hereford.

EXPLANATION OF PLATE CX.—Fig. 1 and 2. *Cortinarius (Phlegmacium) russus*. Fig. 3. Section of the same. Fig. 4. Spores $\times 700$ diameters.

VIBURNUM TOMENTOSUM, Thunb., IN SOUTHERN CHINA.

BY HENRY FLETCHER HANCE, P.H.D., ETC.

The occurrence of this plant, detected in April of the present year, by Mr. Sampson, near the summit of the Pakwan hills, overlooking Canton, is interesting as affording another link between the floras of

Japan and South China. Mr. Bentham, in 1861, stated that he could not enumerate 80 species common to Japan and Hongkong.* This island, being separated by a strait, of no great depth and only half a mile in width, from the mainland, may, for phytogeographical investigations, be practically regarded as a part thereof; and, indeed, it seems unlikely that any members of its flora are strictly endemic. But the arboreous vegetation of Southern China has long since all but disappeared.† Meyen, in his 'Pflanzengeographie,'‡ has suggested that *Pinus sinensis* originally formed, on the islands and mainland hereabouts, forests not distinguishable from the pine-woods of Germany. There can, I think, be no doubt that, while the flanks of the hills were dotted more or less thickly with this Pine, forming *silvæ acerosæ*, all the valleys and sheltered glens between their spurs were formerly densely clothed with other trees (*silvæ frondosæ*), which have been gradually cut down for fuel. A mile or two outside Canton, hundreds of plants of *Liquidambar formosana*, only a foot or two high, are met with, which prove on examination to be merely shoots springing up from old stumps buried beneath the soil, showing that this tree, now all but exterminated, was once common; and so eager is the search for firewood, that any shrub which has attained half an inch in diameter is almost certain to be ruthlessly cut down. This denudation of arboreous vegetation, and consequent deprivation of shade and diminution of humidity, entail the disappearance of numbers of herbaceous plants, and will serve to explain why so many of the species enumerated in the 'Flora of Hongkong,' amounting to one-seventh of the entire number, had not been met with on the adjacent continent; the sparse fishing population of the island, engaging in agriculture so far only as was

* Fl. Hongkongensis, pref., p. 15.

† Mr. Albert Bickmore has, I find, made a similar remark. He thus writes in his 'Sketch of a Journey from Canton to Hankow' (Journ. N. China Branch R. As. Soc., n.s., iv. 1), "This nakedness appears to be a universal characteristic of mountain scenery in China, but it is not the fault of the soil or the climate, for wherever the little Pines are suffered to rise they show a vigorous growth. The cause of this universal deficiency in forests seems to be the frequency of rebellions that have swept to and fro over the whole empire like a desolating scourge. . . . It is true they do raise some trees in a few places; but over the wide area that I have travelled, not a tenth part of the soil is thus improved that might be, and then the trees are generally cut down before they attain any size. . . . The old trees occasionally seen in groves around the Buddhist temples, that only owe their preservation to the superstitions of the destroyers, show what splendid timber thousands of hillsides in China might yield."

‡ Ray Soc. translation, p. 131.

necessary to supply their own wants, having left the virgin forest inviolate. In fact, the scantily-peopled islands off the coast, and the neighbourhood of temples or monasteries amongst the hills of the mainland, afford the only opportunities to the botanist of studying the primitive tree-vegetation in this part of China. These temples are for the most part built in depressions or glens between the converging apices of spurs, in order to defend them from the violence of the wind; and are further sheltered on the sides and at the back by thick woods,—the constituent elements or *essences* (to use a French term) of which, so different from the trees habitually planted by the Chinese for ornament or shade, unequivocally prove them to be remnants of the once doubtless wide-spreading forest, preserved from destruction only by the presence of the sacred edifices which they embosom. Botanists are under deep obligations to the founders of these temples, so directly instrumental in rescuing from the otherwise inevitable axe many fine though small woods, the existence of which permits us to study the sylvan flora, of whose nature, but for this aid, we must have remained almost entirely ignorant. Since the publication of Mr. Bentham's book, the botany of the neighbourhood of Canton, within a few miles of the coast, and with which, as above remarked, that of Hongkong is in all essential features identical, has been steadily explored, mainly through the perseverance and activity of Mr. Sampson; and, amongst the numerous species found, many of which have not hitherto been recorded as natives of China, a certain number have been also met with in Japan. The following short list, which, had I more leisure, might certainly be extended, may be interesting. One or two of the plants occur in Hongkong itself, and of the majority I have compared Japanese and South Chinese specimens:—

<i>Xylosma japonicum</i> , <i>A. Gray.</i>	<i>Patrinia scabiosifolia</i> , <i>Lk.</i>
<i>Hypericum Sampsoni</i> , <i>Hance</i> (H. electrocarpum, <i>Maxim.</i> !).	<i>Isolobus radicans</i> , <i>A. De Cand.</i>
	<i>Lysimachia Fortunei</i> , <i>Maxim.*</i>

* Klatt has curiously referred this to *L. barystachys*, Bge., a very distinct species, of which I have good specimens from N. China and Amuria; whilst Miq. (Ann. Mus. Bot. Lugd.-Bat., iv. 146) considers it nearest to *L. candida*, so imperfectly characterized by Lindley. If, as seems to be the opinion at Kew, my *L. samolina* is identical with this latter, I do not coincide with him, but think *L. Fortunei* certainly much closer to *L. clethroides*, Duby, with which Maximowicz himself compares it (Mél. Biol. Bull. Acad. Petersb. iii. 270), and under which name I had myself, though possessing Duby's species, distributed South Chinese specimens. But I am inclined to think *L. incon-*

<i>Agrimonia viscidula</i> , <i>Bunge</i> .	<i>Mæsa Doræna</i> , <i>Bl.</i> *
<i>Penthorum sedoides</i> , <i>Pursh</i> ; <i>var. angustifolia</i> , <i>Miq.</i>	<i>Symplocos lancifolia</i> , <i>S. and Z.</i>
<i>Haloragis micrantha</i> , <i>R. Br.</i>	<i>Perilla ocimoides</i> , <i>L.</i>
<i>Callitriche verna</i> , <i>L.</i>	<i>Siphonostegia chinensis</i> , <i>Bth.</i>
<i>Tetragonia expansa</i> , <i>Ait.</i>	<i>Saururus Loureirii</i> , <i>Dcne.</i>
<i>Cryptotænia canadensis</i> , <i>De Cand.</i>	<i>Habenaria Miersiana</i> , <i>Champ.</i> †
<i>Dasyloina</i> (?) <i>japonicum</i> , <i>Miq.</i>	<i>Hypoxis aurea</i> , <i>Lour.</i>
<i>Ophiorrhiza japonica</i> , <i>Bl.</i> (<i>O. Eyrei</i> , <i>Champ.</i>).	<i>Eriocaulon sexangulare</i> , <i>L.</i>
	<i>Pollia japonica</i> , <i>Thunb.</i>
	<i>Carex tristachya</i> , <i>Thunb.</i>

Some difference of opinion exists respecting the plant under consideration. Prof. Asa Gray, in his list of the Japanese plants collected by Drs. Williams and Morrow,‡ referred both *V. plicatum*, Thunb., and *V. tomentosum*, Thunb., to the North American *V. lantanoides*, Michx.; but he subsequently§ considered *V. tomentosum* as more likely a radiate form of *V. dilatatum*, Thunb. I believe he was wrong in his reduction of *V. plicatum*; for he has himself described *V. lantanoides* as having sessile cymes,|| and Miquel has well remarked of it**:—"Cyma umbelliformis 4-5-radiata inter foliorum par supremum sessilis, qua nota a *V. plicato* aliisque inflorescentia pedunculata donatis statim discernitur." Notwithstanding this observation, however, the latter author has referred the plant distributed by Maximowicz under the name of *V. tomentosum* (apparently regarding it as really identical with Thunberg's plant) to *V. plicatum*, as a broad-leaved form, with the remark,†† "umbellis non sterili-plenis sed fructiferis; an itaque bona species?" I have specimens of this both in flower and fruit from M. Maximowicz himself; it has sessile cymes, and I refer it without the least hesitation to *V. lantanoides*, my American examples of which differ only in the greater size of the radiant sterile flowers. The Chinese plant, the true *V. tomentosum* of Thunberg, is, however, quite different from this, and agrees perfectly with Zuccarini's beautiful plate.‡‡ Following Miquel, I regard both it and *V. cuspidatum spicua*, Miq., of which I have seen no detailed diagnosis, may rather be the same as my *L. samolina*.

* I have already stated (*Ann. Sc. Nat.*, 5me sér. v. 225) that Champion's *M. coriacea* is a mere variety of this, and that the typical form occurs in Fokien as well as in Japan.

† See *Seem. Journ. Bot.* Vol. VII. p. 161.

‡ Narrative of Commod. Perry's Exped. to Japan, ii. 315.

§ *Mem. Amer. Acad.* vi. 393.

|| *Fl. N. Amer.* ii. 18.

** *Ann. Mus. Bot. Lugd.-Bat.* ii. 265.

† *Ann. Mus. Bot. Lugd.-Bat.* iii. 196.

‡‡ *Fl. Japon.* tab. 38.

as varieties of one species, of which *V. plicatum* is no doubt an entirely sterile luxuriant form. On the other hand, contrary to Asa Gray's opinion, *V. dilatatum*, with the several forms or allied species included under the name of *V. erosum*, seem to me to have more affinity with the American *V. dentatum*, L., and *V. pubescens*, Pursh, than with *V. lanthanoides*.

EARLY ICELANDIC BOTANY.

BY HENRY TRIMEN, M.B., F.L.S.

The paper by Rottböll, alluded to in the notice (p. 236) of Prof. Babington's 'Revision of the Flora of Iceland,' and which has been overlooked by him, is of sufficient importance to merit a more extended notice, as several species were there first named, fully described and figured. It is, with the exception of the descriptions, which are in Latin, unfortunately written in Danish; the English of the title runs 'Observations on the new or little-known but rare Plants found in Iceland and Greenland,' and there is prefixed to it a valuable 'Introduction on the Progress of Botany in Denmark.' The paper was read before the Copenhagen Natural History Society in 1766 and 1767, and was revised and published in 1770, in the tenth volume of its Transactions (*Skripter, som udi det Kiøbenhavnse Selskab af Lærdomsog Sidseskabers Elskere*, etc.), pp. 393-462; its date of publication is therefore the same as Müller's list in the 'Nova Acta,' vol. iv., which is quoted by Babington as the foundation of the Flora of Iceland, but it really antedated that list by three or four years. As regards Iceland, both papers dealt with the plants collected there in 1764, 1765, by Dr. König, then almost the only existing material; some of these had been figured in 1767, in the sixth fasciculus of the 'Flora Danica,' and though short diagnoses on the Linnæan plan were given to the new species, no specific names were applied, so that when Rottböll fully described them in his paper he was also free to name them.

Nineteen Icelandic species are specially described by Rottböll, and there are figures of the whole of them, of which the following is a list in the order of the plates:—*Königa capitata*, *Gentiana involucrata*, *G. detonsa*, *Swertia sulcata* (= *Pleurogyne rotata*, Griseb.), *Gentiana*

nivalis, *G. tenella*, *Juncus biglumis*, *J. triglumis*, *Saxifraga punctata*, *S. Cotyledon*, *Stellaria biflora*, *S. cerastoides*, *Saxifraga rivularis*, *Stellaria humifusa*, *Arenaria ciliata*, *Ranunculus hyperboreus*, *Diapensia lapponica*, *Epilobium corymbosum*, *Papaver radicum*. There are also figures of the following, drawn from Greenland specimens:—*Andromeda cærulea*, *A. tetraquetra*, *Campanula uniflora*, *Saxifraga tricuspidata* (here first described, figured, and named), *Potentilla nivea*. The figures are uncoloured but fairly characteristic drawings.

As some of the Icelandic species above named are plants about which Professor Babington has doubts of different kinds, it will be well to see what light can be obtained from Rottböll's descriptions and plates. Some information about them has also been obtained from Gunner's 'Flora Norvegica,' pars posterior, published in 1772, in which Rottböll's paper is frequently quoted, but where his names are in several cases not adopted, e. g. *Ranunculus hyperboreus*, Rottb., is named *R. Ammanni*, and *Gentiana tenella*, Rottb., *R. Kæningii*. Gunner appears to be generally accurate, but is quite at fault at p. 140, where he gives a Scandinavian locality for *Swertia (Pleurogyne) rotata*,—a plant he evidently quite misunderstood,* and the figure of which in Fl. Dan. t. 343, he names *Gentiana islandica*. He also quotes Fl. Dan. 344 (*G. involucrata*, Rottb.) twice over, once as *G. aurea*, L. (p. 54), and then as *G. quinquefolia*, L.

Ranunculus hyperboreus, Rottb., here first named, and fully described (p. 458). Figured (f. 16); but the plant had been previously engraved in Fl. Dan. tab. 331.

Papaver radicum, Rottb. This is, no doubt, "*P. radiatum*" of Babington's 'Revision' (p. 293). It is described on p. 455, and figured in f. 24. As Professor Babington states, it does not seem to be more than a small variety of *P. nudicaule*.

Arenaria ciliata, L. Babington excludes this, but it is figured from König's specimens in Fl. Dan. t. 346, and Rottböll's figure (f. 15) represents this species rather than *A. norvegica*; his description (p. 448) also agrees with the former.

Stellaria humifusa, Rottb. This is also excluded by Babington. There can, however, be no doubt about its occurrence. The species was founded on Icelandic specimens, and is fully described by Rottböll on p. 447, and figured in f. 14.

* Hartman (Skand. Flora, ed. 2 (1864) p. 276) says that, according to Prof. Blytt, *Gentiana tenella* was the plant intended by Gunner.

Epilobium corymbosum, Rottb p. 440, f. 23, according to Gunner does not differ from *E. latifolium*, L.

Saxifraga punctata, L., Rottb. Babington says that it is difficult to tell what can have been meant by this name. Rottböll's description (p. 445) and figure (f. 10) seem, without doubt, to have been made from *S. cuneifolia*, L.; yet it is certainly difficult to believe that this species can have occurred in Iceland. Rottböll states that Paduan specimens, sent to him from Arduin under the name given in Morison's 'Historia,' quoted by Linnæus as a synonym of his *S. punctata*, differed from Morison's figure (which is indeed a good figure of the *S. punctata* of the Linn. Herb.) in several particulars; and that he compared the plant from Iceland with these Italian specimens, and found that the two "were as like as two drops of water to one another." Gunner (p. 140), however, says that Rottböll's specimen at Copenhagen comes nearer to *S. nivalis* than to any other species. The figure, however, cannot represent this, and it is not evident where the error, if there be one, can exist.

Saxifraga bulbifera, L. Gunner says this was found in Iceland by König. Gunner seems to have known the true *S. bulbifera*, and says it can be distinguished from *S. cernua* by its inferior ovary. He does not quote for it Fl. Dan. 390, which was drawn from Iceland specimens, but represents the large-branched form of *S. cernua*, of which there is a specimen in Herb. Banks, collected in Iceland by Banks and Solander.

Gentiana involucrata, *G. detonsa*, and *G. tenella*. All these are Rottböll's species (not Fries's, as given by Babington), founded on Icelandic plants, and are described for the first time in his paper, pp. 434-6. They are figured in f. 2, 3, and 6, but had been previously published in Fl. Dan. t. 344, 317, and 318; *G. involucrata* as "*G. quinquefolia*, L.," and the other two without names. With regard to *G. detonsa*, Rottb., it is probably right to regard it, as Hartman does, as merely a variety, with a 4-fid corolla, of a plant which has usually 5 corolla-lobes. The figure in Fl. Dan. 317, has the latter number, and is called by Gunner (p. 101) *G. serrata*, which name is retained by Hartman.

Veronica Anagallis, L. This is excluded by Professor Babington; there are, however, specimens in the British Museum, collected by Banks and Solander, labelled "Islandia in thermis."

FERDINANDOA MAGNIFICA, Seem., A NEW SPECIES
FROM TROPICAL AFRICA.

BY BERTHOLD SEEMANN, PH.D., F.L.S.

F. magnifica, Seem. mss. in Herb. Kew. "fruticosa" (fide cl. Kirk); foliis 6-jugis cum impari, foliolis sessilibus ovato-oblongis subtus glandulosis coriaceis utrinque glaberrimis; pedicellis elongatis (coroll. long. multo excedentibus); calycibus corollis ovarisque glaberrimis.—Rovuma, Lake Chidia, Zambesi (Kirk! in Herb. Kew.), collected October, 1862.

Closely resembling in habit *F. superba*, Welw., Journ. of Bot. Vol. III. p. 330, tab. 37, 38), from Angola, the leaves being imparipinnate, and the flowers of equal size; but the foliage and calyx, etc. are quite glabrous, and the pedicels three times the length of those of the beautiful species discovered by that indefatigable collector, Dr. Welwitsch. Judging from the dry specimen at Kew, the flowers of *F. magnifica* are as bright as those of *F. superba*.

It should be added that on the publication of the genus the name was misspelt; it should have been "Ferdinandoa" (*vide* Journ. of Bot. Vol. IV. p. 123); and the pattern plate, having come in contact with some chemical influence, had changed colour in transmission from Mr. Fitch to the colourist, who, of course, copied what he had placed before him, instead of that indicated in the letterpress and put on by Mr. Fitch.

ON THE BRITISH DACTYLOID SAXIFRAGES.

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

The question of the relationship to one another of the multiform types of Dactyloid Saxifrages, and the manner in which they are dispersed through the Arctic and subarctic regions, and other parts of the world, is one of great interest, because it is probable that there is no other group with a well-marked Arctic-alpine rôle of dispersion in which there exists such a large number of forms which have such a close mutual relationship. To discuss fully the whole matter would be a very elaborate inquiry, and beyond the scope of our columns; so what I propose to attempt now, is simply to compare the forms known

in Britain with identical or similar ones from other parts of the world, and to report the result of such comparison. A large number of British forms have been separately named, and many of these names have been dropped, but some are still retained. Have we, then, any forms peculiar to Britain, and, if so, which are they? What is the range beyond our bounds of the forms which Britain produces, and where can be best drawn lines of demarcation to separate our types into species or varieties? I propose to examine the Kew specimens with these questions in mind, making use of the plates adopted in the last edition of 'English Botany' as standards of comparison.

1. Of the Scotch plant, described by Dr. Boswell Syme as *cæspitosa*, I have seen only two specimens gathered on Ben Nevis by Mr. Woods, and a series in the fruiting stage from the Clova Mountains, from Dr. Barry. This form differs from all the others known in Britain by its more compact growth, and by the barren shoots not being elongated beyond the tufts of leaves at the base of the flowering-stems. The leaves are very slightly hairy, with three or rarely five lobes, with the central lobe not more than $1\frac{1}{2}$ -2 lines long, and at least half as broad as deep, with a bluntish point. The flowering-stem is not more than $1\frac{1}{2}$ -2 inches long, with very few flowers (1-3 in the specimens just referred to, and considerably larger than Mr. Sowerby has drawn them), the fruit-calyx being semiglobose, and with blunt, oblong-deltoid lobes. To me this plant appears to be quite identical with the common Greenland, Labrador, and Scandinavian form of *cæspitosa*, with the plant given for typical *cæspitosa* in the 'Herbarium Normale' of Fries, and with the Hartz *cæspitosa* of Reich. Exsicc. 1887. In an Iceland specimen, which otherwise quite agrees, the petals are more than half an inch deep, and a quarter of an inch broad. There are fine specimens in Sir W. C. Trevelyan's Feroe collections, marked "*S. cæspitosa grænländica*," by Horneman, more robust in habit than the Ben-Nevis ones, with more hairy, more robust, deeper-lobed leaves, and larger flowers. I have seen only one specimen in fruit of the Welsh *S. cæspitosa*, gathered on rocks above Cwm-Idwel, Caernarvonshire, in 1825, by Mr. Wilson, but judging the plant from this and the original 'English Botany' figure, I do not see any reason why it should not be identified with the Ben-Nevis plant, and would say the same for the Irish plant which has been referred to *cæspitosa*, of which there is a specimen at Kew, gathered by Mr. Wilson on

Brandon Mountain in 1829. The Arctic *S. uniflora*, R. Br., in Parry's first Voy. App. p. 275, is, to my eyes, just the plant of the original figure. The Pyrenean plant which has been called *grœnlandica*, (De Cand. Fl. Franc. iv. 376; Gren. et Godr. i. 649. = *S. Iratiana*, F. Schultz, Archiv, ii. 176, Exsicc. 1254; *S. melæna*, Boiss. Diagn. ii. fasc. ii. p. 66; *S. pyrenaica*, Koch, Deutsch. Fl. iii. 151, non Villars), is, as Dr. Boswell Syme indicates, a clearly separable form approaching *exarata* and *muscoïdes* by its considerably smaller flowers, and more rigid, viscid, strongly-nerved, persistent, densely-imbricated leaves, the upper ones ascending, and the lower ones reflexed, so that about the middle of the stems the two sets, instead of being regularly imbricated as in all our English forms, abruptly part company.

2. Of the Irish plant, figured by Smith in 'English Botany' t. 2291, under the name of *hirta*, I have examined a large series of wild and cultivated specimens, gathered by Dr. Mackay, Rev. W. T. Bree, and Professor Babington. The 'English Botany' figure is well drawn, but it is from a cultivated specimen, and makes the plant look more different from *cœspitosa* and *decipiens* than it really is. In this the copious barren shoots lengthen out (in the wild specimens 1 or 2 inches, in the cultivated 3-4 inches) beyond the rosettes at the base of the flower-stems; the leaves are less fleshy in texture than in most of the Arctic specimens of *cœspitosa*, but scarcely more so than in the Scotch plant, and are thinly furnished with short, spreading, grey, cottony hairs; the fully-developed leaves are 8-9 lines long, with 3-5 ligulate lobes, the central one 3-4 times as long as broad, never so decidedly blunt as in *cœspitosa*, and sometimes subacute; the flowering-stem is much more lengthened out, with usually 4-6 flowers in a very lax corymb, and the calyx-tube in fruit is turbinate, with deltoid, bluntish, or subacute lobes. Placing the cultivated specimens of the Irish plant by the side of the figure in Sternberg's monograph (t. xxiv.) of *S. Sternbergii*, Willd. Enum. Hort. Berol. i. p. 462, they correspond so precisely that the figure might well have been drawn from the Kerry plant. A specimen from Dr. Romer, sent as *S. Sternbergii*, differs only from the Kerry plant by having the lobes of the leaves rather shorter. Two wild specimens from the Hartz, sent by Professor Mertens as "*S. decipiens*, Ehrh.; *S. palmata*, Smith; *S. petræa*, Roth," agree thoroughly with the Irish specimens; and of a series of five specimens, sent by Count Sternberg as "*S. villosa*, Willd.; *S. palmata*, Panzer;" three,

one "cultæ," and two "spontanea ex agro Norimbergensi," correspond with it fairly. All these names are quoted by Koch under *S. cæspitosa*; and I feel, therefore, no hesitation in considering the Irish plant as identical with the German one, and as representing what Koch intends by the name "*S. cæspitosa*, var. *laxa*," and in sinking the name *hirta* (which does not apply well to the Irish plant) in favour of the earlier one of *Sternbergii*, which takes date from 1809. To my eyes the plants from Brandon Mountain, Maegillicuddy's Reeks, and Galtymore, look precisely the same (although Smith, in 'English Flora,' refers the former to *cæspitosa* and the two latter to *hirta*), and *incurvifolia* of 'English Botany' to be the ordinary wild condition of the same form. This is not precisely the same as D. Don's *hirta*, from the west of Scotland, which is a less robust form, with smaller, more hairy, less deeply-cut leaves, with more acute lobes; neither is it the *hirta* of Haworth, who characterized a totally different plant under that name eight years before Smith. It is the *S. hibernica* of the monograph of Haworth (p. 29), who regarded it as a distinct species peculiar to Ireland, and defines six varieties. The nearest Welsh and Scotch specimens I have seen have the leaves a little more acute, and thus agree better with the 'English Botany' *decipiens*. The Norwegian specimen given for *cæspitosa*, var. *laxa*, in the 'Herbarium Normale' of Fries matches the Irish *hirta* very well, and so do Arctic American (Greenland and Disco island) specimens from Dr. Sutherland and Dr. Lyall. Of the British forms, this and the last are the only two that correspond with Scandinavian and North American examples.

3. The 'English Botany' figure of *S. decipiens* agrees very well with the plant given under that name in Reichenbach's 'Exsiccata,' n. 1261, from the Hartz, and with the plant figured by Sternberg (t. 23) as *decipiens*, making allowance for the latter being drawn from a cultivated specimen. This comes very near the wild specimens of the last variety, agreeing with it quite in general habit, but differing in the leaf-lobes and calyx-lobes being always decidedly acute. As already stated, the specimens sent by Mertens as *decipiens* correspond better with our last variety. The only British specimens which I have seen that unmistakably rank here are from Caernarvonshire, rocks near Llyn-y-Cwm, gathered by Mr. Roberts, of Bangor; and Sleeve Neesh near Tralce, gathered by Mr. Woods. Cultivated specimens from Snowdon, from Mr. Wilson, marked by himself "*palmata*" (Smith's

original name for this variety), and by Dr. Planchon "*sponhemica*," are doubtful between this and the next. In Sir W. C. Trevelyan's Feroe collection there is a sheet of specimens of a form which quite corresponds with the Welsh and Irish examples just mentioned, and of another allied form, more robust and more hairy, with larger flowers and broader calyx-lobes. There is a characteristic specimen from Iceland in the Kew collection, from Mr. Paulsen.

4. *S. affinis* of D. Don, as represented by Mackay's wild Irish specimens, and figured in 'English Botany,' quite corresponds with the specimen in Reich. Exsicc. 1888, of *S. sponhemica*, Gmelin, "e loco classico" (Sponheim in the Palatinate), and the same form is given as *sponhemica* by F. Schultz (Exsicc. n. 67), and there are authentic specimens of it under the name of *sponhemica*, in Herb. Gay both from Koch and Grenier; and Gay refers to *sponhemica* specimens gathered by himself, in company with Professor Babington and the Rev. W. W. Newbould, on Snowdon. All these are unmistakably one and the same plant. This variety is so widely spread in Britain that there is no need to quote special stations, and I can only consider *S. platypetala*, 'English Botany,' as another form of the same variety, with more elongated, weaker stems, and unusually large flowers. This variety is less robust than the last, both in the stems and leaves, usually glabrous, or nearly so, with the leaves of the shoots always without buds in their axils, and usually spreading and cut down into three narrow linear-ligulate acute lobes, and lanceolate acute calyx-teeth. Adding *affinis* to it, I should consider the *S. euhyppoides*, *a. platypetala* of Syme to be just parallel to the *sponhemica* of Koch and Nyman. A series of specimens, labelled *sponhemica* by Sternberg, all come within the range of the British variety as here understood. An original example of *S. palmata*, Lejeune, Fl. Spa. p. 191, is just the average British form. From the Continent I have seen it from Belgium, France (the Jurassic border only, not the interior or Pyrenees), the Palatinate, and Bohemia, which, in fact, are just the tracts from which Nyman reports it. The following is Gmelin's original account of the plant in 'Flora Badensis,' vol. iii. p. 226:—

"*S. sponhemica* foliis radicalibus aggregatis, sessilibus, cuneatis, quinquepartitis, laciniis rectis, aristatis, caulinis tripartitis, rameis setaceis, integris, adpressis; caule erecto, glabriusculo, ramoso, stolonibus rep-
tantibus.

“Habitat in Sponhemia inter *Winterburg* et *Burgsponheim* in saxis et rupibus, quos longe lateque tapetis more pulcherrime obducit maxima in abundantia. Floret Majo, Junio. Semina Julio, Augusto matura.

“Primo aspectu *S. hypnoidem* ob stolones suspicatus sum, sed hujus specimina vere alpina in Helvetia et Pyrenæis lecta possideo, quæ longe à nostrate Sponhemica planta discrepant, neque minus diversa est à *S. cæspitosa* vera, Linn., et *S. decipiente*, Ehrh., quæ in Hercynia, nec non in Franconia prope *Muckendorf* crescit. Differt hæc à nostrate caulibus adscendentibus, sæpe altioribus (non erectis, strictis); foliis radicalibus anguste cuneiformibus, margine pilosis, pilis longis, mollibus, albis, in petiolum decurrentibus, omnibus fere tripartitis; laciniis ovalibus obtusis (nec quinquepartitis, laciniis lineari-acuminatis aristatis); corollis minus patentibus, petalis dorso semper e basi multi-triatis (nec tri-triatis).

The name *sponhemica* has been widely used upon the Continent since its publication in 1806, but substantially the same plant was characterized in England three years earlier by Haworth in his ‘Miscellanea Naturalia,’ under the name of *S. quinquefida*. The following is Haworth’s account of the plant:—

“S. foliis stolonum erectorum quinquefidis, laciniis lanceolatis, lineola longitudinali subexaratis.

“Habitat in Alpibus Scotticis, *D. Don*. Floret Maio.

“DESCRPTIO. Affinis præcedenti (*S. geranioides*) at multoties minor. Stolones erectiusculi, rubri, pilis albis remotiusculis vestiti. Folia rosarum aggregata 5-11-fida, stolonum sparsa 5-fida vel rarius 3-fida carnosæ longe petiolata, pagina utrinque glabriuscula, marginibus petiolisque ciliato-pilosis. Caulis rubri, flexuosi, subquinqueflori. Bractæe imæ trifidæ, ceteræ elliptico-lanceolatæ, trinerves, recurvatæ. Flores majusculi, petalis albis euneato-obovatis, basi nervisque tribus abbreviatis flavicantibus.” (Haworth, Misc. Nat. (1803) p. 163.)

I have examined an original specimen from Haworth in Mr. Borrer’s collection, and it differs from Reichenbach’s specimen of *sponhemica* only by having the leaves slightly hairy, with more spreading, slightly more compound lateral lobes. The *S. condensata*, figured and described by Gmelin in the same work as *sponhemica*, is evidently only another form of the same variety, with a laxer habit and narrower leaves, which might easily be matched in British examples. Under

this variety come a large number of the species of Haworth and D. Don, differing from one another in robustness, vestiture, the extent to which the shoots lengthen out, the breadth of the claw and lobes of the leaf, and the proportion which they bear to one another. Of these I may note the following:—

(1.) *latevirens*, D. Don, Linn. Trans. xiii. 451. An original specimen from D. Don in Herb. Hooker differs from the Eng. Bot. figure of *platypetala* only by its perfectly smooth leaves and smaller flowers.

(2.) *elongella*, Smith, Linn. Trans. x. 340. An original specimen from D. Don has short, robust, ascending shoots, and robust, smooth leaves, 3–4 lines long, shortly 2- or 3-cleft at the point, with a broader claw and central lobe than usual. Flowers 3–4, middle-sized.

(3.) *trifida*, Haw. Misc. Nat. 165. A Welsh form, not appreciably different from the last.

(4.) *hirta*, D. Don. An original specimen from the West of Scotland, in Herb. Hooker, has very hairy robust leaves, only 3–4 lines long, trifid a third of the way down, with moderately broad lobes and claw. Exactly the same form is in Sir W. C. Trevelyan's Feroe series.

(5.) *lævis*, Haw. Misc. Nat. 30. A Settle and Helvellyn form, with moderately elongated shoots, large flowers, ascending smooth leaves not more than a quarter of an inch long, with three short, very narrow, very acute divisions.

(6.) *hirta*, Haw. Misc. Nat. p. 164. Short ascending shoots, rather fleshy, finely-ciliated leaves, 4–5 lines long, only the uppermost shortly trifid, the others quite simple.

The variety *sponhemica*, as a whole, is common through the hilly regions of Wales, the North of England, and Scotland, but seems to be more rare in Ireland. Specimens from the Isle of Arran, Galway, gathered by Mr. Kirk, belong here.

5. I do not see any reason to doubt that the *S. euhypnoides*, var. *gemmifera*, of Syme, is parallel to the *hypnoides*, not only of Grenier, but also of Koch and Nyman. Comparing it with the last variety, I can only endorse Dr. Boswell Syme's verdict (Eng. Bot. ed. 3, vol. iv. p. 83), "The extreme states are strikingly different, but the transition from one to the other is so gradual, that it appears to be impossible to draw any definite line between them." But, although it seems so to us, Koch, Grenier, and Nyman, all three keep them up without hesitation as distinct species; and the Continental distribution

of the two is materially different. This variety is dispersed widely through the mountainous regions of the Centre and South of France, and stretches through Spain into Portugal. I have seen a large number of French and a few Spanish specimens, and they all manifestly belong to this variety, and show its characteristic narrow, firm, very acute, usually entire leaves, those of the shoots often furnished with strong buds in their axils; and its sharp-pointed, lanceolate calyxlobes. An Icelandic specimen, gathered by Professor Babington, may fairly take rank here. I have seen only one Irish specimen, gathered on calcareous hills in Sligo by Dr. Mackay. In Britain this variety appears to be most frequent amongst the calcareous hills of the North of England.

6. I have examined the original type-specimen of *S. pedatifida* of Ehrhart, given in his published 'Exsiccata,' No. 15, and consider that it quite corresponds with some of the specimens which I have seen of *S. geranioides* of Linnæus. This is a plant quite confined to Spain and the Pyrenees, in which the leaves possess a distinct petiole and several compound lobes, confluent at the base, thus receding appreciably from the dactyloid type of form in the direction of such a palmatifid leaf as that of *Geranium dissectum* or *columbinum*. The plant sent by George Don to Smith, which was figured by Smith as *pedatifida*, I consider, after examination of original specimens, to be materially different from Ehrhart's plant, and to belong to *S. trifurcata*, Sehrad. Hort. Gott. (1809) p. 13, t. 7, a plant with a truly dactyloid type of leaf, strong stems, narrow, linear, acute, rigid, much-divaricated leaf-lobes, which is frequently seen in gardens, and easily recognizable from all our indigenous forms, some of which it otherwise resembles closely, by its rigidity and viscosity. This is a native of the Asturias and other parts of Spain, and comes very near the Pyrenean *S. pentadactylis* of Lapeyrouse, and is the same plant as *S. ceratophylla*, Bot. Mag. t. 1651 (1814), and is usually labelled by this latter name in English collections.

The only conclusion to which I can come is, that, taking Britain as a whole, we possess only a series of varieties, progressing from *cæspitosa* to *hypnoides*, without any clearly-marked gap at any point between the extremes; that the line of progression is substantially straight, very little, if at all, complicated, as it is, for instance, so strikingly in *Rubus*, by cross relationships; that the series of sequence is as fol-

lows ; and that not one of the varieties is peculiar to us, but that every one of them is characteristically represented in Central Europe, every one of them in both areas coming so close to its next neighbour, that particular specimens are frequently difficult to name.

NAMES.

Oldest name specially applied to the variety.	Koch.	Syme.	Babington.
1. <i>cæspitosa</i> , <i>L.</i>	<i>cæspitosa</i> , <i>a.</i> compacta.	<i>cæspitosa</i> .	<i>cæspitosa</i> , <i>a.</i>
2. <i>Sternbergii</i> , <i>Willd.</i>	<i>cæspitosa</i> , <i>β.</i> laxa, ex parte.	<i>hirta</i> , <i>a.</i> genuina, et <i>γ.</i> incurvifolia.	<i>hirta</i> et <i>cæspitosa</i> , <i>γ.</i> incurvifolia.
3. <i>decipiens</i> , <i>Ehrh.</i>	<i>cæspitosa</i> , <i>β.</i> laxa, ex parte.	<i>decipiens</i> .	<i>cæspitosa</i> , <i>β.</i> <i>decipiens</i> .
4. <i>quinquefida</i> , <i>Haworth.</i>	<i>sponhemica</i> .	<i>hirta</i> , <i>β.</i> affinis, et <i>euhypnoides</i> , <i>a.</i> platypetala.	affinis, <i>latevirens</i> , <i>hypnoides</i> , ex parte.
5. <i>hypnoides</i> , <i>L.</i>	<i>hypnoides</i> .	<i>euhypnoides</i> , <i>β.</i> <i>gemmifera</i> .	<i>hypnoides</i> , ex parte.

DEFINITIONS.

1. *cæspitosa*.—General habit very robust ; barren stems not elongating beyond the tufts of leaves at the base of the flowering stems ; leaves of barren shoots with three, or rarely five, blunt ligulate lobes and without buds in their axils ; sepals oblong-deltoid, blunt.

2. *Sternbergii*.—General habit robust ; barren shoots moderately elongated ; leaves of barren shoots with three, or rarely five, bluntish or subacute ligulate lobes, and without buds in their axils ; sepals oblong-deltoid, bluntish.

3. *decipiens*.—General habit robust ; barren shoots moderately elongated ; leaves of barren shoots with 3–5 ligulate-lanceolate acute lobes, and without buds in their axils ; sepals oblong-lanceolate, subacute.

4. *quinquefida*.—General habit usually much less robust ; barren shoots much elongated ; leaves of the barren shoots usually with 3–5 linear-ligulate lobes, and without buds in their axils ; sepals lanceolate acute.

5. *hypnoides*.—General habit much less robust than in 1–3 ; barren shoots much elongated ; leaves of barren shoots linear, undivided, acuminate, usually with strong buds in their axils ; sepals lanceolate, acute.

TABLE SHEWING THE GEOGRAPHICAL DISTRIBUTION OF THE BRITISH VARIETIES OF
DACTYLOID SAXIFRAGE.

Country.	1. <i>cespitosa</i> .	2. <i>Sternbergii</i> .	3. <i>decipiens</i> .	4. <i>quinquefida</i> .	5. <i>hypnoides</i> .
Arctic and subarctic America.	Plentiful.	Present.	Absent.	Absent.	Absent.
Scandinavia.	Plentiful.	Present.	Absent.	Absent.	Absent.
Iceland.	Present.	Absent.	Present.	Absent.	Present.
Ferœe.	Present.	Absent.	Present.	Present.	Absent.
Ireland.	Very rare on the highest peaks.	Present.	Present.	Present.	Present.
Scotland.	Very rare on the highest peaks.	Absent.	Absent.	Frequent.	Frequent.
Wales.	Very rare on the highest peaks.	Absent.	Very rare.	Frequent.	Frequent.
England.	Absent.	Absent.	Absent.	Frequent.	Frequent.
Germany, including Belgium, Austria, Switzerland, and Jura.	Very rare on highest peaks.	Present.	Present.	Frequent.	Frequent.
Central France, Pyre- nees, and Spain.	Absent.	Absent.	Absent.	Absent.	Frequent.

