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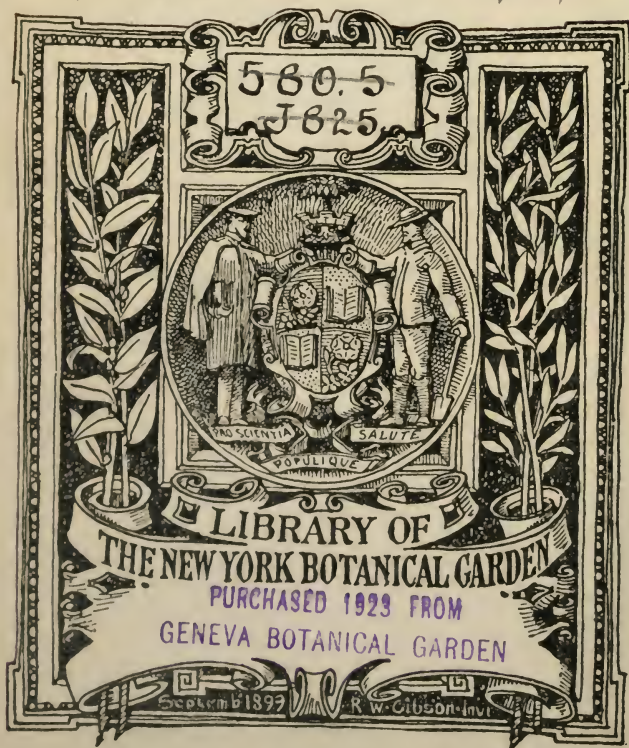
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Original Articles.

ON A MONANDROUS *CYPRIPEDIUM*.

By S. LE M. MOORE.

(TAB. 200, A.)

DURING the past two seasons some of the flowers, as well lateral as terminal, on Kew-grown specimens of *Cypripedium Sedeni*, Rehb. f. (a hybrid between *C. longifolium*, Warsc., and *C. Schlimii*, Rehb. f.*) have lapsed into the curious and highly instructive andrœcial modification which I purpose to describe and make a few comments upon. I may state that flowers showing this malformation are deposited in spirit in the Kew Herbarium, so that even if it should not occur elsewhere there will be material for future investigation.

Reference to Fig. 1 will show that the monstrous flowers have only four instead of six perianthial organs; of these the conjoined lateral sepals (*ss*) are almost normal, and the labellum (*l*) quite so. Opposite the latter, and on the other side of the column, is an organ in the position of the upper sepal, but that it is a petal and not a sepal is shown by its standing on the inner side of the sepals, and by its having the same hue and basal-coloured hairs of a petal. Outside this transposed petal there is no sign of the missing sepal, neither is there a trace of the second petal.† But the most remarkable deviation is to be found in the column. On looking to the centre of the flower the reader will be struck by the absence of the 'shield,' the transformed posticous, in monandrous Orchids antheriferous, stamen. This strange column is shown at Fig. 3

* 'See Gard. Chron.' 1873, p. 1431.

† The following notes are selected from a number made with the monstrous flower before me:—Labellum normal. Breadth of conjoined lateral sepals, an inch and one-fourth (of unmodified flowers an inch and one-twelfth), and their free edges are not reflexed, so that they more closely invest the labellum than is usually the case. Petal an inch and five-sixths long by two-thirds of an inch broad at its widest part; in the ordinary state it has the same length, but is a trifle narrower; the upper sepal is an inch and one-third broad at widest part, and it has no coloured hairs at its base. The figure in the 'Floral Magazine' (1876 t. 206) shows larger and brighter flowers than any I have seen at Kew.

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somewhat larger than nature; beside it I have figured for comparison on the same scale the ordinary shield-bearing column, and at Fig. 4 the monstrous arrangement is shown in a larger and more convenient way. The posterior division of the column is here comparatively narrow, short, and truncated at the top, and it bears at the upper part of its inner (anterior) face a single anther; at the point of divergence of the two divisions on neither side is there the least trace of the usual *Cypripedium* anther. The flower is, therefore, monandrous in the strictest sense of the word. The anterior or stigmatic branch of the ordinary column makes a considerable angle with the common base, and the two lobes of the stigma, as well as the crowning third lobe—the rostellum of the *Monandreae*—are placed transversely and are directed forwards. In the monster, on the contrary, the third lobe is suppressed, and the two longitudinally-placed stigmatic lobes are borne on a branch which is almost continuous with the common base, so that they look upwards as well as outwards (Figs. 5 and 6). Finally, as might with much safety be assumed, from the state of the stigma, the ovary is two-celled.* The modified flowers have, therefore, a two-whorled four-membered perianth, a monandrous andræcium and a dimerous gynæcium. It is manifest that interest centres on the second of these peculiarities, and that two questions will be uppermost in the mind of every morphologist: first, what is the position of the single stamen? and secondly, what phylogenetic deductions, if any, are to be drawn from the anomaly? These questions I shall endeavour to answer as satisfactorily as possible.

A glance at the diagram (Fig. 7), the explanation of which is obvious, will suffice to show that the fibro-vascular bundles of the column are three in number, of which one, namely, that supplying the anther-bearing arm, is median, and evidently belongs to the outer whorl, while the other two proceed each towards a stigmatic lobe; but there is no trace of bundles corresponding in position to the letters a^1 , a^2 , a^3 , † and r of the diagram. There is, therefore, no room for doubting that the andræcium of our monster is similar, allowance made for suppression, to that of ordinary *Monandreae*. The expectation of finding, in accordance with this interesting fact, cellular modifications associated with the morphological ones, was, however, nullified in every way, the anther having the many-layered endothecium and fully-evolved pollen-grains entangled in glutinous matter which mark the genus.

It will here be convenient to mention the published deviations from the usual structure of *Cypripedium*. Asa Gray ‡ has seen a

* A tendency to suppression of one of the placentas is figured by Cramer (Bildungsabweichungen, t. xiv. Fig. 2) in an abnormal flower of *Ophrys arachnites*, and in Asa Gray's specimen of *Cypripedium candidum* ('Silliman's Journal,' 1866, p. 195), there were only two placentas.

† I may here state that, in common with everybody who has worked at Orchid Morphology, I have never seen in this genus a trace of the bundle corresponding in position to the a^3 of the diagrams.

‡ L. c. p. 195. Dr. Reichenbach showed me a similar monster some months ago.

terminal flower of *C. candidum*, L., which had no labellum, but two sterile 'shield' stamens, and two fertile stamens opposite the petals, and therefore normal in position. Unfortunately the two lateral sepals are, in this note, considered as one; and as it is said that the sterile stamens were opposite the sepals, it seems scarcely possible to conclude otherwise than that they represent the organs marked A^1 and a^3 in the diagram. The surprise which is naturally felt at the appearance of the usually-absent a^3 is lessened by the fact of the absence of the labellum,* and by the existence of the former organ in the closely allied genus, if not monstrous form known as *Uropedium*. Then Masters† figures a monster which seems to have been modified in a somewhat similar way to ours. In this the lateral sepals are wanting, and the central one is divided into two; the labellum is quite normal, except for a slight lateral disarrangement; the petals are placed in a median or nearly median position, and the andrœcium is regular, except that the shield is suppressed. The same author says:—"A tetrandrous flower of *Cypridium* has also been recorded." This I presume to refer to Asa Gray's case above-mentioned, though possibly I may be mistaken. To these must be added *Uropedium*,‡ which has a flat petal-like labellum, three complete stamens opposite the petals, and therefore in the position of a^1 , a^2 and a^3 , as well as a median sterile one (A^1), something like the *Cypridium* 'shield,' but free from the style, and united to the lateral stamens. We see then that in *Cypridicæ* every stamen may be antheriferous with the exception of A^2 and A^3 , which by adherents to the Brown-Lindley-Darwin morphology are supposed to be united with the labellum. On the other hand, if we turn to Monandrea, we find that in *Pogonia ophioglossoides* all the stamens have been seen, and in the well-known case of *Arundina pentandra*, figured by Reichenbach in 'Xenia Orchidaceæ,' t. 105, all with the exception of a^3 . Many instances have also been recorded of diandrous and triandrous monsters in several other genera. §

Whether we incline to the conclusion of Brown, Lindley,|| Darwin, and their followers, according to which the position of the

* May not the labellum have been present in the form of the sterile stamen? Cases of pollen being borne by petals in Orchidæ are on record. Perhaps an intermediate condition may be that of a flat labellum, mentioned by Reichenbach as occurring in the case of *Selenipedium Warszewiczii*.

† 'Vegetable Teratology,' p. 93, fig. 44.

‡ Brongniart, 'Ann. Sc. Nat.' III. Ser., Botanique, vol. xiii., p. 113, tab. 2. The question as to the monstrous condition or generic validity of this form has been answered by Reichenbach ('Bot. Zeitung,' 1876, p. 41) in the latter sense. This conclusion is founded on two facts: first, that it bears seed capable of reproduction; and secondly, that for the most part *Uropedium* and *Selenipedium* inhabit different countries, and that where they are compatriots they are not neighbours. It matters little to my present purpose which view be adopted; it ought, however, to be said that Reichenbach speaks of having seen a tripetalous flower of *S. Warszewiczii*.

§ See Masters, *l.c.* p. 380, for a number of these,

|| Every appeal to theoretical structure indicates, in my opinion, a belief in Evolution so far as relates to the differentiations from that structure, so that we may fairly claim the two greatest nineteenth-century English botanists as

vascular bundles is absolutely determinative of that of the organs, or whether with Reichenbach, Crüger and others, we deny the existence of any adnation of andrœcium to labellum,* we cannot have a doubt but that in the andrœcium of *Orchideæ* there has been a tendency to suppression in an organic posticous (usually positional anticous) sense, just the reverse of what we find in *Apostasia*. This applies to the gynœcium as well as to the andrœcium, but conversely. I unhesitatingly include *Cypripediæ* here, and perhaps the proof of the legitimacy of my doing so is the most valuable outcome of this note, since, while a monandrous condition was unknown in *Diandrea*, it might have been considered quite possible that, proximately speaking, these latter and the *Monandrea* did not have a common ancestor, though it must be admitted that Hildebrandt's† discovery of the reciprocal effect of the pollen made this position a very unsafe one. Fortunately there is no need to make a great call on the imagination to gain clear insight into the process of evolution of the various forms, for the normal and abnormal 3-6-androus states among *Monandrea*, together with *Uropedium*, afford us the plainly defined outlines for such insight. What we have to decide is, whether our monstrous condition is a mere 'freak of nature,' or a reversion to some ancestral condition. The method in the madness at once puts a veto on the first presumption. As for the second, were Link's‡ view of the monandry of *Cypripedium* the correct one, we should feel almost sure that, in spite of some difficulties, this is an instance of simple reversion, the *Diandrea* being the descendants of

believers, to some extent, in Darwinian principles. This has recently been insisted on by Kuntze, who says, "Diese Mutationslehre der Blüten ist vor Darwin's Epoche in Geltung gewesen; sie wird auch heutzutage von allén Gegnern Darwin's inconsequenterweise nicht beanstandet, trotzdem eine Lehre ohne die andere nicht denkbar ist," 'Schutzmittel,' p. 63.