So that we get primary varietal characters principally in—

1. Robustness of general habit and degree of elongation of the barren shoots ;
2. Shape of leaves and leaf-lobes ;
3. Shape of calyx-lobes :

And more or less variation under each variety, mainly in—

1. Depth of leaf-lobes ;
2. Vestiture of the whole plant ;
3. Number and size of the flowers.

But if, studying the varieties in Britain and Germany, we are led to conclude that their relationship to one another is as close as has been indicated (and, for my own part, I cannot come to any other conclusion), it is extremely curious, in the light of this view, to study the geographical distribution of the varieties. How is it they are dispersed as we find them amongst our own hills? But especially how is it that at one end of the chain, *hypnoides* and its two nearest allies are entirely cut off through such a wide northern area, whilst at the other end of the chain, all of them, except the extreme *hypnoides* link, are cut off through a very wide tract of those southern regions through which Dactyloid Saxifrages are distributed ?

SHORT NOTES.

RESTORATION OF *SCIRPUS PARVULUS*, *Ræm. and Schult.*, TO THE ENGLISH FLORA.—This plant was first discovered about the year 1835, by the Rev. G. E. Smith, on a mud flat near Lymington, Hants, and although carefully searched for subsequently by the late Mr. Borrer and Dr. Bromfield, on the spot indicated by the discoverer, no traces of it have since been found. From that time it was generally considered an extinct species, till in 1868 Mr. A. G. More found it in soft mud, overflowed at high tide in salt marsh creeks, at the mouth of the river Oveca, coast of Wicklow, Ireland (*Journ. of Bot.* Vol. VI. p. 321) ; still the English Flora could not claim it. In the third edition of ‘English Botany,’ edited by J. T. Boswell Syne, LL.D., the plant is supposed by that eminent botanist to be extinct, and more recently by Dr. Hooker in his ‘Student’s Flora,’ p. 402. I was fortunate enough to find it last July on sandy saline ground, under

exceptional tidal influence, near Poole harbour. Its diminutive size may be the cause of its eluding casual observation, but its authenticated existence in Dorsetshire will stimulate further search for it, wherever similar favourable circumstances occur. Although the plant has a considerable geographical range, extending from Denmark and Livonia to Arcachon and Biarritz, on the western coast of France, the Pyrénées Orientales, Piedmont, and Dalmatia, it appears to be sparingly distributed. The Dorsetshire station, and its neighbourhood, is fertile in rare plants, of which the most remarkable are *Simelhis bicolor*, Kunth; *Cyperus longus*, L.; *Cynodon Dactylon*, Pers.; *Lotus hispidus*, Desf.; *Erodium marinum*, Smith; *Ophrys aranifera*, Huds.; and *Allium oleraceum*, L.—J. C. MANSEL.

PLANTAGO LANCEOLATA, L., var. *allissima*, L.—I collected specimens of this plant, which differs in general appearance as well as in some points of detail from *P. lanceolata*, L., on the bank of a stream near Temple Mills, Essex. Although it is probably an introduced plant, I thought it might be desirable to record its occurrence. I enclose specimens.—JOHN CHERRY.

VACCINIUM OXYCOCCOS, L.—Is it generally known that there are two forms of the fruit of this plant, one pyriform, the other round? While botanizing in July at Oakmere, Cheshire, I was struck with their different appearance; but supposing it to be of common occurrence, I only collected one or two specimens of each. I do not find the dimorphism mentioned in any of the books I have referred to, and shall be glad to learn more about it. The two forms were about equally common, and I did not observe any intermediates; the plants were, of course, out of flower. I am sorry that I did not collect specimens for distribution; those I gathered are now in the Kew herbarium.—JAMES BRITTEN.

IBERIS AMARA, L.—Very abundant on the railway bank below the station at Monsal Dale, Derbyshire. It has evidently been established there for some years, and its origin is unknown to the station-master.—JAMES BRITTEN.

BOTANICAL TERMS.—Synpetalous and apopetalous, proposed by Mr. A. W. Bennett (p. 191) as substitutes for gamo- and poly-petalous, were used in 'A Handbook of Field Botany,' by William E. Steele, A.B., M.B., published at Dublin in 1847. Any change tending to the simplification of botanical terminology is a clear gain, but

the oblivion into which these words have fallen since their introduction looks as if their equivalents ordinarily in use were too firmly established to be supplanted. It is perhaps just worth notice that sympetalous would be the correct form, on the analogy of such words as sympathy, symphysis. Though Dr. Steele's book is not now very well known, it is well conceived, and a new edition would be useful. A book for the pocket with mere diagnoses of plants is a real want.—W. T. THISELTON DYER.

SILENE ARMERIA, *L.*—Professor Church has given me a specimen of this plant, which he noticed in 1867 at intervals on the sandhills and in hedges, over some fifteen miles of country, in Cornwall between Par station, near Lostwithiel, and Fowey Point. The locality, according to Professor Church, was almost destitute of houses, but much cannot be inferred from this, as to the spontaneity of the plant, looking at the way in which *Saponaria officinalis* establishes itself in similar localities.—W. T. THISELTON DYER.

Reports.

THE LOCAL FIELD-CLUBS OF GREAT BRITAIN.

BY JAMES BRITTEN, F.L.S.

V. THE BIRMINGHAM NATURAL HISTORY AND MICROSCOPICAL SOCIETY.

This Society, which held its first meeting on November 17, 1858, was established by the exertions of an artisan, himself a practical naturalist, and may now be reckoned among the best of our local clubs. Particulars of its rise and progress, of the trials it has successfully passed through, and of the more notable events connected with it up to November, 1866, are given in a little pamphlet; reprinted from the 'Midland Herald' of that date, for which, as for most of the following statistics, we are indebted to Mr. James Bag-nall, the active Secretary of the Botanical Section.

At the present time the Society numbers about 150 members, of whom a fair proportion are real workers, the average attendance at the meetings being about one-fifth of that number. These meetings are

held weekly, and are devoted to the reading of papers on natural science, the exhibition of objects, and discussion on various matters arising from such exhibition. As a rule, about six papers are read during each quarterly session, the other evenings being specially devoted to the exhibition of specimens. The microscopical section takes precedence on the second Tuesday in each month, the first being assigned to the committee, the third to the conchology section, the last to zoology and botany, while geology takes the last Friday in each month. The general meetings are held on the same evenings (Friday excepted) after the other meetings. Each section has its own chairman and secretary, and at the meetings short papers are read on the special subject of the section, and reports on local observations. It is to the sections that we owe the local lists to which reference will hereafter be made.

The meetings are held at the rooms of the Midland Institute, where a natural science museum has been formed, and a useful library of works on natural history. Among other works of general utility in which the Society has been engaged we may mention its efforts, which have been partially successful, to obtain a rearrangement of the objects in the Queen's College Museum, as also a proper labelling of the plants in the Botanic Gardens, and the setting aside a portion of the grounds for the special illustration of English botany, towards the expenses of which a grant was made by the Society.

The first volume of the 'Proceedings' has just been issued, and is now before us. At the very moderate price of 2s. 6d., it contains 110 nicely-printed pages, comprising "the substance of some of the papers read during the year 1869, with a brief reference to others, which it is either impossible now to reproduce, or unnecessary to present in an extended form. The papers are on various subjects, and are less noteworthy than the fifteen lithographic plates with which they are illustrated, nearly all of which have been most creditably executed by members of the Society. We could wish that local information was somewhat more prominently brought forward, but a promise of this for subsequent volumes is held out, and local lists of the Flowering Plants and Ferns, Mosses, Lepidoptera, and Mollusca are given, so that we must not complain. Of the first of these, 688 species and varieties are enumerated, and *Carex diculsa*, *C. lævigata*, and *Arundo Calamagrostis* have been added since the publication of the list. A ten-mile

radins is taken for investigation. Of Mosses, 173 species and varieties are enumerated. Dr. Braithwaite's assistance in naming critical species is acknowledged.

We may, therefore, confidently wish success to the Birmingham naturalists and their work. We are glad that they have determined to issue their 'Proceedings' to the public, and that those who are interested can, without difficulty, obtain copies. In this respect one or two older Clubs would do well to follow their example. The present Honorary Secretary of the Society is Mr. Edward Simpson, 17, Noel Road, Birmingham.

OFFICIAL REPORT FOR 1869 OF THE BOTANICAL DEPARTMENT OF THE BRITISH MUSEUM.

BY JOHN J. BENNETT, F.R.S.

The principal business done in the Department during the year 1869 has consisted,—

In the rearrangement of a portion of the presses of the general herbarium, with a view to their extension, and to rendering them more accessible, subsequent to the painting and cleaning of the herbarium rooms and studies, which was carried out during the summer.

In the rearrangement of the families of *Gramineæ*, *Cyperaceæ*, *Junceæ*, *Restiaceæ*, *Eriocauloneæ*, *Asphodeleæ*, *Amaryllideæ*, *Hemerocallideæ*, *Smilaceæ*, and other smaller Monocotyledonous Orders, as also of the *Urticeæ* and *Piperaceæ*, and of the Lichens, both British and foreign, with numerous additions to each.

In the selection of a very large number of specimens from the herbarium of the late N. B. Ward, Esq., and from the collection of Abyssinian plants sent by Dr. Schimper through the Foreign Office.

In the naming, arranging, and laying into the general herbarium of Berlandier's Mexican collection; of Linden's collection, from New Granada; Tate's, from Nicaragua; Coulter's, from California; Sartwell's *Carices* of North America; Wight's collections, from the Nilgherry Hills and from India generally; Jameson's, from the Andes of Quito; *Orchideæ*, from different countries; Ferns, from the islands of the South Pacific; and of a large number of miscellaneous specimens of various families and from different countries.

In the examination and arrangement of the recent and fossil *Coniferae* and *Cycadeae*, and of Mr. Brown's collection of fossil woods.

In the arrangement of a very great number of specimens of European plants, with a view to their incorporation in the general herbarium, which has been commenced.

In the rearrangement of various portions of the British herbarium, and of the collection of fruit and seeds.

And in the rearrangement of various parts of the collections contained in the Exhibition Rooms, and especially of the cases containing *Coniferae* and *Cactae*, with large additions.

The principal additions made to the collection during the year 1869 have been the following, viz. :—

- 650 plants of Europe, from the collection of Dr. Rostan.
 460 „ „ from the collection of the late Mr. Ward.
 52 „ the Isle of Wight; presented by Fred. Stratton, Esq.
 50 „ Belgium, forming fasc. 7 of the 'Plantae Rares de Belgique.'
- 96 *Salices* from the north of Europe; collected by Læstadius.
 250 plants of the Rhine, forming fasc. 8–12 of Wirtgen's 'Plantæ Rhenanæ.'
- 900 „ Ingermannland.
 110 „ Styria, } presented by the Chevalier Pittoni.
 22 „ Sicily, }
 77 „ Athens; collected by Boissier.
 300 „ Sicily, forming fasc. 7–9 of Todaro's 'Flora Sicula.'
 48 „ Gibraltar; presented by A. H. Hurst, Esq.
 80 species of European *Algæ*, forming decad. 205–212 of Rabenhorst's 'Algen Sachsens,' etc.
- 200 „ European Fungi, forming fasc. 12 and 13 of Rabenhorst's 'Fungi Europæi.'
- 200 „ Italian Cryptogams, forming fasc. 1–4 of series 2 of the 'Erbario Crittogamico Italiano.'
- 2000 plants of Abyssinia; collected by Dr. Schimper.
 3094 „ South Africa; from the collection of Mr. Ward.
 560 „ Madeira; collected by Lemann and others.
 926 „ the mountains of Altai; from Mr. Ward's collection.
 943 „ India; collected by Dr. Wight.
 71 „ Nilgherry Mountains; collected by Dr. Wight.

- 431 plants of Malacca ; collected by Griffith.
 110 „ Australia ; presented by Dr. Ferd. Von. Müller.
 111 „ Swan River, New Holland ; collected by Mylne.
 113 „ the Feejee Islands ; collected by Harvey.
 784 „ North America ; from the collection of Mr. Ward.
 221 „ California ; collected by Coulter.
 213 Carices of North America ; collected by Sartwell.
 416 Fungi of South Carolina ; collected by Ravenal.
 323 plants of Nicaragua ; collected by Tate.
 700 „ the Andes of Quito ; collected by Jameson, and presented by J. N. Kuczinski, Esq.
 439 species of *Orchideæ* ; from the collection of Mr. Ward.
 A fine set of Pine-cones from California ; collected by Mr. Warren.
 A large fossil trunk from the London clay, at Highgate, and a cone of *Stangeria paradoxa* ; presented by James Yates, Esq.
 A fine specimen of *Ulodendron majus*, Lindl. and Hutt. ; presented by Daniel Ross, Esq.
 Numerous specimens of plants and fruits, chiefly from Africa ; purchased of Mr. Cutter.
 ‘Flora Britannica Indigena,’ by John Walcott, Esq. Svo. Bath, 1778. The author’s copy. Presented by the Rev. M’Kenzie E. C. Walcott.
 The number of visits paid to the herbarium for purposes of scientific research was 974.

New Publications.

An Elementary Course of Botany, Structural, Physiological, and Systematic. By ARTHUR HENFREY, F.R.S. & L.S., etc. Second Edition. Revised, and in part rewritten, by MAXWELL T. MASTERS, M.D., F.R.S. & L.S., etc. London: Van Voorst. 1870. (Pp. 708.)

Henfrey’s ‘Elementary Course,’ first published thirteen years ago, has always been an indispensable book to advanced students, and a new edition, to be revised and partly rewritten by Dr. Masters, has been expected for some time with considerable interest. Henfrey was

almost alone in this country in the study of the minute anatomy of plants; it is his treatment of this subject which makes his book so valuable, and it needed nothing but to add to it the latest observations. There was reason, however, to hope, from the reputation that Dr. Masters has made in morphology, that that subject would at any rate be a good deal remodelled. Yet perhaps there was no choice but to leave the book still substantially in the form that Henfrey gave it, with only such changes and additions as the progress of botany in the last dozen years rendered absolutely necessary. Labour of this kind is, as Dr. Masters remarks, onerous, and is likely to be inadequately appreciated. No one could see, without comparing the text as it now stands with the old edition, the constant traces of revision; and if some occasions for criticism from time to time suggest themselves, they, no doubt, often arise from the editor's desire to disturb the text as little needlessly as possible.

The distribution of the subject matter is perhaps not such as any one would now adopt. The interpolation of the systematic botany between the morphology and the so-called physiology, seems unphilosophical, though a common arrangement in text-books. It has the disadvantage of placing the driest and most technical matter foremost, with the risk of deterring those who attack botany for the first time, and of keeping up its traditional character as a science of hard names. The wants of medical students who have hitherto been the principal buyers of botanical text-books, are no doubt mainly responsible for this. Botany in a medical school is unfortunately only looked upon as one of the ordeals which have to be gone through, and terminology, however uninteresting, is well adapted for examination purposes, requiring nothing more than an effort of memory for its acquisition, and being, as soon as it has served its purpose, easily forgotten. Yet with the spread of natural science in our public schools and universities, a totally different class of students may be expected, and greater prominence will have to be given to the facts of plant life, and less to the technical apparatus of description. Had it been possible, the best plan would have been to give the systematic part in a separate volume, as was indeed originally Henfrey's intention, and, following the plan of Asa Gray and Duchartre, to treat the morphology somewhat more transcendently, working up with it the minute anatomy and the functional history of the different organs (physiology proper) so as to re-

lieve the tedium of the mere terminology, and produce something like a complete and continuous picture of the life-history of the plant. A bolder recasting of the book, such as Dr. Masters could have given us, would certainly not have diminished its popularity; the ready sale of geological books seems to show that there is a taste for a rather speculative treatment of a subject.

The sections devoted to the root and stem, which are written with great freshness, remain pretty much as in the last edition. Henfrey's account of the branching of roots by continued bifurcation is totally opposed to the statements of other writers, and it does not seem easy to verify it by observation, nor to explain on this view the at first symmetrical disposition of the branches observed by Gaudichaud and Clos. Germination is usually very briefly dismissed, but the division of Phanerogams into Exorhizæ and Endorhizæ is far from absolute, and, as pointed out by Berkeley,* depends upon cereals being usually taken exclusively as the type of monocotyledons, although Richard's view of the scutellum being the radicle, which he is led to adopt, is no doubt untenable. The germination of Palms does not seem to be noticed at all. A few changes might have been made for the sake of uniformity. *Batatas edulis* is said to have a "large fleshy tuber" (p. 320). Elsewhere (p. 29), the stem-tubers passing into rhizomes of *Convolvulus Batatas* are described; they are usually considered to be enlarged adventitious roots. A student, too, would probably overlook the identity of the stock (*caudex*) of *Tamus elephantipes* (p. 37) with the tuber of *Testudinaria elephantipes* (p. 373).

The use of the term rhizome or rootstock (p. 31) for the stem of the Male-fern, though adopted in the Student's Flora, seems incorrect; there is surely no essential structural difference between it and the stem of a Tree-fern; indeed, the ingenuity of gardeners has sometimes given our Male-fern an arborescent habit. The description of the internal anatomy, moreover, of the stem of Ferns stands unaltered. Mohl correctly describes it as consisting within the cortex of a fibro-vascular cylinder with perforations, which allow the central parenchyma to be continuous with that of the bases of the leaves, the fibro-vascular bundles of which are derived from the margins of the perforations, and not from the surface of the cylinder between them. The statement

* Journ. Roy. Agr. Soc. xxiv. p. 422.

that "the stems never alter in dimensions when once formed" is only true if the transverse are meant, since, as pointed out by Brongniart,* the lower parts of the stems continue to elongate in the direction of their length.

Schleiden† makes a vigorous remonstrance against the uselessness of classifications of fruits. That given here enumerates 36 different kinds. Dr. Masters is constrained to add that it is far from satisfactory, and too complicated for the student, and he indicates the most important by a difference of type. The rest might very well have been discarded altogether, as has been done by Asa Gray in his textbook. How many practical botanists use or even know the meaning of *Diclesium*, or *Sphalerocarpium*, or *Amphisarca*? One oversight may be noticed; fig. 280 is said to represent the drupe of a Date, which is correctly stated to be an improper use of the term on the following page. The Date is certainly a berry, with a solitary rather large seed. Why, however, should not the Cocoa-nut be called a drupe? the only peculiarity is a fibrous, instead of a fleshy mesocarp.

In the Systematic Botany, which remains a most admirable compendium of condensed information, little has been done, except the addition of the most recent English views as to the affinities of the different Orders. Henfrey's arrangement was in the main Candollean, with some attempt, following Lindley, to throw the Orders into groups, to which, however, no characters were assigned. The accounts of some of the minor Orders have been compressed, and this might have been perhaps carried further. If some rearrangement of the sequence, after the views of Hooker and Bentham, with the adoption of some of their aggregate Orders, would have been acceptable to students of systematic botany, teachers who demonstrate in botanic gardens will be glad that it has not been disturbed. One peculiarity may be noticed; the descriptions of the epigynous Gamopetalæ have been transferred to the Corollifloræ, but in the analytical key they still remain among the Calycifloræ. The common error that Cycads have characteristically leaves circinate in vernation should have been corrected. They are not so in the *Zamiæ* and the *Eucephalartea*, and in the *Cycadeæ* it is only the leaflets, and not the rachis, which are circinate.

The most important feature of this edition is the description of the

* Hist. des Vég. Foss. t. i. p. 156.

† 'Principles of Botany,' p. 442.

Cryptogamic Orders. The matter has been redistributed, and a great deal that is recent added. De Bary's curious observations on the reproduction of the Myxogastres, however, do not find a place, though they are of great interest in showing the vegetable nature of some amœboid forms, and the account of the very curious perennial axis of the *Isoetaceæ* gives very little information about a structure which is unknown in other Cryptogams.

It would require considerable space to examine in any detail the Physiology. Some notice of every important addition to our knowledge will be found, though often necessarily briefly. Herbert Spencer's remarkable researches are dismissed in a few lines. Of minor points it may be noted, that in the formula of starch $C_6H_{10}O_5$ (p. 573), the commas are superfluous; *Lastræa* should be in many places *Lastrea*, and *Bassoine* (p. 497) *Bassorine*. It is liable to lead to mistakes to speak (p. 495) of *cellulose* as a constituent of starch; part of the starch granule is less soluble than the rest, but it is not cellulose, though isomeric with it. The statement quoted from Nägeli, that "all organic substances are composed of *crystalline* molecules" (p. 478) would make them all crystalloids, and is more likely to confuse our present use of words than to add to our knowledge.

The concluding chapter of the book is, as formerly, devoted to Geological Botany, but is exceedingly meagre. Stigmarias, Sigillarias, and Lepidodendron are spoken of as part of the coal flora, but as none of these words are to be found explained in any part of the book, or included in the index, this does not teach much. The two indices might in another edition be conveniently combined; the single index of the Student's Flora is a good practical innovation.

Altogether, Dr. Masters may be congratulated on the completion of a laborious undertaking, and botanical students on the renewed lease of life of a very valuable book.

W. T. T. D.

Proceedings of Societies.

EDINBURGH BOTANICAL SOCIETY.—*May 12th.*—Sir Walter Elliot, President, in the chair. The following communications were read:—"Botanical Notes of a Journey through Spain and Portugal." By T. C. Archer, Esq. "Botanical Notes on the Garden of Montserrat, Portugal." By T. C. Archer,

Esq. "Botanical Notes taken on the Rock of Gibraltar." By T. C. Archer, Esq. "Report on the Open-air Vegetation at the Royal Botanic Garden." By Mr. M'Nab. Mr. Peach gave a list of forty-one species of *Algæ*, collected by Miss Jeffreys in 1861, at the Outer Skerries of Whalsey, Shetland, ten of which are additions to Edmonston's list. Mr. Christie exhibited growing flowering plants of what appeared to be *Saxifraga granulata*, which he stated had been obtained from the bulblets of plants of *S. cernua*, collected on Ben Lawers. Professor Balfour remarked that plants of *S. cernua* from Ben Lawers had been cultivated in the Botanic Garden for many years, and never changed their normal form. Mr. Sadler thought that, as *S. granulata* also occurred on Ben Lawers near where *S. cernua* grew, it was possible that the two species had been collected by Mr. Christie, and got mixed before planting them in pots. Mr. Sadler exhibited dried specimens of *Tupa rhynchopetala*, a Lobeliaceous plant from Abyssinia, and called attention to the peculiar structure of its stem.

June 9th.—Sir Walter Elliot, President, in the chair. The following communications were read:—"Note on the Ipecacuanha Plant." By Dr. Gunning, Rio Janeiro. "New and Rare Mosses from Ben Lawers." By Dr. J. Stirton. Communicated by Mr. Sadler. "Notice of *Grimmias* collected on Arthur's Seat, near Edinburgh." By Mr. Wm. Bell and Mr. J. Sadler. Species of this genus are numerous on Arthur's Seat, but most are remarkably limited to particular spots on the hill. The *Grimmia edinensis* of Fergusson is made up of specimens of *G. orbicularis* and *G. subsquarrosa*. What is usually called *G. pulvinata*, var. *β. africana*, is the typical form of *G. orbicularis* of Schimper's Synopsis, the common *G. orbicularis* of Arthur's Seat being, according to Mr. Wilson, the var. *elongata*. "Notes on some British Mosses." By Mr. William Wilson. Communicated by Mr. Sadler. Mr. Wilson referred to the British species of *Andræa*, which he has revised for a second edition of the 'Bryologia Britannica' now in preparation, and to *Didymodon Jenneri*, a Moss recently described and figured in the Society's Transactions, and which he believed to be in no way specifically different from *Cynodontium polycarpon*. "On the Ferns found in the Valley of the Derwent." By Mr. T. W. Mawson. Mr. Mawson enumerated twenty-eight species and varieties, e. g. *Asplenium germanicum*, *A. septentrionale*, *Hymenophyllum Wilsoni*, *Osmunda regalis*, *Allosorus crispus*, *Ophioglossum vulgatum*, etc. Dr. Christison presented bulbs which had been produced in place of fruit on a large plant of *Foureroya gigantea* at Agra. Mr. Sadler recorded new stations for *Camellina sativa*, *Erysimum cheiranthoides*, and *Calicium chrysocephalum*, near Edinburgh. Professor Balfour exhibited growing plants of *Saxifraga cernua*, which had been cultivated in the Royal Botanic Garden for many years without changing in their character. Mr. W. Wilson sent growing plants of *Wolffia arrhiza*. Mr. Charles Howie presented flowering specimens of the Wild Hyacinth, having the flowering axis very much shortened, and the stamens petaloid.

GEOLOGICAL SOCIETY OF LONDON.—*May 11th.*—Joseph Prestwich, Esq., F.R.S., President, in the chair. The following communication was read:—“On the Structure and Affinities of *Sigillaria*, *Calamites*, and *Calamodendron*.” By J. W. Dawson, LL.D., F.R.S., F.G.S., Principal and Vice-Chancellor of McGill University, Montreal. With reference to *Sigillaria*, a remarkably perfect specimen of the axis of a plant of this genus, from the coal-field of Nova Scotia, was described as having a transversely laminated pith of the *Sternbergia* type, a cylinder of woody tissue, scalariform internally and reticulated or discigerous externally, the tissues much resembling those of Cycads. Medullary rays were apparent in this cylinder; and it was traversed by obliquely radiating bundles of scalariform vessels or fibres proceeding to the leaves. Other specimens were adduced to show that the species having this kind of axis had a thick outer bark of elongated or prosenchymatous cells. The author stated that Professor Williamson had enabled him to examine stems found in the Lancashire coal-field, of the type of Binney’s *Sigillaria vascularis*, which differed in some important points of structure from his specimens; and that another specimen externally marked like *Sigillaria*, had been shown by Mr. Carruthers to be more akin to *Lepidodendron* in structure. These specimens, as well as the *Sigillaria elegans* illustrated by Brongniart, probably represented other types of Sigillarioid trees; and it is not improbable that the genus *Sigillaria*, as usually understood, really includes several distinct generic forms; but the type described appeared to predominate in Nova Scotia. The erect *Calamites* of Nova Scotia illustrate in a remarkable manner the exterior surface of the stems of these plants, their foliage, their rhizomata, their roots, and their habit of growth. Their affinities were evidently with *Equisetaceæ*, as Brongniart and others had maintained, and as Carruthers and Schimper had recently illustrated. The stems were more advanced in structure than those of modern *Equiseta*. It was further shown that the leaves of the ordinary *Calamites* are linear, angular, and transversely wrinkled, and different from those of the *Asterophyllites* properly so called, though some species, as *A. comosus*, Lindley, are leaves of *Calamites*. The *Calamodendra*, as described by Cotta, Binney, and others, are similar in general plan of structure to the *Calamites*, but much more woody plants. Specimens in the collection of Professor Williamson show forms intermediate between *Calamites* and *Calamodendron*, so that possibly both may be included in one family; but much further information on this subject is required. The tissues of the higher *Calamodendra* are similar to those of Gymnospermous plants. The wood or vascular matter of the thin-walled *Calamites* consists of multiporous cells or vessels in such species as have been examined. In conclusion, a table was exhibited showing the affinities of *Sigillariæ* on the one hand, through *Clathraria* and *Syringodendron* with *Lycopodiaceæ*; and on the other hand through *Calamodendron*, with *Equisetaceæ*; while in the other direction they presented links of connection with Cycads and Conifers.—Mr. Carruthers said that he was inclined to take a somewhat different view on some of the points mentioned. Some time ago he had, in a paper read to the Society, deduced from the internal structure of *Stigmaria*, the root of *Sigillaria*, that the latter was a true cryptogamous plant.

He had since met with confirmatory evidence in a specimen of a fluted and ribbed *Sigillaria*, showing the internal structure of *Stigmaria*. Mr. Baily, in Devonian strata in Ireland, had found the root, stem, branches, leaves, and fruit of a plant which could, with certainty, be correlated. The root was a *Stigmaria*, the stem a fluted *Sigillaria*, the branches and leaves like those of *Lepidodendron*, and the fruit that of a cryptogam allied to *Lepidodendron*. With regard to the American specimens cited by the author, he would not speak with certainty; but he might suggest a different interpretation. The axis was probably foreign to the *Sigillaria* in which it was found, and was a true coniferous stem, composed of pith, medullary sheath, and wood with medullary rays, and vascular bundles passing to the leaves. Plants growing in the interior of decayed sigillarian stems had been mistaken for organic piths, though they belonged to two or three genera. Dr. Dawson's estimate of *Calamites* and allied genera essentially agreed with those which he held.—Dr. Dawson thought that the views of Mr. Carruthers and his own might possibly be reconciled, but he was not prepared to admit that the plant discovered by Mr. Baily was a true *Sigillaria*. It belonged, moreover, to the Devonian period, and not to the Carboniferous. He quite agreed with Mr. Carruthers in regarding the stems described as closely allied with gymnosperms. He insisted on the layer at the base of the interior of the trunks of the erect *Sigillariæ* affording evidence of the interior structure of the plant, inasmuch as it consisted of the compressed and decayed inner tissues of the tree. It was curious that similar specimens had not been found in England; but the structures of these plants certainly occur in the English coal, which, like that of Nova Scotia, rests on *Stigmaria*-underclays; and there were other instances of trees being common in the coal-measures of Nova Scotia, which were extremely rare in England; and the same discrepancies were found between different American coal-fields.

Botanical News.

We are glad to be able to announce that the publication, temporarily interrupted, of the new edition of 'English Botany,' is to be at once resumed. Only the Grasses remain to be described.

Mr. Charles P. Hobkirk, of Huddersfield, is now delivering a course of lectures on botany in connection with the Huddersfield Literary and Scientific Society.

Professor M. A. Lawson, of Oxford, read at the recent Horticultural Congress in that city, a short paper on the more eminent botanists connected with the University, from the first curator of the garden, Jacob Bobart the elder, down to the present time. Short biographical notices were given of Morison, both Bobarts, Dillenius, the two Sibthorps, Dr. George Williams, and the late Dr. Daubeney. The paper has been printed in the 'Gardeners' Chronicle.'

Professor Suringar, of Leyden, has issued a valuable treatise on the Algæ of Japan, many of which are used as food there.

Mr. Baker's portion of the Ferns forms the last published part of Martius' 'Flora Brasiliensis.' It contains the *Polypodiaceæ* and *Cyatheaceæ*, and is illustrated by fifty plates. Many of the new species have been already described in M. Fée's 'Cryptogamie vasculaire du Brésil,' printed only a few months ago.

Mr. Worthington Smith calls attention, in a letter to 'Nature,' to the fungus spores figured in Dr. Bastian's recent articles on spontaneous generation, and expresses his opinion, to which his intimate acquaintance with Fungi lends considerable weight, "that it would be simply impossible to convince any botanist that a spore such as some of those figured by Dr. Bastian, could be produced from any other quarter than the hymenium of a well-defined parent." With reference also to such organisms as the spiral fibres figured, all analogy would lead to the expectation that if living bodies are spontaneously produced, they would be of the simplest nature. It is to be hoped that further observation will be made, and that Mr. Smith's suggestion, that figures of the bodies observed be drawn to a uniform scale, will be accepted.

'Nature' informs us that Professor Hartt, of the Cornell University, "with a professor of botany and nine students," intends to explore the Amazons valley and part of the coast of Brazil.

Robert Brown is a name of such exceptional weight in botany, and "R. Br." is so familiar an authority to systematists, that it is well that the holder of the same name who has recently written on botanical subjects and described some new species, should be in some way distinguished from his great predecessor. We are informed that M. De Candolle, who was asked for an opinion, has suggested, that—on the analogy of several cases of duplicate names on the Continent—the affix "Camp." indicating the place of birth, Campster, in Caithness, of the present Robert Brown, be appended to his initials.

Our readers will be glad to hear that Mr. Hewett C. Watson has got well on with the printing of the third part—completing the book—of his valuable 'Compendium of the Cybele Britannica,' and that it will be shortly published.

The Botanical Department of the British Museum has just acquired the large collection of British and Foreign Fungi made by the Rev. A. Bloxam, and named by him, Berkeley, Broome, Currey, and other botanists.

At the approaching meeting of the British Association at Liverpool, the section of Biology will be presided over by Professor Rolleston, of Oxford, with Mr. Evans and Professor Michael Foster as Vice-Presidents, and Dr. Cobbold, Mr. T. J. Moore, Mr. Stainton, and the Rev. H. B. Tristram, as Secretaries.

We hear that the Belgian Government, which lately bought Von Martius's great herbarium, has also purchased the Horticultural Society's garden at Brussels.

COMMUNICATIONS have been received from Dr. Hance, Dr. Bull, J. Britten, Dr. Masters, J. Sadler, J. C. Mansel, J. Cherry, Professor W. T. Dyer, Rev. J. E. Leefe, M. Dowd.

Original Articles.

DR. ANDERSSON'S REMARKS ON THE WILLOWS CONTAINED IN THE "SALICT. BRIT. EXSICC.," WITH MR. WARD'S AND MR. LEEFE'S OBSERVATIONS.

BY THE REV. J. E. LEEFE, M.A., F.L.S.

In the year 1850, Dr. Andersson, of Christiania, when in England, took the trouble to examine the specimens of Willows contained in the "Salictum Brit. Exsicc.," published by me in two fasciculi, about 1842; and his observations were communicated by Mr. H. C. Watson to Henfrey's 'Botanical Gazette' for May, 1851 (vol. iii. p. 57, *et seq.*). I am indebted to Mr. Watson for copying out Dr. Andersson's notes for me, as I did not possess the work in which they were recorded. For a long time, I am sorry to say, the papers remained unexamined, as my time was fully occupied in other ways. In the last year or so, however, I have, in conjunction with my old and valued correspondent Mr. Ward, of Richmond, Yorkshire, who had so large a share in the collection of the original specimens, gone carefully over the remarks of Dr. Andersson, and now publish our remarks. It may interest some who possess the published specimens to know what we who collected them now think about them. I have only to add that Mr. Ward's remarks bear his name, and that my own have "*Obs.*" prefixed to them.

1, 2. No note by Dr. A.

3, 4. "Hæc forma *S. amygdalinæ*, L., in Germaniâ septentrionali vulgaris, in Sueciâ rarior."

5. "*S. amygdalina*, L.! Sed in Sueciâ nondum ita latifolia visa."

6. "Nullo modo a *S. amygdalina* distinguenda; cum *S. undulata* nihil habet communc." *Obs.* Dr. A. has misunderstood the label. The name refers to an undulated variety of *S. triandra*, Sm. See Hooker's Brit. Fl. p. 356, *note*.

7, 8. "Hæc forma in Sueciâ boreali spontanea. *S. amygdalina* vera Linnæi." *Obs.* I have no doubt Dr. A. is quite right, if *S. amygdalina* is comprehensively defined.

9. No note or name by Dr. A.

10. "Hæc forma *S. purpurea*, in regionibus Europæ septentrionalis rarior, in Sueciâ vix adhuc visa. Iconi et descriptioni *S. Forbyana*, Sm., optime congruit." *Obs.* There is a resemblance in the form of the leaves to *S. Forbyana*, but, notwithstanding, the plant is more nearly allied to *S. purpurea*, L., than to *S. rubra*, Huds. I believe the *S. Helix* of Northern Germany has leaves narrower towards the base than this; such is certainly the case in specimens from Professor Koch. *Mr. Ward*: "No doubt of this being *S. Helix* of Eng. Bot."

11. "*S. purpurea*, L." *Obs.* No doubt this is *S. purpurea*, L.

12, 13. "A *S. purpurea* nullo modo diversa." *Obs.* No doubt these are forms of *S. purpurea*, L., which it seems of little use any longer to attempt to discriminate. *Mr. Ward*: "*S. ramulosa*, *S. Lambertiana*, etc., are all forms of *S. purpurea*, L."

14. "*S. purpurea*, forma latifolia." *Obs.* *S. Lambertiana* = *S. purpurea*, L., var.

15, 16, 17, 18. No name or note by Dr. A.

19, 20. "*S. viminalis*, L."

21. "Mihi *S. stipularis*, Sm., videtur." *Obs.* I hold this to be a variety of *S. viminalis*, a species which presents a considerable range of forms. *Mr. Ward*: "Certainly a variety of *S. viminalis*; no appearance of stipules."

22, 23, 24. No name or note by Dr. A.

25, 26. "Hæc *Salix* forsân est *S. stipularis*, Sm." *Obs.* Here I am obliged to differ from Dr. A. My Essex *Smithiana* was admitted by Mr. Borrer to be exactly Smith's plant. *Mr. Ward*: "Dr. Andersson does not appear to know our *S. stipularis*. I think No. 26 the true *Smithiana* of Smith, and that *S. Smithiana*, Willd., is intermediate between No. 31, *S. rugosa* or *holosericea*, Hook.,—which this number, I think, truly represents,—and No. 26, the *S. Smithiana*, Sm."

27, 28. "*S. Smithiana*, Willd." *Obs.* I think Dr. A. is right here, particularly as to No. 27. *Mr. Ward*: "No. 27, *S. Smithiana*, Willd. No. 28, more *S. holosericea*, Hook. than *S. Smithiana*, Willd."

29. "Optime *S. Smithiana*, Willd." *Mr. Ward*: "This may be *S. Smithiana*, Willd., as the leaves are not so silky as *S. Smithiana*, Sm."

30, 31. "Mihi *S. acuminata*, Sm. *S. lanceolata*, Fries, videtur." *Obs.* This does not at all resemble *S. acuminata*, Sm. Eng. Bot., with which Continental botanists do not appear to be acquainted. *S. acu-*

minata sent to me by Professor Koch is different to the 'English Botany' plant. *Mr. Ward*: "No. 30 the same as 31, but not so well defined as the true *S. holosericea*, Hook., which I take to be 31. It is nothing like our *S. acuminata*."

32, 33. "Optime *S. Smithiana*. Saltem herbarii Smith." *Obs.* This may be *S. Smithiana*, Willd. There is a specimen in Smith's herbarium, marked "1. Osier ground at Bury," which appears to be *S. Smithiana*, Eng. Bot., but the catkins are short, and thicker than my Essex specimens.

34. "Ni fallor melius *S. cinereæ* referenda." [*Note by Mr. H. C. Watson*: "Against another specimen glued on the same sheet, and distributed by Mr. James Ward as *S. rugosa*, Dr. A. wrote, '*S. acuminata*, Sm.' I see the same thing in Mr. Ward's *rugosa*, as No. 34, except that the leaves are longer and more pointed."'] *Obs.* Dr. A. may not have had the true specimen before him. *Mr. Ward*: "This appears to be the *Smithiana*, Willd., from the stipules, which are more distinctly shown than in any other of the forms. This plant does not at all belong to the *cinereæ* group."

35. "Proxima *Salici holosericeæ*, Willd." *Obs.* This is the *S. ferruginea* of 'English Botany,' but not of G. Anderson, which I see, from the 'Salicium Woburnense,' is altogether different. *Mr. Ward*: "Must be *S. ferruginea*, Eng. Bot."

36. "Valde dubia forma. Multa cum *Salice Pontederana* habet communia; foliorum forma iis *S. holosericeæ*, Willd., similis. Nil certe de hac enuntiare audeo." *Obs.* I have always felt uncertain regarding this form, which perhaps is nearest to *S. Smithiana*, Willd. *Mr. Ward*: "I think *S. Smithiana*, Willd."

37. "Certissime *S. dasyclados*, Wimmer (Flora Od. Bot. Zeit. 1849), a *S. acuminata*, Sm. (= *S. lanceolata*, Fr., et *S. Seringiana*, Gaud. (*S. longifolia*, Ser.; *S. canescens*, Willd.) optime distincta!" *Obs.* We have here some valuable synonyms on Dr. Andersson's excellent authority, but I must maintain that this is the *acuminata*, Sm. Eng. Bot. I have cultivated it for many years, and Mr. Borrer long ago confirmed the name. The *acuminata*, Sm., does not appear to be known to Continental botanists, and there is some confusion among Smith's own specimens. One, marked "*S. buddleifolia*," is *acuminata*, Sm. The specimens 1 and 2, from Mr. Crowe's garden, are the true plant; but other specimens—1, from Tuck's Wood, and 2, from

Mr. Crowe's garden—are not *acuminata*, but *S. rugosa*, Borr. (= *S. holosericea*, Hook. not Willd.), and *S. Smithiana*, Willd. Of two other specimens, the right-hand one is *S. acuminata*, Sm.; left-hand, from Soham, Norfolk (Mr. Crowe), is not *acuminata*, but *S. Smithiana*. *Mr. Ward*: “I think Dr. A. has made a mistake in our English Botany *acuminata*.”

38. “Ego crederem hanc formam (saltem folia) ad *S. laurina* ducendam esse.” *Mr. Ward*: “Certainly not *S. laurina*. The catkins are truly those of *cinerea*, and the leaves vary considerably.”

39. “A *Salice Seringiana*, Gaud., non multum diversa.” *Obs.* Koch describes the catkins of *S. Seringiana* to be arcuated, which these are not. *S. cinerea*, L., is a very variable plant, yet true on the whole to certain characteristics, by which it may be recognized, at least when growing. *Mr. Ward*: “I think this *S. cinerea*. If the catkins in *S. Seringiana* are arcuated, this certainly cannot be that species.”

40. No name or note by Dr. A.

41. “*S. cinereæ* forma.” *Obs.* No doubt a form of *S. cinerea*, L.

42. “*S. cinereæ* subspecies.” *Obs.* Doubtless it is so.

43. “Mihi *Salicis laurinae* forma, quæ Nigricantes cum Capreis quodammodo conjungit (conf. And. Sal. Lap.) attentione digna.” *Obs.* In my opinion, Dr. A. has hit the relation of this plant more correctly than Mr. Borrer. The original tree has been washed away, but I have succeeded in obtaining cuttings from it, and specimens will be included in fascic. iii. of the *Salict. Exsicc.* *Mr. Ward*: “I never could make out this satisfactorily. The remark which Dr. A. makes I think the best. I never could refer it to *S. aquatica*, although Mr. Borrer thought so. It certainly is very different from any form that I have seen.”

44. “Mihi *S. cinereæ* forma.” *Obs.* No doubt a form of *S. cinerea*, L.

45–49. No remark or note by Dr. A. *Obs.* I may remark with reference to *S. herbacea*, No. 49, (*S. reticulata* should be numbered 48,) that search should be made in Scotland for *S. retusa*. I have received (originally from Mr. Borrer) from my friend the Rev. L. Darwall a plant named *S. Grahami*,* gathered somewhere in the Highlands, which I consider to be a form of *S. retusa*. Mr. Borrer many years ago asked me if I had any confirmation of *S. serpyllifolia* as a Breadalbane plant,

* See Journ. of Bot. Vol. V. (1867) 157, and Tab. LXVI.

from which I infer he had a suspicion that it might be a native. I have heard of *S. herbacea* among the Cheviots, but have not yet seen any specimens.

50. "In horto Linneano Upsaliensi duæ arbores a Linnæo ipso satæ, et huic omnino similes, restant. In Succiâ valde rara." *Obs.* Certainly *S. decipiens*, E. Bot., in which observation Mr. Ward concurs.

51. No name or note by Dr. A. *Obs. S. fragilis*, E. Bot. Mr. Ward is of the same opinion.

52. "Specimina foliifera ad *S. viridem*, Fr., amentifera ad *S. fragilem*, L., pertinent." *Obs.* The catkins and leaves are from the same plant, which I have now growing. *Mr. Ward*: "Dr. A. must be mistaken here."

53. No name or note by Dr. A. *Obs.* I still hold by the remarks in the label, as does Mr. Ward also.

54. On this Dr. A. remarks, "Suspicio *S. viridem*, Fr., et *S. Russellianam*, Sm., synonymas esse." Mr. Watson observes here, "The name of *S. viridis*, Fr., is written by Dr. A. against the specimen with advanced aments, May 8; and that of *S. fragilis*, L., against the specimen with young aments, April 22, and full-grown leaves, July 30." *Obs.* This is *S. Russelliana*, E. Bot., and probably *S. viridis*, Fr. The specimens are from the same tree, cuttings from which are growing in my shrubbery. Mr. Ward appears to agree with Dr. A. that *S. viridis*, Fr. = *S. Russelliana*, Sm.

55. "A *Salice fragili* non distinguere potui." *Obs.* From the form of the ovarium and serratures of the leaves I consider this to be *S. Russelliana*. *Mr. Ward*: "Dr. A. considers this *S. fragilis*. I do not think we have the female of *S. fragilis* here; your specimens from Essex appear very different to this, which I think to be *Russelliana*."

56. "Hæc forma in Germania *S. cærulea* appellatur." *Obs.* This no doubt is *S. alba cærulea*.

57, 58, 59. No note or name, by Dr. A. *Obs.* 57. I see no reason to alter the name on the label.

From 57-66 inclusive, no note or name by Dr. A.

67. "*S. nigricans*, Sm. Fr., forma *nemorosa*." *Obs.* With *S. nigricans*, Sm., I am not well acquainted. *Mr. Ward*: "Dr. A., as well as yourself, considers this *S. nigricans*, Fr. In my remarks to you some time ago I thought this *S. hirta*, Sm. This certainly resembles *S. damascena*, as you observe. The description of the leaves

of *S. nigricans* in E. Bot. does not agree with the specimens in Salict. Brit. Exsicc."

68, 69, 70. "*S. phyllicifolia*, L." *Obs.* I am rather surprised that Dr. A. considers these to be *S. phyllicifolia*, L., without any hesitation, for *S. phyllicifolia*, L. = *S. bicolor*, Ehrh., and that he appears to maintain *S. laurina* as a species distinct from *S. bicolor*, Ehrh. This is not *rupestris* according to the Salict. Wob. The style is short for one of the *nigricantes*, and the leaves do not turn black in drying. *Mr. Ward*: "I think Dr. A. may be right here. No. 68 appears to belong rather to the *bicolor* group." 69. *Mr. Ward*: "The leaves and catkins are from the same plant. I have thought this more like *S. propinqua*, yet Dr. A. thinks it *S. phyllicifolia*." 70. *Mr. Ward*: "I think this one of the *bicolors*. I do not think it the male of 69. Dr. A. thinks it *S. phyllicifolia*, which I consider that it resembles."

71. "*S. phyllicifolia*, L., forma maxime memorabilis, non autem ad *S. nigricantem* referenda." *Obs.* Nearly related to No. 68. The stipules have a straight point, and therefore resemble *S. nigricans*, Fr. *Mr. Ward*: "This I consider the nearest to *S. rupestris*, E. Bot., of any form we have."

72. "*S. phyllicifolia*, L." *Obs.* The catkins are much shorter and thicker than those of *S. tenuior*, Borr. Dr. A. is probably right in referring it to *S. phyllicifolia*, L. *Mr. Ward*: "*S. tenuior*, the catkins are shorter, as you remark, than the plant in E. Bot., yet the leaves appear to agree, and I think the name may be right."

73. "Hæc forma non nihil a vera *S. laurina*, Sm., recedens, ad eam attamen proxime referenda." *Obs.* Leaves more coarsely serrated and pubescent beneath than in *S. laurina*, Sm. and Borr. *Mr. Ward*: "This may be a variety, as you and Dr. A. observe." -

74. "*S. phyllicifolia*, L. (sine dubio in horto culta.)" *Obs.* I may remark once for all that the specimens in fasc. 1 and 2 of Salict. Brit. Exsicc. are none of them garden specimens, but all gathered wild, or apparently wild. An unfortunate mistake will account for Dr. A.'s remark. The catkins of No. 74 are those of *S. Davalliana*. The leaves will be found at No. 84. The leaves of 74 are not like those of *S. petraea* from Borrer; nor are the catkins of 84 the same as Mr. Borrer's plant. *S. petraea*, Borr., turns very black in drying. *Mr. Ward*: "It is a pity that the leaves in this number should have been put with No. 84, and those of 84 with 74. I think No. 74 may be

right; but as to No. 84, *S. petræa*, there is great doubt. Mr. Borrer thought the styles like *S. petræa*; but as the leaves in authentic specimens of *S. petræa* turn black in drying, this cannot be the same species."

75. "Utrum Salicis nigricantis an *S. phyllicifoliæ* forma vix dijudicandum. Mihi *S. phyllicifolia* videtur." *Obs.* I never saw any but dried specimens of *S. propinqua*. In the form of its leaves and shape of its catkins this plant resembles *S. Forsteriana*, which I had not seen when this collection was published. Dr. A., like myself, appears to find it difficult sometimes to decide whether a plant is one of the *nigricantes* or *bicolores*. *Mr. Ward*: "I think I called this *S. Forsteriana* when I first got it, and, as you remark, it comes near it. The leaves appear smaller than the E. Bot. fig. Still it may be *S. Forsteriana*."

76. "*S. phyllicifolia*, L., *rotundifolia*." *Obs.* The leaves are very like *S. Wulfeniana*, Forbes *Saliet. Wob.* No. 48. *Mr. Ward*: "*S. Weigeliana*, E. Bot. Dr. A.'s remarks here are correct."

77. "*S. phyllicifolia*, L." *Obs.* Dr. A. is no doubt right if *S. phyllicifolia* is defined so as to include most of our *bicolors*. I think this is *S. Weigeliana*. *Mr. Ward*: "*S. Weigeliana*, E. Bot."

78. No remark by Dr. A. *Obs.* This closely resembles *quoad folia*, *S. Weigeliana*, *Saliet. Wob.*

79. "*S. phyllicifolia*, L." Mr. Watson observes, "Perhaps the name may be intended also to apply to No. 78." *Mr. Ward*: "*S. Weigeliana*, Forbes, but with more wavy serratures. May not No. 70 be the male of this? I think it very probable. They are both growing on the banks of the Swale."

80-85 inclusive. "*S. phyllicifolia*, L.," written by Dr. A. to all these. *Obs.* 80. *S. Croweana*, Sm.; 81, leaves larger and broader than in my *Croweana* from Mr. Borrer; 82, *S. nitens*, I think; 83, no doubt *S. Croweana*. *Mr. Ward*: "80. *S. Croweana*, Sm., the true plant; 81. *S. Croweana*, with broader leaves." 84. *Obs.* See remarks on No. 74. 85. *Obs.* Germens more silky than in *S. tetrapla*, from Borrer, and the leaves broader. *Mr. Ward*: "This may vary from yours, yet I think it will be right."

86-89 inclusive. "*S. repens*, L.," written to all by Dr. A. *Obs.* No doubt *S. repens*, L., includes them all. *Mr. Ward*: "*S. repens*, L., and its varieties."

✓ EXIGUITATES CARPOLOGICÆ.

AUCTORE H. F. HANCE, PH.D., REL.

1. *Bocconia cordata*, Willd.—Hujusce stirpis fructifera exemplaria, ex interioribus provinciæ Kwang-si, a. 1866 retulit missionarius J. R. Graves, in quibus hæc invenio :—Capsula 4-sperma. Stylus brevissimus, stigmatē ad basin usque bifido, lobis conniventibus. Semina oblonga, testa crustacea, hepatico-brunnea, nitida, nervis longitudinalibus atque transversis reticulata, basi superiore strophiola oblonga alba spongiosa, in raphen elevatam excurrente, prædita. Docti 'Generum Plantarum' auctores "stigma oblongum vix lobatum" prædicant, quale minime reperio, quæruntque numne semina arillam carnosam habeant, uti in speciebus americanis occurrit. Utriusque vero organi structuram jam bene exposuerat divus Endlicher. (Gen. Plant. 855.) Planta, teste Loudonio, in hortis anglis a. 1795 e Sina introducta est, sed e quanam provincia, vel si profecto spontanea in hoc imperio antehac reperta sit, plane nescio. Speciminum japonensium structuram carpiceam nuper descripsit Miquelius. (Ann. Mus. Bot. Lugd. Bat. iii. 11.) Folia in Gravesianis subtus crispulo-tomentosa.

2. *Rhamnus oreigenes*, Hance.—Specimina fructibus onusta plantæ satis raræ, m. Septembri 1869 inventa, sententiam quam enuntiavi de ejus loco inter *Frangulas* plane confirmant. Drupæ, calycis tubo explanato insidentes, sunt globosæ, grani piperini majoris vel pisi minoris mole, 2-4-pyrenæ; pyrenæ cartilagineæ, fusco-nigricantes, dorso convexæ, facie nonnihil complanatæ, basi perforatæ. Semen strato tenui fusco, pyrenæ adhærens, luteum, oblongum, compressum, basi in cornua duo crassa lutea nitida adpressa conniventia, e pyrena protrusa (qualia in *R. crenata*, S. et Z. descripsit Maximowicz, Rhamn. Orient.-asiat. 20), inter quæ foraminulum medio constrictum adest, productum, raphæ laterali, inconspicua.

3. *Æsculus chinensis*, Bge.—Præsto sunt maturatæ hujus arboris capsulæ, in ditone Pekinensi lectæ, quæ sunt obovoideo-subglobosæ, basi veluti in stipitem subattenuatæ, abortu 1-loculares, trivalves, valvis coriaceis, cinnamomeæ, omnino inermes, suberoso-leprosæ, sesquipollicem tantum longæ. Semen loculum implens, subglobosum, testa brunnea sublucida, hilo fere dimidiam seminis superficiem occupante pallido opaco. In specimine ad Hakodate ab amico Maximowiczio collecto calycem campanulatum, petalæque quattuor conformia, fere

æqualia, lamina orbiculata basi cordata, tomentella atque ciliata, ungue fere æquilongò suffulta, invenio. Clar. Asa Gray stirpem japonicam *Hippocastanum* potius quam *Paviam* statuit (Mem. Amer. Acad. vi. 385): calycis petalorumque forma illis quidem convenit, sed ovario etiam (in specim. chinensi viso) asperitudinum omnino experte his magis congrua videtur. Limites vero hasce inter sectiones, optime monentibus cell. Bentham et Hooker, prorsus evanidi. Fructus pro genere parvus.

4. *Xanthoceras sorbifolia*, Bge.—Capsula corticata, crassa, sphærica, hepatico-nigrescens, subglauca, asperitatibus minutis squali ad instar corii undique obsita, $2\frac{1}{2}$ poll. alta, periphèria circ. 7-pollicari, 3-4-locularis, loculicide 3-4-valvis, septis spongiosis. Semina in quovis loculo 8, exarillata, obovoideo-subglobosa, vix compressa, semipollicem longa, testa crassa, sublignosa, olivaceo-nigra, nitida, hilo satis magno semicirculari albido opaco, embryone exalbuminoso cyclico, cotyledonibus crassis inæqualibus farinosis, radícula supera descendente corniculata, intra plicam lateralem testæ abscondita. Descriptionem ad specimina Pekinensia concinnavi. Semina grati saporis, Castaneis haud dissimilis, a Sinis comeduntur.

5. *Cæsalpinia Millettii*, Hook. et Arn.—Fructus quos præterita hieme in Macaiensium insula Lappa carpsi, hanc inter *Sippanias* collocandam, uti jam suspicati erant beati descriptores, probant. Sunt legumina compressissima, glaberrima, dimidiato-obcordata vel fere dolabriformia, nempe margine superiore recto, sutura conspicue incrassata, inferiore eximie rotundato, apice latissimo, in suturæ rostrum curvamine concavo excurrente, 1-3-sperma.

6. *Cratægus pinnatifida*, Bge.—Hæc planta, quæ sinice Shan-li-hung, h. e. 'fructus ruber collinus' audit, circa Peking vulgaris, ubi in planitièbus tantum frutescens atque spinosa occurrit; sed, teste amico Bretschneider, legationis cæsareæ rossicæ apud Sinas medico, cui fructus debeo, in montosis quinquaginta mill. pass. a metropoli occasum versus sitis (v. c. circa templum Miao-feng-shan, 4000 ped. supra oceanum æquor), altitudinem 20-30 pedum attingit, armis quoque amissis. Specimina florifera in herbario *C. monogynæ*, Jacq., admodum similia, fructibus vero, in genere facile maximis, prædita, prorsus diversa. Poma enim præbet oblongo-globosa, pollicem longa, diametro circ. 10-lineali, vivide punicea, punctisque griseis crebris, lenticellis omnino simillimis, consita, vertice profunde perforata, odorem suaven-

pomarium spargentia, intus pyrenas 5 osseas oblongas subtrigonas 5 lineas longas liberas foventia. Hi fructus, testante item cl. Bretschneider, saccharo conditi, inter lautiora Pekinensium bellaria numerandi.

7. *Argyrothamnia tuberculata*, Muell. Arg.—Specimina florifera, ineunte æstate 1865, atque fructifera m. Septembri 1866, in collibus ad occidentem urbis Peking inventa, benevole misit Dr. S. W. Williams. Verrucæ quibus ovarium obseritur provectiore ætate evanescent, quare nomen specificum minus aptum. Capsula matura viridula, trigastra, pilosula, nequaquam tuberculata, coccis intus bivalvibus. Semina ovoideo-subglobosa, olivacea, rugosa.

8. *Codicæum umbellatum*, Muell. Arg.—Stirpem hanc, quæ nondum ex imperio sinensi innotuerat, in colliculis circa pagum piscatorium Pak-shá, ora maxime australi prov. Kwang-tung, primus offendi d. 20 Novembris 1866. Quæ examinavi semina sunt 5 millimetra longa, lævissima, ovoidea, facie subcomplanata, fusco-brunnea, striolis saturatioribus inconspicue marmorata; caruncula vix elevata, late subcordata, apice utrinque fossulata. Flores masculi potius racemosi quam umbellati (quales profecto a Wightio depinguntur, Ic. Plant. Ind. Or. t. 1874) foliaque quam in zeylanico exemplari minus coriacea, sed huic staminum numero atque disci fabrica in totum congruunt specimina chinensia.

9. *Iris oxypetala*, Bge.—Occurrit in prov. Fokien, unde amic. De Grijs specimina misit, Pekinensibus omnibus notis comparia. Capsula, adhuc indescripta, est pergamenea, oblonga, utrinque angustata, apice rostrata, æqualiter 6-costata, inter costas crassas tenuiter reticulata, bipollicaris, ut videtur indehiscens. Semina brunnea, mutua compressione angulata, integumento adhærente lucido. Flores, fide cl. Dr. Williams, sunt flaventi-albi, secus perigonii nervulos cæruleo-tincti. In exemplaribus vetustioribus caules basi fibris deusis fuscis crassis tenacibus e foliis emortuis residuis obteguntur. Juxta systema Spachianum, species in sectione *Eremiridum* stationem poscit. Planta homonyma caucasica, a beato C. A. Meyer descripta, *J. Meyeriana* rectius nuncupanda, nam stirps Bungeana antecessionis gaudet jure.

OBSERVATIONS ON PROTANDRY AND PROTOGYNY
IN BRITISH PLANTS.

BY ALFRED W. BENNETT, M.A., B.Sc., F.L.S.

(Read at the Meeting of the British Association at Liverpool, 1870.)

The arrangement of the reproductive organs in hermaphrodite plants, the presence in the same flower of both pistil and stamens, suggested to the minds of the older botanists no other idea than that of self-fertilization.

Sprengel was the first, at the close of the last century, to point out, in his 'Das Entdeckte Geheimniss der Natur,' that it is frequently impossible for the pistil to be fertilized by the pollen of stamens belonging to the same flower. His observations, however, attracted but little attention from botanists generally, and were not followed out until Darwin laid down his famous axiom that "nature tells us in the most emphatic manner that she abhors perpetual self-fertilization."

The most effectual way, of course, of securing cross-fertilization, is by unisexuality in the flowers; and a very accurate observer of nature, Mr. Robert Spruce, maintains, contrary to the general view, that hermaphroditism is the earlier, unisexuality the later, stage in progressive development.

It is now generally admitted that, even in hermaphrodite flowers, cross-fertilization is the rule, self-fertilization the exception. Two sets of facts have been especially observed,—in particular by Darwin in this country, Hildebrand in Germany, and Delphino in Italy,—to favour cross-fertilization in hermaphrodite flowers; the phenomena of dimorphism and trimorphism, and the special arrangements which render it easier for the pollen to be brushed off by insects visiting the flower than to fall on its own stigma. But, besides these, another arrangement exists by which self-fertilization is hindered, the simple fact that the stamens and pistil belonging to the same flower are frequently not ripe, so to speak, at the same time. The only published systematic observations on this point with which I am acquainted are in Professor Hildebrand's 'Die Geschlechter-Vertheilung bei den Pflanzen,' published in 1867; none have, as far as I am aware, been systematically made in this country. The terms *Protandry* and *Protopyny* used by Hildebrand to express, in the one case the development

of the stamens before the pistils, in the other case the development of the pistil before the stamens, are so convenient and expressive that I have adopted them in this paper ; the term by which he expresses that the two organs are matured simultaneously, "Non-dichogamy," does not seem to me so happy, and I propose to substitute for it *Synacmy*,—the phenomena of *Protandry* and *Protopyny* forming together that of *Heteracmy*.

The following observations must be understood as referring simply to the fact of the relative times at which the reproductive organs arrive at maturity, as shown by the discharge of the pollen from the anthers and the appearance of the viscous or papillose surface on the stigma, or other evidence of readiness for the reception of pollen ; they have not been further confirmed by the dissection of the style and detection of pollen-tubes, which would have occupied more time than I had at my disposal. The plants observed are all British, growing in their native habitats, nearly all common plants, or at all events easily attainable, and the parts so conspicuous as to render observation of the phenomena described accessible to any one with a microscope of comparatively low power, in many cases with the naked eye. The classification and specific names used are those of Dr. Hooker's 'Student's Flora.' The time of observation was between August 1st and September 2nd. Several important Orders and classes, as *Umbelliferae*, *Compositae*, *Apetalae*, and *Gramineae*, have been entirely passed by.

I should premise that my observations do not confirm the inference that may be drawn from the remarks of previous observers, that, in heteracmic plants, the difference in the time of maturity of the two organs is so great as to render self-fertilization impossible. This I find to be seldom the case ; generally, in heteracmic plants, the period of maturity of one organ to a certain extent overlaps that of the other, so that self-fertilization is not so much rendered impossible as cross-fertilization is facilitated. In synacmic plants, on the other hand, the period of maturity of one organ may frequently exceed in length that of the other, so as to render cross-fertilization easy. Hence no absolute line can be drawn between the plants indicated in the three subjoined lists ; further observations may, in a few cases, cause the transference of a species from one to another.

<i>Protandrous.</i>	<i>Synaemic.</i>	<i>Protogynous.</i>
Ranunculus repens.	Fumaria officinalis.	Ranunculus scleratus.
R. Flammula.	Hypericum hirsutum.	Potentilla anserina.
Stellaria graminea.	H. quadrangulum.	Spiræa Ulmaria.
Cerastium glomeratum.	H. humifusum.	Chlora perfoliata.
Lychnis Flos-cuculi.	Linum catharticum.	Erythræa Centaurium.
Silene inflata.	Potentilla reptans.	Plantago major.
Malva sylvestris.	P. Tormentilla.	P. lanceolata.
Geranium pratense.	Rubus fruticosus.	Scrophularia aquatica.
G. sylvaticum.	Drosera rotundifolia.	Mentha Pulegium.
Vicia Cracca.	Lythrum Salicaria.	Verbena officinalis.
Lotus corniculatus.	Epilobium montanum.	
L. major.	E. hirsutum.	
Trifolium pratense.	Erica Tetralix.	
T. medium.	E. cinerea.	
Anthyllis Vulneraria.	Calluna vulgaris.	
Ononis spinosa.	Gentiana campestris.	
Agrimonia Eupatoria.	Solanum nigrum.	
Alchemilla vulgaris.	S. Dulcamara.	
Circæa lutetiana.	Plantago media.	
Galium verum.	P. maritima.	
G. Mollugo.	Digitalis purpurea.	
Knautia arvensis.	Linaria vulgaris.	
Scabiosa succisa.	L. Cymbalaria.	
S. Columbaria.	Euphrasia officinalis.	
Campanula rotundifolia.	Bartsia Odoutites.	
Convolvulus arvensis.	Veronica Beccabunga.	
Echium vulgare.	Lysimachia Nummularia.	
Mentha sativa.		
Calamintha Clinopodium.		
Stachys sylvatica.		
S. Betonica.		
Origanum vulgare.		
Teucrium Scorodonia.		

It will be seen from the above lists that, as far at least as concerns the comparatively few plants I have been able to examine (and I believe the remark will be found to hold good of British plants taken as a whole), the most frequent arrangement is that the pollen commences to be discharged from the anthers at a longer or shorter interval before the maturing of the stigma. In some cases there still remains a certain quantity of pollen in the anthers when the stigma is ready to receive it; in other cases, the anthers have either withered up or entirely dropped off before fertilization of the ovules can possibly

take place. Synacmy, or the contemporaneous maturing of the reproductive organs, is nearly as frequent as protandry; while protogyny is a phenomenon of far less common occurrence. The two extremes among the species observed may be stated to be *Campanula rotundifolia* and *Scrophularia aquatica*. In the Harebell, the pollen is discharged long before the opening of the flower, so as to suggest the idea of necessary self fertilization, were it not that the stigmas do not open and become receptive until after the flower has been expanded for some days, and is almost withering. Either, therefore, the pollen must be retained in the flower by means of the hairs which clothe the style until the stigma is ready to receive it, or it must be carried by insects to other flowers. In *Scrophularia*, on the other hand, the stigma is itself mature in the bud, the stamens not discharging their pollen until after the flower is open. It will be remarked that in some Natural Orders, as *Leguminosæ* and *Labiata*, all the species examined, with scarcely an exception, range themselves in one or other of the three classes; while in others, as *Rosaceæ*, they are distributed over all three, and in some instances, even closely allied species of the same genus differ in this respect, as, for instance, *Potentilla* and *Ranunculus*. Careful observation might even, in some cases, derive from this point a useful diagnosis of difficult species. The following remarks may be permitted on some species which afford points of special interest.

In those Natural Orders in which the flowers are furnished with two sets of stamens of different lengths, it is most usual for the longer ones to discharge their pollen at an earlier period than the shorter ones, and they probably have different functions to perform. This is commonly the case with *Crucifera*, *Caryophylleæ*, *Geraniaceæ*, and *Onagrariceæ*, but not, I believe, with *Labiata* or *Scrophularineæ*. The same phenomenon is found in those Orders where the numerous stamens are arranged in different whorls, as *Ranunculaceæ* and *Rosaceæ*. In the Strawberry the mode in which different sets of stamens successively bend over towards the pistil is very curious. In *Ranunculus* and *Anemone* the outer rows of stamens first discharge their pollen extrorsely on to the corolla or calyx, whence it is doubtless picked up by insects; the inner rows are discharged at a later period.

In *Ranunculus repens* and *Flammula* the discharge of pollen commences considerably before the stigma is ready; in *R. sceleratus* the reverse appears to be the case. Caryophylleous plants appear to have

a strong tendency towards protandry ; in *Stellaria graminea* the versatile anthers have dropped completely before the stigmas have become papillose. In several species of *Geranium* the protandry is very marked, in others not so decided. All the species of *Leguminosæ* which I have examined present the same phenomenon, though not to such a degree as to render self-fertilization impossible. In *Rosaceæ* we find all grades, from the decided protandry of the Agrimony to the marked protogyny of the Meadow-sweet. In the Bramble the enormous crowd of stamens bending in a mass completely over the pistil, and discharging their pollen while the stigmas are in a receptive condition, would seem to imply self-fertilization ; and yet no flower is more constantly and persistently infested by minute insects. In the Ladies'-mantle (*Alchemilla vulgaris*) the stamens also bend over the pistil while discharging their pollen ; but, on the other hand, the stigmas do not rise up in a mature state till a later period. The Flax family has furnished Mr. Darwin with some of his most striking instances of dimorphism ; and yet in our little *Linum catharticum*, the pistil and stamens are of the same length, and the pollen is discharged quite on to the stigma, affording a *primâ facie* instance of self-fertilization.

The Sundew (*Drosera rotundifolia*) is a little plant of very great interest. Rarely opening its flowers, it yet almost invariably produces its full complement of seed-bearing capsules. It appears to be strictly synœmic, and I believe presents a very peculiar contrivance for ensuring self-fertilization, which, however, I am not able fully to describe on the present occasion. In *Dipsacææ*, decided protandry appears to be the rule. In the three species examined, the flower-heads present two distinct phases ; as soon as the corolla opens, the large versatile anthers appear at the end of their very slender filaments, the pistil being quite hidden in the tube of the corolla ; after a time the anthers drop off, and the filaments wither up, and then for the first time the long styles and funnel-shaped stigmas appear, protruding considerably beyond the mouth of the corolla. In *Scabiosa succisa*, and to a smaller extent in other species of the Order, there is a singular combination, which I do not remember to have seen noticed, of the centripetal and centrifugal modes of inflorescence. The outer, larger, often rayed, flowers of the capitulum open first, then those in the centre, leaving an intermediate band which opens last of all.

The discharge of pollen in the bud must not be taken as a necessary sign of self-fertilization. I have shown that this conclusion cannot be drawn in the case of the Harebell; and the same remark will apply to the Heaths.

In *Erica Tetralix* and *cinerea*, the pistil and stamens both arrive at maturity before the opening of the flower, and yet apparently self-fertilization does not take place. The pollen is discharged from terminal pores directed inwards in close contact with the style, and can scarcely reach the stigma without artificial aid. Every one who is accustomed to walk over heath-land must have noticed the small number of capsules produced compared to the flowers. The fecundation which does take place I believe is due to the small insects which enter the bud through the little holes so constantly found pierced in the side of the flower. In *Chlora perfoliata*, which is protogynous, and opens only in bright sunshine, the stamens appear to approach the pistil successively when the stigma is in a receptive condition, but before the anthers are ready to burst. In *Solanum Dulcamara* the pollen is discharged from terminal pores at a level not much more than halfway up the style, in *S. nigrum* actually on to the stigma; is either of these species dimorphic? both are nearly synacmic. *Plantago lanceolata*, the common Ribgrass, is one of the most striking common instances of protogyny, the long awn-like stigma projects from the flower-bud long before it opens, giving a comate appearance to the spike, and generally withers up as soon as the anthers spring out on their long thread-like filaments. In *P. major* the phenomenon is much less conspicuous, while in *P. media* and *maritima* the stigma rather lags behind the stamens than otherwise. In *Scrophularineæ*, with the exception of the very remarkable instance of protogyny in *Scrophularia aquatica* already described, synacmy appears to be the rule, not, however, I believe, implying self-fertilization. In the Foxglove neither stigma nor stamens are mature till the flower has been out some days, and is nearly withering, and yet the number of pollen-tubes that pierce the style to fertilize the almost innumerable ovules, must be prodigious. The species of *Labiatae* examined present, with the single exception of *Mentha Pulegium*, uniformly strongly-marked instances of protandry. The Marjoram is dimorphic, presenting one form with the stamens longer than the pistil, in which the flowers are larger and of a darker hue; another form in which the pistil is longer than the stamens, and

the flowers smaller and lighter-coloured. Like the Thyme, however, it is frequently unisexual. In *Verbena officinalis*, which is protogynous, both the pistil and stamens are completely concealed in the tube of the corolla, beneath the ring of hairs which clothe its throat.

My object in presenting these few observations to the notice of the readers of the 'Journal of Botany' is to induce others who have more leisure at their disposal to follow them out. I believe a few systematic observations of this kind may not be without their fruit in physiological botany. The points which I should especially desire to have submitted to close observation are, whether the same species is uniform in its phenomena of protandry, protogyny, or synaemy; and if it varies, under what conditions of climate, soil, or season.

NOTE ON PLANTS GATHERED NEAR LAKE BARLEE DURING MR. FORREST'S RECENT EXPEDITION.

BY FERDINAND VON MUELLER, Ph.D.

Director of the Melbourne Botanic Garden.

The plants in this collection have more of the character of the vegetation of Southern than of Western Australia. Some of them extend to the Brigalow Scrubs of the Burdekin river and to Sturt's Creek, and have thus a wide range through the more central portions of Australia; and, indeed, it may be safely asserted that the physiognomy of the vegetation of at least two-thirds of the continent is in its main features the same, although an admixture of endemic species gives to the vegetation of some portions of the interior a somewhat peculiar character.

The occurrence of a *Rhagodia* of the series of *R. parabolica* and of *Kochia villosa* indicates a salt-bush country, available for pasture. The genus *Eremophila*, which contains the most beautiful of all our desert bushes, generally bordering semi-saline flats, where they pass into sandy or rocky ridges, is well represented in Mr. Forrest's small collection, inasmuch as the following species occur: *E. latifolia*, *E. Latrobei*, *E. platycalyx*, a narrow-leaved variety of *E. Oldfieldii* (verging towards *E. graciliflora*), and a new species, to which I am happy to give the name of the young, but talented and courageous

leader of the expedition. Various *Cassia* of the series of *C. artemisioides*, so abundant towards Lake Torrens, the Barkoo and Darling rivers, were also found.

Other plants in the collection deserving some notice are *Sida calychnenia*, *Abutilon cryptopetalum*, and *Cassia pleurocarpa*. *Jasminum calcarium* was previously only known from between the Moore river and Shark Bay, and from J. Macd. Stuart's track, while *Hakea grammatophylla*, a rare and splendid South Australian species, has not been previously recorded from any West Australian locality. The tree compared by Mr. Forrest to the Weeping Willow is *Ptilosporum phillyroides*, which stretches across the continent in most directions from the settled parts of West Australia. Of *Stackhousia pubescens*, an exclusively West Australian species, an aberrant variety was brought. The tall climber with pods, gathered by the natives for food, is the "Daubah" of Sir Thomas Mitchell's journal, *Marsdenia Leichhardtiana*, which I have traced myself to the Murray river, Sturt's Creek, the rear of Carpentaria, Lake Torrens, and the Burdekin river, and which Mr. Oldfield saw also on the river Murchison.

The West Australian natives, who, as Mr. Forrest informs us, call the fruit "careular," eat the young seeds and the inner part of the pericarp.

The most interesting plants in this collection are a new *Ptilotus* and *Eriostemon*. The latter is of an eastern type, allied to *E. scaber*; and in bestowing on it as a specific appellation the honoured name of Lieut.-Colonel Bruce, the Acting Governor of West Australia, I wish publicly to record my appreciation of the philanthropic and scientific generosity which prompted his Excellency and his advisers to send out this last expedition in the cause of a lost traveller and for the advancement of geography. The new *Ptilotus* resembling *P. latifolius*, I wish to bear the name of the Hon. Captain Roe, R.N., under whose immediate control not only Mr. Forrest and his companions were sent out, but who, moreover, for nearly forty years has been identified with the territorial and naval explorations of the Australian continent, more particularly its great western portion, over which he held so long and so worthily the administration of the Survey Department, and who on this occasion is entitled to special consideration, as he took an active share in the elucidation of West Australian plants as far back as the time of Baron von Hügel's visit.

SHORT NOTES.

FERNANDOA, *Welw.*—We are sorry to have for the second time spelt this name incorrectly, and hasten to give it in its proper form. Dr. Welwitsch's genus of *Catalpeæ* is neither "*Ferdinandia*" as originally printed in this Journal, Vol. III. p. 330, nor "*Ferdinandoa*" as at p. 280 of this volume; but—as was correctly stated in Vol. IV. p. 123—*Fernandoa*.

DIOICISM IN SILENE—In a paper read before the Edinburgh Botanical Society in July last, Dr. Buchanan White detailed the results of his examination into the sexual conditions of *Silene maritima* and *S. inflata*. Of 72 plants of the former species, 39 were perfectly hermaphrodite; 11 had the stamens quite abortive, no pollen being produced; whilst 10 had the styles abortive, and 11 showed a tendency towards the same condition; in one plant both staminate and pistillate flowers coexisted. In the flowers of the hermaphrodite plants—which may be distinguished at once by their much larger petals—the stamens and styles were equal in length; in the unisexual flowers the stamens were a quarter to a half the length of the styles, or four to six times as long as the styles (which were never altogether absent), in the pistillate and staminate flowers respectively. Of *S. inflata*, 15 plants were examined, of which 5 were perfectly hermaphrodite, 6 entirely pistillate, 3 quite staminate and 1 with a tendency to be so. Dr. White further noticed that in every staminate flower (*i.e.* those in which the styles were generally abortive), and in them only, the anthers were filled with *Ustilago* spores; the styles were in no case affected with the fungus. It is interesting to place this fact by the side of that observed by Miss Becker in plants of the usually diœcious *Lychuis diurna* (see Journ. of Bot. VII. (1869), 291), where the *Ustilago* was found in the anthers of all the bisexual flowers. The subject is worthy of further investigation; the *Caryophyllææ* will be probably found to contain other occasionally diœcious or subdiœcious species (*e.g.* in the genus *Stellaria*), and the influence on them of the *Ustilago antherarum*, in modifying the relations of the reproductive organs, requires elucidation by a larger number of facts than are yet put on record. (See also a note by M. J. Berkeley in Gard. Chron. 1870, p. 986.)

MALVA BOREALIS, *Wallow.*, NEAR DUBLIN.—This occurred apparently wild about this city in the autumn of 1869. I enclose specimens raised from the seed of the original plants.—MICHAEL DOWD.