* I venture to think that Crüger's citation of *Isochilus*—a genus in which the labellum is scarcely different from the petals—is as much unfortunate as otherwise, since it may be that the tendency to pentandry is a consequence of the singleness of the labellum, so that this may be an exception upon which no conclusion can be founded. It is here noteworthy that the labellum of *Arundina pentandra* is comparatively small, and but slightly differentiated. On the other hand, teratological cases in which the labellum is simplified without numerical increase of the stamens support the Reichenbachian view. In the curious *Dichæa* referred to by Reichenbach ('Bot. Zeitung,' 1877, p. 38), I can only see an example, either of fission or of multiplication and displacement. Crüger found that in *Catasetum* the labellum appears after the petals, and nearly at the same time as the stamen, a fact which militates to a certain extent against his theory. The same order of appearance of the members of the petaline whorl was observed by Payer in *Calanthe veratrifolia* ('Organ. Comp.' p. 665, t. 142).

† 'Bot. Zeit.,' 1865, p. 246. He found that pollen of *Cypripedium parviflorum* applied to *Orchis mascula* caused the ovary to swell and the ovules to come to almost a perfect development, though there was no embryo-formation; in fact this pollen, curiously enough, was more effectual on the above-named *Orchis* than was pollen of *O. Morio*. Conversely, pollen of *O. mascula* was similarly effectual on *Cypripedium Calceolus*.

‡ 'Bot. Zeitung,' 1849, p. 745. He thinks that each division of the column bears half an anther! He examined *C. spectabile*, L., a species about which I can affirm that there is nothing peculiar.

the Monandreae. But nowhere has Link's curious theory, so far as I am aware, met with favourable reception, and whatever refutation it does not carry with itself is furnished by the appearance in *C. Sedeni* of a single median anther essentially similar to either of the normal ones.

In all probability the Cypripedeous type is an earlier one than the Monandrous, since there are in it more similar parts and a lesser differentiation of those parts; and this may be held in spite of the undoubted fact of retrogression in both the animal and the vegetable kingdom;* in fact, if the subject be thought out, there seems to be no other possible view than this; for, supposing otherwise for a moment, we can conceive no conditions which could educe the Diandrous from the Monandrous type, since all the causes of floral retrogression, viz., variations in entomophily or in reciprocal fertility, unfavourable weather, and change of entomophily to anemophily are out of the question here. I do not mean to say that *Cypripedium* is the progenitor of all other Orchids, but that some type, probably extinct at the present time, containing stamens of the two whorls and Cypripedeous pollen, was the starting point of the Order. On this supposition the persistence of *Uropedium*, provided it be not a monster, and the possession by *Yucca Whipplei*, Torr.,† of pollen like that of the *Cypripediæ* are facts of the highest importance. After a time all the stamens except A^1 , a^2 and a^3 would appear to have been either entirely eliminated or partially so, and finally, either A^1 or both a^2 and a^3 failed to produce pollen. Now if in our monster a^2 and a^3 had not entirely aborted, we should have precisely the structure of some ordinary Monandreae. I believe, then, that we see here a peculiar kind of reversion, entirely distinct from any form of what Darwin has called "analogous variation," and perfectly consonant with the theories of 'Pangenesi' and 'Physiological Units,' as well as with the 'Plastidule' theory of Haeckel adopted by Strasburger.‡ It differs from ordinary reversion in this, that whereas in the latter the teratological structure is the ancestral one, in *C. Sedeni* the monstrous is the derived state. I was at first so struck with this that I thought of proposing some term to express it, such as 'Revision of Structure,' or 'Re-presentation of a Process of Evolution,' but I now think all requirements will be satisfied by accentuating this as a peculiar method of reversion.

We see, then, that those of the lapses from normal expression of organised existence which are sufficiently constant to be apprehended by the science of to-day as orderly phenomena, may be separated into two groups. One of these shows us Reversion

* For the animal kingdom see Darwin's 'Descent of Man,' i., p. 205, and text-books; also E. R. Lankester on Dohrn's Theory in 'Nature,' Vol. xii. p. 479. In the vegetable kingdom, take Glumales for instance, and most *Monochlamydeæ*, as well as many aquatic Phanerogamia. Sixteen years ago Mr. Darwin came to the conclusion that *Cypripedium* is an ancient type. 'Fert. of Orchids,' ed. i., p. 331.

† See J. G. Baker in 'Gard. Chron.' 1876, pt. I., p. 196, Fig. 42.

‡ 'Studien über Protoplasma,' p. 48.

to an ancestral condition, and for it the term "Proximate Reversion" may perhaps be allowed. The other is a re-delineation, as it were, of developmental lines which are usually invisible. Moreover, it may confidently be expected that when our knowledge of that difficult subject the pedigree of organisms becomes more definite, and when some safe conclusions have been reached concerning the phylogenetic value of the facts of Teratology, many more instances of this second form of Reversion will be brought to light.

[APPENDIX.—Since writing the above I have had the advantage of oral communication with Dr. Reichenbach, who informs me that he has in his collection two monstrous states of *Cypripedium Sedeni*, the one above-noticed, and another in which the sides of the 'shield' are polleniferous. As he has many other interesting *Cypripedium* monsters, we may hope soon to have a memoir on the Teratology of the genus at his hands.—Oct. 1878.]

EXPLANATION OF TAB. 200, A.—1. Monandrous flower of *Cypripedium Sedeni*, Rehb. f. (natural size). 2. Column of normal flower about natural size. 3. Column of monster on scale of last. 4. Enlarged view of monstrous column. 5. Stigmatic lobes of normal flower slightly enlarged. 6. Stigmatic lobes of monster on scale of last. 7. Diagram of flower.

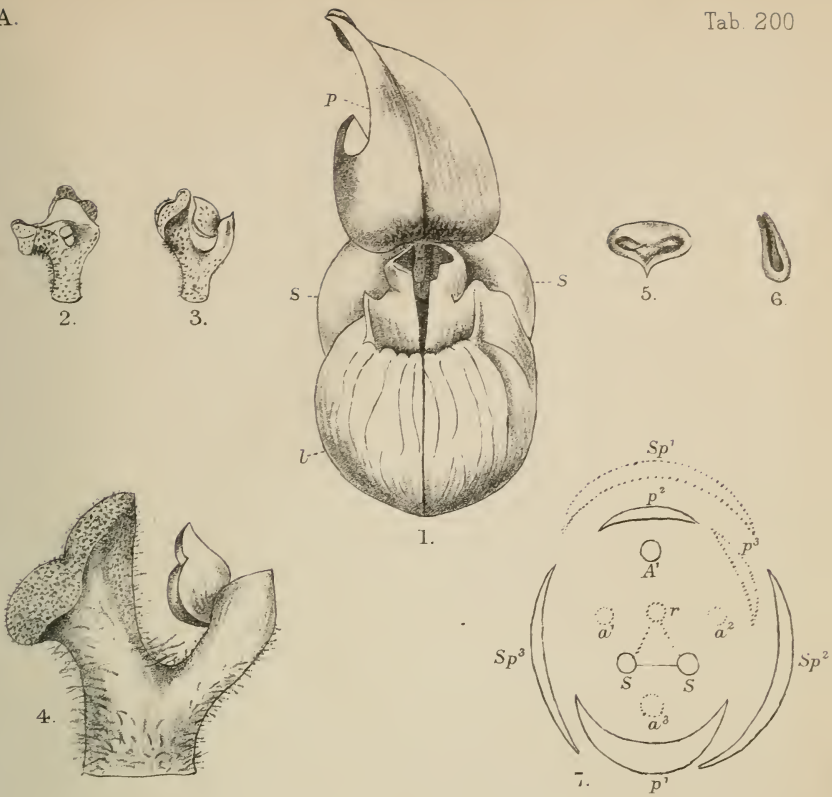
FURTHER NOTE ON THE STRUCTURE OF COMPOSITES.

BY MAXWELL T. MASTERS, M.D., F.R.S.

(TAB. 200, B.)

In the number of this Journal for February last I took occasion to allude to certain malformations of interest as bearing upon the structure of Composites. The flowers of *Helenium autumnale*, to which reference was there made, had neither ovary nor calyx, the corolla was virescent, the five stamens were free and sprang from a prolonged thalamus, which bore at its summit two open leaves representing carpels but without trace of ovules. It is not necessary to refer in greater detail to these flowers; suffice it to say that from a consideration of the structure, normal and abnormal, of Composite flowers, as well as of the course of development, I arrived at the conclusion that the balance of evidence lay with those who consider the pappus not as a true calyx, but as a series of outgrowths or trichomes rather than as definite phyllomes.

I have now to mention some malformations in *Leontodon* (*Apargia*) *autumnale* which appear to me to be of considerable interest, and for which I am indebted to the kindness of Mr. M. P. Edgeworth. Under ordinary circumstances the flower-heads of this plant are borne on long slender stalks, destitute, or nearly so, of scales. The involucre consists of numerous linear-lanceolate bracts in many rows, surrounding a flat receptacle from which the ligulate florets proceed. Each floret emerges, as it were, from a little socket in the receptacle, the edge of the socket bearing four or five small



Monandrous Cypripedium.



M. Suft del

Mintern Bros. imp

Monstrous Aparagia.

lanceolate teeth. The pappus is plumose, in many rows, and surrounds the ordinary ligulate corolla, with its usual contents.

In the flowers with which I was favoured by Mr. Edgeworth the condition of things was very different. The peduncles were covered nearly throughout their length with minute linear bracts passing insensibly into the involucre. The involucreal bracts surrounded tufts of strap-shaped, oblong, membranous, ciliated scales. Possibly these represented the pappus of an ordinary flower. Within them the corolla was present in the form of a variable number of yellow thread-like processes, quite distinct one from the other. No trace of stamens was visible in any of the flowers that I examined. The ovary, however, was wholly superior, with a single cavity and a single style terminating in a variable number (2-5) of stigmatic branches. The ovule was of the ordinary character and, in some cases, was associated with a second.