[The Mallow sent quite agrees with that collected about Gloucester by Dr. St. Brody, and, like it, is probably an introduction. It differs from the introduced *Malva* found about London (Journ. of Bot. Vol. IV. p. 149, and Fl. Middx. 61), *M. parviflora*, Gren. and Godr., non L.?, in having a prostrate habit, downy carpels about half the size, and a calyx which does not enlarge in fruit.]

BOTANY AT CLIFTON COLLEGE.—We are forming a botanic garden and herbarium for the use of the boys of Clifton College, and I shall feel greatly obliged to any fellow-botanist who will help me by giving a contribution of dried or living British plants. The great difficulty in such a case is to make a good beginning, and there are many who could aid our endeavours by giving a few common duplicates from a herbarium, or some of the ordinary hardy plants, such as would illustrate Lindley's 'School Botany.' I shall be glad, after a time, to reciprocate the favour from the rare plants with which this neighbourhood abounds.—M. J. BARRINGTON WARD.

ARENARIA CILIATA, L.—Under the name *Lychnis alsinoides parva flore albo minimo*, there is a specimen of this plant preserved in Buddle's Herbarium at the British Museum (vol. exxiv. f. 6), collected by Lhwyd near Sligo, and sent to Buddle by Dr. Richardson. It was probably gathered in 1699. Dr. Mackay, the supposed discoverer of the species as Irish, found it in 1806, as stated in 'Cybele Hibernica.' We are indebted to the Rev. W. W. Newbould for calling our attention to Buddle's specimen.

FLORA OF MARLBOROUGH.—Having lately had through my hands a portion of the Herbarium of the Marlborough College Natural History Society, I have entered in my copy of Mr. Preston's 'Flora of Marlborough' (1863) such species as do not appear in that work. I have also added the new species recorded in the Reports of the Society from 1865 to 1869. The following list of the plants so added may be of interest to those who possess the original Flora, of which a new edition is in contemplation. Those which I have seen are indicated by an (!) after their names; the remainder are from the Reports above mentioned.

Ranunculus pseudoflui-	Nuphar lutea!	Thlaspi arvense!
R. peltatus!	[tans! Papaver strigosum!	Viola Riviniana!
R. Drouetii.	Nasturtium palustre!	V. Reichenbachiana!
R. trichophyllus.	N. sylvestre.	[des! Arenaria leptoclados!
Berberis vulgaris!	Erysimum cheiranthoi-	Montia fontana.

Ulex Gallii.	Carduus pratensis.	Ruscus aculeatus!
Genista tinctoria!	Tragopogon minor!	Allium oleraceum.
Astragalus glycyphyllos.	Helminthia echioides.	Juncus conglomeratus.
Ononis campestris!	Picris hieracioides.	J. diffusus!
Lotus major!	Crepis biennis.	J. obtusiflorus!
Vicia tetrasperma!	Phyteuma orbiculare.	J. acutiflorus!
V. gracilis!	Campanula Trachelium!	Triglochin palustre.
V. sativa, var. segetalis,	C. hybrida!	Typha latifolia.
Thuill.!	Menyanthes trifoliata!	Lemna gibba!
Lathyrus Nissolia!	Cuscuta Trifolii!	L. polyrrhiza!
L. Aphaca!	Echium vulgare!	Potamogeton compress-
Ornithopus perpusillus.	Lithospermum officinale!	P. pectinatus! [sus!
Rosa micrantha.	Hyoseyamus niger.	P. luceus!
R. tomentosa!	Orobanche elatior!	Scirpus lacustris!
R. rubiginosa.	Linaria spuria.	S. sylvaticus.
Epilobium angustifolium!	Pedicularis palustris!	Carex remota!
E. palustre!	Veronica scutellata!	C. pulicaris!
Sedum anglicum.	Mentha sativa!	C. ampullacea!
S. reflexum.	M. Pulegium.	C. disticha!
Hydrocotyle vulgaris.	Teucrium Scorodonia.	C. hirta!
Helosciadium inundatum!	Verbena officinalis!	C. ovalis!
Apium graveolens!	Chenopodium rubrum.	C. pendula!
Silvaus pratensis!	Atriplex deltoidea.	C. paniculata!
Sison Amomum!	Polygonum minus.	Aira caryophylla.
Ceanothe fluviatilis.	P. Hydropiper.	A. flexuosa.
Torilis nodosa.	Ulmus montana!	Catabrosa aquatica!
Galium uliginosum.	Salix viminalis!	Poa compressa.
Dipsacus pilosus!	S. purpurea!	Festuca pratensis!
Erigeron acris!	S. rubra.	F. loliacea.
Inula Conyza.	S. fusca.	F. sciuroides!
Achillea Ptarmica.	Populus alba.	F. arundinacea.
Senecio campestris.	Alnus glutinosa!	Triticum caninum.
Solidago Virgaurea.	Carpinus Betulus!	Hordeum pratense!
Aretium nemorosum.	Orchis incarnata!	H. murinum.
A. intermedium.	Ophrys apifera. [flora.	Lastrea Borreri.
	Cephalanthera grandiflora.	L. Oreopteris.
	Iris foetidissima!	L. Thelypteris.

Introductions: *Papaver somniferum*, *Farselia incana*, *Geranium rotundifolium*, *Oxalis corniculata*, *Trifolium hybridum*, *Fragaria elatior*, *Onopordum Acanthium*, *Mimulus luteus*, *Borago officinalis*, *Fagus castanea*, *Phalaris canariensis*. *Herminium Monorchis* was erroneously inserted in the Flora, specimens from the locality cited being *Habenaria viridis*.—JAMES BRITTEN.

HETEROGENESIS has been used as a synonym of spontaneous generation. Mr. Spencer, however, ('Principles of Biology,' vol. i. p. 210.)

expressing his disbelief in the *per saltum* evolution of life, has disregarded this, and has employed the term to indicate those cases of multiplication sometimes described as alternate generation where there is only a *cyclical* recurrence of the same form; it therefore, in Mr. Spencer's symmetrical terminology, stands opposed to Homogenesis. Heterogenesis, in fact, consists of Gamogenesis, alternating with Agamogenesis, while Homogenesis is Gamogenesis alone. Professor Huxley has lately proposed Biogenesis for the *omne vivum ex vivo* view, and Abiogenesis for its opposite. Biogenesis, however, includes those hypothetical cases to which Milne-Edwards has applied the term Xenogenesis, where new living things are produced by modifications of the substance of some other living thing. The production of grubs from galls and of entozoa were accounted for in this way by Redi, who nevertheless disbelieved spontaneous generation. Professor Huxley thinks that in cancer-cells and microzymes (the cause of contagious diseases) we may have real examples of Xenogenesis.

As its assumed harmony with the theory of evolution has been advanced in support of spontaneous generation, it is interesting to note the following passage from the appendix to the 'Principles of Biology' as indicating Mr. Spencer's views upon the subject:—"In the early world, as in the modern laboratory, inferior types of organic substances, by their mutual actions under fit conditions evolved the superior types of organic substances, ending in organizable protoplasm. . . . And to the mutual influences of its metamorphic forms under favouring conditions, we may ascribe the production of the still more composite, still more sensitive, still more variously-changeable portions of organic matter, which in masses more minute and simpler than existing *Protozoa* displayed actions verging little by-little into those called vital,—actions which protein exhibits in a certain degree, and which the lowest known living things exhibit only in a greater degree. Thus, setting out with inductions from the experiences of organic chemists at the one extreme, and with inductions from the observations of biologists at the other extreme, we are enabled deductively to bridge the interval, are enabled to conceive how organic compounds were evolved, and how, by a continuance of the process, the nascent life displayed in these became gradually more pronounced; and this it is which has to be explained, and which the alleged cases of 'spontaneous generation' would not, were they substantiated, help us in the

least to explain." (Pp. 483-484.) It may be remarked as a bibliographical fact that this appendix is not a separately-published pamphlet, as might be inferred from the notice in 'Nature,' but it is bound up in the most recent copies of the 'Principles,' and has been sent out to the subscribers.—W. T. THISELTON DYER.

Extracts and Abstracts.

ON THE NATURAL ROPES USED FOR PACKING COTTON BALES IN THE BRAZILS.

(From a Paper read by CHARLES BAILEY, Esq., before the Literary and Philosophical Society of Manchester, Feb. 8th, 1870.)

Most of the cotton bales which reach this country from the Brazils are corded with the long stems of climbing plants, which grow in the greatest profusion in the forests bordering on the cotton districts. In their fresh state these stems are exceedingly pliant and of remarkable strength, so that they serve admirably for cordage purposes, but by the time that the cotton reaches the mills of Lancashire they are dry and rigid, and as no further use can be made of them, they are burned for firewood. My attention was first directed to them by a paper read on the 7th December last, by Mr. Robert Holland, of Mobberley, to the Manchester Scientific Students' Association, on "Some Peculiar Forms of Exogenous Stems."

One of the earliest to minutely study this class of plants was Charles Gaudichand, a botanist who visited Chili, Peru, and the Brazils in 1830, and who subsequently published a memoir entitled, 'Recherches générales sur l'organographie, la physiologie et l'organogénie des Végétaux' (Mém. Savans Étrangers, t. viii. Paris, 1835), in which will be found a large number of engravings of many Lianas, but very little descriptive matter. The most complete general account of their structure which I have met with is that by Adrien de Jussieu, "Sur les tiges de diverses Lianes, et particulièrement sur celles de la famille des Malpighiacées" (Annales des Sciences Naturelles, t. xv., Paris, 1841); this was afterwards reprinted, with additions, and incorporated in the same author's 'Monographie de la famille des Malpighiacées' (Arch. du Mus. t. iii., Paris, 1843). Another account of their organization is

included in the eighth volume of the 'Botanische Zeitung,' by Hermann Crüger, entitled "Einige Beiträge zur Kenntniss von sogenannten anomalen Holzbildungen des Dikotylenstammes," and published in 1850. Notices of the structure of other Lianas are also to be met with in isolated memoirs, some of which will be referred to, and in most botanical text-books, particularly in those of Lindley, Schleiden, Richard, and Duchartre. Much important information may also be anticipated from some recent memoirs by a Brazilian botanist, Dr. Ladislaü Netto, who has presented memoirs on the subject to the French Academy, extracts only from which have been published in the 'Comptes Rendus' and 'Annales des Sciences' for 1866, 1867, etc.

Bignoniaceæ.—Travellers in the Brazils tell us that by far the larger number of climbing plants in the South American tropics belong to the Natural Order *Malpighiaceæ*, and we should therefore expect that this would be the family which furnishes the majority of natural ropes. But this does not appear to be the case; *Bignoniaceæ* being the most largely used for supplying Lianas for packing purposes, both as regards the quantity of ropes, and the largest number of species.

Most of them are readily identified by the remarkable and symmetrical outlines presented by the cortical and woody systems of their stems when seen in a horizontal section, the bark being projected into the woody tissue, towards the centre, in the form of rays. These cortical rays are wholly formed of liber-fibres, and they vary in colour according to the species. In the majority of stems such prolongations of the bark are four in number, disposed after the manner of a Maltese cross. In a few species each of the four cortical portions is very thick and perfectly square in contour, but in the larger number they are long and slender, frequently reaching the pith itself.

The yearly additions to these rays do not proceed after a uniform method, and I shall notice two or three of the principal arrangements. The more common is that where the four primitive rays are deeply projected into the woody portion, the additions taking place each season in the form of plates deposited on each side of the primitive cortical ray. It is difficult without the aid of a diagram to convey a clear idea of the sequence in which the various portions of bark and wood are formed; suffice it to say that each successive addition of bark is projected into the wood a shorter distance than its predecessor, and as the innermost extremity of every plate is truncate or rectangular, it

follows that the outline presented by each cortical mass is that of a pyramid, whose sides are formed of a series of rectangular steps like an ordinary staircase. It is difficult to account for this singular appearance, but the more probable explanation seems to be that a layer of wood is deposited for every layer of bark, so that by the time a new deposition of the bark is about to take place the wood has already surrounded the extremity of the previous plate, in consequence of which the progress of the new plate inward is barred by the previous season's layer of wood. If this explanation be sound the number of cortical plates on one side of, and including the primitive cortical ray, indicates the age of the stem under examination. Each annular layer of wood is thus broken up into four distinct portions by the projecting bark, each portion filling up one of the spaces enclosed by two of the arms of the cross. The number of plates formed on each side of the four primitive cortical rays rarely exceeds six. The peculiarity of arrangement, to which I here draw attention, is so striking, that it is a matter of surprise to see this feature so badly represented in Gaudichaud's plates; it is fairly drawn by Schleiden, in his 'Principles of Botany' (pp. 251-252 of the English translation), but a better figure is given by Duehartre, in his 'Éléments de Botanique,' p. 167.

Another arrangement of the cortical portion is also common. It commences, as in the last method, with the projection of four slender rays into the midst of the woody fibres, reaching about halfway to the pith; but the next additions which take place are not found by the side of the four primitive rays, as in the first-noticed arrangement, but occur as four new projections placed exactly midway between the first four, so that the stem now exhibits eight of these rays arranged like the spokes of a cart-wheel. At first, the four secondary rays are very much shorter in length than the four primitive rays, but as the stem increases in age, all the eight rays become of equal length. Even in this type some species exhibit an approach to the first type, by some of the primitive rays in the older stems having one or two lateral plates lying alongside them.

Perhaps the most striking form of all the *Bignoniaceæ* I have hitherto examined is one which unites the peculiarities of both the preceding arrangements, carried to such an excess that the cortical portion at last forms one-half the bulk of the stem. Originally, the woody portion is arranged in the form of a cross, the bark filling up the whole space enclosed by the four arms of the cross. As the stem increases in diameter,

new cortical rays are projected into the four extremities of the woody mass, so that the arms appear to be bifid; these bifurcations also in their turn become bifid, and so the woody mass has its primary, secondary, tertiary, and quaternary divisions according to its age. Further, as the innermost cortical deposit—that surrounding the woody tissue—is very dark, it throws into high relief the stellate outline of the woody portion. I have met with only one or two species which furnish this arrangement.

The woody system is by no means uniform, and it requires careful study before a detailed description can be given. Nearly all the species, however, have numerous vessels of large diameter, so that the stems are for the most part very light and porous. Such an arrangement might have been expected in plants whose stems are only as thick as a finger, and whose sap has to travel a long distance before it can reach the leaves, which are for the most part met with only in the uppermost portions of the stems. In most of the species this woody tissue is traversed by a large number of fine medullary rays, which give a beautiful figure to many of the sections. The internal arrangement does not manifest itself in any marked way on the exterior; their form is generally cylindrical, but some of them exhibit four slight projections in the form of narrow raised bands arranged lengthwise, which correspond with the outermost portions of the four cortical rays. Some species have a square stem during their early growth, and even the older stems do not altogether lose their four-sided character.

Malpighiaceæ.—If the Lianas which belong to the *Bignoniaceæ* are remarkable for the symmetry of their parts, the Lianas of this family may be said to be characterized by an absence of symmetry. In general, their stems are singularly rugged in outline, a section presenting deep sinuosities or irregular projections, while at other times they appear to consist of a number of separate branches which have become consolidated in the progress of growth, so as to form a rough-looking rope of many strands.

Jussieu gives a full account of the structure of the stem of *Stigmaphyllon emarginatum* ('Mémoire,' etc., pp. 103, etc.), and Gaudichaud ('Recherches,' etc., pl. xviii. f. 11. p. 129), figures an allied species, but I have not, as yet, identified either amongst those coming with cotton. I exhibit, however, a stem which appears to be the *Tetrapterys Guilleminiana*, referred to by Jussieu, and figured by him in his monograph, pl. iii. f. 5. p. 106; but this species does not exhibit the sinuosities so characteristic of most of the Lianas of this family.

As a general rule, the woody matter is developed unequally round the central pith in the form of irregular lobes, the bark closely following all the sinuosities of the stem. If the lobes increase on one side of the stem only, the pith soon becomes eccentric; but, on the other hand, in many species, while the pith retains its central position, the irregular growth of the woody lobes—each of which is closely invested by the bark—causes some to grow beyond their neighbours, and these latter, in the progress of growth, become imbedded, with their bark, in the midst of the woody matter produced by the more vigorous lobes. Such stems, therefore, present the greatest irregularity of form, particularly in the genera *Banisteria* and *Heteropterys*.

Sapindaceæ.—In this Order we meet with some wonderfully aberrant forms of stems, but I shall here notice only two which are met with on cotton bales.

One of these is most probably the *Serjania cuspidata*, figured by Duchartre ('Éléments,' etc., f. 82. p. 170) and Schleiden ('Principles,' f. 168. p. 253), and easily recognized by its triangular form and compound character. It consists of a primitive stem not specially noticeable for any divergence from the usual dicotyledonous type; but round this stem are arranged three other lateral ones, each of which has its own bark separate from the rest, but united to the bark of the primitive central stem. These lateral portions are circular in outline, save that they are flat on the side by which they are attached to the central stem, which latter is in consequence hexagonal. The attachment of the lateral portions to the central mass is not very firm, as most of the ropes of this species reach this country with their strands separated, in consequence of the rough usage to which they have been subject in packing; but Gaudichaud points out that in certain parts of the stem—most likely at the nodes, for he is not very clear upon the point—the lateral strands have an organic attachment to some of the woody fibres of the central mass being continued in one of the lateral strands, and *vice versa* ('Recherches,' pl. xiii. f. 2 and 3. p. 110).

A still more remarkable example supplied by this family in the form of a natural rope, is one which might have served our telegraph engineers as the model of a submarine cable. Like the *Serjania*, there is a central woody mass possessing a medullary sheath and pith, woody layers, and a cortical system; but surrounding this and arranged parallel with it is a series of eight lateral strands each surrounded

by its own bark, the whole being consolidated so as to form a rigid cylindrical axis, which presents no external manifestation of its peculiar internal organization. It is represented in the last figure of Gaudichaud's 'Recherches' (pl. xviii. f. 21. p. 130), and has been copied into most of our text-books, and in some cases incorrectly described as a Malpighiaceus plant, as by Professor Balfour in his 'Class Book,' f 186, 1429.

The pith and medullary sheath with its characteristic tracheal vessels appear to me to be met with in the central mass only, but one of the most recent observers of these stems, Herr Nägeli, has recently demonstrated their presence in each of the surrounding woody masses. (Dickenschwamm des Stengels . . . bei den Sapindaceen. Munich, 1864.)

A short summary of their mode of growth, communicated to the French Academy by Monsieur Netto, will be found in 'Comptes Rendus,' t. 57. pp. 554-557, 21st September, 1863, from which it would appear that a young stem, two to three weeks old, exhibits a number of fibro-vascular bundles in the midst of an outer zone of cellular tissue, one bundle being formed opposite the innermost portion of each of the external grooves of the stem; so that from its very earliest stage the stem exhibits all the rudiments of the lateral strands which surround the core. Around each of the fibro-vascular bundles a mass of liber is formed, at first crescent-shaped, but afterwards annular; and by the growth and union of these several parts the stem soon assumes its peculiar composite character.

Leguminosæ.—Another group of Lianas, presenting some external resemblance to the sinuous Malpighiads, is met with in plants of the genera *Bauhinia* and *Schnella*. In the Brazils they bear the name of *Cipo d'Escada*, from their resemblance to a ladder, but Jussieu restricts this name to the *Schnella macrostachys*. ('Mémoire,' p. 118.)

They are chiefly remarkable for depositing their woody fibres on two sides only of the central pith, so that their stems have a singular flat tape-like appearance, presenting in section the outline of an elongate ∞ , the position of the pith being at the intersection of the two loops. The pith, however, by no means maintains its central position, for according to the researches of M. Netto, the growth of branches brings about a lateral deposit of woody matter, sometimes on one side and sometimes on the other, so that the pith soon becomes eccentric. The pith is generally in the form of a small Maltese cross, formed of two unequal arms, the longest of which lies in the direction of the largest diameter of the stem.

There are other forms of *Bauhinia*, many of which will be found figured in the works of Lindley, Schleiden, Richard, Duchartre, etc.

Aristolochiaceæ.—To this I refer for the present two species remarkable for their very striking medullary rays.

In both species these increase in breadth and volume as they recede from the pith, so that by the time they reach the bark they become of considerable thickness.

In one species, whose wood has a reddish tinge, there are about nineteen or twenty of these magnificent rays in a stem exceeding half an inch in diameter; the intermediate spaces are filled up with woody fibres in which occur large vessels. In this species secondary medullary rays are rarely found. But in the other species, which has a beautiful cream-coloured wood of the shade of our common Holly, secondary and tertiary medullary rays make their appearance, so that in a stem three-quarters of an inch in diameter there will be as many as thirty primary rays, and as many more secondary rays. In this, the commoner species of the two, the cortical system is much thicker than in the first mentioned species. Both bear much resemblance to a wood-section in my cabinet which is called "New Zealand Pepper," of the position of which I am ignorant.

Ampelidææ.—Gaudichaud in his memoir ('Recherches,' pl. xiii. fig. 5. p. 109) gives a figure of the *Cissus hydrophora* as one of the common Lianas of the Brazil, but I am not sure whether it occurs amongst the ropes which reach this country. It is described by M. Netto (Ann. des Sc., 5th ser. Bot. t. vi. p. 320; 'Comptes Rendus,' t. 62. p. 1076) There is one histological character presented by this Liana which will lead to its identification, and that is the abundant quantity of raphidian crystals contained in all parts of the stem. M. Netto describes the form of these as needle-shaped, but bifurcate at one extremity.

However abnormal many of the stems belonging to these various Orders may be, there can be no doubt that the characteristic elements of the dicotyledonous stem are present during some portion of their lives. Their unequal development may be brought about either by the vital energy of the growing tissue of the bark being in excess of that of the wood, or *vice versâ*; or it may be produced by a much more copious deposition of woody tissue at some points of the circumference than at others, from which will result the curious forms presented by the *Bauhinias* and many of the *Malpighiaceæ*.

The monocotyledons have also their representatives amongst these ropes. There are two species, perhaps belonging to the Grasses, which I have met with ; but in neither case is the entire stem used. One species is much larger than the other, their diameters being about two inches and four inches respectively ; both are hollow, and are divided into strips.

Specimens are found amongst these ropes which belong to other Natural Orders, such as the *Menispermaceæ*, *Gnetaceæ*, *Asclepiadaceæ*, etc., but our knowledge of them is too limited to assign them to their respective Orders. Most of my specimens have come from bales of Santos Cotton. I am very anxious to get some from the Pacific coast, where many species differing from Brazilian species must be found. Gaudichaud mentions the neighbourhood of Guayaquil, in Ecuador, as being particularly prolific in Lianas.

A specimen was sent me from the Liverpool docks by Mr. Griffiths, whose structure is so puzzling that I know not whether to call it dicotyledonous or monocotyledonous. It consists of a central spongy mass of woody tissue apparently without medullary sheath, pith, or medullary rays, and arranged in the form of a pentagon formed of semicircular lobes, the whole being surrounded with what appears to be liber which has shrunk away from the very thick and hard external bark, so as to leave the woody core isolated within it. The core consists of woody fibres, but half its area is taken up with wide-mouthed vessels.

New Publications.

Kryptogamen-Flora von Sachsen, der Oberlausitz, Thüringen und Nordböhmen, mit Berücksichtigung der benachbarten Länder. Zweite Abtheilung. Zweite Hälfte (Bogen 13-Schluss). Die Flechten. Bearbeitet von Dr. L. RABENHORST. Leipzig. 1870.

A few months ago we noticed in this Journal (p. 125), the first half of the second volume of the above work, which, with that now before us, treats of the Lichen flora of these districts. Like the former half, the present one is illustrated with numerous engravings of typical species and their spores in the different families and genera. As it completes the enumeration and description of these apparently well-examined tracts, it enables us to understand more fully the cha-

acter of their lichenology. We find that this comprises some 440 species, exclusive of numerous varieties, which, making allowance for the necessary absence of purely maritime species, bears a very fair proportion to the number found in other continental regions of similar extent. Amongst them the British lichenologist will find several which do not reach our more northern latitudes, and miss not a few with which he is familiar in various parts of these islands. These 440 species are in addition to the principal divisions which we previously noticed, arrayed under no less than 92 different genera. Dr. Rabenhorst has thus, in opposition to the system of Nylander, followed that of the Massolongian School. How far, however, the spores are entitled to be regarded as affording generic characters, is a question upon which we do not enter. At the same time it seems to us that even on Massolongian principles, Dr. Rabenhorst has, in several instances, unnecessarily multiplied genera. This does not, of course, in any way detract from the value of the work in other respects, though it serves to show how far we still are from a generally accepted system of classification of Lichens.

Proceedings of Societies.

BOTANICAL SOCIETY OF EDINBURGH.—*July 14th.*—Sir Walter Elliot, President, in the chair. The following communications were read:—"On Kashmir Morels." By M. C. Cooke, M.A. "On the Nature, as regards Stamens and Pistil, of *Silene maritima* and *S. inflata*." By Dr. F. Buchanan White. (See p. 323.) "Notes of a Botanical Excursion to the Neighbourhood of Perth." By Mr. Sadler. The places visited were the North Inch, banks of the Tay, the "Wooded Island," Bertha Woods, banks of the Almond, Pitcairnfield, and Methven Bog. Some of the party visited Scone and Kinnoull. Lists of the principal species collected were read. "Results obtained from the Cutting and Transplanting of a Plaited Hornbeam Hedge." By Mr. James M'Nab. (Illustrated by drawings.) "On some Striped Stones from Hayle, Cornwall." By Mr. C. W. Peach. Professor Balfour stated that plants of *Mandragora vernalis* were now fruiting in the Botanic Garden, and that he had tried the juice of the fruit on the eye, and found it to dilate the pupil in a marked degree. The dilatation was as complete as that produced by *Belladonna*, but its effects did not seem to continue so long. Professor Balfour also exhibited a plant in full flower from the Botanic Garden, which had been sent by Mr. Loftus from Persia, under the name of *Dorema Asafetida*. Mr. Sadler reported, in accordance with instructions received at last meeting of the Society,

that he and Mr. Bell had examined the specimens of *Didymodon Jenneri* in the University herbarium, and that they concurred with Mr. Wilson in regarding them as not specifically distinct from *Cynodontium polycarpon*. (See p. 301.)

Botanical News.

We are glad to learn that the seventeenth and last volume of the 'Prodromus' is in active preparation, and is expected to be published in the winter.

The botanical part of the 'Journal of the Linnean Society,' just printed, contains, among other papers, Mr. Baker's "Revision of the Gamophyllous capsular *Liliaceæ*," and Professor Lindberg's "Contributions to British Bryology."

Botany at the British Association was, as usual, poorly represented in the programme. We print Mr. A. W. Bennett's suggestive paper on "Protandry and Protogyny," and intend next month to give an abstract of the other botanical communications.

Among the prizes offered by the Scientific Society of Haarlem is one for a monograph of the flora of the Dutch sandhills. Much information on the plants of the neighbouring coast of Belgium will be found in M. Dumortier's excellent paper called "Bouquet du Littoral Belge," in vol. vii. of the 'Bulletin' of the Belgian Botanical Society. An inspection of this shows how much of investigation is yet open to British botanists on our own coasts among the *Chenopodiaceæ*, Grasses, and other rather neglected Orders. The Belgian Botanical Society has done much for the flora of that kingdom; witness the recently-published 'Acquisitions de la Flore Belge' by A. Thielens (whose loss to science we recently noticed), where all the new species and rediscoveries in Belgium from 1861 to 1868 are entered, with the localities and finders' names.

We congratulate Mr. M. C. Cooke on the honour of M.A. which the University of St. Lawrence has bestowed on him, *honoris causâ*. The first part of his 'Handbook of British Fungi,' advertised on our cover, is announced as ready.

The Pharmaceutical Society gives annually prizes for the best herbaria collected during the year. This autumn the following were the awards:—Silver Medals: E. Rammell, Crediton, Devon; E. A. Webb, Clapham, Surrey. Certificate of Honour: A. Wood, Brentford, Middlesex. Certificate of Merit: C. J. Stansby, Derby. The herbaria were collected in the localities above given.

Mr. James Britten, of the Royal Herbarium, Kew, and Mr. Robert Holland, of Mobberley, Knutsford, Cheshire, have in preparation a work on the folklore connected with plants. Any assistance will be gladly received by either at the addresses given above.

COMMUNICATIONS have been received from Dr. Parry, A. W. Bennett, Professor Thiselton-Dyer, J. Sadler, Dr. Masters, Barrington Ward, J. Britten, Dr. Yeats, I. Carroll, etc.

CORRIGENDUM.—P. 292, line 11, for fifteen read five.

Original Articles.

REVISION OF THE NATURAL ORDER BIGNONIACEÆ.

BY BERTHOLD SEEMANN, PH.D., F.L.S., ETC.

(Continued from p. 149.)

NEWBOULDIA, *Seem.*

I have already stated, Journ. of Bot. 1863, p. 225, that the original two species of *Spathodea* represented different generic types, and why I retain the name of *Spathodea*, not for *S. lævis*, but *S. campanulata*, making *S. lævis* the type of a new genus, far removed from *Spathodea* as restricted by me.

NEWBOULDIA (gen. Eucatalpearum), Seem. Journ. of Bot. I. (1863), p. 226; Bureau, Monogr. Big. t. 15. Calyx oblongus, hinc irregulariter fissus. Corolla subinfundibuliformis, 5-loba, lobis obovatis obtusis, æstivatione imbricatis. Stamina 4, didynama, cum quinto sterili. Antheræ glabræ, 2-loculares, loculis parallelis. Stylus elongatus; stigma 2-lamellatum. Ovarium cylindricum, sessile, ∞-ovulatum, ovulis 4-seriatim dispositis. Discus glandulosus, obscure 5-gonus. Capsula siliquæformis, compressa, loculicide dehiscens, 2-ocularis, septo coriaceo valvis contrario. Semina ∞, ad quodque septi latus 1-serialia, membranaceo-alata, inferiora superioribus incumbunt.—Arbor Africæ tropicæ, foliis alternis v. ternato-verticillatis imparipinnatis, foliolis ovato-oblongis serratis, pauculis terminalibus corymbosis multifloris; corollis albido-roseis, purpureo-maculatis v. purpureis; calycibus corollisque glanduloso-punctatis.—*Bignoniæ* et *Spathodeæ* sp. Auct.

Calycibus corollisque glanduloso-punctatis *N. lævis*.

Calycibus corollisque eglandulosis *N. pentandra*.

1. *N. lævis*, Seem.; Bureau, Monogr. Big. t. 15.—*Spathodea lævis*, Beauv. Fl. Owar. i. p. 48. t. 29; De Cand. Prodr. ix. p. 208; Hook. Bot. Mag. t. 4537; Vent. Choix, n. 40, in adu. *S. adenantha*, Don, Gen. Syst. iv. p. 222; De Cand. Prodr. ix. p. 207. *S. Jenischii*, Sonder in Hamburger Gartenz. iv. p. 370; Bot. Zeit. vi. p. 792; Walp. Ann. iii. p. 89. *S. speciosa*, Brongn. in Lem. Herb. Gen. Amat. iv. (2nd ser.) t. 70, et in Lem. Hort. Univ. v. 357 (1844), cum icon.; De Cand. Prodr. ix. p. 563; Morren, Ann. de la Soc.

d'Agricult. v. p. 213. t. 260 ; Van Houtt. Fl. des Ser. (1st ser.) vi. p. 309, cum icon. ; Lem. Jard. Fleuriste, i. t. 51. *Bignonia glandulosa*, Schum. Guin. p. 274. Nomen vernac. Guineëense, "Nabadi," teste Schum.—Sierra Leone (Afzelius ! Barter ! n. 2173, Th. Heesch, teste Sonder) ; Banks of Gambia (Whitfield !) ; Senegambia (Don ! n. 818) ; Guinea (teste Schum.) ; Oware, near Buono Pozzo (teste Beauv.). Cultivated in Europe.

"A small tree" (Barter !). Largest leaves, including petiole, $1-1\frac{1}{2}$ feet long. Leaflets from 2-6 inches long, 1-3 inches broad.

2. *N. pentandra*, Seem.—*Spathodea pentandra*, Hook. Bot. Mag. t. 3681. (Erroneously identified by Steudel with *Calosanthus Indica*, Bl., an Eubignoniaceous genus.) Exact native country unknown.

Was raised from seeds which had been received from India by the Glasgow Botanic Gardens ; but this, of course, does not prove that the species is indigenous to that country. Sometimes the corolla has six lobes by excess, and, in that case, there are five fertile stamens of unequal length and a rudiment of a sixth.

MUENTERIA (gen. Jacarandearum), Seem. Journ. of Bot. III. (1865) p. 329. t. 36 et 35.

1. *M. stenocarpa*, Seem. l. c. t. 36.—*Spathodea stenocarpa*, Welw.—Distr. of Golungo Alto (Welwitsch ! n. 482, 483) ; between lat. 14° and 19° S. of African continent (Livingstone !)

2. *M. tomentosa*, Seem. l. c. t. 35. *Spathodea tomentosa*, Benth. in Hook. Niger Fl. p. 462 ; Walp. Ann. iii. p. 89.—Golungo Alto (Welwitsch ! n. 485) ; Fernando Po (Th. Vogel ! Mann !) ; banks of the Niger (Barker ! n. 555, ex parte) ; Senegambia (Don ! n. 877) ; Senegal (Heudelot ! n. 877, in Mus. Brit.).

3. *M. lutea*, Seem. ; arborea ; foliis oppositis, 4-6-jugis cum impari, ramisque puberulis demum glabris, foliolis (impari except.) sessilibus vel vix petiolulatis oblongis, acuminatis denticulatis vel integerrimis ; racemis terminalibus paniculatis, multifloris ; calyce extus tomentello ; corolla subinfundibuliformi (pallide lutea, intus sulphurea rubro striata), glabra, lobis denticulatis glandulosis, filamentis glabris ; ovario . . . ; capsula ($1\frac{1}{2}$ ped. long, $\frac{1}{2}$ poll. lat.) siliquæformi, compressa, tenuissime ferrugineo-tomentella (v. s. sp.).—*Spathodea lutea*, Benth. in Hook. Niger Fl. p. 461 ; Walp. Ann. iii. p. 89.—Fernando Po (Th. Vogel ! n. 60, Ansell ! Barter ! n. 555, ex parte) ; Nupé (Barter ! n. 1310).

“Tree 30 feet high” (Barter!) Largest leaves 1-1½ feet long, including petiole. Leaflets 4-5 inches long, 1-2 inches broad,

4. *M. Zanzibarica*, Seem.; arborea; foliis oppositis vel alternis, pinnatis, 2-3-jugis cum impari, foliolis (impari except.) brevipetiolulatis subovalibus vel obovatis subobtusis vel breviter acuminatis mucronatis integerrimis vel serratis lepidotis glabris, subtus albidis, hinc inde glandulosis; paniculis terminalibus axillaribusque multifloris; pedunculis pedicellis calycibus bracteis ovariisque minute lepidotis; calyce nervis obscuribus; corolla subinfundibuliformi, lobis obtusis denticulatis, apice glanduloso, utrinque glabra; stylo glabro; stigmatis lamellis ovalibus, obtusis, integerrimis; capsula late lineari (3 poll. long.), glabra (v. s. sp.).—*Spathodea Zanzibarica*, Bojer, in De Cand. Prod. ix. p. 208; Klotzsch, in Peters' Reise nach Mossambique (Botanik), p. 191. *S. tenuifolia*, Bojer, in lit. ad De Cand. *S. acuminata*, Klotzsch, in Peters' Reise n. Moss. (Botanik), p. 191. Nomen vernac. Mossamb. teste Peters, “Mupeseva.”—Geogr. Distr. Zanzibar (Bojer, teste De Cand.); Mozambique (Forbes! in Herb. Hook. et Mus. Brit.; Peters! in Herb. Berol.).

The leaflets, the largest of which measure 4½ inches in length, 2 inches in width, are like those of *M. lutea*, either quite entire or serrate, and lepidote.

5. *M. puberula*, Seem.; fruticosa; foliis oppositis pinnatis 2-3-jugis cum impari, foliolis subsessilibus parvis oblongis serratis apice attenuato-emarginatis, utrinque puberulis, supra saturate, subtus pallide viridibus, petiolis semiteretibus undique puberulis; racemis axillaribus erectis puberulis sæpe inferne foliosis folium æquantibus; calycibus elongatis incurvis, utrinque attenuatis sparsim puberulis et minute lepidotis, nec apice hamatis. *Spathodea puberula*, Klotzsch in Peters' Reise n. Moss. p. 92.—In rocky places, Rios de Sena (Tette), Mozambique (Peters! in Herb. Berol.) (v. s. sp.).

SPATHODEA, *Pal. Beauv.*

At p. 225 of Vol. I. (1863) of this Journal, I stated my reasons for dividing *Spathodea*; and at p. 332 of Vol. III. (1865), I gave, from Dr. Welwitsch's specimens, a definition of the genus, illustrated by a plate and characters of the two remaining species. Since then I have completed an examination of all the plants at one time referred to this genus, and now submit a list of them.

Species exclusæ.

- S. acuminata*, Kl. = *Muenteria Zanzibarica*, Seem.
S. adenantha, Don = *Newbouldia lævis*, Seem.
S. adenophylla, De Cand. = *Heterophragma adenophylla*, Seem.
S. alternifolia, R. Br. = *Dolichandrone alternifolia*, Seem.
S. amœna, De Cand. = *Radermachera amœna*, Seem.
S. arcuata, Wight = *Dolichandrone crispa*, Seem.
S. atrovirens, Spr. = *Dolichandrone crispa*, Seem.
S. (?) bracteosa, De Cand. = *Pharseophora bracteosa*, Miers (= ? *Bignonia moringiaefolia*, De Cand. ; *Pleomotoma moringæfolia*, Miers).
S. campanulata, Ham., non Pal. = *Markhamia stipulata*, Seem.
S. Candolleana, De Cand. = *Memora Candolleana*, Miers.
S. Coito, De Cand. = *Macfadyena Coito*, Miers.
S. comosa, G. Don = *Bignonia comosa*, Roxb. I have not seen any authentic specimens of this plant, and Professor Balfour informs me there are none preserved in Roxburgh's Herbarium at Edinburgh. As far as the description goes, it agrees with *Paulownia imperialis*, Sieb. et Zucc.
S. corymbosa, Vent. = *Macfadyena corymbosa*, Griseb.
S. crispa, Wall. = *Dolichandrone crispa*, Seem.
S. Diepenhorstii, Miq. = *Dolichandrone Rheedii*, Seem.
S. (?) Dolichandra, De Cand. = *Dolichandra cynanchoides*, Cham.
S. falcata, Wall. = *Dolichandrone falcata*, Seem.
S. Fenzliana, Miq. = *Macfadyena Fenzliana*, Miers.
S. (?) filiformis, R. Br. = *Dolichandrone filiformis*, Seem.
S. flaviflora, Miq. = *Macfadyena*.
S. fraxinifolia, H. B. K. = *Cybistax antisiphilitica*, Mart. (H. B. K. described the lower leaves of this plant, which are pinnate.)
S. gigantea, Bl. = *Radermachera gigantea*, Miq.
S. glandulosa, Bl. = *Radermachera glandulosa*, Miq.
S. heterophylla, R. Br. = *Dolichandrone heterophylla*, Seem.
S. hispida, De Cand. = *Macfadyena hispida*, Seem.
S. ilicifolia, Seem. = *Acanthacearum* gen. nov. (*Digitalis dracocephaloides*, Vell. = *Tabebuia dracocephaloides*, Miers ; *Tabebuia dentata*, Miers).
S. Indica, Pers. = *Calosanthès Indica*, Blume.
S. Jenischii, Sond. = *Newbouldia lævis*, Seem.
S. Kohautiana, Presl = *Macfadyena*.