It is admitted on all hands that there is a certain amount of antagonism between the processes of nutrition and growth and that of reproduction; the circumstances that favour the one are not so propitious to the others. Again, it is not contested that the differentiation from the ordinary leaf-type is considerably greater in the case of the stamens than it is in the case of the corolla or pistil. It would seem, therefore, that in the *Leontodon* before us, the vegetative tendency predominated over the reproductive. The bracts were increased in number, the pappus was no longer a mere series of threads, but represented by broad scales, the corolla was arrested in its development, the stamens were entirely suppressed, while the carpels were well and even inordinately developed. The arrest of vegetative growth and the subsequent differentiation were therefore considerably less marked than usual.

Although malformations are not uncommon in Compositæ, and the literature relating to them is extensive, yet I do not remember to have met with a case like the above, nor with the record of such a one.

DESCRIPTION OF TAB. 200, B.—1. Head of flowers (nat. size). 2. One of the monstrous flowers (enlarged). 3. Ovary (much magnified).

SPICILEGIA FLORÆ SINENSIS: DIAGNOSES OF NEW, AND HABITATS OF RARE OR HITHERTO UNRE- CORDED CHINESE PLANTS.

By H. F. HANCE, Ph.D., Memb. Acad. Nat. Cur., &c., &c.

IV.

1. *RANUNCULUS* (*Hecatonia*) *MOELLENDORFFII*, *sp. nov.* Radice simpliciter et crasse fibrosa, caule erecto fistuloso sulcato-striato glabro pedali et ultra, foliis radicalibus longe caulinisque breviter petiolatis palmato-tripartitis laciniis trifidis acuminatis inciso-

serratis utrinque sparsim hirsutis petiolis basi dilatatis amplexantibus, pedunculis inferne glabris apicem versus hirsutis nudis unifloris v. apice in ramos 2-4 1-2-flosos bracteis tripartitis laciniis oblongis v. linearibus inciso-serratis stipatos divisis, calyce caduco, petalis oblongis integris albis venosis efoveatis extus medio apiceque hirsutis $4\frac{1}{2}$ lin. longis, staminibus carpella sub-æquantibus, carpellis plurimis linearibus-oblongis levibus immarginatis in rostrum tenue iis paulo brevius apice circinatim uncinatum abeuntibus.

In locis humidis m. Po-hua-shan, Chinæ borealis, alt. 5-6000 ped., d. 19 Aug., 1875, collegit am. Dr. O. a Moellendorff. (Herb. propr. n. 20,351.)

It is with reluctance that I characterise a new species in a group where so many are still very unsatisfactorily defined, but the present one seems beyond question different from any yet described from northern Asia. Its nearest allies I take to be without doubt *R. aconitifolius*, Linn. ! and *R. platanifolius*, Linn. ! neither of which occurs in the Orient, in India, or perhaps in any part of the Russian empire. It differs from these by its few-flowered inflorescence, efoveolate petals, and the far more numerous differently-shaped nerveless carpels.

2. *Nasturtium (Clandestinaria) bengalense*, DC. In ditionis Cantonensis agris et cultis vulgaris. M. Boissier has, I know not wherefore, placed his *N. niloticum*, which certainly belongs here, in the section *Cardaminum* ('Fl. Orient.' i. 178).

3. *Capparis hastigera*, Hance. Circa Hoi-hau, ins. Hai-nan, 1877, Bullock. The specimens have leaves for the most part elliptico-lanceolate, and without the hastate form which suggested the specific name, but they undoubtedly belong to the same species.

4. *Ionidium suffruticosum*, Ging. Circa Hoi-hau, ins. Hai-nan, a. 1877, Bullock. Recorded from China by DeCandolle, but I know of no recent instance of its being gathered in the country.

5. *Silene Oldhamiana*, Miq. In arena litorea juxta oppidum Pak-hoi, ora australiori prov. Kwang-tung, m. Martio 1878, coll. T. L. Bullock. Here is another example of the southward extension of a plant at first detected in North-eastern Asia, and which until now had not been found south of Amoy. It sends down a strong perpendicular root into the sand. The late Dr. Rohrbach placed this in the genus *Melandrium*, an arrangement of which few botanists will approve, and he himself, indeed, was not indisposed ('Linnaea,' xxxvi., 203) to refer all the species of his section *Elisanthe*, to which the present plant belongs, back to *Silene*. I think they will very naturally range there, together with *Heliosperma*, next after his series *Compactæ*.

6. *Hypericum (Norysca) chinense*, Linn. In monticulo calcareo Kun-yam-ngam, secus fl. North River, prov. Cantonensis, m. Julio, 1864, leg. Sampson; ad ripas fl. Lien-chau, Oct., 1876, coll. Rev. J. C. Nevin. Apparently a rare plant, but undoubtedly wild. The leaves are of rather a firmer texture than in cultivated specimens, which are common in gardens.

7. *Calophyllum Inophyllum*, Linn. Circa Kieng-chau-fu, ins.

Hai-nan, coll. Rev. P. Delavay; juxta Hoi-hau, ejusdem insulæ, legg. Bullock et Stuhlmann.

8. *Camellia Sasanqua*, Thunb. Supra Teh-king, secus fl. West River, prov. Cantonensis, die 7 Nov., 1877, copiose et sponte in collibus nascentem, invenit Rev. R. H. Graves.

9. *CAMELLIA (Eucamellia) GRIJSII*, *sp. nov.* Ramulis petiolisque glabris, foliis coriaceis glaberrimis elliptico-lanceolatis basi cuneatis apice caudato-acuminatis crebre argute serrulatis supra vix lucidulis subaveniis subtus opacis costa valida nervisque primariis prominentibus secundariis minus conspicuis $2\frac{1}{2}$ – $3\frac{1}{2}$ poll. longis 10–15 lin. latis petiolo 3–4 lineali, alabastris lanceolatis, sepalis ovatis, petalis profunde obcordatis basi in anulum concretis 15 lin. longis, staminibus conspicue monadelphis 3–4 lin. tantum longis glabris, ovario lanato, stylis ad medium usque coalitis crassiusculis glabris. In prov. Tokien, a. 1861, leg. am. C. F. M. de Grijs. (Herb. propr., n. 7308.)

When this was first sent me I supposed it might be Abel's *C. oleifera*, but I believe there is now no doubt that this is referable to the preceding species, which certainly does yield oil in Kwang-tung. The present plant I consider to stand between *C. Sasanqua* and *C. Kissi*, Walt., referred by Seemann, without sufficient proof, I think, to *C. drupifera*, Lour. ('Trans. Linn. Soc.' xxii., 345.) It is nearest and looks more like the latter in its subopaque acuminate leaves; but the nervation is still more conspicuous, and the serratures more copious, divergent, and very acute; the Indian species, too, has but slightly emarginate petals, and slender quite free styles. By its deeply bilobed petals and semiconnate styles it agrees with the former species; but the leaves are not shining, the stamens are shorter, and more distinctly united into a ring.

10. *Hibiscus mutabilis*, Linn. Ad Lung-mun-hap, h. e. "fauces oris draconis," secus fl. West River, prov. Cantonensis, d. Novembris, 1877, coll. Rev. R. H. Graves. The only truly wild specimens I have ever seen.

11. *Hibiscus syriacus*, Linn. Secus fl. North River, prov. Cantonensis sponte crescentem invenerunt Sampson, Julio, 1864, et Rev. J. C. Nevin, Oct., 1876. I do not know why, in the 'Flora of British India,' Dr. Masters has placed this and the preceding in the section *Paritium*. They certainly do not belong there, their capsule being quite destitute of false dissepiments, but to *Ketmia*, where DeCandolle originally stationed the latter, placing the former under *Abelmoschus*. *H. Rosa-sinensis* apparently never fruits here, but I have little doubt that it also falls under *Ketmia*, and not *Paritium*, where it is likewise placed by Masters.

12. *Oxalis (Biophytum) Reinwardtii*, Zucc. Prope Macao, ipse legi, 1860; in umbrosis juxta ripas fl. West River, prov. Cantonensis, d. 21 Julii, 1872. DeCandolle's genus *Biophytum*, united with *Oxalis* in the 'Genera,' has been again separated by Kurz, and also in the 'Flora of British India,' but it seems to have little claim to distinction, especially when the wide differences of habit in various species of *Oxalis* are considered.

13. *Xanthoxylon alatum*, Roxb., var. Circa Amoy, ipse legi,

Oct., 1857; in fruticetis Cantonensibus m. Maio, 1878, inventit E. H. Parker. Mr. Benthani referret meos Amoy specimenes ad *X. nitidum*, Bge., quod est, tamen, different, esse *X. Bungei*, Planch., nomen postea a me *X. simulans*. Presentis plantae quae I, relying on Benthani supposita identificatio, etiam descripta est *X. Bungei*, scarcely differt a *X. planispinum*, S. & Z., to quae I referret the first specimenes I gatheret. (See 'Ann. sc. nat.' 5e. sér. v. 209; and Maximowicz, 'Mel. Biol. Acad. St. Pétersb.' viii., 2 and 372.)

14. *Amoora Rohituka*, W. & A. Circa Hoi-hau, ins. Hai-nan, a. 1877, coll. Bullock. Not, I think, previously recorded as Chinese.

15. *Zizyphus Jujuba*, Lam. Prope Tien-pak, ora australiori prov. Cantonensis, ipse legi, m. Novembri, 1866.

16. *Zizyphus vulgaris*, Lam. Ad Fuk-wing, prov. Cantonensis, coll. b. Krone; in ditone Pekinensi ubique reperitur. Extensively grown in some parts of Kwang-tung for the fruit; when dried usually known to foreigners as "dates," which they resemble a good deal in appearance.

17. *Schmidelia Cobbe*, DC. Circa Hoi-hau ins. Hai-nan, aest. 1877, legit Bullock.

18. *Crotalaria medicaginea*, Lam. In fancibus Sam-yung, fl. West River, prov. Cantonensis, d, 8 Junii, 1867, coll. Sampson.

19. *Crotalaria striata*, D.C. Whampoæ, in ins. Danorum, m. Novembri, 1868, legit filius Alfredus.

20. *Melilotus macrorrhiza*, Pers. Secus ripas fl. West River, alibique in prov. Cantonensi, quotannis m. Junio fl. et fr. copiose occurrens, absque dubio vere spontanea.

21. *Desmodium reticulatum*, Champ., forma foliis omnibus unifoliolatis. Circa Hoi-hau, ins. Hai-nan, aest. 1877, collegit Bullock. This is certainly specifically identical with the Hong-Kong plant, the lower leaves of which have not unfrequently but one leaflet.

22. *Derris oblonga*, Benth. Inter rupes ad ripas limosas fl. Cantonensis, fl. Aprili fr. Jun.-Jul., 1870, detexit Sampson. Now first recorded from China.

23. *Scotanthus tubiflorus*, Naud. ? Circa Hoi-hau, ins. Hai-nan, aest. 1877, coll. Bullock. Apparently referable to this species, but the calyx-tube is much more woolly than represented by Naudin. ('Ann. sc. nat.' 4e. sér. xvi., t. 3.)

24. *Bruguiera cylindrica*, Bl. Circa Hoi-hau, ins. Hai-nan, aest. 1877, coll. Bullock. Identical with Pierre's plant from Phu-kok, before enumerated by me. I suspect Mr. Kurz may be correct ('Journ. As. Soc. Bengal,' xlvii., 51) in acknowledging only one species of this section, *B. gymnorrhiza*, Lam.

25. *Quisqualis indica*, Linn. Secus fl. West River, copiose; juxta Hoi-hau, ins. Hai-nan, coll. Bullock. There is, I believe, but one species of *Quisqualis* in this part of China, and I do not think either *Q. sinensis*, Lindl., or *Q. grandiflora*, Miq., have any claim to distinction.

26. *Eugenia Grijsii*, Hance. Secus fl. Lien-chau, prov. Cantonensis, supra oppidulum Tai-wan, 55 mill. pass. ab ostio, Oct.,

1876, coll. Rev. J. C. Nevin. Bacca globosa, 2-2½ lin. diametro calycis tubo semilineali 4-dentato sinubus latis coronata. Only previously known from Mr. De Grij's Fokien specimens. (See Seemann's 'Journ. Bot.' ix. 5.)

27. *Lagerstroemia indica*, Linn. In collinis circa Cantonem, necnon secus fluvios North et West Rivers; prov. Cantonensis, vulgarem et certe spontaneam collegerunt Sampson aliique.

28. *Mollugo Spergula*, Linn. Juxta Hoi-hau, ins. Hai-nan, coll. Bullock. Common in various parts of India, but I do not think it has been previously recorded from China.

29. *Sanicula lamelligera*, Hance. Secus fl. North River, juxta confluentiam fl. Lien-chau, m. Oct., 1876, coll. domina L. Whilden. Miss Whilden brought away a specimen of this, dug up amongst some ferns, and it has since flowered and fruited abundantly, on a piece of damp rock-work. From the living plant I am enabled to add a few details and corrections to the original character of this noteworthy species. Planta pedalis, umbellis nonnunquam usque ad 16-radiis nunc compositis, petalis pallide violaceis obtusiusculis inflexis (haud retusis), antheris virgineis pallide violaceis cassis albidis, fructibus ovoideis lateraliter conspicue compressis commissura lata mericarpiis facile secedentibus lamelli vel costulis 10 subundulatis auctis, vittis sub singula costula solitariis. Maximowicz's *S. tuberculata* appears intermediate between *S. bipinnata*, H & A., and *S. tuberosa*, Torr. The present is the only known species of the genus with distinct wing-like ribs to the fruit, and is a very remarkable one.

30. HEDYOTIS (*Diplophragma*) AMPLIFLORA, *sp. nov.* Caulibus diffusis subancipitibus lineis duabus pilosis percursis, stipulis ovatis 3-5-setosis, foliis 1½-3 poll. longis 10 lin. latis breviter petiolatis elliptico-lanceolatis basi cuneatis apice acuminatis supra opacis præter nervos parce strigillosos glabris subtus pallentibus hirtellis costa nerulisque tenuibus arcuatis 3 utroque latere elevatis, inflorescentia terminali ampla repetito-dichotoma corymbosa strigillosa, bracteae bracteolisque lanceolatis, floribus longiuscule pedicellatis 1½ lin. longis, calycis lobis tubo æquilongis linearibus acutis plus minus recurvis, corolla extus glabra fauce dense albo-hirsuta, stylo exserto stigmatate bilobo incrassato, capsula subcompressa vertice rotundata leviter emarginata ultra calycem producta in cocos bipartibiles dehiscente, seminibus in utroque loculo 2 rugosissimis. In ins. Hai-nan, circa Hoi-hau, æst. 1877, coll. Bullock. (Herb. propr. n. 20,321.)

31. HEDYOTIS (? *Diplophragma*) EFFUSA, *sp. nov.* Glaberrima, caulibus gracilibus, stipulis triangulatis integerrimis, foliis brevissime petiolatis ovato-lanceolatis acutis supra subopacis subtus pallidis obscure penniveniis 1½-3 poll. longis 8-15 lin. latis, cymis terminalibus compositis dichotomis ramis ramulisque divaricatis, floribus 2 lin. longis, calycis ovoidei dentibus parvis, corolla infundibulari, stylo exserto, stigmatate bicurvi, capsula subrotunda vertice plana in cocos monospermos secus ventrem dehiscentes partibili. Secus fl. West River, prov. Cantonensis, m. Junio, 1864, coll. T. Sampson. (Herb. propr. n. 11,230.)

32. *HEDYOTIS* (*Diplophragma*) *CAPITULIGERA*, *sp. nov.* Caule simplici quadrangulo lineis alternis pilosis percurso, stipulis apice 2-4 setosis, foliis breviter petiolatis oblongo-lanceolatis obtusis v. acutiusculis supra glabris subtus pallidioribus præter costam nervosque tenues lineatos utrinque 6 strigillosos glabris, floribus in capitula globosa multiflora ad apices ramorum 1-2 poll. longorum caulem quasi umbellatim terminantium congestis bilinealibus, bracteis parvis linearibus, dentibus calycinis parvis triangulatis, corolla infundibulari lobis obtusis fauce intus hirta, genitalibus breviter exsertis, capsula compressa polysperma. Secus ripas fl. North River, prov. Cantonensis, d. 26 Julii, 1864, legit Sampson. (Herb. propr. n. 11,402.)

The above three plants are quite distinct from any Asiatic species in my herbarium. I believe I have placed them in the right section, but the correct location of *Hedyotides* is a task of great difficulty. I almost fear Sir Joseph Hooker has rather cut than united the Gordian knot by the elevation to generic rank of so many of the old sections. In many cases they are almost impossible to distinguish, and are often not at all well marked by habit.

33. *Pæderia chinensis*, Hance.* I find the ripe fruit of this, which I have recently been able to examine, agree substantially with Sir J. Hooker's description of the round-fruited species ('Gen. Plant.' ii., 134) except that I fail to detect any thickening of the margin of the integument. On the inner faces of the pyrenes the union between the endocarp and testa is loosened, and this gives them an appearance of considerable tumidity there, especially when moistened. Gaertner's figure ('Suppl. Carpol.' t. 195, f. D.) represents the layer of albumen narrower as regards the width of the embryo than in my plant, in which, too, the embryo, in transverse section, instead of being shaped like a caraway, has a swelling at the junction of the cotyledons and the radicle.

34. *Artemisia vestita*, Wall. Prope Ta-chiao-sze, ditionis Pekinensis, Sept., 1874, Dr. O. a Moellendorff. New to the Peking flora. (See 'Spicilegia,' fasc. 2, n. 27.)

35. *Hieracium umbellatum*, Linn. In monte Po-hua-shan, Chinæ borealis, d. 6 Octobris, 1874, coll. Dr. O. a Moellendorff.

Found in various parts of Siberia, Amuria, Dahuria, and Mongolia, but not to my knowledge previously recorded from China.

36. *Adenophora trachelioides*, Maxim. Chi-fu, Oct., 1874, coll. F. B. Forbes. This, which Mr. Hemsley, under the impression that it was new, has named *A. Isabella*, is quite identical with a Peking plant received from Dr. Wells Williams, which I refer without hesitation to Maximowicz's species.

37. *Primula Maximowiczii*, Regel. In summo monte Po-hua-shan, d. 20 Junii, 1875, coll. Dr. O. a Moellendorff. I cite this species for the purpose of noting that it is the same as my *P. oreocharis*. Dr. Regel, who forestalled me by a very short time

* See last fasciculus, n. 26.

in naming it ('Act. hort. Petrop.' iii., 139) takes exactly the same view of its position as I do; and I am truly glad my specific name is superseded by that of the excellent and amiable botanist to whom he has dedicated it. Dr. v. Moellendorff, when sending specimens of this lovely plant, wrote:—"Amicus noster cl. Dr. Bretschneider erravisse mihi videtur colorem hujus floris saturate purpureum appellans. Equidem, nullum nisi rubrum (tamquam *Lilii tenuifolii*) florem vidi. *Primula* speciem a cl. P. David in opere suo "Renseignements," etc., enumeratam, eandem esse credo, ejus colorem auctor franco-gallice 'rouge ponceau' esse scripsit. Nonnunquam etiam caulis hujus stirpis ruber v. rubescens invenitur." A primrose like this, with flowers of the colour of a corn-poppy, would unquestionably be a fine addition to European gardens, and it would, of course, be perfectly hardy.

38. *Jasminum undulatum*, Willd. In fruticetis ditionis Cantonensis vulgaris. Mr. Baker has quite recently ('Fl. Maurit.' 221) referred this as a synonym to the well-known *J. Sambac*, Ait. If, as I believe there is no doubt, the Canton plant belongs to Willdenow's species, the two appear to me (and I have both living before me) utterly and unmistakably distinct in habit, colour and shape of leaves, and flowers.

39. *Bonnaya reptans*, Spr. Cantone, ipse primum legi, Nov., 1856; in interioribus provinciæ hinc inde occurrens quam *B. brachiatam* tamen multo rarior. The remaining Chinese species have been enumerated by M. Maximowicz ('Mél. Biol. Acad. St. Pétersb.' ix., 421.)

40. *Eranthemum crenulatum*, Wall. In montibus prov. Kiang-si, a. 1873, coll. Dr. O. a Moellendorff; in ins. Hai-nan, juxta Hoi-hau, a. 1877, detexit Bullock.

41. *Peristrophe tinctoria*, N. ab E. Circa Hoi-hau, ins. Hai-nan, invenit Bullock. These and Dr. von Moellendorff's Kiu-kiang specimens are the only ones I have seen of Chinese origin.