- S. læta*, Wall. = *Dolichandrone serrulata*, Seem.
S. lævis, Pal. = *Newbouldia lævis*, Seem.
S. laurifolia, H. B. K. = *Phryganocydia*.
S. Lobbi, Teijsm. et Binn. = *Radermachera amœna*, Seem.
S. longiflora, Pers. = *Dolichandrone crispa*, Seem.
S. longiflora, Vent. = *Dolichandrone Rheedii*, Seem.
S. (?) Loureirana, De Cand. = *Dolichandrone Rheedii*, Seem.
S. lutea, Bth. = *Muenteria lutea*, Seem.
S. macroloba, Miq. = *Dolichandrone Rheedii*, Seem.
S. magnolioides, Cham. = *Tecoma uliginosa*, Mart.
S. Mansoana, De Cand. = *Eubignoniacea*.
S. mollis, Sond. = *Macfadyena mollis*, Seem.
S. montana, Spr. = *Zeyheria montana*, Mart.
S. (?) obovata, H. B. K. = *Macfadyena obovata*, Miers.
S. obtusifolia, Cham. = *Tecoma uliginosa*, Mart.
S. Orinocensis, H. B. K. = *Phryganocydia*.
S. pentandra, Hook. = *Newbouldia pentandra*, Seem.
S. Pisoniana, De Cand. = *Tecoma*.
S. platypoda, De Cand. = *Macfadyena platypoda*, Miers.
S. podopogon, De Cand. = (?) *Macfadyena*.
S. puberula, Kl. = *Muenteria puberula*, Seem.
S. Rheedii, Spr. = *Dolichandrone crispa*, Seem.
S. Rheedii, Wall. = *Dolichandrone Rheedii*, Seem.
S. Roxburghii, De Cand. = *Heterophragma Roxburghii*, De Cand.
S. Schomburgkii, De Cand. = *Memora Schomburgkiana*, Miers.
S. serrulata, De Cand. = *Dolichandrone serrulata*, Seem.
S. speciosa, Brongn. = *Newbouldia lævis*, Seem.
S. stenocarpa, Welw. = *Muenteria stenocarpa*, Seem.
S. stipulata, Wall. = *Markhamia stipulata*, Seem.
S. tenuifolia, Bojer = *Muenteria Zanzibarica*, Seem.
S. tomentosa, Bth. = *Muenteria tomentosa*, Seem.
S. uncata, Spr. = *Doxantha uncata*, Miers.
S. uncinata, Spr. = *Macfadyena uncinata*, De Cand.
S. vernicosa, Cham. = *Sparathospermum lithrontripticon*, Mart.
S. Zanzibarica, Bojer = *Muenteria Zanzibarica*, Seem.

ON *CALLITRICHE OBTUSANGULA*, *Le Gall*, AS A
BRITISH PLANT.

By A. G. MORE, F.L.S., M.R.I.A.

Callitriche obtusangula was first distinguished by Le Gall in his 'Flore du Morbihan' (1852), and has since been recognized by several writers on the botany of the north and north-west of France. In the new edition of 'English Botany,' Dr. Syme mentions it as a subspecies of *Callitriche verna*, likely to be found in Britain. I have long had in my herbarium some specimens of a *Callitriche*, gathered in the Isle of Wight so far back as 1860, and which at the time I was unable to refer to any of the then described British species; and it was only last year when passing through London that I had an opportunity at the British Museum of comparing my plant with authentic examples of *C. obtusangula*, published in Billot's 'Exsiccata' (n. 1191), when I was enabled to satisfy myself that I had gathered *C. obtusangula* in the Isle of Wight.

In the size of the fruit and in the general habit of growth *C. obtusangula* closely resembles *C. stagnalis* (*platycarpa*), with which, indeed, it was at once contrasted both by Le Gall in his original notice and in Billot's 'Archives,' and of which it may be only a form produced by the nature of the locality; but Dr. Boswell-Syme, following Hegelmaier, places it nearer to his subspecies *C. vernalis*. It is on the shape of the fruit that the distinctive characters of *C. obtusangula* are founded; this is less compressed, and the angles of the lobes, instead of being winged as in *C. platycarpa*, or keeled as in *C. verna*, are rounded.

C. obtusangula occurs in many localities along the French shores of the Channel and Atlantic Ocean, in Normandy, Bretagne, and Poitou. It has also been found in Belgium, Sardinia, and Sicily.

The following is a description of the plant as found in the Isle of Wight, preceded by references to the publications in which it is noticed.

C. obtusangula, Le Gall, Flore du Morbihan, p. 203 (1852); Billot, Archives de la Flore de France et d'Allemagne, p. 295 (1854), et Exsicc. Cent. xii. n. 1191; Le Jolis, Plantes Vasc. de Cherbourg, p. 51 (1860); F. Schultz, Herb. Normale, n. 655; Lebel in Mém. Sc. Nat. Cherbourg, vol. ix. p. 175 (1863); Mabilley, Cat. des Plantes de

Dinan et St. Malo, p. 63 (1866); Arrondeau, Hist. Nat. du Morbihan, Plantes Phan. p. 40 (1867); Hegelmaier, Monographie der Gattung *Callitriche*, p. 54 (1864), and in Ascherson's Verh. des Bot. Ver. Brandenb. (1867), p. 21; Lloyd, Flore de l'Ouest de la France, ed. 2, p. 445 (1868); Brébisson, Flore de la Normandie, ed. 4, p. 283 (1869). Leaves all obovate or the lower ones linear. Bracts large, persistent, lanceolate, curved, nearly as long as the mature fruit. Fruit brown, sessile or nearly so, of a squarish obcordate outline; the lobes turgid at the side and rounded at their edge, so as to form a slight ridge or blunt keel. Styles very long, about twice as long as the ripe fruit, permanent, spreading or slightly reflexed, but not closely adpressed to the sides of the fruit.

In marsh-ditches, slightly brackish, bordering on Brading Harbour, Isle of Wight. July, 1860.

THE NORTH AMERICAN DESERT FLORA BETWEEN 32° AND 42° NORTH LATITUDE.

BY C. C. PARRY, M.D., OF WASHINGTON, UNITED STATES.

(Read at the Meeting of the British Association at Liverpool, 1870.)

The desert tracts in North America, as at present defined by our recent geographical knowledge, comprise those interior basins, of greater or less extent, shut in by mountain ranges from the influence of the moist oceanic currents. These well-marked districts, while presenting certain diversities of soil, corresponding to particular geological conditions, are everywhere characterized by an arid climate, irregular and scanty rainy seasons, and wide extremes of heat and cold, both diurnal and annual. The permanent watercourses of this region, having their distant sources in snow-clad summits, traverse a succession of basins, presenting occasionally alluvial belts, bounded by elevated and abrupt table-land, which latter is mainly composed of beds of coarse gravel or drifting sand. The intervening ridges forming the basin rims are cut through by those deep chasms, known as *cañons*.

The local drainage not connected with the main valleys terminates either in salt lakes or saline flats, the intense evaporation being sufficient to carry off the superficial supply of water, leaving their soluble

mineral contents to be concentrated in the lower depressions. The intervening rocky ridges and isolated mountain peaks, when not of sufficient elevation to act as condensers of the upper currents of the atmosphere, exhibit the same characters of arid vegetation, though comprising a larger proportion of shrubby and dwarf tree growth.

In attempting an enumeration of North American desert plants, my aim has been not so much completeness of detail as to exhibit the main features of desert vegetation, as here brought to view, and to afford the means of comparison with corresponding districts in other portions of the earth. One of the most striking features of the desert flora may be noted in the very marked distinction between the annual and perennial vegetation. Thus the annual desert plants, whose period of growth is strictly confined to a short and uncertain period of spring or fall rains, require for their continued preservation a safe deposit for their usually minute seeds during the prolonged dry season. This condition is, in great measure, supplied by the porous, sandy and gravelly soil, or rock crevices, into which they fall and are safely buried, not only out of the reach of climatic influences, but also safe from destruction by animals. Their growth is necessarily rapid and evanescent; and no sooner do warm rains moisten the ground, than they spring forth from their hiding-places and clothe the barren soil with their scanty verdure, rapidly flower and mature their seeds, which are again deposited in the earth, while their slight, evanescent forms dry up and are blown away, hardly leaving any visible trace of their existence. These characteristics are plainly exhibited in ordinary herbarium specimens, and are further exemplified in the specific name of '*evile*,' so often very appropriately applied. On the other hand, the perennial desert plants either store up a large amount of surplus nourishment in their thick tuberous or tap-roots, or, in the case of trees and shrubs, possess exposed stems and foliage of the most scant and starved character; spine-clad branches and green-barked stems are, in many instances, made to supply the office of leaves, or where these latter are present, they are often thickly coated with resinous varnish, or clothed with tomentose hairs or scales, serving, in either case, to check evaporation, and thus limit the usual processes of growth. The preservation of species in perennial plants being less dependent than in annuals on the production of seed, these are generally scanty, often mature late, and are frequently protected by

hard or spiny envelopes. In certain cases, especially among Cactuses, proliferous shoots, easily detached and quickly rooting, serve the purpose of seeds in providing for the continuance and distribution of species; and in such instances the very remarkable and significant fact may be noted, that the fruits generally prove abortive, or even revert to the condition of proliferous shoots.

In the accompanying list a great disproportion in the representation of different Natural Orders and of particular genera is very plainly exhibited, and there is complete absence of some Orders and genera usually represented in north temperate climates.

The list contains 188 species; Dicotyledons are represented by 169 species, included in 48 Natural Orders and 144 genera; and Monocotyledons include 19 species, comprised in 4 Natural Orders, and 10 genera. The Natural Order *Compositæ* possesses the largest number of species, viz. 44, or nearly one-fourth of the whole phanerogamic flora. *Leguminosæ* (which includes most of the dwarf trees and larger shrubs) comes next in point of number, with 25 species. Other prevalent Natural Orders are very variously represented. Of the lower Orders (which are not included in the following list) Lichens only are fairly represented.

<i>Myosurus minimus</i> , <i>L.</i>	<i>Sesuvium Portulacastrum</i> ,	<i>Condalia spathulata</i> , <i>Gr.</i>
<i>Berberis trifoliata</i> , <i>Mori-</i>	<i>L.</i>	<i>Microthamnus cricoides</i> ,
<i>cand.</i>	<i>Lewisia rediviva</i> , <i>Pursh.</i>	<i>Gray.</i>
<i>Argemone mexicana</i> , <i>L.</i>	<i>L. brachycarpa</i> , <i>Engel.</i>	<i>Karwinskia Humboldtii</i> ,
<i>Eschscholtzia Douglasii</i> ,	<i>Fouquieria splendens</i> , <i>Eng.</i>	<i>ana</i> , <i>Zucc.</i>
<i>Hook.</i>	<i>Malvastrum exile</i> , <i>Gray.</i>	<i>Adolphia infesta</i> , <i>Meisn.</i>
<i>Corydalis aurea</i> , <i>Willd.</i>	<i>M. coccineum</i> , <i>Gray.</i>	<i>Janusia gracilis</i> , <i>Gray.</i>
<i>Sisymbrium canescens</i> ,	<i>M. Monroanum</i> , <i>Gray.</i>	<i>Holacantha Emoryi</i> , <i>Gr.</i>
<i>Nutt.</i>	<i>Hibiscus denudatus</i> , <i>Bth.</i>	<i>Canotia holacantha</i> , <i>Torr.</i>
<i>Vesicaria Fendleri</i> , <i>Gray.</i>	<i>Larrea mexicana</i> , <i>Moric.</i>	<i>et Gray.</i>
<i>V. argyrea</i> , <i>Gray.</i>	<i>Kallstrœmia maxima</i> ,	<i>Polygalascoparia</i> , <i>H. B. K.</i>
<i>Dithyrea californica</i> , <i>Har.</i>	<i>Torr. et Gray.</i>	<i>P. Lindheimeri</i> , <i>Gray.</i>
<i>Lepidium flavum</i> , <i>Gray.</i>	<i>K. grandiflora</i> , <i>T. et G.</i>	<i>P. puberula</i> , <i>Gray.</i>
<i>L. Wrightii</i> , <i>Gray.</i>	<i>Thamnosma montanum</i> ,	<i>P. Xantii</i> , <i>Gray.</i>
<i>L. alyssoides</i> , <i>Gray.</i>	<i>Torr.</i>	<i>Krameria parvifolia</i> , <i>Bth.</i>
<i>Cleome</i> <i>la angustifolia</i> ,	<i>Rhus microphylla</i> , <i>Engel.</i>	<i>K. canescens</i> , <i>Gray.</i>
<i>Torr.</i>	<i>Glossopetalon spinescens</i> ,	<i>Dalca spinosa</i> , <i>Gray.</i>
<i>C. longipes</i> , <i>Torr.</i>	<i>Gray.</i>	<i>D. Emoryi</i> , <i>Gray.</i>
<i>Cleome Sonore</i> , <i>Gray.</i>	<i>Rhamnus croceus</i> , <i>Nutt.</i>	<i>D. Fremontii</i> , <i>T. et G.</i>
<i>Polanisia uniglandulosa</i> ,	<i>Ceanothus Fendleri</i> , <i>Gr.</i>	<i>D. Schottii</i> , <i>Gray.</i>
<i>DC.</i>	<i>Zizyphus Parryi</i> , <i>Torr</i>	<i>D. divaricata</i> , <i>Benth.</i>

- Dalea scoparia*, Gray. *Echinocactus Wislizeni*, Encelia conspersa, *Bth.*
D. lanata, Spreng. Engel. E. nivea, *Benth.*
Petalostemon exile, G. E. horazonthalonius, Eng. *Sinsia canescens*, Gray.
Hosackia puberula, *Bth.* *Cereus dasyacanthus*, Eng. *S. frutescens*, Gray.
Astragalus Missouriensis, C. stramineus, Engel. *Hymenatherum acero-*
Nutt. C. Engelmanni, Parry. sum, Gray.
A. Nuttallianus, Gray. C. giganteus, Engel. *H. pentachætum*, DC.
A. Fremontii, T. et G. *Opuntia basilaris*, Engel. *Nicolletia Edwardsii*, Gr.
Lupinus pusillus, Pursh. O. Emoryi, Engel. *Porophyllum scoparium*,
Sophora sericea, Nutt. O. Whipplei, Engel. Gray.
Hoffmanseggia micro- O. arborescens, Engel. *Palafolia linearis*, Lag.
phylla, Torr. O. Parryi, Engel. *Bahia rubella*, Gray.
H. drepanocarpa, Gray. O. tessellata, Engel. *B. biternata*, Gray.
Cercidium floridum, *Bth.* O. Arbuscula, Engel. *Burielia lanosa*, Gray.
Cassia bauhinioides, G. O. Bigelovii, Engel. *Trichoptilium incisum*, G.
C. Punilio, Gray. O. Davisii, Engel. *Baileya pauciradiata*, G.
Parkinsonia microphylla, Pectis filipes, Harv. et G. *B. pleniradiata*, H. et G.
Torr. P. longipes, Gray. *Artemisia tridentata*, Psh.
Algarobia glandulosa, P. imberbis, Gray. *A. filifolia*, Torr.
Torr. et Gray. P. papposa, Harvey et G. *Psathyrotes annua*, Gray.
Mimosa Lindheimeri, G. *Carphephorus junceus*, P. scaposa, Gray.
Acacia Greggii, Gray. Benth. *Senecio longilobus*, *Bth.*
A. constricta, Benth. *Machæranthera tanacetifolia*, Nees. *Rafinesquia neo-mexi-*
A. Schottii, Torr. *folia*, Nees. cana, Gray.
Prunus minutiflora, Eng. *Eremiastrum belloides*, *Lygodesmia juncea*, DC.
Cercocarpus parvifolius, Gray. *Stephanomeria minor*,
Nutt. *Aphanostephus ramosis-* *Nutt.*
Cowania mexicana, Don. sinus, DC. *Nemacladus ramosissi-*
Fallugia paradoxa, Torr. *Gymnosperma corym-* mus, Nutt.
Purshia tridentata, DC. bosa, DC. *Plantago patagonica*,
Eriogonum albicaulis, Nutt. *Gutierrezia Euthamiæ*, Jacq., var.
E. chamænerioides, G. Torr. et Gray. *Chilopsis linearis*, DC.
E. claviformis, Torr. *Linosyris graveolens*, *Martynia arenaria*, Engel.
E. cardiophylla, Torr. Torr. et Gray. *Maurandia Wislizeni*,
E. brevipes, Torr. *Aplopappus spinulosus*, Engel.
E. dentata, Cav. DC. *Pentstemon ambiguus*, T.
Cevallia dentata, Lag. *Perityle nuda*, Torr. *P. puniceus*, Torr.
Petalonyx Thurberi, G. P. Emoryi, Torr. et G. *Castilleja affinis*, Hook.
Mentzelia albicaulis, Dgl. *Baccharis Emoryi*, Torr. *Mohavea viscida*, T. et G.
M. multiflora, Nutt. et Gray. *Sericographis californica*,
Euenide lobata, Gray. *B. sergiloides*, T. et G. Gray.
Cucurbita digitata, Gray. *Melampodium cinereum*, *Hyptis Emoryi*, T. et G.
Apodanthera undulata, DC. *Salazaria mexicana*, Torr.
Gray. *Dicoria canescens*, T. et G. *Tetradlea Coulteri*, Gray.
Mamillaria phellosperma, *Franseria dumosa*, Gray. *Tiquilia brevifolia*, Nutt.
Engel. *F. deltoidea*, Torr. *Eritrichium micranthum*,
M. Grahami, Engel. *Florensia cernua*, DC. Torr.

Pectocarya linearis, <i>DC.</i>	E. Abertianum, <i>Torr.</i>	Pilostyles Thurberi, <i>G.</i>
Amsinchia spectabilis, <i>Fisch. et Mey.</i>	Chorizanthe brevicornu, <i>Torr.</i>	Ephedra antisiphilitica, <i>Berland.</i>
Nama jamaicensis, <i>L.</i>	Acanthogonum rigidum, <i>Torr.</i>	Juniperus tetragona, <i>Schl.</i>
Phacelia micrantha, <i>Torr.</i>		J. occidentalis, <i>Hook.</i>
Gilia aurea, <i>Nutt.</i>	Centrostegia Thurberi, <i>G.</i>	Agave americana, <i>L.</i>
Navarretia Schottii, <i>Tor.</i>	Achyronychia Cooperi, <i>G.</i>	A. lecheguilla, <i>Torr.</i>
Ipomœa leptophylla, <i>T.</i>	Acanthochiton Wrightii, <i>Torr.</i>	A. geminiflora, <i>Gawl.</i>
Evolvulus argenteus, <i>Psh.</i>		A. parviflora, <i>Torr.</i>
Nicotiana quadrivalvis, <i>Pursh.</i>	Sarratia Berlandieri, <i>Moq.</i>	Dasyliroium graminifolium, <i>Zucc.</i>
Physalis cardiophylla, <i>Torr. et Gray.</i>	Guillemina densa, <i>Moq.</i>	D. Bigelovii, <i>Torr.</i>
	Alteranthera lanuginosa, <i>Torr.</i>	Hesperocallis undulata, <i>G.</i>
Lycium pallidum, <i>Miers.</i>	Obione canescens, <i>Moq.</i>	Yucca angustifolia, <i>Psh.</i>
Amsonia tomentosa, <i>T.</i>	O. hymenelytra, <i>Torr.</i>	Y. stenophylla, <i>Eng. ined.</i>
Asclepias subulata, <i>Dne.</i>	O. occidentalis, <i>Moq.</i>	Y. brevifolia, <i>Eng. ined.</i>
Selinocarpus angustifolius, <i>Torr. et Gray.</i>	Corispermum hyssopifolium, <i>L.</i>	Y. baccata, <i>Torr.</i>
S. diffusus, <i>Gray.</i>	Sarcobatis vermicularis, <i>Nees.</i>	Aristida purpurascens, <i>Poir.</i>
Boerhaavia erecta, <i>L.</i>		Pappophorum boreale, <i>Led.</i>
B. erioselina, <i>Gray.</i>	Phoradendron californicum, <i>Nutt.</i>	Bouteloua oligostachya, <i>Nutt.</i>
Abronia mellifera, <i>Dougl.</i>	Euphorbia albo-marginata, <i>Torr.</i>	B. eriopoda, <i>Torr.</i>
A. cycloptera, <i>Gray.</i>		B. polystachya, <i>Benth.</i>
A. fragrans, <i>Nutt.</i>	Croton procumbens, <i>Esch.</i>	Chloris alba, <i>Presl.</i>
Eriogonum fasciculatum, <i>Benth.</i>		Tricuspis pulchella, <i>Kth.</i>
E. gracile, <i>Benth.</i>	Aphora serrata, <i>Engel.</i>	Brizopyrum spicatum, <i>Hook.</i>
E. vimineum, <i>Dougl.</i>	Mozinna cardiophylla, <i>Engel.</i>	
E. cordatum, <i>Torr.</i>		

NOTES RESPECTING SOME OF THE ROSES OF THE NEIGHBOURHOOD OF PLYMOUTH, WITH THEIR DISTRIBUTION WITHIN TWELVE MILES OF THAT TOWN.

BY T. R. ARCHER BRIGGS.

The following paper is an attempt towards identifying the Roses of the neighbourhood of Plymouth, with plants described by Mr. J. G. Baker in his two valuable papers, "Review of the British Roses," and "A Monograph of the British Roses." To the same distinguished student of this difficult genus, I must express my obligations for kind assistance rendered in correspondence at various times.

1. *Rosa spinosissima*, Linn. Our only example of its group, and

extremely rare. On a mass of rock above Whitsand Bay, near Rame, Cornwall; also on a bank, by the path, leading through the plantation, to Penlee Point, from Cawsand Village; possibly introduced at the latter station, which, like the other, is in Cornwall.

2. *R. tomentosa*, Sm. Common, and generally distributed about Plymouth, in hedges and thickets, being, after *R. canina*, *R. arvensis*, and *R. micrantha*, our commonest Rose. Some of our plants should, I think, be referred to the variety *subglobosa*, Sm., but the differences between it and the type seem so slight, that I find it difficult to separate the two. The species is extremely variable. One of its forms, *R. scabriuscula*, Sm., which is as plentiful as ordinary *R. tomentosa* about Plymouth, is so much unlike the latter in general appearance, that it might be regarded as distinct, did not intermediate forms connect the two. About Plymouth I have never seen any form of *R. tomentosa*, with either quite naked peduncles or pure white flowers.

3. *R. rubiginosa*, Linn. Rare. Apparently quite wild in a wood near Riverford, Plym Valley, where are two bushes at present (1870); one only a few years old, growing very near a spot where a larger bush grew some years ago, from a seed of which it has probably sprung. A fine bush on a hedgebank by the Plymouth and Ivybridge Road, near the hamlet of Lee Mill Bridge, in a situation where the suspicion that it may have been sown by a bird can alone attach to it. Two bushes, near together, but on different sides of the Plymouth and Saltash Road, about three miles from the former place, both growing on banks where a periodical paring will prevent either from ever producing flowers. There are some bushes of this Rose in a waste spot by the line of the South Devon Railway, near the village of Cornwood, but there they, together with *Pastinaca sativa*, growing near them, may perhaps mark the site of an old garden. A few years ago a single bush grew amongst bushes of *Ulex europæus*, on a bank between Knackersknowle and Tamerton Foliot, but it has since disappeared.

4. *R. micrantha*, Sm. Quite common, and generally distributed all about Plymouth, being, after *R. canina* and *R. arvensis*, our commonest Rose; growing on the shelving slaty banks of our estuaries and creeks, as well as in bushy spots on the borders of Dartmoor, in sheltered valleys by our sparkling streams, and in hedges exposed to the salt sea-breezes coming in from the Channel. A variety with quite naked peduncles is scattered over a considerable portion of our district, but I

have not as yet ever found this across the Tamer. At Bickleigh it occurs with subglobose fruit. All the naked-peduncled plants I have examined have had the sepals destitute of setæ on the back, whereas in the ordinary form they seem always to have them. The two plants often occur in the same hedgerow, and I have met with both on limestone and on slate. A very luxuriant naked-peduncled plant, growing at Rumble, in the Plym Valley, is the variety *Briggsii* of Mr. Baker's Monograph (Journ. Linn. Soc., Botany vol. xi. p. 222). In the neighbourhood of Plymouth I sometimes find *R. micrantha* instead of *R. rubiginosa*, the "Sweet Briar" of cottage gardens.

5. *R. canina*, Linn., var. *lutetiana*, Leman. One of the commonest forms of *canina* in the Plymouth district. Var. *sphærica*, Gren. A plant gathered by me near Modbury, about eleven miles to the east of Plymouth, and sent to Mr. Baker, has been pronounced by him to be this. (Journ. Linn. Soc. Botany, vol. xi. p. 227.) Var. *senticososa*, Ach. A Rose from a hedge near Yeo, about eight miles to the east of Plymouth, Mr. Baker identifies with this. (Journ. Linn. Soc., Botany vol. xi. p. 227.) Var. *dumalis*, Bechst. Very abundant about Plymouth; often with nearly white flowers. Var. *urbica*, Leman. Common, but not so general as the last. Var. *arvatica*, Baker. Very rare. Some bushes on top of a hedgebank between Wiverton and Blackpool, Brixton. They differ from most of the North of England examples in having leaves that are glaucous on both sides; still Mr. Baker, who has had specimens from me, pronounces them to be "good *arvatica*." Var. *tomentella*, Leman. Local and rare. Three bushes a short distance below Lee Mill Bridge, by the path as you ascend from the valley of the Yealm towards the lane leading from Yealmpton to Ivybridge, and several others in a hedge by this lane, near the cross-road to Modbury; also two bushes in a hedge on the left of the lane leading from the Plymouth and Ivybridge Road, by Blackpool, towards Yealmpton, just after you pass the cross lane in front of Wiverton House; and one or two more, judging from barren shoots only, in a hedge by the Plymouth and Ivybridge Road, near Lynham Lodge. Var. *verticillacantha*, Merat. Rare. In a hedge by a lane leading from Pennycross to Woodlands; in another near Harestone, Brixton; in a hedge near Hemerdon House, Plympton St. Mary. In two places on the ascent of the hill toward St. Mellion Village from Penter's Cross,

Cornwall. The branches of the Harestone plant exhibit a curious abnormal development of setæ and aciculi, recalling the aspect of the least prickly species of the *Spinossimæ* group; and a similar armature prevails to some extent on those of the Hemerdon plant. A very beautiful Rose, called by Mr. Baker, in his Monograph, an extreme specimen of this variety, with calyx-tube uniformly prickly all over its surface, and with sepals thickly covered with setæ on the back, I found, a few years ago, near Ernesettle, in the parish of St. Budeaux, growing in two hedges, but since then it has been destroyed at one spot, through the levelling of the hedgebank. Another bush of the same form still exists in a hedge near Budockshed, in the same neighbourhood; and two very large ones grow about a mile from this among copse-wood at Warleigh, by the side of Tamerton Creek, a saltwater inlet from the Tamer. Var. *collina*, Jacq. About Plymouth this is the most abundant example of the aciculate-peduncled forms of *R. canina*, being in the immediate neighbourhood of the town, and in most parts of the district one of the commonest Roses. We have two forms; that which I regard as the most typical has nearly erect branches, strongly hooked prickles, leaves of a very dark green, and young shoots, prickles and other parts much tinged with vinous purple; the two colours forming a remarkably striking contrast with the petals, as these are white when the flowers are fully open, though creamy when expanding. It comes into bloom a little later than do our other common *canina* forms, and sometimes it has as many as from fifteen to twenty flowers on its most luxuriant branches. Mr. Baker has given a full description of this in this Journal, Vol. III. (1865), p. 82. The other form is also common about Plymouth, though less so than that just described. It differs considerably from it in general appearance when growing, so that the practised eye can then readily distinguish it from the other; but dried specimens of the two are found to be greatly alike, and I, in deference to the opinion of Mr. Baker, give this second plant as only a form of *collina*. It has long arching shoots; stout prickles; leaves sharply pointed, glabrous and rather glossy above, hairy at least on the midrib and principal veins beneath; serratures simple, sharp, and regular; petioles moderately prickly, with a few scattered hairs, and an occasional seta; stipules and bracts glabrous on the back, sparingly gland ciliated; peduncles long, copiously furnished, in most typical examples, with setæ, but these are occasionally

only scattered; calyx-tube narrowly ovate or oval, slightly setose at the base or naked throughout; sepals generally more or less setaceous on the back, with very narrow leafy points and pinnæ; petals light pink, often mottled; styles glabrous; disk convex. The young shoots, peduncles, and calyx-tube are sometimes much tinged with deep red. It is widely distributed around Plymouth, occurring in Cornwall as well as in Devon.

6. *R. arvensis*, Huds. Extremely common over the enclosed and wooded parts of our district, and on some of our driest hedgebanks the most abundant Rose, *canina* not excepted. Var. *bibracteata*, Bastard. This occurs plentifully in hedgerows by the Plymouth and Yealmpton Road, between Billacombe and Brixton, attaining great luxuriance, a little beyond the village of Elburton, and rendering itself very conspicuous in June and July by the profusion of its large blossoms. It is rather common about Plymouth, as, besides growing in other hedges in the neighbourhood of the locality just mentioned, it occurs by the Plymouth and Ivybridge Road; between Chaddlewood Lodge and Lee Mill Bridge; near Longbridge; between Harford and Cornwood; about Plymstock; near Down Thomas; etc.

The places mentioned above are in Devon unless the contrary is stated.

ORIENTAL EDIBLE FUNGI.

BY M. C. COOKE, M.A.

Two samples of dried Fungi employed as food have come under my notice which are, as I believe, undescribed; both are Agarics, and both belonging to the subgenus *Pleurotus*. In 1862 the first sample was sent to the International Exhibition through Singapore, but said to have been derived from China, and was recorded in the Indian section of the catalogue, at page 73, under the name of *Agaricus* (*Pleurotus*) *subocreatus* with the following note:—"This is a new and apparently undescribed species of *Agaricus*, belonging to the subgenus *Pleurotus*. It is nearly allied to the British *Agaricus ulmarius*, from which it is separated by the volva, remains of which may be traced at the base of the stem. It is a dendrophytal species, drying readily, and is employed in the Straits settlements as an article of food." Although no additional information has been obtained, it may be

well to give as good a diagnosis of its characters as can be drawn up from the dried specimens.

AGARICUS (PLEUROTUS) SUBOCREATUS, *Cooke*.—Pileus rather fleshy, smooth, convex, then expanded and plane; margin at first slightly incurved, at length open and splitting into lobes; stem excentric, short, nearly equal, with remains of a volva at the base; gills ventricose, rather crowded, reaching the stem, but not decurrent. On trunks of trees; China, etc.

Pileus 1-3 inches broad, dark greyish-brown when dried, quite smooth; gills tawny.

The other sample of dried Fungi came recently from North-Western India, said to have been collected on the Cabul Hills. It belongs to the same subgenus as the foregoing, but is larger, more robust and fleshy, dries well, retaining a pleasant mushroom odour, and is reported to be employed as food. It is sold at from forty to fifty rupees for one hundred pounds, or from tenpence to one shilling per pound. The following description has been drawn up solely from the dried specimens.

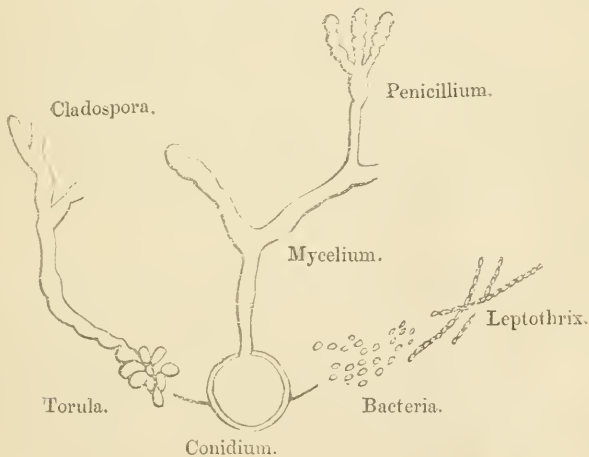
AGARICUS (PLEUROTUS) FOSSULATUS, *Cooke*.—Pileus fleshy, compact, oblique, deeply cracked and fissured in a tessellate manner, with the flesh and fissures white, the scales and prominences brown; margin more or less lobed; excentric, thick, fleshy, attenuated downwards; gills rather narrow, decurrent, slightly forked behind, running down the stem and ending in lines upon it; rather distant; spores white, $\cdot 00015 \times \cdot 00025$ to $\cdot 0003$ in. On trees; Cabul Hills.

Pileus 2-4 in. broad; stem 2-3 in. long. The pileus usually broken up into large, thick, brown scales.

SHORT NOTES.

SPONTANEOUS GENERATION.—Two papers in the current number (October, 1870) of the 'Quarterly Journal of Microscopical Science' seem of special importance amid the numerous articles which the publication in 'Nature' of Dr. Bastian's experiments have called forth, and both argue against the reception of Dr. Bastian's inferences. One is a report of an address delivered *vivâ voce* by Prof. Huxley, in the biological section of the British Association, on the relations of *Penicillium*, *Torula* and *Bacterium*. From direct observation the

author arrives at the conclusion that all these are terms in the development of one and the same organism, and his position is that the chance of this *same* identical form turning up as the result of spontaneous production from inorganic matter is mathematically infinitely minute. His experiments showed that the spores (or "conidia") of ordinary *Penicillium* mould are capable, in the absence of light, of sending off a mass of *Torula* cells, which either separate and are often found interspersed among the filaments of the usual mycelium (the whole then closely simulating the structure of a Lichen), or develop themselves into a *Cladospora*-like fungus. *Bacteria*, like *Torula*, are also considered to be developed from the conidia, and like it are regarded as the simplest stage of the fungus; the two being, perhaps, somewhat analogous to the macro- and micro-gonidia of *Algæ*. These views are expressed in the accompanying diagram, for which we are indebted to Messrs. Churchill.—The other paper is by Prof.



Thiselton Dyer, who attacks the theory on wider grounds. Dr. Bastian, in publishing his experiments, endeavoured to raise a strong *à priori* argument in their favour, by showing that they were conformable to, and even deducible from, the theory of "Evolution." A note from Prof. Thiselton Dyer in our last number (p. 325) proves that this view is, at any rate, not shared by Mr. Spencer, who is the chief expounder of that theory in this country; and in the paper be-

fore us he discusses Dr. Bastian's paper in detail. He endeavours to show that the fundamental principle of evolution being continuity, it lends no sanction to such a leap as the direct production of a *Penicillium* from ammonium tartrate. Evolution regards complexity as only gradually attained; and the exigencies of differentiated organisms imply antecedent organisms genetically connected with them which were undifferentiated. It cannot be contended that these successively existed in the experiments, because the production of differentiation is the result of a continual effort to meet, by increasingly complex modifications, changes in an organism's environment. Differentiation, therefore, demands two conditions which could not be present in the experiments, viz. *a*, amplitude of variation in the environment; *b*, a lengthened period of time for the gradual accumulation of small changes. It is equally difficult to regard *Bacteria* as spontaneously produced. As with *Torulæ*, it is pretty well ascertained that these are derived from fungi, such as *Penicillium*. Consequently, though very simple in structure, like the animal ovum they are *potentially* complex. This potential complexity can only be gradually arrived at by the same process as that which produces *actual* and structural. It is true that Evolution bridges over the interval between the living and the lifeless; but the earliest living things that it looks for are proteiaceous masses, simpler even than *Amœba*, and only attaining higher places in the scale by the most gradual accumulation of minute modifications.

BRITISH DACTYLOID SAXIFRAGES.—I wish to correct a strange mistake Mr. Baker has fallen into respecting our Irish "*Saxifraga cœspitosa*" (abundant on Brandon), which he considers identical with the Scandinavian plant. The *Scottish* specimens *may* belong to true *cœspitosa*, which is abundant in Iceland—a little tufted plant with *small yellowish* or cream-coloured flower; but *Irish S. cœspitosa* and *S. hirta* are evidently only luxuriant forms of *hypnoides* (see Cyb. Hibern. 118). As to the actual specific distinctness of *cœspitosa* (true) and *hypnoides* I offer no opinion; but I can assert, from actual observation, that *cœspitosa* of Iceland, Norway, and our Brandon Saxifrage are exceedingly different plants. *S. hirta* (from Brandon; Galtymore! and Carrantuel!) is a large straggling plant, with rather yellow-white flowers; "*S. cœspitosa*" of Brandon has large handsome white flowers. In cultivation *hirta* becomes very like *cœspitosa*.

I. CARROLL.—[I asked Mr. Carroll to send specimens in illustration of his note, and he has kindly done so. His Iceland "*cæspitosa*" is my *cæspitosa*; but what he calls "*cæspitosa*" from Brandon mountain agrees precisely with the plant from that hill, of which I spoke under the name of "*Sternbergii*" at page 283, so that to his charge of mistake I may safely plead not guilty. The difference between us probably is that I have united together as one variety the two plants of which he speaks as Irish *cæspitosa* and *hirta*. I should like him to enlighten us further as to how these differ from one another. The specimen in Herb. Borrer, gathered by Wilson on Brandon mountain, I cannot in any way distinguish from true *cæspitosa*; but it is only a single scrap without petals, so that I do not rely upon it as fully establishing that variety as Hibernian. As evidence in confirmation of what I said about the nearness to one another of *cæspitosa* and *Sternbergii*, I would ask any one interested in the matter to read what Sir J. E. Smith says in 'English Flora' about a plant from that same mountain.—J. G. BAKER.]