42. *Myoporum (Pentacelium) chinense*, A. Gr. Ad ripas fluvii juxta Pak-hoi, ora australiori prov. Kwang-tung, m. Dec., 1877, coll. T. L. Bullock. A very southerly station for a plant hitherto, as far as I am aware, only found on the Fokien coast.

43. *Clerodendron squamatum*, Vahl. Circa Hoi-hau, ins. Hai-nan, a. 1877, coll. Bullock et Stuhlmann.

44. GENIOSPORUM HOLOCHELUM, *sp. nov.* Caule ramisque hispidis, foliis oblongis acutiusculis leviter serratis in petiolum brevem angustatis utrinque setis albidis articulatis adpressis hispidis $1\frac{1}{2}$ - $1\frac{3}{4}$ poll. longis semipollicem latis, verticillastris multifloris in spicam densam cylindraceam sesquipollicarem congestis, floribus vix bilinealibus breviter pedicellatis, calycibus villosissimis bilabiatis labio superiore 4-nervi nervis apice anastomosantibus truncato integerrimo tenuissime glanduloso-ciliato inferiore duplo brevioro integerrimo obtuso, corollæ calycem duplo excedentis labiis extus glanduloso-pilosis, genitalibus exsertis, filamentis glanduloso-pilosis. Juxta Pak-hoi, ad oram australiorem, prov. Kwang-tung, m. Novembri, 1877, coll. T. L. Bullock. (Herb. propr. n. 20,515.)

This curious plant differs in the structure of its calyx from all

described species, agreeing rather with the Madagascar *Acrocephalus villosus*, Benth., and appears to point to the propriety of combining the two genera. Technically, indeed, it is rather an *Acrocephalus*, but it is certainly less close to *A. capitatus*, Benth. !—the only Asiatic species—than to *G. elongatum*, Benth. ! which is apparently its nearest ally, and which it is a good deal like both in foliage and inflorescence.

45. *Perilla ocimoides*, Linn. In ruderalis infra moenia urbis Cantonis, Oct., 1869, detexit Sampson.

46. *Amarantus retroflexus*, Linn. Prope Ta-chiao-sze, ditionis Pekinensis, m. Sept., 1874, leg. Dr. O. a Moellendorff. This widely-spread weed, suspected by Dr. Cosson to be of American origin ('Ann. sc. nat.' 3e. sér vii., 212), has been found in various parts of Siberia; but the present is, I believe, the first indication of its occurrence anywhere in China.

47. *Aerua scandens*, Moq., var. *minor*. In bambusetis prope pagum Sai-nam, secus fl. North River, prov. Cantonensis, d. 15 Sept., 1866, coll. Sampson et Hance. The Chinese plant is certainly referable to this species, in Dr. Thwaites's judgment, but it looks very unlike the Panjab and Sikkim specimens distributed by Hooker and Thomson.

48. *Polygonum Donii*, Meissn. Accepi a variis imperii chinensis regionibus, ipseque in provinciis Fokienensi atque Cantonensi legi. Mr. Benthham considered the Chinese plant as a variety of *P. barbatum*, Linn., but it is much slenderer, agrees perfectly with Meissner's diagnosis, and is more like *P. Posumbu*, Ham. From Peking and the North River I have specimens with the leaves glabrous beneath, but with conspicuous raised granular dots, and the primary veins less distinct.

49. *Polygonum serrulatum*, Lag. Ad ripas fl. Cantonensis, m. Sept., 1866, legg. Sampson et Hance. Though very widely distributed, not, I believe, before recorded from China.

50. *Aporosa lanceolata*, Thw. In silva supra monasterium Ting-ü-shan, secus fl. West River, d. 10 Julii, 1870, leg. Sampson. Not before reported from China.

51. *Betula alba*, Linn., subsp. *latifolia* v. *Tauschii*, Rgl. In monte Po-hua-shan, Chinæ bor., d. 6 Oct., 1874, coll. cl. Dr. O. a Moellendorff.

52. *Betula davurica*, Pall. Cum priore.

53. *Betula Ermani*, Cham. Cum præcedentibus. M. Maximowicz, in his 'Index floræ Pekinensis,' mentions but one species of Birch, which he refers doubtfully to *B. davurica*. I have before had occasion (Trimen's 'Journ. Bot.' xiii., 137) to speak of three species found on Po-hua-shan by Dr. Bretschneider. The specimens now forwarded from the same locality by Dr. O. von Moellendorff are far from satisfactory, being too much advanced, the catkin-scales and nucules very deciduous, and the second only having any leaves. Nevertheless, a careful comparison with authentic specimens in my herbarium makes me feel quite confident as to the accurate determination of the second and third, and tolerably certain also with regard to the first. Dr. von Moellendorff

sent specimens of a fourth species, unfortunately in an equally unsatisfactory condition, and also entirely leafless. It is unquestionably distinct from the others, and, judging only from the figures (t. ix., figg. 6, 8, 9-12), in Dr. Regel's 'Monographia Betulacearum,' published at Moscow in 1861, I was disposed to refer it to the tree he at first considered as a variety *sibirica* of *B. nana*, Linn., but which, in his second review of the order for DeCandolle's 'Prodromus,' he transferred as a variety *rotundifolia* to *B. glandulosa*, Mx., for it agrees well both in the shape of the catkin-scales and in the scarcely margined nucules. In this case it would, of course, be a dwarf species, but I have no information as to the habit of Dr. v. Moellendorff's tree. It may possibly be new, but this can only be determined when proper materials are obtained.

54. *Salix tetrasperma*, Roxb. Ad ripas rivuli juxta Shek-mun, ditionis Cantonensis, Nov., 1869, leg. Sampson.

55. *Salix* ? *populifolia*, Anderss. In ripis limosis, Cantone, Jan., 1870, specimina ♂ florifera detexit Sampson. The leaves of this plant exactly resemble Andersson's figure ('Monogr. Salic.' t. 1, f. 5), but the branchlets, instead of being glabrous, are densely fusco-tomentose. Though, in the absence of female flowers, it is impossible to form a trustworthy judgment, I doubt, notwithstanding the very differently shaped leaves, whether this is more than a variety of the preceding. My *S. cantonensis*, according to Andersson's classification, falls into the group *Pleiandra*, *fragiles*, and I feel satisfied that its nearest relationship is with *S. fragilis*, Linn. My diagnosis is so imperfectly copied into the 'Prodromus' as to give no clue to its affinities.

56. *Zingiber Zerumbet*, Rosc. In silvis circa cœnobium ad Ting-ü-shan, prov. Cantonensis satis copiose crescens, invenerunt Sampson et Hance, d. 17 Julii, 1872. Undoubtedly truly wild.

57. *Microtis parviflora*, R. Br. In graminosis circa Tam-sui, ins. Formosæ, m. Aprili, 1864, legit infaustus Oldham.

58. *Lloydia serotina*, Rehb. In m. Siao-wu-tai-shan, Chinæ borealis, m. Julio, 1876, coll. Hancock.

59. *Smilax perfoliata*, Lour. In ins. Hai-nan, Martio, 1868, coll. b. Swinhoe. On the stout main stem of this rare species the cirrhi are fully developed, and arise from the axil formed by the petiole and the upper margin of the very conspicuous amplexicaul rigid scarious stipule; in the branchlets, where the stipules are much smaller, the cirrhi are reduced to short spinous processes, occupying, of course, the same position.

60. *Arisæma ringens*, Schott. In silvis ad Tam-sui, Formosæ septentrionalis, m. Apr., 1864, leg. def. Oldham. Only recorded hitherto, I believe, from Japan.

61. *Amorphophallus campanulatus*, Bl. Not particularly uncommon, I believe, in South China, but rarely flowering. Widely spread over the tropical regions of continental and insular India, in the Archipelago, Madagascar, and New Guinea. Very troublesome and disagreeable to dry, from the size and fleshiness of the inflorescence, and its dreadfully overpowering odour of putrefying flesh.

62. *Rhaphidophora pinnata*, Schott. Ad Lien-fa-shan, secus fl. Cantonensem, ipse legi, d. 3 Maii, 1869. Known only hitherto from Timor and Eastern tropical Australia.

63. *Cyperus globosus*, All. Prope vicum Ta-chiao-sze, ditiois Pekinensis, m. Sept., 1874, coll. Dr. O. a Moellendorff.

64. *Cyperus Fragrostis*, Vahl. Cum præcedenti specie. I find South Chinese specimens to be sometimes diandrous. Both these widely diffused *Cyperis* are additions to the Peking flora.

65. *Fimbristylis subbispicata*, Nees & Meyen. Ad Ta-chiao-sze, pagum inter septentrionem et solis occasum situm, m. Aug., 1874, coll. Dr. O. a Moellendorff. Known previously only from Southern China, as far north as Amoy, and from the Philippines.

66. *Fimbristylis ovalis*, N. ab E. Prope eundem vicum, Sept., 1874, leg. Dr. O. a Moellendorff. Occurs in various parts of India, in Ceylon, and in New Caledonia (Vieillard, n. 1448), but had not before, I believe, been found anywhere in China. No *Fimbristylis* is mentioned in Maximowicz's 'Index floræ Pekinensis,' and the detection of the above two species affords another example of the mingling of northern and tropical forms in Eastern China.

67. *Scirpus triqueter*, Linn. Prope Ta-chiao-sze, Aug., 1874, leg. Dr. O. a Moellendorff. I have previously recorded this as a native of the Canton flora (Trimen's 'Journ. Bot.' xii., 329.) I am now enabled to add it to the Peking list.

68. *Scleria elata*, Thw. In montibus Pak-wan, supra Cantonem, d. 22 Junii, 1870, leg. Sampson. Not hitherto known from China.

69. *Panicum villosum*, Lam. Circa Macao ipse legi, Junio, 1863; in ditioe Amoyensi, Maio, 1866, necnon in ins. Wong-mau, 40 mill. pass. ad occid. coloniæ Macaiensis sita, exeunte Julio, 1867, invenit Sampson. Found in various parts of India and Ceylon, but not known previously from China. I give the name—already suspected to belong here by Nees—on the authority of General Munro. It is the *P. coccospermum* of Steudel.

70. *Sorghum halepense*, Pers. Secus fluvios prov. Cantonensis in pluribus locis] vulgo invenitur, nonnunquam gregarie crescens, longosque tractus segetis instar occupans, nullibi tamen, ut videtur, cultum.

71. *Melica nutans*, Linn. Versus cacumen m. Po-hua-shan, Chinæ bor., alt. 6-7000 ped., d. 20 Junii, 1875, coll. Dr. O. a Moellendorff. Plentiful in Amuria, but new to the Peking, and, I believe, to the Chinese flora.

72. *Rottboellia exaltata*, Linn. f. In fossis circa Amoy, ipse legi m. Octobri, 1857; in subhumidis ins. Danorum, Whampœ, d. 6 Aug., 1873, primus detexit filius Alfredus. New to the Canton flora.

73. *Leptochilus quercifolius*, Fée. Ad ripas deruptas in convallibus montium Pak-wan, juxta Cantonem, ipse legi, d. 23 Julii, 1871; iterumque secus fl. West River, Jul., 1872. Though recorded by Fée as gathered in China by Moreau, I am not aware that it has been found by any collector for many years past,

nor does any specific locality for it appear to have been previously given.

74. *Asplenium prolongatum*, Hook. Specimina in parva insula juxta Hong-Kong, a. 1872 lecta communicavit cl. C. Ford. Not, I believe, heretofore recorded from China. United by Baker with *A. rutifolium*, Kze., but all the specimens I have seen from India, Ceylon, and Japan are very constant in form, and it appears to me more distinct than *A. borbonicum*, Hook., which, though kept apart by Mr. Baker, was regarded as a variety of *A. rutifolium* by Mettenius.

75. *Polypodium hemionitideum*, Wall. In continenti chinensi prope Hong-Kong, a. 1872. Commun. C. Ford. Only previously known from the mountainous regions of India.

ON FOUR NEW SPECIES OF *EREMURUS* FROM PERSIA.

By J. G. BAKER, F.R.S.

THE four following new species of the fine Asphodelaceous genus *Eremurus* were discovered by Dr. Bunge in Persia in the years 1858 and 1859. My descriptions are taken from specimens sent by Dr. Cosson to the Kew herbarium this present summer. The numbers prefixed to the names refer to my monograph of the genus in the fifteenth volume of the 'Journal of the Linnean Society.'

1*. *EREMURUS* (*EU-EREMURUS*) *BUNGEI*, *Baker*, n. sp. Root fibres cylindrical, the crown of the root surrounded both by fibres and membranes. Leaves cotemporary with the flowers, linear, a foot long, under $\frac{1}{4}$ inch broad, firm in texture, glabrous on the faces, minutely ciliated at the edge. Scape terete, moderately stout, a foot long, glabrous. Raceme oblong, dense, 4-5 inches long when in full flower, above 2 inches in diameter, including the exerted stamens. Pedicels erecto-patent, $\frac{1}{2}$ - $\frac{2}{3}$ inches long, articulated at the tip. Bracts subulate, flexuose, shorter than the pedicels, glabrous. Perianth bright yellow, 4-4 $\frac{1}{2}$ lines long; segments oblong, reflexing from above the base, $\frac{1}{8}$ inch broad, furnished with a distinct green keel. Stamens finally twice as long as the perianth; anthers minute, oblong. Ovary minute, globose; style declinate, an inch long. Immature fruit the size of a small pea.

Persia, between Nischapur and Medsched, 13th July, 1858, in full flower. *Bunge Liliacea*, No. 3!

12*. *EREMURUS* (*HENNINGIA*) *ALBOCITRINUS*, *Baker*, n. sp. Root and leaves not seen. Scape above a foot long, moderately stout, terete, glabrous. Raceme finally above a foot long, moderately dense, an inch and a half broad when expanded. Pedicels $\frac{3}{8}$ - $\frac{5}{8}$ inches long, erecto-patent, articulated at the tip. Bracts minute, lanceolate, brown, scariose, glabrous, at most a third of the length of the pedicels. Perianth white, with a yellow throat, 5 lines long; segments oblong, reflexing from near the base, $\frac{1}{8}$ inch

broad, furnished with a distinct green keel. Longest stamens finally equalling the perianth; anthers minute, oblong. Declinate style $\frac{5}{8}$ inch long. Capsule globose, the size of a pea.

Persia, between Nischapur and Medshed, 22nd June, 1858. Top of raceme in flower, base in fruit. *Bunge Lil.*, 2!

14*. EREMURUS (HENNINGIA) PAUCIFLORUS, *Baker*, n. sp. Leaves cotemporary with the flowers, above a foot long, erect, linear, firm in texture, channelled down the face, $\frac{1}{4}$ – $\frac{3}{8}$ inch broad, minutely ciliated at the edge. Scape a foot long, stout, terete, pubescent. Raceme lax, few-flowered for the genus, nearly a foot long when fully expanded; axis stout, sulcate, pubescent. Pedicels ascending, $\frac{1}{4}$ – $\frac{1}{2}$ inch long, articulated a little below the tip. Bracts lanceolate, $\frac{1}{4}$ – $\frac{1}{3}$ inch long, pubescent, white with a brown keel. Perianth tubular, 5 lines long; segments ligulate, a line broad, whitish with a brown keel, not reflexing. Longer stamens finally equalling the perianth. Style exerted, finally $\frac{3}{4}$ inch long. Capsule globose, one third of an inch in diameter.

Persia, near Eschrebad, 7th May, 1859, in full flower. *Bunge Lil.*, 6!

18*. EREMURUS (HENNINGIA) LUTEUS, *Baker*, n. sp. Root-fibres cylindrical, the crown of the root surrounded by fibrous and membranous relics of old leaves. Leaves numerous, cotemporary with the flowers, linear, glabrous, erect, a foot long, $\frac{1}{8}$ – $\frac{1}{5}$ inch broad, firm in texture, channelled down the glabrous face, minutely ciliated at the edge. Scape stout, terete, glabrous, a foot long. Flower-raceme moderately dense, 3–4 inches long, 2 inches in diameter when expanded. Pedicels erecto-patent, $\frac{1}{2}$ – $\frac{3}{4}$ inch long, articulated at the tip. Bracts lanceolate, white with a brown keel, acuminate, $\frac{3}{4}$ –1 inch long, densely ciliated. Perianth bright yellow, $\frac{5}{8}$ inch long; segments oblong-spathulate, reflexing from near the base, $\frac{1}{6}$ inch broad, furnished with a distinct brown keel. Longest stamens distinctly shorter than the perianth-segments; anthers bright yellow, oblong, under a line long. Declinate style finally $\frac{3}{4}$ inch long.

Persia, near Sser-Tschah, 14th March, 1859, in full flower. *Bunge Lil.*, 4!

SHORT NOTES.

SCIRPUS PARVULUS, *R. & S.*, IN S. DEVON.—I write to correct an error in my paper on the Flora of the extreme south of Devon, inserted in the number of 'Journal of Botany' for October last (vol. vii. N. S. p. 298). After giving *Scirpus Savii* as a plant of the district I went on to say: "Another species, *S. acicularis*, we did not find anywhere in the tract about Kingsbridge, but discovered growing plentifully in pools and pits in a salt-marsh by the Avon, at Aveton Gifford." I recently sent Mr. Watson a specimen of this *Scirpus*, and he has just called my attention to the fact of its being *parvulus*, not *acicularis*. The latter does not grow anywhere about Plymouth, and, from not being familiar with its

appearance, I stupidly took the much rarer *parvulus* to be it. The habitat of *S. parvulus* is a salt-marsh by the tidal river Avon, about three miles from its mouth, and close to the ancient village of Aveton Gifford. Among the plants associated with it there I noticed *Enanthe Lachenalii* and *Ruppia rostellata*.—T. R. A. BRIGGS.

SURREY PLANTS.—*Teucrium Botrys*. As this plant is recorded in the December number of the 'Journal of Botany' as having recently been found by Mr. H. Pierson near Addington, it may be well to state that Mr. John Flower, of Croydon, found it there in 1875. In the two following years the open chalky field in which the *Teucrium* grows was under cultivation, and not a single plant could be obtained. This year (1878) the field has been lying fallow, and the *Teucrium* has again appeared, and in the greatest profusion. The locality (if the same as Mr. Pierson's) is more correctly described as "between Selsdon and Sanderstead," and is probably in reality the station of "about Sanderstead" recorded in the 'Phytologist,' iv. p. 1095 (1853) by Mr. Borrer, who saw in Chelsea Garden a plant said by Mr. Anderson, "the late Curator," to have been brought thence.—*Trifolium glomeratum*. As this plant is now, I believe, extinct in the only two stations recorded for it in Surrey, I take this opportunity of mentioning a new one, viz., a gravelly bank on the Addington Hills, near Croydon, where I have seen it growing abundantly for the last three years.—W. H. BEEBY.

CAREX PUNCTATA, *Gaud.*, IN SOUTH HANTS.—When searching (without success) for *Chara connivens* at Stokes Bay, in July last, I found *Carex punctata* in the valley of the Alver Stream, about half a mile from the coast. As all the counties given for this plant in 'Topographical Botany' are quite on the western coast, this considerably extends its recorded distribution.—JAMES GROVES.

Notices of Books and Memoirs.

ON THE VEGETABLE REMAINS IN THE EGYPTIAN MUSEUM AT BERLIN.

BY ALEXANDER BRAUN.

Edited from the Author's MSS. by P. ASCHERSON and P. MAGNUS. ('Zeitschrift für Ethnologie,' ix., 1877).

The inducement to examine the vegetable remains preserved in this (the Berlin) Egyptian Museum, was supplied by the surprising discovery of Prof. Oswald Heer of Zurich, that the flax found in the Lake-dwellings does not belong to the now generally cultivated species *Linum usitatissimum* (L.), Mill., but to *Linum angustifolium*, Huds., a species which is not cultivated now, but may be met with growing in a wild state in the whole Mediterranean region up to the German frontiers, in France, and in the

British Islands. This perennial species may be distinguished at the first glance from the annual *Linum usitatissimum*, by its dividing into numerous branches immediately above the root. Its fruits and seeds are only half the size of the last-named species. As it is known that Heer is inclined, for several reasons, to assume an African origin for the cultivation of this plant found in the Lake-dwellings, it would be at any rate of the highest interest to make sure whether the flax cultivated in ancient Egypt agrees with that of the Lake-dwellings. At the request of Professor Heer, the vegetable remains preserved in this Egyptian Museum were therefore examined with this object. The result was certainly not very satisfactory, since there were found only three seeds of *Linum*, and these among seeds the authenticity of which may be doubted on very serious grounds.