SAXIFRAGA CÆSPITOSA.—I am informed by Mr. Watson that this was gathered by Dr. Martin Barry in 1832 on Ben Avon, which stands at the head of Banffshire, on the borders of Aberdeenshire. As I never heard that Dr. Barry collected it more than once, it is probable that the station of Clova mountains, which I gave at page 281 on the authority of the note copied on the sheet with the specimens in the Kew Herbarium, is incorrect; and I would consider that this Ben Avon station for the plant is the only one in Scotland yet ascertained that rests upon a safe foundation.—J. G. BAKER.

FLORA VECTENSIS.—In a letter by Richard Waring, F.R.S., on some plants found in several parts of England (Phil. Trans., vol. lxi. 1770), he states that he found "*Sambucus humilis sive Ebulus*, C. B., between Newport and Caresbrook Castle, I. W.," and "*Helenium sive Ecnula Campana*, J. B., in some waste places about Freshwater and elsewhere in ye Isle of Wight." The former has long been lost sight of in the spot indicated above (see 'Phytologist,' iii. 415); the latter is still to be found in two or three places about Freshwater and in other parts of the island.—ROBERT TUCKER.

CUSCUTA HASSIACA, Pfeiff.—It may be worth recording that this Dodder has appeared last year, and again this year, in a field of Lucerne, near Rugby, belonging to Mr. E. Edwards. It was first noticed by Mr.

Varenne at Witham, in Essex, in 1851, and was found in 1868 by the Rev. J. F. Crouch at Marston, in Herefordshire. The plant now growing in Warwickshire was, of course, introduced with the seed of the Lucerne; but it is remarkable that, from some of the same seed, not used at the first sowing, Mr. Edwards made every possible effort to exclude the Dodder seeds, and yet the parasite has persistently reappeared.—F. E. KITCHENER.

THE FLORA OF ICELAND.—*Plantago Coronopus*, L.; I found this plant in Iceland in 1861; but, although I noted this occurrence, neglected to take specimens, supposing it to be frequent. *Salix glauca*, L.; the plant found by me is certainly *not* glauca; it is *S. arctica*, Pallas. *S. glauca*, L., very frequent in Lapland and Norway, I have never seen in Iceland; but it, in all probability, grows there.—I. CARROLL.

GENTIANA CAMPESTRIS, L.—In connection with my remarks on this plant at page 223 of this volume of the 'Journal of Botany,' bearing on a previous note respecting it by Mr. Tucker, it may be worth while to add that, on October 1st, I again visited the two pastures in which I noticed some specimens of this Gentian in flower in May last, on purpose to see if any could be found at this autumnal season, when it ordinarily flowers. There it was in profusion, as well as in two other pastures of similar character in the same locality. There were numerous specimens in fruit, others in flower, and some in bud, and several white-flowered plants grew amongst the others. I now believe we must look on the spring blooming of some plants of this Gentian as quite a casual circumstance, and consider it likely that if Mr. Tucker's Isle of Wight locality were diligently searched at the autumnal season, it would, like my Devon station, be found producing the plant more plentifully than at the vernal one.—T. R. ARCHER BRIGGS.

VIOLA ODORATA, L., AND V. LACTEA, Sm., in S.W. ENGLAND.—I venture to make a few remarks on what Dr. Hooker, in his recently published 'Students' Flora of the British Isles,' says respecting the English distribution of *Viola odorata* and *V. lactea*, Sm. Of the former I read (p. 44), "wild in E. and S.E. England, naturalized elsewhere." I do not think the latter statement quite correct, since I believe *V. odorata* to be undoubtedly wild on the limestone beds, and in spots around them, lying to the east of Plymouth, between it

and Yealm Bridge, which latter place is distant about seven miles from the town. In the district indicated it occurs plentifully on many hedgebanks and in bushy places, associated with *Hypericum montanum*, *Origanum vulgare*, *Rubus cæsius*, etc., together with its ally, *Viola hirta*, between which and it there is in some spots an intermediate plant, described by Messrs. Baker and Foggitt as the *Viola permixta* of Jordan in the Report of the Thirsk Botanical Club for 1865. Elsewhere about Plymouth *V. odorata*, with both white and purple flowers, may be seen in many scattered localities, but, perhaps, only where it has either escaped from cultivation or been introduced. With regard to the distribution of *V. lactea*, Dr. Hooker says (p. 45), "Heaths, E. England." S.W. might certainly have been added, as downs about Plymouth, situated in S.W. Devon and S.E. Cornwall yield the plant, together with *V. flavicornis*, Sm., and one or two other forms of *V. canina*, L., proper.—T. R. ARCHER BRIGGS.

CAREX DISTANS, L.—In the 'Students' Flora' (p. 418) a query is inserted after the words "absent in Devon," followed by "and Cornwall." I reply,—the plant is both a Devonian and Cornubian species, as I have seen it at Long Bridge, on the right bank of the Plym, opposite to where Tory Brook falls into that river, a little above the Laira estuary; also in a marsh at Blaxton by the Tavy, which is there a tidal river; and on the coast east of Plymouth, between Bovisand and Wembury; these stations are in Devon. In Cornwall I have noticed it at more than one spot on the coast by Whitsand Bay, near Plymouth.—T. R. ARCHER BRIGGS.

ADDITIONS TO THE FLORA OF THE SCILLY ISLES.—During a visit to this group in 1869, I noticed the following species, which are not included in Mr. Townsend's list published in this Journal, Vol. II. (1864), pp. 106–120 :—

Fumaria officinalis, *St. Agnes*.
Sinapis alba, *St. Agnes*.
Lepidium Smithii.
Draba verna, *St. Mary's*.
Reseda Luteola, *St. Mary's*.
Silene inflata, *St. Agnes*.
Medicago sativa, *Tresco*.
Trifolium fragiferum, *Tresco*.
Spiraea Ulmaria.
Sium angustifolium, *St. Mary's*.

Tanacetum vulgare, *Tresco*.
Sonchus arvensis, *Tresco*.
Erythraea Centaurium, *Tresco*.
Solanum nigrum, *St. Agnes*.
Linaria Cymbalaria, *Tresco*.
Linaria vulgaris, *Tresco*.
Galeopsis Ladanum, *Tresco*.
Polygonum Persicaria, *St. Mary's*.
P. Hydropiper, *St. Mary's*.
Juncus supinus, *Tresco*.

Alisma ranunculoides, *Tresco*. I suspect Mr. Townsend intends this by his *A. Plantago*, for I never saw the latter.

Eriophorum latifolium, *St. Mary's*.

Briza minor, *St. Mary's*.

Molinia cærulca, *Tresco*. No doubt the *Sesleria cærulea* of Townsend's list.

Lavatera arborea is common on most of the islands, and no doubt indigenous.

With the exception of *Eriophorum latifolium*, all have been recorded in Cornwall.—M. A. LAWSON.

HYDROCOTYLE VULGARIS, *L.*, etc.—In the August number of this volume (p. 241) Dr. Seemann asks and answers in the negative the question whether there is a second European *Hydrocotyle*; apparently forgetting *H. natans*, *Cyr.*, which occurs in Italy and Sicily. It is interesting to know that *H. pleiantha*, *Ces.*, is the same as *H. vulgaris*, *L.* Having lately had occasion to examine this genus with reference to the flora of another part of the world, I find that the question of the identity of *H. vulgaris* with *H. verticillata*, *Thunb.*, non *Turcz.*, is mixed up with that of the identity of these with *H. umbellata*, *H. petiolaris*, *H. Caffra*, and *H. bonariensis*. The principal differences relate to the number of veins on the leaves, and the size, ramification, and number of flowers in the umbels. These differences are great and remarkable in the extreme cases, but there can perhaps be traced an uninterrupted gradation amongst them. I notice the following facts taken from the Kew herbarium, which lead me to question some of the conclusions in Dr. Seemann's paper:—(1.) Some specimens of *H. vulgaris* (or *H. verticillata*) from South Africa have the leaves 10-nerved. (2.) Other specimens from the same country have the leaves with more than 11 nerves. (3.) The ripe fruits are about equally emarginate at the base in the specimens of all those species from Europe, and from various parts of the world.—W. P. HIERN.

Reports.

THE LOCAL FIELD-CLUBS OF GREAT BRITAIN.

By JAMES BRITTEN, F.L.S.

VI. THE MANCHESTER FIELD NATURALISTS' SOCIETY.

This Society owes its existence to a few gentlemen of the town and neighbourhood, who, impressed with the belief that an Association for

the out-door study of natural history would be highly useful and agreeable, formed themselves into a temporary committee, in order to give practical shape to the idea. This was early in 1860, and circulars, stating the objects of the proposed field-club, having been issued to those likely to feel interested in it, the Society was at once formed, the Earl of Ellesmere being the President, and Mr. Leo Grindon the Secretary, a post which he has filled from that date until the present. In little more than a fortnight 170 ladies and gentlemen were enrolled as members, and the first meeting was held on April 11th, 1860, in the Library Hall of the Athenæum, at which about 250 were present. On this occasion an inaugural address was delivered by Thomas Turner, Esq., and there was an exhibition of objects in all branches of natural history.

The management of the Society is vested in a President, two Vice-Presidents, a Treasurer, Secretary, and General Committee. These officers are elected annually. Members are admitted by ballot. The annual subscription is 10s. 6d., and the same amount is paid as an entrance fee. During the ten years of the Society's existence thirty-five *soirées* have been held; at each of these there has been a large attendance, and one or more papers have been read, the greater number by the Secretary and Mr. R. Holland. There has also been at each *soirée* a well-arranged collection of objects for inspection. During the same number of years 105 excursions have been made, one (on an average) on every other Saturday during the summer months. On many of these occasions the whole day has been taken for the excursion, and by this means, with the facilities offered by railways, distant localities, such as Matlock and Buxton, are visited which would not otherwise be attainable. At these excursions short *extempore* addresses are delivered by the Secretary and other members, either on the objects met with during the walk or some other topic of interest.

The President is Dr. Simpson, and the number of members is 225. As might be expected, so large a number comprises many whose love for natural science is but small; and it is a matter for question as to how far their presence tends to the advantage of the Society. It certainly goes some way to justify the opinion which has been expressed regarding this and kindred bodies that a *dilettante* and superficial knowledge alone is likely to result from membership. But there is in the Manchester Field-Club, as in all similar ones, a substratum of

genuine workers, and it is to these that we must look to uphold the character of their respective Societies. That such workers exist in Manchester no one who has had the privilege of being present at a meeting of the field naturalists can doubt, and we can only regret that they have not given to the public some more substantial proof of their work. There is room for a good Flora of Manchester, for Mr. Grindon's, although useful as far as it goes, was published in 1859, and is now out of print, since which much has been added to the knowledge of the botany of the district. A list of the Mosses of the district, by Mr. G. E. Hunt, appeared in the Report for 1864, and similar lists of the various natural productions of the district might well be issued with each Report instead of the abstracts of papers, which, though admirable in their way, are scarcely of the permanent value which local lists would possess. The Annual Report is the only publication of the Society; it is issued gratuitously to members, and to non-members at 6d. Those who would obtain further particulars of the first decade of the Society's existence than can be given in a brief notice like the present cannot do better than purchase the Report for 1869, in which a summary is given of its doings up to the present time.

New Publications.

BRITISH FUNGI.—1. *Remarks on some of the Fungi met with in the neighbourhood of Bath.* By C. E. BROOME, M.A., F.L.S. (In the 'Proceedings of the Bath Natural History and Antiquarian Field-Club,' vol. ii. no. 1, p. 55.)—2. *On the Forms and Persistency of Arboreal Fungi, particularly Polyporei, and notices of some rare species in the Malvern District.* By EDWIN LEES, F.L.S., F.G.S. (In the 'Transactions of the Malvern Naturalists' Field-Club,' part 3, p. 197.)

During the last few years the study of Fungi in this country has greatly advanced; instead of a few students devoting themselves to the Fungus tribe, we have now many zealous workers. Some years ago British fungology was comparatively neglected and cast aside, and amongst those who then laboured most earnestly and successfully

to keep the subject alive in this country, Mr. Broome will ever take a foremost position. We are, therefore, especially glad to welcome the above-named valuable contribution from his pen, and only trust that in future he may be induced to put more of his accurate notes and observations into print.

In this paper the author gives an enumeration of all the Hymenomycetous Fungi found near Bath, 159 in all,* prefacing the list with a concise introduction to the subject, and introducing remarks throughout on such species as are peculiar in their structure, useful as articles of food, or to be avoided on account of their noxious qualities. In the list of species we observe many that are new to this country, and one, at least (*Dacrymyces sebaceus*), described for the first time; others, though not published elsewhere, have appeared in the pages of this Journal. The following are new to our lists:—*Agaricus* (*Armillaria*) *robustus*, A. and S.; *A. (Tricholoma) cælatus*, Fr.; *A. (Collybia) plexipes*, Fr.; *A. (Mycena) citrinellus*, P.; *A. (M.) pellatus*, Fr.; *A. (Volvaria) medius*, Fr.; *A. (Clitopilus) vilis*, Fr.; *A. (Nolanea) mammosus*, Fr.; *A. (Eccilia) Parkensis*, Fr.; *A. (Hebeloma) uniformis*, P.; *Cortinarius (Telamonia) gentilis*, Fr.; *Marasmius impudicus*, Fr.; *Merulius himantoides*, Fr.; *Irpex fusco-violaceus*, Fr.; *Typhula gyrans*, Fr.; and *Dacrymyces sebaceus*, B. and Br. Out of the eleven new Agarics here mentioned, three only appeared in the list of new species appended to Mr. Smith's 'Clavis Agaricorum,' published simultaneously.

Undoubtedly the most important feature in this paper is the removal of the genus *Solenia*, P., from among the Discomycetes, to a position after *Cyphella* in the Order *Auricularini* of the Family *Hymenomycetes*; the spores being produced, according to Mr. Broome, as in that genus. In this Mr. Broome has followed the later views of Fries, and from our own careful examination of one of the species referred to, we can fully confirm the accuracy of his observations. He gives two species of *Solenia* as British, *S. ochracea*, Hoffm., and *S. candida*, Hoffm., neither of which had before been observed in this country. The critical remarks on the various Orders and genera throughout are most valuable, embodying, as they do, his own and the latest views of botanists of eminence.

* In the list of Middlesex Hymenomycetous Fungi published in the 'Flora of Middlesex,' Mr. W. G. Smith enumerated 329 species.

Mr. Lees's paper is of a very different order from the last, and proves its author quite incompetent to deal with the subject he has chosen. Discarding the kitchen in favour of Dr. Bull and others, Mr. Lees goes in for pure science; but our readers may judge of the value of his teachings when we inform them that in his scientific description of the genus *Polyporus* he says, "*Sporidia contained in slender asci, and very small*" (!) The merest beginner knows that one of the fundamental characters of the genus consists in having spores *never contained in asci, and often very large*. The author naively informs us that full descriptions of the plants he mentions may be found in Fries's 'Systema Mycologicum' of 1821, so we can only in charity imagine that Mr. Lees is half a century behind the age, and that the feeling which recently prompted him to adopt the Linnean system in his 'Flora of the Malvern Hills' has now led him to ignore the last fifty years of Fries's labours, and to pass over the works of such accurate botanists in this country as Messrs. Berkeley, Broome, Currey, and others. Hence we find *Lactarius* referred to *Agaricus*, *Trametes* to *Polyporus*, etc., and no author's name appended to any species except Mr. Lees's own.

The views of the *Polyporei* are original to a degree. Mr. Lees says, "It has been *generally considered* that all these arboreal Fungi spring from spores" (!) but that "it seems possible to imagine that (unless the spores are really *contained in and circulate with the sap*) the alburnum has a metamorphic power of producing simulated forms of Fungi, and that these 'sap-balls' *are not* really autonomous plants *producing real spores*, from which similar plants can arise." Also, he is "not aware that experiment has proved the growth of Polypores from actual spores, and in this case the sap of trees when running to waste may have a metamorphic power of *retrocession into lower life*."

Mr. Lees ventures to publish three new species, although he does not know the old; and after the above quotation our readers will not be surprised to hear that such unascertained and ambiguous things as *spores* are quite ignored. He says no species with central stems have come under observation in the district, yet the *first* plant described has normally and generally a central stem. He, however, chooses to remove it to the group with *lateral* stems, and he writes of the very next species of the group, stem "entirely obsolete." The first new

species is *Polyporus Ulicis*, Lees, found growing on stumps of gorse. We cannot see that it specifically differs from *P. lentus*, B., common on stems of *Ulex*; the stems of all the allied species are occasionally absent. The next, *P. tumidulus*, Lees, "Tumpy Polypore," found by the author on the Oak, is unmistakably a description of a young plant of *P. quercinus*, Fr.; and Mr. Lees's *P. flavo-marginatus*, found on the Alder, judging from the imperfect description, is probably nothing more than a large form of *P. Ribis*, Fr.

The species described in addition to these are thirty-five in number (exclusive of a few belonging to other Orders). So long as the author follows Mr. Berkeley he is correct, but as soon as he goes off on his own account the confusion is melancholy. As an instance, the long paragraph descriptive of *Polyporus suaveolens* (p. 203) is only so much nonsense, arising from a series of errors and misapprehensions. He says, Berkeley has referred the plant to "*Trametes*," whereas Fries himself made the alteration Mr. Lees probably intends. In this description the plant mentioned by Mr. Lees under the synonym of *Dædalea suaveolens* is peculiar to *Willows*, and not British, whereas Mr. Lees declares he has found it, and on a *Beech*. Again, he says it is probable that *Polyporus salicinus* of Berkeley (meaning Fries) is *Polyporus suaveolens* (meaning *Trametes*) become scentless with age, and then his (Berkeley's) *Trametes suaveolens* (meaning Fries's) may really be the same as *Dædalia suaveolens* of Fries (meaning Persoon), which, as we have said before, is not British at all, and is quite different.

To conclude, *Polyporus hybridus* (p. 205) is termed Tree-leather, or *Dry Rot*; and the author says, "I believe this is the Fungus that in various states is known as *Dry Rot*, and is so mischievous to unseasoned wood." In transposing Messrs. Berkeley's and Broome's words, Mr. Lees has reversed their meaning. They say distinctly "*on Oak*;" "the dry-rot of our *oak-built* vessels;" thus distinguishing it from the true "*dry rot*" of Fir. Besides, Mr. Lees found his plant on a *decayed Pear-tree* (!), so that it is more than doubtful whether he has *Polyporus hybridus* in view at all.

The author briefly returns to his paper in the last volume of the 'Transactions of the Woolhope Club' on the subject of fairy-rings, and mole agency, but he must be aware that it is a very old theory,—referred to, amongst others, by Mr. Cooke, in his 'British Fungi,' as long ago as 1862.

Proceedings of Societies.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.—Meeting at Liverpool, 1870.

The following botanical communications were read.

Section D. Biology, Department of Zoology and Botany. *September 17th.*—Professor Balfour presided.—I. Colonel Grant, “On the Vegetable Products of Central Africa.” II. Professor Archer, “Notes on the Changed Habit of *Lotus corniculatus* under cultivation.” A very common plant in cultivation in the Shetland Isles is a shrub (one plant observed was nearly four feet high), perfectly hard-wooded, and producing no seeds. It is cultivated by cuttings throughout the islands, and is a common window-plant; the leaves have two or three pairs of pinnæ; the centre of the stem is very much like box-wood. All the botanists present united in thinking that the leaves exhibited were not those of *L. corniculatus*, but probably of some species of *Vicia*. [Was it *Coronilla Emerus*?]. III. Mr. T. Gibson, “Parasitic Habits of *Pyrola rotundifolia*.” The writer believed *Pyrola rotundifolia*, *media*, and *maritima* to be varieties of the same species produced by soil and situation, and by the plants with which they are associated. A careful and persevering examination failed to detect any instance in which the *P. rotundifolia* was not growing in immediate proximity with *Salix repens*; and if not actually parasitic upon this plant, the writer believes it to have a remarkable sympathy with it in the choice of its habitats; the fibres of the roots are often yards in length, and from the extremities the young plants spring up. A plant springing from a single root will often cover a space several yards in circumference. In only a few instances, however, did he find the roots in actual contact with those of the *Salix*, and the parasitism was rather inferred than actually demonstrated. IV. T. Gibson, “Abnormal Petals of *Ranunculus aquatilis*.” V. A. W. Bennett, “On Protandry and Protogyny in British Plants” (see pp. 315–321). VI. Dr. Parry, “The Desert Flora of North America” (see pp. 343–347). VII. Professor M. A. Lawson stated that he had this autumn again visited the Isle of Skye, and found *Ribes spicatum*, Robson, first noticed there by him in 1868 (*Journ. of Bot.* vol. VII. p. 110) abundantly; he distributed some specimens.

September 20th.—Professor Rolleston presided. I. Professor A. Dickson, “On the Embryo of the Date-Palm.” II. E. J. Lowe, “On the Abnormal Forms of Ferns.” III. Mr. Tyerman, “On the Growth of *Lodoicea Seychellarum*.” IV. J. Price exhibited germinating leaflets of *Cardamine pratensis*.

September 21st.—T. M. Hall, “On the Abnormal Growth of Ferns.”

Section C.—Geology.—Sir Philip M. de G. Egerton, Bart., in the chair. *September 15th.*—I. W. H. Baily, “Report on the Fossils of Kiltorcan.” These were of Devonian age, and consisted of specimens of *Palaeopteris hibernica*, Sch., and abundant remains of *Sagenaria Bailyana*, Sch. Mr. R. H. Scott stated that Professor Heer had determined the specific identity of fossils, from Bear Island, with those described by Mr. Baily. II. W. S. Mitchell, “Fourth Report on the Bagshot Leaf-beds.” III. W. C. Williamson, “On the Organiza-

tion and Affinities of the Calamites of the Coal Measures." The structure of a Calamite stem of considerable diameter, but consisting of only a delicate cylinder of mixed tissue was minutely described. It was composed of parallel bundles of scalariform vessels, everywhere penetrated by minute medullary rays, and separated by large tracts of medullary tissue. A third set of medullary structures occurring at the nodes was also described. The phragmas seen on the sides of some stems, the author held to be the scars of roots. He entered on the affinities of these fossils as indicated by their stems, and proposed to separate them from *Equisetaceæ* as a distinct Order, *Calamitaceæ*. Mr. Carruthers doubted whether systematic determinations based on stem-structure were of value. He preferred the evidence derived from the fruit, and that he had shown to be very near to that of the living *Equisetum*. The various points of difference pointed out by the author he considered to depend upon the more highly organized vegetative portions of the plants. Mr. Bentham insisted on the value of fruit characters in determining systematic position, and urged the desirability of employing subgeneric names for imperfectly determined forms.

September 16th.—W. Carruthers, "On the History and Affinities of the British *Coniferae*." Having pointed out the characters of the great divisions of this Order, the author traced their appearance and development in the stratified rocks. The *Araucariæ*, represented by sixteen living species, natives of the southern hemisphere, made their appearance in carboniferous rocks, where eight species at least had been determined from the structure of the wood. Cones belonging to six species were known from secondary rocks, belonging to the section *Eutaeta* of *Araucaria*. The *Pineæ*, a group almost confined to the northern hemisphere, and having a single indigenous species, appeared in the old red sandstone; a second species was known in the coal, and cones, leaves, and stems were abundant in Secondary and Tertiary strata. The *Taxodiæ*, now represented by fifteen species, natives of the northern shores of the Pacific, appeared in the Secondary rocks, among them were several species of *Sequoia* from Cretaceous and Eocene strata. The *Cupresseæ*, of which the British Juniper was a member, was known from Tertiary beds only. The *Taxineæ*, containing nearly a hundred species, found all over the world, had been detected in Carboniferous strata, in a not unfrequent fruit, and by several species of fruits in the Eocene deposits of Sheppey.

September 19th.—I.: W. Carruthers, "Note on Specimens of *Antholithes* found by C. W. Peach, Esq." These fossils exhibited specimens of fruits known as *Cardiocarpa*, organically attached to the long filaments which had been figured as proceeding from the buds of *Antholithes*, and supplied data from which the author hoped to determine the systematic position of this remarkable fossil. II.: W. Carruthers, "On the Sporangia of Ferns from the Coal Measures." These specimens occur in the Coal-balls from the coal of Bradford. They exhibited the structure, form, and attachment of sporangia of some recent Hymenophyllaceous genera.

September 21st.—W. Carruthers, "Remarks on the Fossils from the Railway Section at Huyton." These cuttings supplied a limited number of species, and consequently afforded the means of correlating the different parts with

some certainty. The author explained the additions which the series made to our knowledge of the Coal flora, especially in the genera *Calamites*, *Lepidodendron*, and *Flabellaria*.

Botanical News.

By the death of Dr. F. J. Ruprecht, in August last, the Directorship of the Botanical Museum of the St. Petersburg Academy became vacant. It has been conferred on C. J. Maximowicz. Dr. Ruprecht was the author of a 'Flora Ingrica,' and of several works on *Gramineæ* and Cryptogams. The first part of his 'Flora Caucasi' appeared last year.

Among new books, we have to especially notice the fifth volume of Bentham's 'Flora Australiensis,' carrying down the enumeration to the end of the *Proteaceæ*, which great family occupies nearly half the volume; the third part (which completes the book) of Watson's 'Compendium of the Cybele Britannica;' and Dr. Weddell's 'Notes sur les Quinquinas,' containing a complete list of species and varieties of the genus *Chinchona*.

We learn from a well-known botanist who has visited Strasbourg since its change of masters, that the accounts of the destruction there are too well founded. The library and museum are entirely destroyed, and the botanic garden has been used as a cemetery. It is believed that Schimper, the palaeontologist and botanist, left the city before the siege, but the fate of his collections is not yet known.

Professor Balfour, of the University of Edinburgh, has just published the statistics of his class for 1870. The number of pupils was 283 (probably the largest class of botany on record), and of these 240 were medical, 12 pharmaceutical, and 31 general students. 64 lectures were delivered, 35 practical and 32 histological demonstrations given, and 10 excursions made. The number of students who attended the excursions was 225, and the number at each excursion varied from 26 to 130. Six of the medical students were ladies, and we are glad to see that all of them get a place among the 38 of the honours list, their positions being 3, 5, 12, 24, 30, 33; No. 3 also obtained a special prize for a series of dried specimens illustrating the forms of definite inflorescence. In addition, Professor Balfour gave a separate course of 40 lectures to ladies, which was attended by over 30, of whom 23 underwent an examination at the end of the term, the result of which showed a high degree of proficiency.

At a meeting of the Perthshire Society of Natural Science, held on Oct. 7th, a paper was read by Mr. Sadler, Edinburgh, entitled "Contributions to the Flora of Perthshire." After the meeting the members adjourned to the Moncrieffe Arms Hotel, where supper was prepared, consisting of different species of Fungi, cooked in various manners. The dishes most relished were *Boletus edulis*, *Coprinus comatus*, and *Agaricus campestris*.

We learn, from a report in a local paper of a recent meeting of the Norfolk

and Norwich Naturalists' Society, that steps have been taken to secure local lists of species in the different departments of natural history, and that Mr. Geldart and Mr. Corder have undertaken the botanical department. Each list, when drawn up, will be submitted to those who are likely to assist in its completion. A collection of interesting Norfolk plants was exhibited at the meeting.

We are glad to announce that the museum belonging to the town of Folkestone, which had fallen into a disgraceful state, and was practically useless, has been handed over to the Natural History Society for arrangement, and was formally reopened by the Mayor on the 4th of October. The museum is rich in geological specimens, and has the nucleus of other collections. The labour of arranging and cleaning the specimens was undertaken mainly by the secretary, Mr. Ulyett, assisted by the Rev. C. L. Acland. The Society is working well in other departments, and we hope we shall soon have a good list of the plants of the district, especially as a singularly useless one has just been issued by a publisher in the town. In this the plants are arranged alphabetically under their English names, and errors of printing abound, as well as more serious mistakes. We should scarcely expect to find the "Isle of Man Cabbage" at Folkestone; and our acquaintance with plant names does not enlighten us as to what is intended by the "Cheea Prickly," which is found there on chalky hills.

Two Fungus Exhibitions were held in October. On the 5th, in the Royal Horticultural Society's rooms, at South Kensington, a large number of edible species were shown, and some rarities, as *A. conissans*, *A. porrigens*, *A. circinatus*, and *A. corticatus*; *Lactarius controversus*, several *Polypori*, including *P. Schweinitzii* and *P. frondosus*; and *Lycoperdon echinatus*. On the next day, at Hereford, under the auspices of the Woollhope Club, the exhibition was a very large one; an immense specimen, weighing 14½ lb., of *Polyporus frondosus* was conspicuous, as were also its congeners *P. applanatus* and *P. hispidus*. *Sparassis crispa*, *Lactarius controversus*, *Boletus badius*, *Agaricus corticatus*, *Cortinarius fulgens*, and many others, were also exhibited. An excursion followed the show, during which Dr. Bull was so fortunate as to discover a new British *Scleroderma*, probably *S. Geaster*, of which we hope to give a description in a future number.

Dr. John Yeats has published a useful manual, under the title of a 'Natural History of Commerce.'

Persons desirous to obtain copies of 'The Lichen-Flora of Great Britain,' preparing for publication, are requested to send their names and addresses to the Rev. William Allport Leighton, Shrewsbury, as the number of subscribers must regulate the price, which it is hoped will not exceed 10s. 6d.

Dr. S. H. Wright, of New York, a first-class collector, and versed in *Carices*, etc., wishes to exchange, say, 1000 North American plants for as many British. This is a good opportunity for any English botanist.

We are asked by Professor Eaton, of Yale, the eminent American pteridologist, to find a correspondent for a lady in Canada, who desires to exchange a set of herbarium specimens of North American Ferns for British ones. Particulars may be had on application to Mr. Baker.

In part 7 of the 'Vargasia,' or bulletin of the Society of Physical Science and Natural History of the Caracas, our correspondent Dr. Ernst has commenced a paper on the more interesting plants of the country, giving special stations for, or critical remarks upon, about 150 species, and a full diagnosis and popular account of his new genus of *Senecionidea*, *Libanothamnus*, recently proposed in a paper read before the Linnæan Society. (See p. 207.)

We regret to announce the death of Dr. Thomas Anderson, F.L.S., Superintendent of the Royal Botanic Gardens, Calcutta. He was a devoted student of Natural History at Edinburgh, and selected the East India Company's service as likely to afford him opportunities for the prosecution of those studies, as it had done to many others. On the occasion of Dr. Thomson's leaving Calcutta, Dr. Anderson was appointed to the temporary charge of the Gardens, and afterwards succeeded Dr. Thomson when he retired from his office. Nearly two years ago he was compelled to return to England on account of dangerous illness, though his friends feared lest his strength should prove insufficient to bear the journey. He reached his native land in a very weak state, but soon recovered sufficiently to enable him to prosecute his botanical work. He began in earnest at the Flora of India, and there was good reason to hope that this greatly desiderated Flora would ere long have been published. About three months ago, however, he suffered a relapse, which compelled him to interrupt his labours, and to seek in quiet and rest the restoration of his health. He never rallied, and on the 26th of October died at Edinburgh. He laboured successfully in establishing the Cinchona plantations in the North of India, and published several interesting reports on the subject, abstracts of which have been printed at different times in this Journal. Our pages also contain an interesting account of the terrible cyclone which, in 1865, brought desolation to the Gardens under his care. Besides these official communications, Dr. Anderson has published the following papers on systematic botany:— "Flora Adenensis;" supplement to vol. v. Linn. Soc. Journ. (1860). "On *Spharocoma*, a New Genus of *Caryophyllea*;" Linn. Soc. Journ. vol. v. p. 15 (1861). "An Enumeration of the Species of *Acanthaceæ* from the Continent of Africa;" Linn. Soc. Journ. vol. vii. p. 13 (1864). "On a Presumed Case of Parthenogenesis in a Species of *Aberia*;" l. c. p. 67. "On the Identification of the *Acanthaceæ* of the Linnæan Herbarium;" l. c. p. 111. "An Enumeration of the Species of Ceylon *Acanthaceæ*," in Thwaites' Enum. Plant. Zeyl. p. 223 (1864). "*Aphelandra ornata* from Brazil;" Seemann's Journ. Bot. Vol. II. p. 289 (1864). "On Two Species of *Guttifera*;" Linn. Soc. Journ. vol. ix. p. 261 (1867). "An Enumeration of the Indian Species of *Acanthaceæ*;" l. c. p. 425.

The death is announced, on September 7th, of Dr. Philipp Wirtgen, of Coblenz, well known as a critical botanist, especially amongst the Roses, *Rubi*, *Mentha*, and Verbascums, and for his excellent 'Flora der Preussischen Rhein-provinz' (1857) and other works.

COMMUNICATIONS have been received from T. R. A. Briggs, M. C. Cooke, Dr. Hance, A. Ernst, F. E. Kitchener, W. P. Hiern, R. Tucker, Prof. Thiselton Dyer, J. Britten, Dr. Braithwaite, Prof. A. Gray, Prof. M. A. Lawson, etc.

Fig 1.

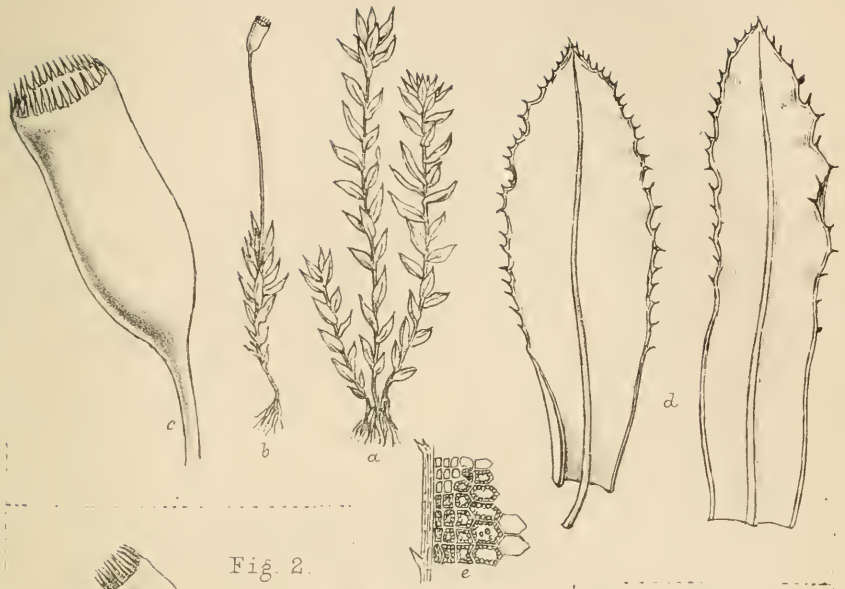


Fig. 2.

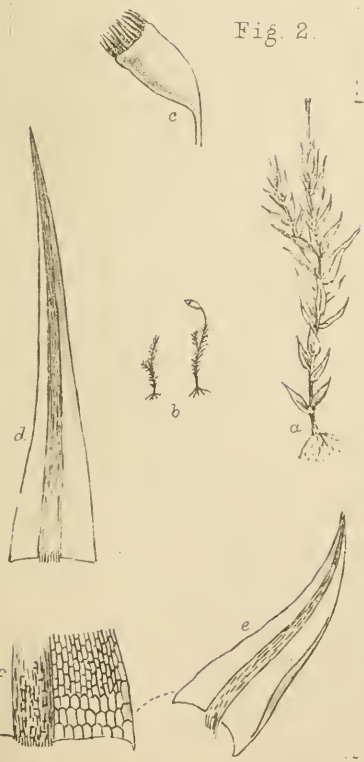


Fig. 3.

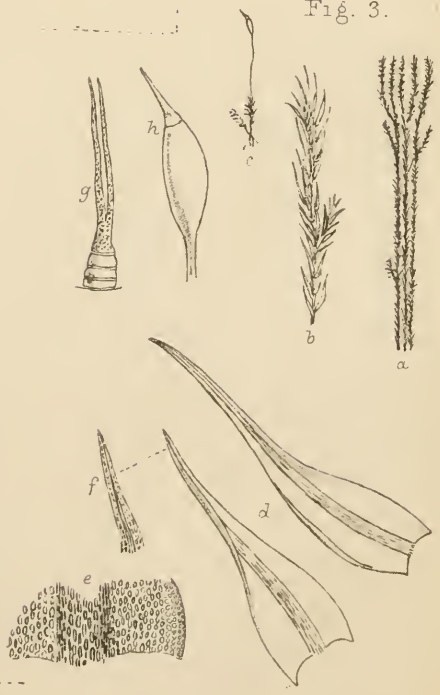


Fig. 1

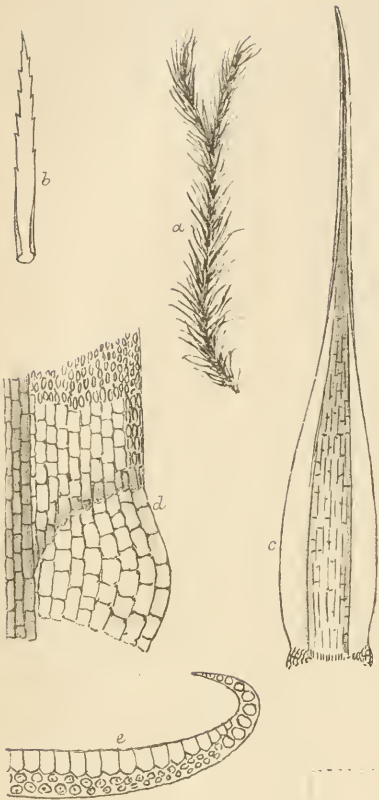


Fig. 2

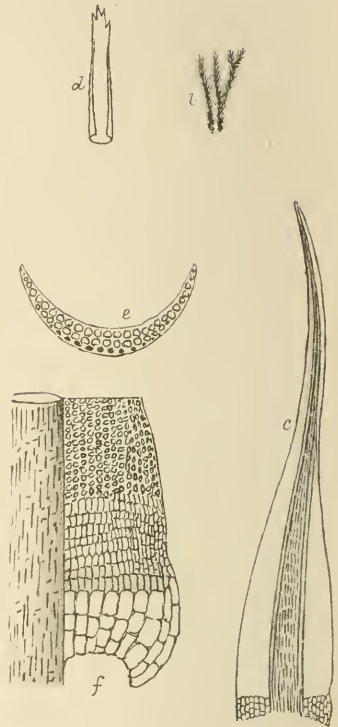
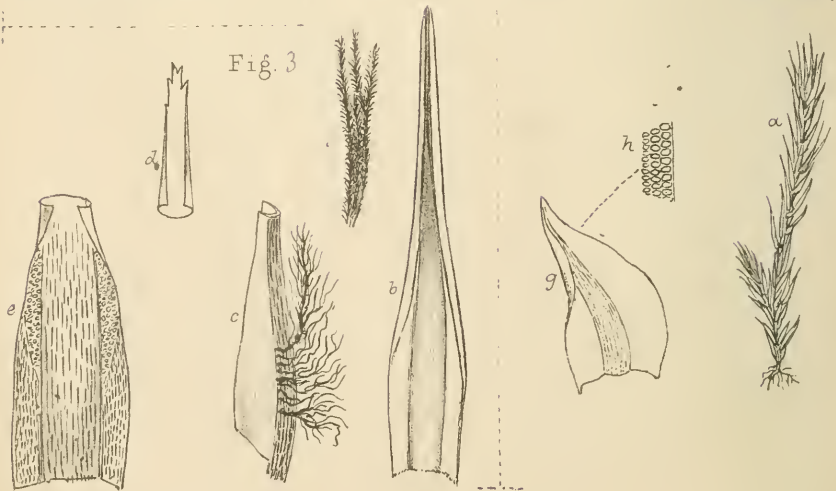


Fig. 3



Original Articles.