These three seeds belong to two different species; one certainly belongs to *Linum angustifolium*,* the two others to *Linum humile*, Mill. (*L. usitatissimum* var. *crepitans*, Schübl. & Martens, the so-called "Klenglein," the fruits of which burst open on becoming ripe, while they remain closed in *L. usitatissimum*, Mill., "Schliess" or "Dreschlein," very commonly cultivated in Central Europe). As, however, these seeds were mixed in so small a quantity with the seeds of other cultivated plants, the former with those of *Lactuca sativa*, and the latter with those of *Nigella sativa*, the supposition is probable that they belonged to weeds accidentally present among these cultivated plants. The occurrence of *Linum humile* has therefore a special interest, as this is the only species cultivated in Abyssinia. As to its uses there, W. Schimper gives the following information: †—

"The cultivation of this plant is neither for producing oil nor the manufacture of flax. Its only use is as a miserable famine-food, prepared from the (seeds) grains which, first roasted and pounded, are then mixed with cold water and form a soup, which is eaten with the addition of salt and pepper. This is also the almost daily nourishment of the poor classes."

It is, of course, not impossible that the flax cultivated in ancient Egypt was *Linum humile*. ‡ Unger certainly states that he found

* *Linum angustifolium* is now unknown in Egypt, but probably exists in Cyrenaica, which bounds it on the west (Rohlf's, compare Cosson 'Bull. Soc. Bot. France,' 1875, p. 46), and in Palestine, which bounds it on the east (Boissier 'Fl. Or.', vol. i. p. 861).

† Schweinfurth, 'Beitrag zur Flora Aethiopiens,' Berlin, 1867, p. 28.

‡ The circumstance that I have as yet seen only *Linum humile* from Egypt is in favour of this conjecture; in the Berlin Botanical Museum there are specimens raised from seeds brought by Geheimrath Lepsius. I found this species cultivated in Fajum: Ehrenberg at Fuah in the Delta, and at Cairo, laid up among other cultivated plants; Boissier has also found this species in Egypt under similar circumstances ('Fl. Orient.' i. 1861). It remains to be settled whether *Linum usitatissimum*, Mill., was cultivated in Egypt before modern times; the "Lin de Riga" and "Lin de Pskoff," which are given in De Chevalerie's 'Catalogue rais. des produits de l'hortic. et de l'agric. expos. la par direction des domaines du Khedive d'Egypte (Expos. intern. a Cologne en 1875),' may probably belong to this species.

in a piece of brick given by Prof. Lepsius a fragment of a capsule of *Linum usitatissimum*;* this naturalist in all probability excludes *L. angustifolium* only. He did not take into consideration *L. humile*, Mill., which in this condition could scarcely be distinguished from *L. usitatissimum*. Since there are old Egyptian flax-seeds in the Museum of Bulaq (Mariette, Notice &c., p. 243), the doubt as to the species cultivated in ancient Egypt may be soon solved.

That flax was cultivated in great quantities and used in many ways in ancient Egypt is known. Mummy-clothes are always of linen,† and priests were compelled to wear linen garments. In our Egyptian Museum there are two combs or heckles which have been used in the preparation of flax, and between the teeth of which the remains of threads were found, which on microscopic examination turned out to be flax.‡

Unger (*l. c.*, p. 46) found a thread of flax in a brick of the pyramid of Dahschûr, by which the cultivation of this plant is carried back to 4000 years before Christ.

If the searching for flax-seeds gave no distinct result, the other vegetable remains preserved in the Egyptian Museum offered a subject of higher interest. These were chiefly from two sources. A number of smaller seeds were brought home by the well-known traveller, Von Minutoli, from that great expedition to which Ehrenberg was naturalist. As Ehrenberg himself remarks in a still extant letter, addressed on the 16th December, 1831, to Joseph Passalacqua, then Director of the Egyptian collection, the fresh appearance of these seeds, and in several cases their still existing characteristic taste and smell, § make their ancient origin highly suspicious. We will therefore, in this communication, leave the Minutoli seeds out of the question.

Much more important, on the other hand, are the other vegetable objects which the above-mentioned Passalacqua acquired, mostly from the tombs of the Necropolis at Thebes, and indeed he took a number from one tomb until then completely undisturbed, which he opened on the 4th December, 1823. His collection was exhibited in Paris in 1826, where Professor Kunth, then staying there, made the vegetable remains the object of a careful examination. || Ehrenberg has, in the letter above-mentioned, dated 1831, subjected these plants to a criticism with the results of which we can generally agree. Another examination of this important collection is desirable, as the naturalist who lately occupied himself most particularly with the vegetation of ancient Egypt, Franz

* 'Sitzungsberichte der Wiener Akad. Math.-Naturw. Classe.' liv. Bd. 1 Heft. Abth., Juni, 1866, p. 47.

† Compare 'Ascherson in Verhandlungen der Berliner Anthropologischen Gesellschaft,' 1875, p. 58.

‡ Not *hemp*, as given in Passalacqua's 'Catalogue raisonné, etc.', p. 23.

§ This is still strong in *Cuminum Cyminum* and *Artemisia judaica*.

|| J. Passalacqua, 'Catalogue raisonné et historique des antiquités en Egypt.' Paris, 1826, p. 227-229. 'Examen botanique des fruits et des plantes,' par M. Kunth. And C. Kunth, 'Recherches sur les plantes trouvées dans les tombeaux égyptiens,' par M. Passalacqua. 'Ann. des sc. nat.' t. viii. (1826), p. 418-423.

Unger,* did not see it, and his statements might be corrected in many points by the result.

The sources from which we have gained our knowledge of the vegetation of ancient Egypt are the following :—

(1.) By far the most important and most authentic evidence are the pieces of plants which have been found, for the most part, in a good state in old Egyptian tombs, and have been preserved in the different museums. Besides the museum here, the collections at Vienna, Leyden, Paris, London, Turin, Florence and Bulaq,† near Cairo, possess more or less numerous objects of this kind, which mostly still want scientific examination.

(2.) It was a happy thought of Unger to examine for organic fragments the unburned clay-bricks, of which many still well-preserved monumental buildings—*e. g.*, several pyramids of the group of Dahschûr—are built. Treated with water these bricks completely dissolve, and the straw intentionally used in their manufacture, as well as many vegetable remains accidentally sticking in the mass, are set free. New facts as to the cultivated plants of ancient Egypt are certainly only exceptionally to be gained in this way, since most found are only remains of marsh plants and weeds. Unger has, however, in this way ‡ discovered the fact of the cultivation of *Eragrostis abyssinica*, Lk., in ancient Egypt, which has not yet been otherwise proved.

(3.) Many discoveries prove the existence of the manufacture from vegetable substances of textile fabrics, basket-work and wooden objects of many kinds.

(4.) The numerous figures of plants found on old Egyptian monuments give us also much information about the plants employed in the life of the ancient Egyptians for sacred or profane purposes. Although in some cases the characteristics have been happily caught in these figures, the illustrations of plants are on the whole far inferior to those of animals, of which, for instance, the fishes of the Red Sea, mostly determined as to genus and species by Prof. Doenitz, have been rendered with much truth in El-Dér-el-bachri.§ Unger has expended much labour on the

* F. Unger. 'Botanische streifzüge auf dem Gebiete der Culturgeschichte.' IV. 'Die Pflanzen des alten Aegyptens.' (Sitzungsberichte der kaiserlichen Akademie der Wissenschaften in Wien, Math. Naturw. Classe. xxxviii. Bd., No. 23 (4 Nov. 1859), p. 69—140, mit ix Tafeln). — V. 'Inhalt eines altägyptischen Ziegels an organischen Körpern' (*l. c.* xlv. Bd. 1 Heft, Jän, 1862), 2 Abth. p. 75—88, mit 1 Tafel). — VII. 'Ein Ziegel der Dashûr-Pyramide in Aegypten nach seinem Inhalte an organischen Einschlüssen. (*l. c.* liv. Bd. 1 Heft, Juni, 1866, 1 Abth.), p. 33—62. — VIII. 'Die organischen Einschlüsse eines Ziegels der alten Judenstadt Ramses in Aegypten. (*l. c.* lv. Bd. 1 Heft, Jän, 1867, 1 Abth., p. 198—205).

+ Prof. Braun received from Prof. Radlkofer, in Munich, a very valuable letter on the two last-named collections. A list of the old Egyptian vegetable remains to be found in Florence was sent to the editors by Dr. Stern. Specimens of a number of the objects preserved there have been sent by the kindness of their friend Dr. E. Levier.

‡ *L. c.* liv. 1, p. 42 (Dahschûr), lv. 1, p. 202 (Ramses).

§ Dumichen, 'Die Flotte einer ägyptischen Königin.' Leipzig, 1868. Taf. xx.—xxiv. p. 22.

meaning of the monumental figures of plants; nevertheless, many of his interpretations do not appear by any means certain. A few important plants on the monuments still await explanation.

(5.) Lastly, we find in the writings of classical antiquity frequent mention of the plants of ancient Egypt; of particular importance are the statements of Herodotus, who, with his well-known gift of observation and rare freshness of perception, reports on many plants in the lands over which he travelled. Compare, for instance, his characteristically short description of *Nelumbium*.

The examination of the vegetation of ancient Egypt possesses also an important bearing on botanical science. Especially prominent was the question whether any important alterations were evident on a comparison of these nearly five thousand years old vegetable remains with the present forms of the same species. But Kunth as well as Unger justly agree that no actual difference exists between the ancient and modern specimens of the same species. At the most may be observed a few unimportant variations from the present forms of the fruits of *Punica Granatum*, about to be mentioned.

(To be continued.)

Vergleichende Untersuchungen über die Entwicklungsgeschichte der Utricularien. Von Dr. FR. KAMIENSKI. ('Bot. Zeitung,' Nov. 1877).