ON THE THAMES-SIDE BRASSICA.

BY HEWETT C. WATSON.

In the 'Journal of Botany' for December, 1869 (Vol. VII. p. 346), I endeavoured to show that this plant is the wild or semi-wild state of the common Turnip, and neither Swede nor Rape. Having this year, 1870, dried numerous examples of it for distribution through the Exchange Club, I ask permission to add some supplementary notes on it; this time directing attention to the distinctive characters of the plant itself, rather than to a correction of the misnomers of it in books. My examples have been selected in order to illustrate three successive stages in growth, and an account of these three states will most readily explain the peculiar characters of the plant, and prove its true affinities.

1. The autumn and winter state:—These specimens are the young plants produced from seeds shed naturally in the late summer or early autumn months immediately preceding. Their leaves are hispid and green, not at all glaucous, and they constitute a loose crown of radical leaves, not produced into a stem. This state continues through the winter into the following spring; the very earliest leaves gradually decaying away.

2. The spring state:—Earlier or later, varying with the character of the season, the rough green leaves of autumn and winter are succeeded by others which differ from them in being nearly glabrous and somewhat glaucous. These are the proper stem-leaves; but the change comes so gradually that it is not always easy to decide where the rough green root or crown leaves cease and the smooth glaucous stem-leaves begin; some of them showing an intermediate or transition character, neither quite glabrous nor quite glaucous.

3. The summer state:—This is the flowering stage, when the rough green root-leaves have all disappeared, usually before a single flower of the corymb is open; and the more weakly plants often lose also their lower stem-leaves before the flowers are open. The upper stem-leaves are now smooth, almost entire, and more decidedly glaucous; still, not so truly glaucous as those of the Swede or most varieties of the Cabbage.

It will be evident by this account, that the whole growth of the plant, from seedling to ripe seed again, occurs within a single year of time, although it occurs in portions of two different solar years, say, the three or four latter months of one year, and the first seven or eight months of the succeeding year. I have not actually tried the experiment, but cannot feel any doubt that the whole growing-time might be reduced to six or seven months by collecting the seed in early autumn and not sowing it until the succeeding spring. In the latter case it would clearly be an annual; its biennial character arising only from gradually arrested growth during our winter months.

Now, as to the affinity of this Thames-side *Brassica* with the common Turnip, sown as a crop in our gardens and fields. In this year of 1870, at several different dates from February to May, I brought home the living plants from the banks of the Thames and situations adjacent, in order to compare these with beds of garden Turnips at like stages of growth. On a fair general comparison, I have found no differences between them, such as could be expressed in the technical language of botany, beyond the one obvious difference between the enlarged succulent root of the cultivated Turnip, set against the slender fibrous root of that from the Thames. There are, indeed, several varieties of the cultivated Turnip, which practical gardeners and farmers can distinguish from each other; and so are there slight variations to be seen among the wild examples, which do not vitiate the general similarity. I had made like comparisons occasionally in years past, but specially repeated them this year in order to make assurance doubly sure before again asserting my own view, that the Thames-side *Brassica* is simply a wild state of the common Turnip, whether an original wild stock or simply become wild.

Next, as to the difference between the Turnip and the Swede, the latter rather inconveniently and misleadingly called 'Turnip' also. These differences, once fairly understood, are sufficiently distinctive; and I regard Turnip and Swede to be species about as distinct from each other as are Swede and Cabbage. The leaves are too variable in form to afford a clear distinction, but in general those of the Swede are less lyrate and less spreading than are those of the Turnip. The leaves of the Swede are all of them glaucous,—more truly glaucous at all ages of the plant than even the stem-leaves of the Turnip: the upper surfaces of the former are much less rough or bristly than those

of the latter. The inflorescence of the Turnip may be called truly corymbose, while that of the Swede is racemously corymbose, that is, the open flowers of the Turnip are usually close together at the top of the flowering stem, out-topping the unopened buds, while those of the Swede are more loosely scattered, few or none of them rising above the unopened buds. This is not quite a constant difference, though exceptions to it are rarely seen according to my own opportunities for observation. The most obvious and constant distinction is found in the size and colour of the flowers, those of the Swede being conspicuously larger and of a pale orange colour inclining to buff, quite different from the bright buttercup-yellow of the Turnip flowers, whether of the wild or any of the cultivated varieties ever seen by myself.

What is the proper specific name for the *Brassica* of the Thames side? The plant itself is neither Rape (*Napus*) nor Swede. The choice of names rests between Turnip (*Rapa*) and Navew (*campestris*), as described in 'English Flora' and figured in 'English Botany,' nos. 2176 and 2234. I should myself have preferred to use *Rapa*, but an objection to this name is found in the fact that most botanists apply it specially to the cultivated varieties with the enlarged succulent root, thus leaving *campestris* only for any wild state with the slender root. The *campestris*, as figured in 'English Botany,' n. 2234, does not represent the *Brassica* of the Thames so well as the figure of *Rapa* does, n. 2176; the more strictly corymbose inflorescence of the latter figure corresponding with that of the Thames plant. Moreover, Mr. Archer Briggs has sent me specimens of an apparently annual plant from the turnip-fields of South Devon, which agree better with that figure of the Navew or *campestris* in 'English Botany,' especially by their more scattered flowers and hispid stems. But Mr. Briggs expressly says that their early radical leaves are green, not glaucous. Supposing the South Devon plants to be truly the wild Navew, and the Thames plant to be as truly the wild Turnip, they would seem to require distinct varietal names, if both are treated as forms of *campestris*. The question remains open, however, whether the Devon plants are simply the annual form, and the Thames plants are the sub-biennial form of the same thing.

As the 'English Flora' of Smith is now passing into the category of old works not usually found in the hands of young botanists of the present time, it may not be amiss to quote a few sentences which bear

on this discussion:—"The Swedish Turnip, not wild in Britain, is surely a distinct species from this and the following,"—namely, from *Rapa* and *campestris*. . . . "Most botanists, both British and foreign, have found a difficulty in distinguishing this plant (*campestris*) from *B. Napus*, and the confusion of their synonyms is inextricable. *B. campestris* is perhaps the most certainly wild of all our three species now described."

Perhaps Smith himself has contributed to the subsequent confusion by describing the leaves of his *campestris* as being "all somewhat glaucous." He describes the situations of growth of his *campestris* on the authority of Ray and Edward Forster, not as an eye-witness himself; and there is thus a ground for doubt whether he had ever seen the very earliest or lowest leaves of it in a fresh condition, so as to judge of their tint correctly. At any rate, in describing *campestris* as the "most certainly wild," and in omitting the Swede as "not wild in Britain," Smith showed that he held the *Naveu* and the *Swede* to be species apart. In the third edition of 'English Botany' they are treated as one and the same, which I maintain to be a mistake.

JOTTINGS FROM A BOTANICAL NOTE-BOOK.

BY A. ERNST, ESQ.

1. *PILEA MOLLIS*, Wedd. Mon. Urt. 251; De Cand. Prodr. xvi. p. 1, 151. n. 121.—Generally a diœcious plant; but I have lately found three monœcious specimens, with capitate male flowers in the upper axils, and ramified female cymes in the lower axils, so that the genus *Pilea* may be added to those mentioned by Dr. Masters in his 'Vegetable Teratology,' p. 194.

2. FERTILIZATION OF *CATTLEYA MOSSIÆ*.—This beautiful orchid is one of the most common plants in our flora, but I never had been able to discover what insects take an active part in its fertilization. In the month of May last I was so fortunate as to see that a species of *Euglossa*, a hymenopterous insect, is at least one of the principal fertilizers. I caught about a dozen, ten of which bore the pollinia of this our "May-flower" on the upper part of the thorax.

3. *FLACOURTIA SAPIDA*, Roxb. (?) IN CARACAS.—In two or three gardens in Caracas a species of *Flacourtia* is cultivated which I

believe to be the *F. sapida*, Roxb. The tree, however, has *no spines at all*. Is this want, perhaps the effect of cultivation, and has it been noticed elsewhere, too? I do not think the species is strictly dioecious, but polygamous. I never saw any but female flowers, which nevertheless produce an abundance of fruit, though there is no male specimen known to exist in Caracas. The fruit is edible, of a deep vinous colour when ripe, but must be bruised for half a minute between the fingers before it becomes palatable. It is called *guinda* in Caracas, and was introduced by General J. A. Paez. (*Guinda* [from *guindar*, to hang down] is originally the Spanish name of the fruit of *Cerasus caproniana*, De Cand.)

4. *PLATYMISCIUM POLYSTACHIUM*, *Benth.*; Seem. Bot. Her. 111. t. xxi. "Roble blanco," *i. e.* White Oak.—I have seen specimens which agree in every particular with Bentham's short description, and the fine plate in the 'Botany of the Herald.' But others, from the immediate neighbourhood of Caracas, appear to be distinct. The leaves are even, in flowering specimens much larger, 8–10 centim. long, and 5–6 broad, and the standard is orbiculate, but distinctly notched at its apex. The fruit is very thin and papery, 8 centim. long, 2½ broad; the seed 3–4 centim. by one. The number of racemes, too, is not so large. If a distinct species, it might be called *P. emarginatum*.

5. *PASSIFLORA* (Sect. *Granadilla*) *MULTIFORMIS*, *Jacq.*; De Cand. Prodr. iii. 332. n. 123.—As this species hitherto has not yet been fully described, I think the following description of it will prove to be of interest:—Caule scandente tereti, foliis glabris subtus rugosis, basi cordatis simplicibus bi- et trilobatis (superioribus etiam integris) acuminatis minutissime serratis, margine basali inter lobulos macula glandulosa notata, petiolis (3 centim. long.) infra medium biglandulosis glandulis sessilibus suboppositis; stipulis linearibus semipollicaribus hinc integris illinc glanduloso-dentatis dentibus 3–4, in caulibus ramisque supra petiolum glandula conica obtusa permagna; cirrhis simplicibus axillaribus; floribus speciosis axillaribus solitariis, involucri foliolis magnis (6–7 centim. long., 3–4 lat.) ovatis acuminatis membranaceis intus viridibus, extus rosco-venosis; calyce carnoso, sepalis infra apicem extus mucronatis (mucrone 8 millim. long.), ibidem viridibus, intus rubro maculatis; petalis sepalis similibus; corona simplicis, filamentis pluriserialibus rubro-maculatis bicentimetralibus; filamentis et pistillo viridibus minute rubro maculatis; antheris luteis, centim.

longis; ovario glabro; fructum maturum adhuc non vidi. I gathered flowering specimens of this very fine plant in the month of May, in the Quebrada Tacagua, in about 400 metres above the level of the sea.

6. TWO NEW SPECIES OF *CISSUS*.—Many species of the genus *Cissus* appear to be very little known, probably on account of the generally bad condition of specimens in herbaria. They are, indeed, troublesome things to dry, breaking up nearly always in a great many small and worthless fragments. The following two, which I cannot identify with any of those described in the botanical works I have access to, will perhaps prove to be new to science:—

Cissus sexangularis, n. sp., caulibus ramisque sexangularibus alatis, alis undatis; foliis ternatis, petiolis et ramis colore vinoso pilosis, foliolo intermedio æquilatero basi attenuato apice breviter acuminato margine crispo crenato-dentato dense ciliato, foliolis lateralibus valde inæquilateris, omnibus supra saturate viridibus pilosulis, subter pallidioribus nervis pilosis, pilis rufis; inflorescentiis oppositifoliis cymas umbellatas formantibus, pedunculis sexangularibus pilis rubris subasperis, pedicellis subbrevibus (5 millim. long.); floribus rubris, disco pistilloque albo-luteis, fructu (immaturo) ovoideo pistillo terminali coronato 1-loculari, loculo 1-spermo viridi, pedicello fructifero reflexo. Petioli foliorum superiorum 2 centim., folia 4 centim. et quod excurrit, inferiora duplo majora. Species alte scandens, pulcherrima. Florentem inveni mense Junio in Quebrada Tacagua (alt. 300 metr.) prope Caracas.

Cissus paucidentata, n. sp.; caule ramisque teretibus, ad foliorum ortum tumescentibus, internodiis brevibus (4 centim.) foliis simplicibus cordatis obtuse acuminatis (3 centim. long; 2 ad 3 lat.) grosse et remote dentatis, dentes antrorsum inflexi apice subtiliter mucronulati, 5 ad 6 ab utroque latere limbi; cymis umbellatis oppositifoliis (diam. circiter 3 centim.) pedicellis brevibus (2–3 millim.); floribus parvis, viridibus. Tota planta glauca. Cum præcedenti florentem mense Junio observavi.

7. *CISSUS SALUTARIS*, H.B.K. Nov. Gen. et Sp. pl. v. 225.—“Bejuco de sapo” incol. (*i. e.* Toad’s Creeper). The root is a large, woody tuber, used in refreshing poultices on inflamed or suppurating parts of the skin. There is some misstatement in Kunth’s description of the petioles, it ought to be “Petiolo communi pollicaris et quod excurrit, petiolulo folii intermedii semipollicaris, foliis lateralibus sessi-

libus vel subsessilibus." I have further to add, "Stipulæ ad basin petioli arete adpressæ, obtusæ, fere rectangulares, apice pilosæ vel ciliatæ, 3 lineas longæ, unam latæ."

8. *ASPIDOSPERMA VARGASII*, De Cand. Prodr. viii. 399.—The leaves and flowers are very well described; the fruit was unknown to De Candolle. It is an ovate, unequal-sided follicle, $2\frac{1}{2}$ inches long, $1\frac{1}{2}$ broad, greyish, covered with numerous white spots. It contains from 6 to 8 seeds; these are ovate, $1\frac{1}{2}$ inches long, and 1 inch broad. The follicle looks like a ham *in miniature*.

9. *POGONOPUS OTTONIS*, *Klotzsch*; Walp. Ann. v. 124.—The leaves are not exactly obovate; I should prefer ovate-lanceolate; the under side is pale green, and densely covered with short hairs. The stellate hairs, described by Klotzsch, near the base of the large petaloid sepal, are a good character, but appear to be of a very fugacious existence. I have seen many flowers with two petaloid sepals, one, however, being always smaller, a mere attempt at petaloid outgrowth. The venation of the enlarged calycine segment is different from that of the true petals, the former being distinctly 3-nerved, the latter with one principal nerve. (See also Masters, *Veget. Teratology*, p. 249.) The genus *Pogonopus* appears to be established on rather slight differences from the old genus *Calycophyllum*, of which it might form a section, distinguished by the hairy basis of the filaments.

10. Under the vernacular name *Amargoso*, the exceedingly bitter bark of a small tree is used in popular medicine against fever and similar ailments. It was but lately that I got flowers of the plant, which proved to be a species of *Vallesia*. It is, however, distinct from those mentioned in the *Prodromus*, viii. 348, 349. I find no other species in Walpers, nor in Karsten, and believe it therefore to be a new one, which I call—

Vallesia hypoglanca, caule arborescente, ligno durissimo, ramis cortice albo-punctato, amarissimo. Foliis alternis, in apice ramulorum interdum oppositis vel suboppositis, petiolatis (petiolo 7–8 millim. long., supra canaliculato); limbo ovato-oblongo, epunctato, basi subattenuato, margine integerrimo, apice obtuso, 8–9 centim. longo, 3–4 lato, supra obscure viridi, subtus glauco (*inde nomen specificum*), nervatione dense reticulata subtus prominente. Inflorescentiis racemosis oppositifoliis vel terminalibus, ramis rectangulare patentibus bracteis suffultis. Floribus glomeratis, sessi-

libus, brevibus (5-6 millim. longis); calyce æstivatione quincunciali, millimetro cum dimidio longo; corolla dextrorsum convoluta, intus pilosa, viridescente. Cætera ut in genere. Fructum non vidi. This species may be of some pharmaceutical interest; it is known that the Pareira bark is referred to *Vallesia punctata*, Spr. (Rosenthal, Syn. Plant. Diaphoricarum, 366), and in Brazil this species is called "Pao pereiro, Uva assu, Camará de Bibro, Camará do mato, Pao forquilha, Canudo amargoso" (Colmeiro, 'Curso de Botánica,' ii. 478).* Pereira mentions Pareira bark (Mat. Med. iii. ed. ii. 2159) as "belonging to *Strychnaceæ*, and before noticed;" but I have not been able to discover where it is noticed. I have collected a considerable quantity of bark from our Caracas species, which I will forward with some other indigenous remedies to the Museum of the Pharmaceutical Society of Great Britain, where it may be studied and tried.

ON *BROMUS ASPER*.

BY HENRY TRIMEN, M.B., F.L.S.

Murray gave this name, in 1770 (Prod. Design. Gotting. p. 24), to the plant described by Haller in 1768 from specimens collected in Switzerland and at Göttingen (Hist. Helv. p. 236. n. 1503). The latter cites for it *B. ramosus*, Huds., which name Hudson in 1762 (Fl. Anglica, ed. 1. p. 40) had given to a Grass long known in England, and well distinguished by Ray, Morison, and others.

Linnæus,† in his 'Mantissa,' i. p. 34 (1767), applied the same name, *B. ramosus*, to an entirely different plant (now *Brachypodium ramosum*, R. and S.); and, probably from a mistaken deference to the great naturalist, Hudson, in the second edition of his Flora (1778), abandoned his name *B. ramosus*, and called the British plant *B. nemoralis* (p. 51). Other botanists also gave it various appellations; it is the *B. montanus* of Pollich and Retzius, and the *B. hirsutus* of Curtis;

* The 'Curso de Botánica,' by D. Miguel Colmeiro (2 vols. in 3 parts, Madrid, 1857), is an excellent work, which we recommend to all those taking an interest in vernacular names of South-American plants. Its author is to-day *facile princeps* of botanists in the Iberian peninsula.

† Linnæus appears to have entirely misunderstood the English plant. In 1771 (Mant. ii. 186) he quotes Hudson's name under *B. inermis*, a very different grass; yet he has labelled '*ramosus*' a specimen of *asper* in his herbarium, according to Col. Muuro (Linn. Journal, vi. p. 47).

Solander named it *B. serotinus* in 1773, and, though this name was never published,* it was current for a time in England, and all the older specimens in the Banksian Herbarium are so named.

In 1798, Sir J. E. Smith redescribed all the British *Bromi* (Trans. Linn. Soc. iv. 293), and adopted the name *B. asper*, L., for the present species from the 'Supplementum Plantarum' (1781) of the younger Linnæus, entirely ignoring previous writers, and simply remarking that "Linnæus, by accident, called another *B. ramosus*." But such deference to a great man cannot be allowed to override the rules of priority in nomenclature, which require the adoption of Hudson's first name, *Bromus ramosus*.

The principal synonymy, then, is as follows:—

Bromus ramosus, Huds. Fl. Ang. ed. 1. p. 40 (1762); Linn. Syst. Veg. curâ Murray, ed. 13. p. 102 (1774), *non* Linn. Mant. i. p. 34 (1769).

B. asper, Murray, Prod. Fl. Gott. p. 24 (1770); Linn. fil. Supp. p. 111 (1781); Linn. Syst. Veg. curâ Murray, ed. 14. p. 119 (1784).

B. serotinus, Solander, ms. in Herb. Mus. Brit. ("1773").

B. montanus, Pollich, Palat. i. p. 116 (1776); Retz, Obs. ii. p. 7 (1781).

B. hirsutus, Curt. Fl. Lond. ii. p. 8 (1777).

B. nemoralis, Huds. Fl. Ang. ed. 2. p. 51 (1778).

Two distinguishable forms appear to be included under this species; and attention was first called to this fact, by Beneken describing, under the name of *B. serotinus*, in the 'Botanische Zeitung' for 1845, p. 724, what he considered a new species, found near Naumburg. It is singular that he should have bestowed on it a name which had previously been in use in this country for the same plant. Beneken distinguishes his species from what he thinks ordinary *B. asper*, Murr., by its later period (two or three weeks) of flowering, by its less hairy leaves, all the upper sheaths of which have rough hairs, by the branches of the lowest semiverticils being never more than two and divaricate, and by its glabrous glumes. "*B. asper*" of the usual form has a larger though more slender panicle, with from three to six approximated branches at the lowest whorl, one or more of the branches always

* Retzius states, in 1781 (Obs. 2. p. 7), that Dryander sent him a specimen of *Bromus montanus* under the name *B. serotinus*.

bearing but a single spikelet; the lateral nerves of the upper glumes are furnished with cilia, and the sheaths of the upper leaves are glabrous. The spikelets of the latter also have a grey appearance, from the lower pales being hairy up to the very apex.

In the Report of the Botanical Exchange Club for 1867 (Journ. Bot. Vol. VI. p. 71) the curators state that Herr von Uechtritz, of Breslau, had referred to Beneken's species specimens sent to him from Derbyshire, and that plants collected in North Yorkshire are the same, but it is hinted that the characters distinguishing the two plants are not very satisfactory ones, nor do they work well in practice. An examination of a larger series of specimens, has, however, shown that while the characters taken from the leaves are of little value, differences in the number and arrangement of the panicle branches seem to hold good. As stated in this volume (p. 191), I have been unable to find any British specimens which would not by panicle-characters have to be referred to Beneken's *B. serotinus*, with the exception of a plant in Sowerby's herbarium, labelled "near the 'Plough,' Camberwell." This has a very full panicle, and there are five branches in the lowest verticil; the spikelets are smaller than in the ordinary English plant, though containing on an average more florets; in short, it has less of the lax aspect of *Festuca gigantea*, and more the look of a large *Serrafalcus*. It agrees with the plant from Belfort in Billot's Exsicc. n. 889, called *B. asper*, Murr., and with specimens from the south of France and from Tyrol in the British Museum herbarium. All the other European specimens I have had an opportunity of examining, appear to be *B. serotinus*, which will probably be found to be the commoner plant throughout Europe; from a note in the Bulletin of the Belgian Botanical Society for 1870 (p. 149), it would seem to be the usual form in Belgium. Sowerby's Camberwell plant may have been an introduction.

Mr. H. C. Watson has, in his 'Compendium' (p. 450), very rightly condemned the practice, not unfrequent among critical botanists, of restricting to a rarer segregate the name of the old aggregate species, whilst the far commoner, and therefore the type form, receives a new name, and is thought to be a novelty. It is of course possible that a name may have been too widely applied, but in cases where all the segregates are covered by the description of the aggregate, the original name ought to be retained for the most usual variety. Now in the

case before us, there is nothing to show that either Hudson or Murray (or rather Haller) had specially in view either segregate, in their definitions of *B. ramosus* and *B. asper*, and if, as seems probable, the *B. serotinus* of Beneken is the most usual form, in fact the type, it is for the rarer segregate that a varietal name is required.

My object has been to direct attention to the *B. serotinus* of Beneken, and the *B. asper* of Billot's 'Exsiccata.' Are they distinct? and have we the latter in this country? To determine the first question fresh specimens are necessary; characters derived from the rachis are only beginning to attract the attention of students of Grasses, and should they prove to be of the value which, from the papers of Dumortier and Crepin, seems likely, they will hardly be available in herbarium specimens.

REVISION OF THE NATURAL ORDER BIGNONIACEÆ.

BY BERTHOLD SEEMANN, PH.D., F.L.S., ETC.

(Continued from page 341.)

DOLICHANDRONE (gen. nov. Jacarandearum), Seem. in Journ. of Botany, 1863, p. 226. Calyx spathaceus, longitudinaliter fissus, acutus, integerrimus. Corolla subinfundibuliformis, tubo elongato, limbo subæquali 5-fido, lobis dentatis v. fimbriato-crispis, æstivatione imbricatis. Stamina 4, didynama, cum quinto sterili, fauce corollæ inserta. Antheræ glabræ, 2-loculares, loculis discretis. Stylus elongatus; stigma 2-lamellatum. Ovarium sessile, ∞-ovulatum, ovulis 12-seriatim dispositis. Discus glandulosus, integer. Capsula subcylindracea v. siliquæformis compressa, loculicido-dehiscens, ex septo valvis contrario lateraliter dilatato spurie 4-ocularis. Semina ∞, ad quodque septi latus 2-3-serialia, suberosa, membranaceo-alata v. alis crassiusculis opacis, septo applicato, nec (ut in *Stereospermo*) in foveis immersa, superiora inferioribus incumbunt.—Arbores elatæ v. mediocres in Asia et Australia tropica indigena, foliis oppositis verticillatisve (v. in pl. jun. et ram. infer. alternis), imparipinnatis v. simplicibus, foliolis varie ellipticis v. rarissime filiformibus, integerrimis v. denticulatis; floribus terminalibus racemosis v. paniculatis, corollis albis, quandoque fragrantibus.—*Dolichandra*, sect. B. *Dolichandrone*, Fenzl, in Regenb. Denkschrift. iii. p. 113.

Allied to *Jacaranda* in the nature of the fruit, but, by the septum

being much laterally dilated, the capsule becomes 4-celled, and the septum *appears* to run parallel to the valves, while in reality it is transverse.

1. *D. Rheedii*, Seem. ; arborea ; foliis calycibus ovaris capsulaque minute lepidotis, demum glabris ; foliis oppositis, pinnatis, 3-4-jugis, foliolis petiolulatis, ovali-lanceolatis, acuminatis, integerrimis, basi obliquis, axillis nervorum barbatis ; racemis terminalibus, 2-6-floris ; calyce deciduo, nervis obscuris ; corollæ (albæ) utrinque glabræ tubo gracili (4-5 unc. long.) calycem triplo longiore, lobis fimbriato-crispis ; capsula subcylindracea, acuta, recta, (1-2 ped. long.) glabra ; seminum alis crassiusculis, opacis, truncatis (v. s. sp.).—*Spathodea Rheedii*, Wall. Cat. n. 6516, non Spreng. ; De Cand. Prodr. ix. p. 206 ; Wight, Icon. iv. t. 1339. *S. Diepenhorsti*, Miq. Fl. Ned. Ind. ii. p. 754. *S. ? Loureiriana*, De Cand. Prodr. ix. p. 209 ? *S. longiflora*, Vent. Choix, n. 40 in obs. *Bignonia longissima*, Lour. Fl. Cochinch. p. 380 ? *B. longiflora*, Willd. Spec. iii. p. 304. *Nir Pongelion*, Rheede, Mal. vi. p. 53. t. 29. Nomen vernac. Mal. "Koeda-Koeda," teste Miq.—Geog. Distr. Malabar (teste Rheede, Icon.) ; Ins. Timor (Exp. Baud. teste De Cand.) ; Rawack (Gaudichaud, teste De Cand.) ; Mergui (Griffith !, Parrish ! n. 253) ; Labuan (Mottley !) ; Malacca (Griffith !) ; Sumatra (Diepenhorst, teste Miq.) ; Cochinchina (teste Lour.) ; Nicobar Ins. (Soc. Unit. Fratr. ! in Mus. Brit.) ; Java (Sir Joseph Banks !, Horsfield ! in Herb. Brit. Mus.) ; Point de Galle, Ceylon (Champion ! in Herb. Lindl.) ; New Caledonia (Vieillard, n. 1001) ; Sunderbund (Wallich ! n. 813).

Bignonia longissima of Loureiro, of which there is no authentic specimen amongst Loureiro's collection at the British Museum ("foliis alternis ; floribus solitariis, longissimis ; calyce nullo"), may have been described from a young, simple-leaved state of *D. Rheedii*, in which the deciduous calyx (peculiar to this species) had already dropped off. The height assigned to his plant by Loureiro (9 feet), and the *alternate* leaves ascribed to it (a usual state in young *Bignoniaceæ*), may be quoted in favour of this conjecture. All other characters assigned by Loureiro to his plant fully agree with those of *D. Rheedii* ; moreover, there is no other Asiatic *Bignoniacea* known with which they do agree.

2. *D. Lawii*, Seem. ; ramulis puberulis ; foliis imparipinnatis, 2-jugis, foliolis petiolulatis obovatis acuminatis vel obtusis integerrimis, basi

cuneatis subobliquis minute lepidotis; petiolis inter petiolulos axillisque foliolorum barbatis; racemis terminalibus 2-6-floris; calyce minute lepidoto, nervo medio prominenti, cæteris obscuris; corolla (alba?) extus intusve glabra, tubo gracili (1-1½ unc. long.), lobis fimbriato-crispis, filamentis abbreviatis (1 lin. long.); capsula (immatur.) minutissime lepidota (v. s. sp.).—Concan (Law! in Herb. Hook.).

At first I was somewhat doubtful whether this might not be a form of *D. Rheedii*, to which it is closely allied, but none of the seventeen specimens preserved in the Hookerian Herbarium show any sign of transition to the genuine *D. Rheedii*; and, moreover, they have all a uniform look. *D. Lowii* (so termed in honour of its discoverer) is smaller in every part than *D. Rheedii*, and the filaments are very short, scarcely 1 line. The entire leaves (including petiole) are from 3-3½ inches long; the uppermost leaflet is the largest, and 1-1½ inches long and $\frac{3}{4}$ of an inch broad.

3. *D. falcata*, Seem.; arborea; ramulis petiolis nervis foliolorum subtus calycibusque rufo-hirtellis; foliis oppositis, pinnatis, 2-3-jugis cum impari, foliolis (impari except.) ovali-orbiculatis integerrimis; racemis terminalibus paucifloris; calyce obscure multinervio; corollæ (albæ) utrinque glabræ tubo gracili (1 unc. long.), lobis obovato-oblongis undulato-crispis; ovario glabro; capsula siliquosa, compressa, arcuata (12-18 unc. long. 9 lin. lat.), glabra. (v. s. sp.).—*Spathodea falcata*, Wall. Cat. n. 6517; De Cand. Prod. ix. p. 206, excl. syn. Linn. et Sprengl. *Bignonia spathacea*, Roxb. Fl. Ind. iii. p. 103; Fl. Coromand. ii. t. 144. *Bignonia falcata*, Kœnig, mss. in Herb. Mus. Brit. Nomen vernaculum Telingianum, "Woody," teste Roxb.—Coromandel Coast (Roxburgh! Russel!), Dovenaoor (Wallich! Cat. n. 6517).

Closely allied to *D. crispa*, Seem., and chiefly distinguished by the form of the leaves, and the much compressed, not subcylindrical fruit. By an error of drawing in Roxburgh's figure, the lobes of the corolla are quite entire; but an examination of specimens shows them to be undulato-crispate, as in allied species.

4. *D. crispa*, Seem.; arborea; ramulis foliis racemisque pubescenti-velutinis; foliis oppositis, pinnatis, 2-5-jugis cum impari, foliolis petiolulatis ovali-ellipticis vel ellipticis acuminatis integerrimis, basi obliquis; racemis terminalibus 6-8-floris; calyce puberulo, demum glabro; corollæ

(albæ fragrantis) tubo gracili (2 unc. long.), lobis fimbriato-crispis; capsula subcylindræa, arcuata (12–15 unc. long.), glabra; septa spongiosa (v. s. sp.).—*Spathodea crispa*, Wall. Cat. n. 6515; De Cand. Prod. ix. p. 206; Bureau, Monog. Bign. t. 27. *S. arcuata*, Wight, Icon. iv. t. 1340; Walp. Ann. iii. p. 89. *S. atrovirens*, Sprengl. Syst. ii. p. 835. *S. Rheedii*, Sprengl. Syst. ii. p. 835. *S. longiflora*, Pers. Synop. ii. p. 123, excl. syn. omnib. *Bignonia spathacea*, Linn. fil. Suppl. 283, et Linn. Herb. propr. *B. crispa*, Ham. Buch. in Roxb. Fl. Ind. iii. p. 103. *B. atrovirens*, Roth, Nov. Spec. p. 284. Nomen vernaculum Tamulense “*Will-Padri*,” teste Kœnig in Herb. Mus. Brit.—Mysore (Wallich! n. 6515), Ceylon, locis sylvaticis desertis (Kœnig! Herb. Mus. Brit. et Sir J. E. Smith).

5. *D. heterophylla*, Seem.; arborea, glabra; foliis oppositis vel inferioribus alternis, aliis simplicibus lanceolato-linearibus vel subspathulatis integerrimis vel bifidis, aliis pinnatis 2–4-jugis cum impari, foliis petiolulatis lineari-lanceolatis lanceolatisve attenuatis integerrimis nervis utrinque prominulis; racemis terminalibus 12–18-floris, quandoque paniculatis; pedicellis elongatis, bracteolatis; calyce glanduloso; corollæ (albæ?) tubo gracili calycem duplo longiore, lobis fimbriato-crispis; capsula subcylindræo-subarcuata (8–10 unc. long., $\frac{1}{2}$ unc. lat.), glabra (v. s. sp.).—*Spathodea heterophylla*, R. Brown, Prod. p. 472; De Cand. Prod. ix. p. 207; Benth. Fl. Austr. iv. p. 538. *S. (?) alternifolia*, R. Brown, Prod. p. 472; De Cand. Prod. ix. p. 209; Benth. l. c.—North coast of New Holland (R. Brown! in Herb. Mus. Brit.), Upper Victoria River (F. Müller!), Burdekin River (F. Müller!), Careening Bay. (A. Cunningham! in Herb. Hook.)

The most developed form of this species is that collected at Careening Bay. It has opposite imparipinnate leaves, and occasionally paucicled flowers. Less developed are those gathered by R. Brown and F. von Müller, the leaves of which are sometimes alternate and simple, and the flowers merely racemose. I look upon Brown’s *Spathodea alternifolia* (of which there is no authentic specimen) as identical with this species, the *alternate* leaves being an indication that the specimen upon which it was founded was that of a young or undeveloped plant, and the form of the leaves insisted upon as character is being met with in *Spathodea heterophylla*. I have adopted the name of “*heterophylla*” in preference to that of “*alternifolia*,” as the former best expresses a prominent feature (the extreme variation to which the leaves

are subject), whilst the latter merely indicates a character peculiar to most young *Bignoniaceæ* (that of having alternate leaves). The largest leaves are 12 inches long, the largest leaflets $3\frac{1}{2}$ inches long, 1 inch broad, whilst the smallest leaflets measure only $\frac{1}{2}$ inch in length, and $1\frac{1}{2}$ line in breadth.

6. *D. filiformis*, Seem.; F. Müll. Frag. Aust. iv. 149; arborea, glabra; foliis irregulariter ternato-verticillatis, pinnatis, 1-3-jugis cum impari; petiolis foliisque filiformibus; racemis terminalibus paucifloris; pedicellis elongatis ($1\frac{1}{2}$ -2 unc. long.); calyce eglanduloso; corollæ (albæ?) glandulosæ tubo gracili calycem duplo triplove longiore, lobis undulato-dentatis; ovario glabro; capsula subcylindraceo-arcuata (8-10 unc. long., $\frac{1}{2}$ unc. lat.), glabra (v. s. sp.).—*Spathodea? filiformis*, De Cand. Prodr. ix. p. 209; Benth. Fl. Aust. iv. p. 539. *Stereospermum filiforme*, De Cand. Rev. in Bibl. Univ. Oct. 1838, sine descript. *Bignonia filiformis*, A. Cunn. in Herb. Hook.—Copeland Island, North Coast of New Holland (A. Cunningham! in Herb. Hook.); Victoria River (F. Müller! in Herb. Hook.).

Largest leaflets 10-12 inches long.

7. *D. serrulata*, Seem.; arborea; glabra, foliis oppositis, pinnatis, 2-4-jugis cum impari, foliolis (impari except.) subsessilibus obovatis brevi-acuminatis basi cuneatis obliquis integerrimis, vel hinc inde grosse serratis; floribus . . . ; capsula siliquæformi, compressa, glabra, (2 ped. long.), seminibus biserialibus, alis pellucidis (v. s. sp.).—*Spathodea serrulata*, De Cand. Prodr. ix. p. 206. *Bignonia serrulata*, Wall. Cat. n. 6505 A. *B. (Spathodea) lata*, Wall. Cat. n. 6505; De Cand. Prodr. ix. p. 171. *Stereospermum serrulatum*, De Cand. Rev. Bign.—Geogr. Distr. Banks of the Irawaddy (Wallich! Cat. n. 6505); Stony Hills, Central India (Edgeworth! in Herb. Benth.).

SHORT NOTES.

ALYSSUM INCANUM, L.—Has any botanist observed this plant in the clover-fields of England of late years? In the autumn of 1870, I found it by scores in two fields of clover in Surrey, a dozen miles apart. The plants had been cut off at the first mowing, but they had branched out again, and had conspicuously outgrown the clover, which was thin and short for the second mowing, through the unusual dryness of the

summer, and left longer uncut. A single example of it was picked in July of this year, near Marlborough College, Wilts; whether solitary or not there, cannot now be ascertained. While mentioning this plant in the 'Compendium of the Cybele Britannica,' I knew only of two old records; one so long back as 1766, the other by the late Mr. Borrer some time in the present century. The plant is otherwise known under the names of *Farsetia incana* and *Berteroa incana*.—
HEWETT C. WATSON.

FLORA VECTENSIS.—Having recently gone through some histories of the Isle of Wight, with a view to culling information bearing upon its flora, I wish to put my results on record for the benefit of other readers. I find no notices in Sir Richard Worsley's 'History of the Island' (1781); nor is there any floral matter in Wyndham's 'Picture of the Isle of Wight' (1794). Albin in his history (1795) says, "Almost every species which are to be found in any other part of England are met with here. They abound in quantity as well as in variety; so that persons are annually employed in the summer season to collect those of a medical nature by professional and other gentlemen who visit the island for that purpose" (p. 10). He instances, however, only one plant, the *Satyrion*, or Bee-orchis, found in the environs of Carisbrooke Castle. The only reference to island plants in Tennant's 'Journey to Dover and the Isle of Wight' is in vol. ii. p. 152; "the southern coast in some parts much covered with brushwood; such is Shanklin Chine." In Tomkins' 'Tour to the Isle of Wight' (1796), allusion is made (vol. i. p. 186) to the occurrence of the Bee-orchis (*O. apifera*) in meadows near Carisbrooke, and the cliffs of Freshwater are stated (vol. ii. p. 71) to "abound with Samphire" (*Crithmum maritimum*); but of both these plants we find more copious details in the 'History of the Isle of Wight,' by the Rev. Richard Warner (1795). This writer remarks that a large volume might be devoted to the natural history alone, and gives up a chapter to the botany of the island; he considers, however, "the mere systematic classification of herbs and flowers, without a view to their utility" (as simples, etc.), "to be but a trifling pursuit, an useless waste of time and patience." He mentions, however, but *four* plants, "*Digitalis*, or Foxglove, in almost every hedgebank" (p. 248); *O. apifera* in fields about Carisbrooke Castle (p. 248); with remarks on its "nectarium," "by which appearance, it is probable, a number of

depredators, who would otherwise rob the plant of its means of support, are deterred from approaching it." On pages 252, 253, he remarks that *Crithmum maritimum* occurs among the ledges and precipices of the cliffs, and gives a description of the gathering of it. It seems that in his days "some little fraud was practised," and the "purchaser furnished with a bastard kind of plant, by no means so fit for medicinal or culinary purposes as the genuine Samphire. This substituted vegetable is called the *Inula crithmoides*, or Golden Samphire, and gathered with little trouble and no danger on all the sea-beaches in and near the island." The author then proceeds to distinguish between the two plants. Dr. Bromfield remarks ('Flora Vectensis,' p. 254) that perhaps *I. crithmoides* "would be a good and certainly more accessible substitute." The notice in Warner is interesting, as I do not find any earlier record for it (it is given for Hampshire in Ray's Cat. Plant. Angliæ, 1670); and only two localities in the island are given for it by Bromfield, in one of which it is still abundant. In addition to the above phanerogams, Warner gives a few seaweeds and lichens. I have given my earliest records for *C. maritimum* at p. 159, and will now further add that this habitat (Freshwater) is also given in Coles' 'Adam in Eden,' p. 378 (1657). *I. crithmoides* does not find a place as an Island plant either in the 'Flora Vectiana' (1823), or in Dr. Hooker's recent 'Student's Flora,' though given in Watson's 'Cybele Britannica,' and also in the later 'Compendium.' With reference to Mr. Stratton's statement (p. 259) respecting the first notice of *Matthiola incana* as an Island plant, I think he has overlooked the foot-note on p. 26 of the 'Flora Vectiana,' in which Mr. Snooke remarks, "The cliffs from Compton to Freshwater Gate are covered by a *Cheiranthus* not easily accessible, probably *C. sinuatus*." The habitat is not given in Watson's 'New Botanist's Guide' (1835). Whilst on the subject of Vectensian plants, I may here mention that Mr. Britten informs me he has in his herbarium a specimen of *Centunculus minimus*, labelled "Ex herb. C. P. Hobkirk. Wootton, I. of Wight. Rev. A. M. Norman, Aug. 1860." Has the plant lately been found in this spot?—ROBERT TUCKER.

GENTIANA CAMPESTRIS, *L.* (pp. 160, 356).—Mr. Archer Briggs will see, on referring to the remarks I made on the occurrence of this plant in the Isle of Wight, that I have acted on the advice he gives (p. 356); indeed, but few autumns have passed since my discovery

without my searching for the plant in the spot indicated. *G. amarella*, var. β . (Bromfield) occurs rather plentifully on the adjacent down. I have not been in the vicinity in the month of May since the date given at page 160.—ROBERT TUCKER.

Reports.

RECENT ADDITIONS TO OUR MOSS FLORA.—PART III.

BY R. BRAITHWAITE, M.D., F.L.S.

(PLATE CXI.)

DICRANACEÆ.

Campylopus.—Of this fine genus, numbering about 120 species, several have recently been added to our flora, most of them, however, only known in a barren state; as there is also a great general resemblance among them, they present some difficulty to beginners, and I have, therefore, given descriptions of all our species, and append also a table of differential characters, which may be of service.

Hampe and some other bryologists still combine the genus with *Dicranum*, though apart from the fringed calyptra, a peculiar facies stamps the species, indicating a truly natural genus. In several the leaves become falcato-secund, when they occur in dry localities.

* Leaves hoary at point.

† Leaves aurieled at base, with the enlarged alar cells . . . 1. *C. atrovirens*.

†† Leaves not aurieled.

Nerve one-third width of leaf base; hair point short 2. *C. brevipilus*.

Nerve three-quarters width of leaf base; hair point longer 3. *C. introflexus*.

** Leaves unicolorous.

† Leaves aurieled at base.

§ Stems tomentose, with radicles.

Stems tall; leaves longly subulate.

Lamina suddenly narrowed at one-third of length of leaf; upper cells incrassate, elliptic 4. *C. Shawii*.

Lamina gradually narrowed upward; upper thin walled, narrowly rectangular . . . 5. *C. alpinus*.

- Stems short ; leaves shortly subulate.
 Glossy yellow-green, about 12 longitudinal rows of cells in the lamina 6. *C. flexuosus*.
 Dull green, about 16 rows of cells in the lamina 7. *C. paradoxus*.
 §§ Stems free from tomentum.
 Margin of leaf serrulate above 8. *C. setifolius*.
 Margin of leaf entire 9. *C. Schwarzii*.
 †† Leaves not auricled.
 § Stems tomentose.
 Nerve half width of leaf base ; basal cells very large, lax, and hyaline 10. *C. fragilis*.
 Nerve two-thirds width of leaf base ; basal cells small, narrow, and hyaline 11. *C. Schimperii*.
 Nerve one-third width of leaf base ; lamina suddenly narrowed at one-fourth length of leaf 12. *C. pyriformis*.
 §§ Stems not tomentose, very short 13. *C. brevifolius*.

1. *C. atrovirens*, De Not. Syllab. Musc. Ital. n. 298 (1838).—*Dicranum atr.* C. Müll. Synop. vol. i. p. 414. *D. flexuosum*, γ . *piliferum*, Turner, Musc. Hib. p. 74 (1804). *D. flexuosum*, β . *nigro-viride*, Hook. and Tay. Musc. Brit. *C. longipilus*, Bridel, Bry. Univ. vol. i. p. 477, *pro parte* ; Wils. Bry. Brit. ; Schpr. Musc. Eur. Nov. fasc. 1 and 2.—In very densely matted tufts, often of great extent, 1–3 in. high, rufescent, yellowish-green above, becoming brown below, and black at base. Stem erect or ascending, dichotomous, with a few radicles at base of innovations. Lower leaves of stem and innovations rather lax, shorter, the rest densely crowded, erecto-patent, lanceolate, very longly subulato-setaceous, channelled below, the wings converging above and tubulose. Nerve continued as a hoary hispid arista of variable length, channelled at back, one-third width of leaf-base, of 4 or 3 strata of narrow cells, those of anterior layer hyaline, the rest narrower and chlorophyllose. Cells of auricles dilated, castaneous, with the central ones colourless, above these subrectangular, the uppermost oblongo-elliptic. Female flowers 2 or 3 at apex of innovations.—Hab. Wet rocks and moorlands in mountain districts. Scotland, Ireland, Wales, North of England. This species and *C. introflexus* have been confounded by all the older authors, but *C. atrovirens* may be easily recognized by its lurid colour and structure of the leaf-base ; occasionally the comal leaves are subsecund.

2. *C. brevipilus*, Br. and Schpr. Bry. Eur.—*D. brevopilum*, C. Müll. Syn. vol. i. p. 412. *C. decipiens* and *Molkenbeeri*, Van der Sande-Lacoste.—In dense broad tufts, cohering only at base, stiff and fragile when dry, glossy yellow-green above, fuscous below. Stems slender, $\frac{3}{4}$ – $1\frac{1}{4}$ in. high, almost free from radicles, fastigiate; the innovations fascicled and often thickened at apex. Leaves erect, appressed when dry, densely crowded, narrowly lanceolate-subulate, very concave and subtubular, the point denticulate at margin and back. Nerve one-third width of leaf-base, and one-quarter of lamina above; smooth at back, extended into a short hair-point, composed of three layers of small cells, the central larger and hyaline. Perichæatial leaves wider, sheathing, suddenly narrowed into a hispid hair, recurved at margin above the base. Areolation lax; basal cells quadrate, hyaline or in part yellowish, those above rhomboidal, flexuose, the marginal ones very narrow; female flower solitary.—Hab. Heathy places. Press-ridge Warren, Sussex, and Matley, New Forest (Mr. Davies). Oake-mere, Cheshire, and Arrau (Mr. Hunt). Glen Prosen (Mr. Ferguson). Strensall Common, York (Mr. Wilson). *C. adustus*, De Not. (Epil. della Briol. Ital. p. 649), appears to be a depauperated variety.

3. *C. introflexus*, Bridel, Mant. Musc. p. 72; Mitten, Journ. Linn. Soc. vol. xii. p. 84.—*Dicranum introflexum*, Hed. Sp. Musc. t. 29 (1801). *C. pilifer*, Brid. Mant. Musc. p. 72. *C. longipilus*, Brid. Bry. Un. vol. i. p. 477, *pro parte*. Br. and Sch. Bry. Eur. vol. i. *C. polytrichoides*, De Not. Syll. Musc. 300 (1838); Schpr. Musc. Eur. Nov. fasc. i. and ii. *C. leucotrichus*, Sullivan, Musc. United States. *D. ericetorum*, Mitt. Journ. Linn. Soc. vol. i. Supp. p. 20.—Tufts dense, sometimes widely extended, stiff when dry, olivaceous, brown below, the innovations yellow-green with hoary tips. Stems $\frac{3}{4}$ to $1\frac{1}{2}$ in. high, sparingly radiculose, dichotomous. Leaves rather densely imbricated, erecto-patent, lanceolato-subulate, channelled; the wings but little incurved, the comal leaves broader and lanceolato-acuminate, all (except the lowest, which are muticous) prolonged into a diaphanous spinuloso-denticulate arista, shorter than the leaf. Nerve occupying three-quarters of limb, lamelluligerous at back, of 4 strata of cells, the upper lax and without chlorophyl. Basal cells hyaline, large and empty, the rest chlorophyllose, gradually becoming obliquely oval and minute, a few fuscous alar cells evident in the comal leaves. Perichæatial leaves oblong, convolute, subulate at apex, with a narrow

excurrent nerve, and nearly all the cells elongate and pellucid. Thecae aggregated on short peduncles, oval, unequal, rough at base, with an obliquely rostrate lid. Calyptra reaching middle of capsule, sparingly fimbriate. Male plant also having the perigonia clustered in a capitulum and thus precisely imitating a *Polytrichum*.—Hab. Dry heaths and stony places, especially near the coast. Cornwall and Jersey. Cromaglow, Killarney (Dr. Carrington). W. of Ireland with falcate leaves (Prof. Barker). Unst, Shetland, and Tigh-na-Bruaich (Mr. Shaw). After consulting the fine series of specimens in the Kew Herbarium, I must concur with Mr. Mitten's reference of this Moss to Hedwig's *D. introflexum*; and at the page quoted (Journ. Linn. Soc. vol. xii. p. 84) ten more species will be found added as synonyms, so greatly does it vary in size (there are specimens from Ascension 4 in. long), glossiness, shades of colour, and also in the direction and length of the white point. It is diffused over the whole southern hemisphere, but the fruit has not been found in Europe.

4. *C. Shawii*, Wilson, ms. (Plate CXI. fig. 1.)—In lax tufts, yellow-green above, blackish-brown below, 1-2 in. high. Stems robust, simple or dichotomous, bearing numerous radicles. Leaves erectopate, straight, rigid, from a somewhat contracted linear base, lanceolate, very longly subulate, suddenly narrowed at one-third their length, the margin becoming involute and thus rendering the subula semitubular, apex acute, with a few minute denticulations. Nerve occupying two-thirds width of base, of three layers of cells, the anterior being large, lax and diaphanous; the two posterior small and chlorophyllose. Cells at basal wings enlarged and lax, reddish brown, except the exterior rows, which are hyaline, above these they are rectangular, but soon become rhomboido-elliptic, forming about twenty-four longitudinal rows.—Hab. Outer Hebrides, 1866 (Mr. Shaw). This fine species has the leaves falcate when growing in dry places.

5. *C. alpinus*, Schpr. Musc. Eur. Nov. fasc. 1 and 2 (1864). *C. intermedius*, Wilson, ms.—Densely cæspitose, 2-3 in. high. Stems erect, repeatedly dichotomous, invested at base of innovations with rufous radicles arising from back of leaf-base. Leaves rather rigid, fragile and deciduous, erect or slightly secund, lowest lanceolate, becoming larger upward and longly subulate, subtubular; the subula sharply or obsoletely serrate. Nerve half width of base, composed of two strata of narrow chlorophyllose cells. Basal auricles very large,

decurrent, their cells orange-brown with the central ones hyaline; above these they are laxer, becoming narrowly hexagono-rectangular and at last quadrate, without chlorophyl, solid and yellowish.—Hab. Moist heaths and rocks. Llanberis (Mr. Wilson). Stronaclacher, at head of Loch Katrine (Mr. Hunt). Arrochar (Mr. Kinlay), with fruit. Glenprosen (Mr. Fergusson). In structure the leaves closely accord with those of *Dicranodontium longirostre*, but Mr. Hunt reports that the fruit is that of *Campylopus*.

6. *C. flexuosus*, Bridel, Bry. Univ. vol. i. p. 469, *pro parte*; Bry. Eur. *Bryum flexuosum*, Linn. Sp. Pl. p. 1583 (1763). *D. flexuosum*, C. Müll. Syn. vol. i. p. 400.—Tufts more or less dense, yellowish-green. Stems $\frac{1}{2}$ – $1\frac{1}{2}$ in. high, erect, dichotomous, radiculose to apex, the radicles rufous-purple, bearing gemmæ intermixed, secondary shoots small leaved, deciduous. Leaves patent and straight or secund and subfalcate, having the same direction wet or dry; lower lanceolate, upper lanceolate subulate, uppermost very long and toothed at apex; all concave, somewhat glossy; the base, and by age wholly, red. Nerve at base occupying one-third width, minutely channelled at back, of 3 or 4 cell layers, the anterior hyaline and larger; angles not decurrent, with short, wide, fuscous cells, the others being hexagono-rectangular, and the upper quadrate and chlorophyllose; perichaetial leaves 9, the inner sheathing, longly subulate, with a much narrower nerve. Fruit 1–3 on the same shoot; calyptra fuscous at apex. Capsule oval, regular or gibbous, short-necked, olivaceous, or when empty pale brown, with 8 ferruginous striæ, sulcate when dry; lid from a convex, conical base, rostrate, shorter than capsule. Annulus broad, double. Teeth rufous-brown.—Hab. Damp rocks and moist, peaty soil, principally in subalpine districts. This species and *C. pyriformis* and *fragilis* have been much confused by the old authors, but are easily distinguished by the structure of the leaf-base.

7. *C. paradoxus*, Wilson, ms. (Plate CXI. fig. 2.)—In compact fastigiata tufts $\frac{1}{2}$ –1 in. high, dull yellowish-green above, pale brown below. Stems with a few rufous sparingly-branched radicles, simple or dichotomous, with short lateral ramuli. Leaves erecto-appressed when dry, erecto-patent when moist, the uppermost longest and slightly secund, lanceolate-subulate, concave, and channelled above, the apex usually ending in two teeth, with a few irregular ones on each side below it. Nerve occupying one-third width of base, composed of

three strata of cells, the two anterior larger and empty. Lamina extending to apex; the cells at base thin and fragile, enlarged, hyaline in the young leaf becoming fuscous when old, above these rectangular in 14–16 longitudinal rows, gradually incrassate and quadrate toward apex. In some tufts the stems terminate in a rosette of ovate leaves with short points, and more distant elliptic cells. These are probably male plants, but I have not succeeded in finding antheridia.—Hab. Peaty soil, with *D. heteromalla*, in Trickley Fir Wood, on the top of Whiteside Hill, near Wooler, Cheviots (Messrs. Boyd and Hardy, 1868). Although differing much in appearance from *C. flexuosus* this Moss closely resembles it in structure, and may perhaps be not specifically distinct. The dull green colour, compact tufts, with shorter, denser leaves, and the lamina tapering more gradually to the apex, are the chief points presented by *C. paradoxus*, for the areolation of the two is almost identical.

8. *C. setifolius*, Wilson, Bry. Brit. p. 89; Schpr. Musc. Eur. Nov. fasc. 3 and 4.—In lax, soft, irregular tufts, bright green or silky yellowish-green above, blackish below, without radicular tomentum. Stems 5–10 in. long, geniculate, erect, slender, dichotomous. Leaves distant, erecto-patent or subsecund, glossy; very long from a lanceolate base, gradually running into a long subula, subtubular concave, not unfrequently half twisted; uppermost with the wings serrated. Nerve more than half width of base, passing into a rough arista forming the subula, smooth at back, composed of three strata of cells, the posterior being minute and chlorophyllose, the middle of same size but hyaline, the anterior twice the size and hyaline. Auricles very large and inflated, the cells partly fuscous, partly hyaline, hexagonal, above these hexagono-rectangular, the upper rhombic and chlorophyllose with thick walls. Flowers of each sex collected in capitula; males 3–4, females numerous.—Hab. Wet places among grass and heath and in clefts of rocks. Gap of Dunloe, Killarney (Schimper). Sligichan, Skye (Hunt).

9. *C. Schwarzii*, Schpr. Musc. Eur. Nov. fasc. 1 and 2 (1864).—*C. auriculatus*, Wilson, ms.—In dense soft silky yellowish-green tufts, brownish below, free from radicular tomentum. Stems 2–3 in. high, slender, repeatedly dichotomous; leaves erecto-patent, straight or very slightly secund, those at base lanceolate, the upper lanceolato-subulate and subtubular, entire at apex, the base somewhat sheathing, with

greatly inflated hyaline auricles and decurrent angles. Nerve broad, occupying $\frac{2}{3}$ of base, finely sulcate on the back toward apex, formed of four strata of cells; those of anterior layer lax and hyaline, those of 3 posterior much narrower and chlorophyllose. Basal areolation narrow, thin, that of auricles very lax, hexagono-rectangular and hyaline, above subquadrate.—Hab. Granite rocks. Snowdon (Mr. Wilson). S. of Ireland. Highlands, as Ben Voirlich (M'Kinlay, 1863). Breadalbane Range; head of Clova (Mr. Fergusson), forming great cushions. Resembles the straight-leaved form of *D. longifolium*.

10. *C. fragilis*, Br. and Schpr. *Bryum fragile*, Dickson, fasc. 3. p. 5 (1795). *Dicranum densum*, Funck. *D. Funkii*, C. Müll. *D. flexuosum*, β . *fragile*, Turner, Musc. Hib.—In pale green, glossy, cushioned tufts. Stem $\frac{1}{2}$ to 2 in. high, very fragile, clothed with rufous-purple radicles to apex, ramuli fascicled, arising from axils of leaves, caducous, with minute narrowly lanceolate leaves. Leaves very densely crowded, erecto-patent, rigid, incumbent when dry, lower lanceolate, upper extended into a subula, toothed at apex, wings recurved in upper part. Nerve very broad, channelled at back of 3 cell layers, the 2 anterior very lax, without chlorophyl. Areolation at base very lax and pellucid, narrowly rectangular, without any distinct alar cells, above minute, incrassate, quadrate. Capsule solitary, bent down in the perichætal leaves, oval, symmetric, fuscous, when dry plicate, contracted below mouth, calyptra whitish, rufous at apex, covering $\frac{1}{3}$ of capsule, lid conico-subulate, oblique, red.—Var. β . *densum*. *Dicranum densum*, Schleicher. *C. densum*, Br. and Schpr. *D. Schleicheri*, C. Müll. Syn. i. p. 393. Stems taller, repeatedly dichotomous; leaves shorter, with more acute, entire points, and laxer cells.—Hab. Sandstone rocks and moist heaths. Mr. Fergusson sends me most beautiful specimens from Glen Prosen.

11. *C. Schimperii*, Milde, Botanische Zeitung, 1864, Supp. p. 13; De Not. Epil. Briolog. Ital. p. 650. *C. compactus*, Schimp. ms. (Plate CXI. fig. 3).—In extensive very dense and compact tufts, interwoven with rufous tomentum, fastigiate, 1–2 in. high. Stems slender, dichotomous, with alternate innovations, which are easily detached, light silky green above, fuscous below. Leaves on all sides erecto-patent, appressed when dry, straight, rigid, lanceolate subulate, channelled in the lower part, becoming tubulose above from the converging wings, denticulate only at extreme apex. Nerve very broad, occupying

all width of leaf except about 8 rows of cells on each side, composed of 3 strata, the anterior laxer and hyaline. Cells at base lax, rectangular, hyaline, very narrow at margin, above elliptic.—Hab. Highland mountains, Shetland and Hebrides, frequent; Ben Challum (M'Kinlay, 1863); Ben Lawers (R. B. 1865).

12. *C. pyriformis*, Bridel, Bry. Un. vol. i. p. 471; Mitten.—*Dicranum pyriforme*, Schultz, Fl. Stargard. Suppl. p. 73 (1819). *D. flexuosum*, Hed. Sp. Musc. t. 38. *C. flexuosus*, Bridel, vol. i. p. 469, *pro parte*. *C. turfaceus*, Br. and Schpr. Bry. Eur. *D. turfaceum*, C. Müll. Syn. vol. i. p. 399.—In flat tufts, olivaceous or bright green, finally tawny. Stems $\frac{1}{2}$ –1 in. high, slender, erect, radiculose only at base, the innovations numerous, without sterile ramuli. Leaves less crowded, gradually larger upward, erecto-patent, lower lanceolate, middle lanceolato-subulate, upper from an ovato-lanceolate base, suddenly setaceous. Nerve one-third width of leaf-base, thin, channelled at back, obsoletely toothed at apex, of 3 cell layers, the two anterior lax and without chlorophyl. Arcolation resembling that of *C. flexuosus*, but thinner, narrowed toward the margin and at the subdecurent angles, hyaline at base. Fruits several from the same apex, calyptra whitish with the tip brown, reaching one-half length of capsule, pedicel suddenly bent down in middle, theca ovate, olivaceous, when ripe fulvous, sulcate, lid obliquely rostrate, red.—Var. β . *Mülleri*. *C. Mülleri*, Juratzka. Leaves caducous, calyptra without any fringe. Hab. Moist heaths and sides of ditches, common all round London. Readily distinguished from *C. flexuosus* and *fragilis* by the form and structure of the leaf base. I adopt the earliest name, though quoted by Schimper and others with doubt, perhaps because Schultz describes it “capsula glabra, nec striata;” but the rest is excellent.

13. *C. brevifolius*, Schpr. Musc. Eur. Nov. fasc. 1 and 2 (1866). *C. subulatus*, Schpr. Milde in Bot. Zeit. 1862, p. 460.—In short flattened yellowish-green patches without tomentum, rooting only at base. Stem $\frac{1}{2}$ in. high, once or twice dichotomous, with caducous ramuli. Leaves short, rigid, erect, lanceolate, longly acuminate, concave, obsoletely toothed at extreme apex. Nerve occupying half width of leaf-base, composed of four strata of cells, the two anterior lax and empty, the two posterior narrower, the inner one alone containing chlorophyl. Basal arcolation hyaline, rather lax, rectangular, the cells gradually becoming shorter and more quadrate; the lower with their transverse

walls much thickened.—Hab. Dry stony places. Succoth Hill, Ar-rochar, and Craig-na-Gour, Ben Lawers (M'Kinlay, 1865).

1. *Leptodontium flexifolium*, var. *gemmascens*.—*Didymodon gemmascens*, Mitten, ms. *D. flexifolium*, var. *gem.* Wilson.—In dense tufts $\frac{1}{2}$ to $1\frac{1}{2}$ in. high, always barren. Leaves entirely according in structure with those of *L. flexifolium*, but with the nerve excurrent in an apiculus, which bears a cluster of egg-shaped or oblong gemmæ, each having two or three transverse septa, these rapidly develop prothallium and young plants.—Thatched roofs. Amberley and Hurst, Sussex (Mr. Mitten).

EXPLANATION OF PLATES CIX. AND CXI.

PLATE CIX.—Fig. 1. *Atrichum crispum*, James; male from specimens communicated by Mr. Hunt; female from American specimens collected by Sul-livant. Capsule, leaves, and their areolation, magnified. Fig. 2. *Dicranella fallax*, Wils.; male and female plants, natural size and magnified, with leaf and areolation. Fig. 3. *Ditrichum tenue*, Hampe; plant, natural size and magnified, with leaf and areolation.

PLATE CXI.—Fig. 1. *Campylopus Shawii*, Wils. Fig. 2. *C. paradoxus*, Wils. Fig. 3. *C. Schimperii*, Milde.

New Publications.

Compendium of the Cybele Britannica; or, British Plants in their Geographical Relations. By HEWETT COTTRELL WATSON. Part Third. Pp. 425–651. Thames Ditton. Printed for private distribution. 1870.

It is certainly a matter for congratulation that we have among us a botanist who has always been ready and willing to spend so much time, labour, and money as Mr. Watson has done in the furtherance of British topographical botany. He has now brought to a conclusion this useful 'Compendium,' the several portions of which, with his usual liberality, he has distributed, as printed, amongst those botanists whose addresses he knew. The whole will be shortly published in one volume, and obtainable for ten shillings. It is indispensable to all interested in our flora, who may be considered fortunate in possessing a trustworthy and comprehensive treatise such as no other country can boast of, and which is, indeed, consulted by the botanists of all lands who turn their attention to plant distribution.

We have in our two last volumes noticed the first and second parts of the 'Compendium' respectively. These comprehended the distribution of the natives, "denizens," and "colonists," whilst this third part consists of a separate list, including the "aliens," the "casuals," and, hardly to be separated from the last, the errors, and the extinct plants. These are treated on a formula much less full than that employed for the natives; the area in provinces is given, and references to books in which additional information will be found, as well as a few special localities. We are somewhat sorry to see that the hope we expressed (Vol. VI. p. 375), that the exotic distribution of the introductions would have been indicated, has not been fulfilled; it would have been especially useful in the case of these plants, which are in such large numbers making their appearance, to know from what quarters they come. This class of plants is every day increasing, many are becoming commoner, and some already form a prominent feature in the vegetation of the districts round our large towns. The questions arise in each case, how did this species get here and from where, what does its presence mean, and what is to be its future history? How much interest lies in the solution of such problems is seen in a recently-published paper* by M. André Devos—in which, by the way, Mr. Watson's terms for the classes of naturalized plants are adopted—on the introduced plants of Belgium, where the history and exotic distribution of many species are examined. What strikes one with regard to not a few of these plants is, that they play so much the same part under similar conditions everywhere,—cosmopolitans, in short, and scarcely more native in one country than another. It is easy to put all such species into an appendix, and determine to more or less ignore them, but they continually force themselves on our attention. We confess to a rooted objection to all appendices and supplementary lists; it seems to us more rational, as it is certainly more convenient, to give all in one series, of course typographically distinguishing the native from the naturalized species. The defence which is reasonably urged by those (upon whom Mr. Watson is somewhat severe) who put on record the occurrence of mere casuals is, that it may become a matter of importance to know when, where, and by whom they were first noticed, if, as is by no means unlikely, any should spread and become a *de facto* part of the vegetation of Britain. Such facts, how-

* Bulletin de la Soc. Royale de Bot. de Belgique, 1870, pp. 5-122.

ever, require to be very carefully recorded, and every endeavour should be made to discover the mode in which the seeds, or other means of propagation, were introduced, and this should be accurately stated; vague expressions, such as "perfectly established," convey, when standing alone, very little definite information.

In addition to the introductions, the list includes a large number of segregates, the distribution of which is too little known to allow of their treatment according to the full formula. These are Mr. Watson's *opprobria*. The first forty pages (pp. 421-460) are entirely occupied with an exposition of the impossibility of dealing with the published records of the localities for such plants, as exemplified in the case of the aquatic *Ranunculi*, the Dog Violet, and other cases of confused synonymy. Though one cannot help feeling for Mr. Watson in his efforts to reduce to order these tangled records, yet the impression is forced upon us that, as the topographical is almost the only aspect in which the confusion of names presents any insurmountable difficulty, our author might have treated with more leniency those who have, in their endeavours to throw light on difficult genera and species, sometimes crossed names, and introduced some unavoidable synonyms. If necessary, it would not be difficult to produce a very confusing series by tracing certain species through the six editions of the 'London Catalogue.'

The whole additional list occupies (with a brief introduction) pages 461-605, and is arranged in the same order as the general synopsis in the two preceding parts. It seems brought down pretty nearly to the present time, and our own pages are laid under frequent requisition, though often insufficiently quoted. The most important omission (among the segregates?) is *Callitriche truncata*, noticed in this Journal last May (see p. 154). On an average about eight species are treated on a page, and everywhere there is apparent a power of comprehensive condensation, of seeing the real point at issue, and putting it in the fewest possible words, which is really admirable. Yet we could wish that Mr. Watson had taken a little more trouble in the investigation of some of the plants which are shortly disposed of as "ambiguities." There could be no possible difficulty in settling absolutely and at once what was the species found at Granton, and recorded in this Journal as *Hieracium stoloniflorum* (not "*stoloniferum*," as Mr. Watson prints it, p. 525); and it would have been certainly more satisfactory

to the readers of the 'Compendium' to have had this information, instead of a condemnation of the authors of the 'Flora of Edinburgh.' Again, on the next page, under *Hieracium præcox*, Schultz, one would have expected that the natural course for Mr. Watson to take would have been to pay a visit to the British Museum, and examine the specimen from Denbigh which Schultz himself so named, instead of telling us what his own specimens are like, and smothering the whole question by the word "ambiguity." There is no ambiguity whatever to any one who cares to investigate the matter, either in this case or in a good many others so easily disposed of by our author, *e. g.* *Malva borealis*, Wallin., on p. 493. It is to be regretted that Mr. Watson has thus neglected to avail himself of assistance which it would have been so easy to obtain, if only it had been known to be required. However, we are very thankful for what we have, and the best thing that British botanists can do, is to go carefully over pp. 473-605, and correct and add to it from their own *personal* knowledge, for one use of such a list is to show what is unknown-or uncertain. That all may add somewhat is seen from the notes and corrections forming the conclusion of the volume, which embody the observations of Messrs. Galt, Briggs, and More, called forth by a perusal of the 'Compendium' on plants of their respective districts, and additions from other sources. An excellent index to the whole completes the book.

The author has stated that the 'Compendium' supersedes the three first volumes of the 'Cybele Britannica' and its 'Supplement' of 1860; but, until a list showing distribution through all the counties of Great Britain is in existence, the 'Supplement' remains the most detailed "Cybele" we have, tracing out in detail, as it does, each species through the thirty-eight "subprovinces." While we thank Mr. Watson for the 'Compendium' and congratulate him on its completion, we are still sanguine enough to hope that a second 'supplement' enters into his plan—and, indeed, it is needed to complete it—which shall exhibit the species-distribution throughout the 118 counties and vice-counties into which he has divided Great Britain.

The Natural History of Commerce. With a Copious List of Commercial Terms and their Synonyms, in several Languages. By JOHN YEATS, LL.D., F.R.G.S., F.G.S., etc., assisted by several Scientific

Gentlemen. Illustrated with Meyen's Botanical Map of the World. London: Cassell, Petter, and Galpin. 1870. 8vo, pp. xvi. 436.

The perusal of this book has given us pleasure. It supplies a want long felt, and, though it is not all we desire, yet it deserves recommendation. Dr. Yeats was induced to undertake it through finding, on comparing the educational literature of the Continent with that of England, that we possessed no books adapted for technical instruction. The object of the book is thus expressed in the introduction:—“In the following pages, which comprise the geography and the natural history of raw materials, an attempt is made to supply young Englishmen engaged in mercantile pursuits with such knowledge of the earth and its productions as is regularly afforded in the Handels-Schulen of Leipsic, Berlin, Antwerp, and Rotterdam. In them the future Dutch or German merchant is taught to look beyond the limits of the Zollverein, and to regard the world as a vast storehouse, with the contents of which he must make himself familiar. At school he studies the sources of supply for the goods he must hereafter deal in. A counting-house, he is told, is a place in which he will be expected to *use* his knowledge, *not to seek it.*”

The book is divided into four parts, viz.:—Part I. “Geography of the Home Country, the adjacent Continent, our Colonies and Dependencies, and Foreign Trade Connections” (pp. 1–121). Part II. “The Commercial Products of the Vegetable Kingdom” (pp. 128–255). Part III. “The Commercial Products of the Animal Kingdom” (pp. 257–348). Part IV. “Raw Mineral Products” (pp. 349–385). We must restrict ourselves to a short examination of Part II., in the preparation of which the author had the assistance of Mr. Harland Coultas.

The commercial products of the vegetable kingdom are considered under two classes, Food Plants and Industrial and Medicinal Plants. Under “Farinaceous Plants” the chief food plants of the world are mentioned. All the East Indian Rice is not sent over in the “paddy” state, but with the glume or “husk” removed to a greater or less degree. *Tous-les-mois* is stated (with a query) to be the produce of *Canna coccinea*. It cannot be from this plant, the roots of which are fibrous and not tuberous; from the researches of Lambert, *C. edulis* seems to be the source. Chillies, or Cayenne Pepper, is derived from *Capsicum fastigiatum*, not from *C. annuum*. Star-Anise, and Mustard (though their

Natural Orders are indicated) are rather out of place under the head of Umbelliferous products. Under Sugar-plants, we find the Palm producing "jaggery" given under the name *Saguerus saccharifer*, whereas at page 151 the same plant is called *Saguerus Rumphii*; not many readers would know that they are synonyms. Only one species, *Ilex Paraguayensis*, is mentioned as producing Maté, whereas Mr. Miers has enumerated eight species of the genus which are so employed. Amongst the fruits, we find Apples and Pears are left out in the cold; and only a single Palm (*Cocos nucifera*) is mentioned as producing food.

In the 'Miscellaneous Food Products,' *Cetraria islandica* is omitted. We hardly think that the account of the action of "churrus" is in its right place under "fibres." Oil of lavender is obtained from *Lavandula vera*, not *L. Spica*, which is the source of foreign oil of lavender, or oil of spike, as it is more often called. In the account of india-rubber, *Ficus elastica* is called the "far famed banyan-tree," "whose daughters grow about the mother-tree," though at page 181 this name is rightly applied to *F. indica*. *Urceola elastica*, the caoutchouc from which enters largely into commerce, is not mentioned. *Isonandra gutta* is the only tree given as yielding gutta-percha, whereas at least a dozen others produce the same substance. We should have preferred too, to have seen the name *Garcinia Morella*, instead of Graham's disused name *Hebradendron gambogiodes*. *Boswellia serrata*, Roxb. (= *B. thurifera*), is the only source of olibanum mentioned, but from the researches of Carter, Birdwood, and others, this, though a thuriferous species, does not appear to yield any of the olibanum of commerce; the bulk of which is obtained from *B. Carterii* and *B. Bhan-Dajiana*. In the account of medicinal barks, we notice that New Granada is not mentioned as a Chinchona region; the Countess of Chinchon is wrongly called the Countess of Cinchona; and the source of red bark is said to be not yet ascertained, though a reference to Howard's 'Nueva Quinologia,' or any materia medica work, would give *Chinchona succirubra*, Pavon. At p. 235, twelve lines are taken up with an account of "cedron," the seeds of *Simaba Cedron*, but only one and a half with *Quassia amara*; *Picræna excelsa* is not mentioned at all. Catechu, terra japonica, cutch, and gambier are all put down to one plant, *Acaciu Catechu*. This is incorrect; the substance obtained from the wood of *Acacia Catechu* is known under the names of cutch, catechu

(*cate*, a tree, *chu*, juice), or *catechu nigrum*. Gambir, or gambier, is the Malay term for the reddish-brown earthy substance from the leaves and young shoots of *Uncaria Gambir*, a rubiaceous plant; to distinguish it from that of *Acacia Catechu*, it is termed *catechu pallidum* or *terra japonica*.

It is a hard matter to get the vegetable products of commerce into some one hundred pages, but though more room should undoubtedly be given, yet such plants as Balsa and Cedron could well be dispensed with; in a book which deals with commercial products, all substances which do not actually figure in commerce should be omitted. Speaking, then, only of the part which more immediately concerns us, we should recommend its enlargement and careful examination by an economic botanist, thoroughly acquainted with the recent literature of the subject. We cannot, however, think of closing this notice, without bestowing our praises and thanks for the Appendix, in which between 300 and 400 products are catalogued, and the synonyms in some 24 languages given. The book is well got up, the paper and type good, and we wish it every success. J. C.

Botanical News.

We are glad to be able to say that Armand Thielens, whose death we announced at p. 240, and again alluded to on p. 336, was the father of the botanist of the same name, and not, as we thought, the botanist himself.

The eighth fasciculus of Van Heurck's 'Herbier des Plantes rares ou critiques de Belgique' is published. It is, we think, somewhat to be regretted that the consistency of the series is interfered with by the inclusion of Italian species, whilst so many more Belgian plants remain to be issued. We notice, also, the publication of the fourth fascicle of Braun, Rabenhorst, and Stizenberg's specimens of European *Characeæ*.

The fourth volume of the Royal Society's 'Catalogue of Scientific Papers' includes author's names from L'Héritier to Pozzetti.

CORRIGENDUM.—On p. 354, lines 4 and 5, for "exigences . . . imply," read existence . . . implies.

NOTE.—The part of Dr. Seemann's "Revision of the *Bignoniaceæ*" on pp. 337-339, including the genera *Newbouldia* and *Muenteria*, cancels the portion containing the same genera on pp. 210-212.

COMMUNICATIONS have been received from Dr. Braithwaite, J. Collins, H. C. Watson, J. Sadler, W. Mitten, Dr. Hance, L. H. Grindon, W. Phillips, J. Britten, Prof. Thiselton Dyer.

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