In this paper will be found a detailed history of the development of the embryo and early growth of the acotyledonous (aquatic) portion of this genus, whose peculiarities of seed-structure were, if we are not mistaken, first studied by Professor Dickson and afterwards formed the subject of a memoir from the pen of Dr. Warming. The author takes *U. vulgaris* as the type of the aquatic section; in this he finds that the embryo-sac projects beyond the micropyle, and is directed towards a corresponding depression in the placenta. The embryo-vesicle divides by a transverse partition into two cells, one of which becomes the suspensor and the other the embryonic mother-cell: the latter now appears rounded, and divides transversely into an upper and an under cell; the former, which is also the smaller, being pushed to one side by the lateral growth of the larger, which is soon subdivided by means of an inclined wall. The midmost of these three cells takes the greater part in the formation of the embryo: immediately after its appearance it pushes to one side the top cell, so that the first-formed originally horizontal septum is now vertical. After four cells have been formed from the originally upper cell, and six from the middle one, differentiation of dermatogen begins, and the lowest of the three original cells, till now unchanged, becomes divided into three by two transverse septa. But for the formation of dermatogen the embryo at first remains undifferentiated; afterwards the epidermal cells at its top and their neighbours together make up a small-celled tissue. After the embryo has assumed the form of a flattened globe, at the

vegetative point are seen small foliar protuberances arranged on the $\frac{5}{17}$ plan. At the radicular pole there is no differentiation, neither can any hypophyse cell be formed; and finally, to crown the list of divergences from typical exogenous embryology, the vegetative point, as we have already seen, develops from the side instead of from the organic apex. From a study of germination it is concluded that the youngest-formed leaf becomes an adventitious shoot, the next youngest the leaf-bearing "axis," if the term may be allowed, the third youngest the primary bladder, and all the rest primary leaves. The author informs us that the *Montana* group does not share in the above-mentioned eccentricities, and as his paper concludes with a "Forts. folgt," we have long waited for its continuance. As, however, our patience has not as yet been rewarded, we think it advisable to make a note of the results already attained with this interesting genus.

S. M.

Kryptogamen-Flora von Schlesien herausgegeben von PROF. DR. FERDINAND COHN. *Zweiter Band, Erste Hälfte. ALGEN; bearbeitet von* DR. OSKAR KIRCHNER. Breslau, J. U. Kern's Verlag. 1878.

THE first volume of the second part of this excellent Cryptogamic Flora is given up to the *Algæ*, the subject entrusted to Dr. Oskar Kirchner. Alluding to the phycological exploration of the province, Dr. Kirchner says:—"By far the greatest part of Silesia is *terra incognita*." Of the 1988 species of European fresh-water *Algæ* cited by Rabenhorst in his *Flora Europæa Algarum*, and 1656 of Koch's *Synopsis* of the German and Swiss Flora, Dr. Kirchner states there have been found in Silesia 762, a considerable number of the smaller genera being unrepresented. It is therefore to be hoped that this excellent treatise of Kirchner's will incite a more wide-spread exploration of the *terra incognita*. The following table will show the relation of the Silesian to the German Flora in more detail—

	Germany.	Silesia.
Florideæ	17	11
Fucaceæ	1	0
Confervoidæ	181	86
Siphonææ	15	6
Protococcoideæ	183	88
Conjugatæ	391	225
Bacillariaceæ	375	195
Schizosporeæ	525	183

In his scheme of the vertical distribution of the Silesian *Algæ*, the author divides the province into four regions—the plain extending to an elevation of 150 metres, the hilly region from 150 to 500 metres, the mountainous region from 500 to 1100 metres, and the Alpine from 1100 to 1500 metres. Only 8 per cent. of the whole is to be found throughout the four regions. From the Alpine region 104 species are recorded, of which 16 are peculiar to it in the province; from the mountainous

region 131 species, of which 30 are peculiar; from the hilly region 612 species, of which 219 are peculiar, and from the plain 472, of which 116 belong exclusively to it.

Though this poverty in the number of species recorded is regretted, it has not interfered with the application of the author to the work of describing those brought to his hand. This part of the book has been done with a diligence in the accumulation, and a discrimination and precision in the recording of characters which cannot but excite the gratitude of the student. The introduction to the study of *Algæ*, in which their structure and morphology are outlined and pointed to as the basis of classification, will prove of service to those who begin this study with this as their handbook.

The *Characeæ*, it will be remembered, are specially treated of in the last volume which appeared by the late Prof. Alex. Braun, and they are therefore not included in the statistics given above.

G. M.

Recherches organogéniques sur les formations axillaires chez les Cucurbitacées. Par M. G. DUTAILLY (Ass. Française pour l'avancement des Sciences, Congrès du Havre. 1877.)

THIS paper is preliminary to a fuller exposition of the author's results. With reference to the tendril, the only axillary organ hitherto morphologically discussed by botanists, very different views have been held. M. Du Taily's organogenetic studies of *Thadiantha dubia*, *Bryonia dioica*, *Cyclanthera pedata* and *Cucurbita perennis* show that Von Tieghem's foliar theory cannot be supported, but that the tendril is a branch, as Naudin and Warming have maintained. The latter is right in stating that the leaf of this branch is often much more developed than the axis, but he is incorrect in considering this extra-axillary. The author's researches go to prove that the tendrils are always truly axillary; they are axile in nature in their basal portion, but foliar in their upper portion or branches.

The relationship of the tendril to the other axillary organs, often numerous, has also been elucidated by a study of their development, and is more simple than had been supposed. The tendril is completely independent of the principal axis, and entirely inserted on the axillary branch. In fact, all the axillary productions in the species above named, and in *Ecballium Flaterium* also, different as they appear, and complex and variable as they are, are in each case connected with one another and are not separate productions; in the axil of each leaf there exists but a single axillary (always leafy) bud. Of this the two lower internodes are extremely short, and the branches inserted on them are of a special nature. That at the lowest node is a tendril (wanting in *Ecballium*), that at the second is a flower or a more or less complex inflorescence. The third node is always normal, bearing an ordinary leaf, in the organs of which commence to appear the organs above described.

H. T.

In the 'Bulletin de la Fédération des Sociétés d'Horticulture de Belgique' for the year 1877, recently published, there will be found a catalogue of the flora of the province of Liége by T. Durand. The district is divided into the six regions, previously pointed out by M. Crépin, and localities are given for the rarer species. The list has evidently been compiled with great care, and no plant admitted without good claims; even after the rejection of no less than 211 species which have been recorded on insufficient grounds, the flora of this rich botanical district comprises 1202 species, 297 races or sub-species, and 117 marked varieties, a remarkably large number.

'Cien Helechos de Filipinas,' by Don Maximo Luguna, is a catalogue of the Ferns of the Philippines, arranged according to Hooker and Baker's 'Synopsis Filicum,' 1874, and includes 102 species. The paper was published in the 'Anal. de la Soc. Esp. de Hist. Nat.,' vol. vii., 1878.

From the same author we have also received a descriptive clavis of the *Coniferae* and *Amentiferae* of Spain, with the local names of the trees in different provinces, list of localities, &c.

The first part of the 'American Quarterly Microscopical Journal' gives promise of a valuable addition to the periodicals of its class. It is edited by G. R. Hitchcock, and contains also the 'Transactions' of the New York Microscopical Society. In Botany the number contains a 'Description of new species of Diatoms,' by H. L. Smith, with a fine plate, and 'Observations on several forms of *Saprolegnia*,' by F. B. Hine, which is illustrated by four plates, and is to be concluded in the next number.

The Report for 1877 of the Botanical Section of the Yorkshire Naturalists' Union is printed in the part of the 'Transactions' lately issued, having been read and adopted at the first annual meeting, held at Wakefield on October 6th, 1877. It is well and carefully drawn up, and contains a list of eighteen species found in the vice-county, "South-west Yorkshire," but not included in 'Topographical Botany.'

It is a good thing that our large schools should show an interest in natural science, but it is to be regretted that too great a hurry to rush into print should have led the Dulwich School Science Society to publish such a Botanical Report for 1878 as appears in its first annual volume. This consists of a 'Flora Dulwichiensis,' drawn up by two members of the School Society. No information beyond this, that the district extends from Dulwich to Boxhill is given, but a large number of the species enumerated could never have been seen, unless in gardens, in that space. *Ranunculus* "graminea," *Sedum anglicum*, *Spiranthes aestivalis*, *Cladium Mariscus*, *Adiantum Capillus-veneris* and *Carex arenaria* are examples of such erroneous or misleading entries. We have had good school floras, but Dulwich must work on a very different plan to the present to effect any such useful result.

The 'Annual Report and Proceedings of the Belfast Naturalists Field Club' for 1876-7 does not contain much botanical matter beyond some notes on the plants found during the excursion of the Club, some being additional to those recorded for the district in 'Cybele Hibernica.'

OTHER NEW BOOKS. — G. THURET and E. BORNET, 'Etudes Phycologiques,' 50 plates, fol. G. Masson, Paris, 1878 (100 fr.)— J. BRITTEN and R. HOLLAND, 'A Dictionary of English Plant-names,' Part 1 (A—F). Trübner & Co., London, 1878 (8s. 6d.)— J. S. GAMBLE, 'List of the Trees, Shrubs, and large Climbers found in the Darjeeling district, Bengal.' Calcutta, 1878. — F. DE THÜMEN, 'Fungi Pomicoli.' Braumuller, Vienna, 1878 (5 mk.)— N. TERRACIANO, 'Quarto relazione intorno alle peregrinazioni botaniche fatte nella prov. di Terra di Lavoro.' Caserta, 1878. — H. BAILLON, 'Errorum Decaisnearum graviorum vel minus cognitorum centuria prima.' Paris, 1878.

ARTICLES IN JOURNALS.—NOVEMBER, 1878.

Flora.— J. Muller, 'Lichenological notes.'— A. de Krempelhuber, 'Lichenes coll. in Repub. Argentina' (continued).— K. Prantl, 'On the arrangement of the cells in flask-shaped prothallia of Ferns.'— P. G. Strobl, 'On the flora of the Nebrodes' (continued). A. Winkler, 'On the seedling of *Dentaria pinnata*' (tab. 4).

Ann. Sc. Nat. (ser. 6, vol. vi., pts. 3 & 4). — C. Flahault, 'On the growth of the roots of Phanerogams' (continued). — J. Vesque, 'On the influence of the temperature of the soil on absorption of water by the roots.'— Id., 'Absorption directly compared with transpiration' (tab. 9, 10). — Id., 'Development of the embryo-sac in Angiospermous Phanerogams.' — J. Boehm, 'Causes of the ascent of the sap.' — (Pts. 5 & 6), S. de Luca, 'Chemical researches tending to show the production of alcohol in leaves, flowers and fruits of certain plants.'— B. Corenwinder, 'Researches on the chemical composition and functions of leaves.'— P. P. Deherain, 'On the assimilation of mineral substances by plants. II. Assimilation of soda.'

Oesterr. Bot. Zeitschr. — E. Hackel, '*Festuca austriaca*, n. sp.' J. Wiesner, 'The cycle of matter in the plant-world.'— A. Reinhold, 'On the passage of water in the plant.'— J. L. Holuby, '*Cannabis sativa*, *monoica*.'— H. Kempf, 'On the flora of Styria and Carinthia.'— V. v. Borbas, 'Botanical notes' (continued).

Botanische Zeitung. — M. Traube, 'On the mechanical theory of cell-growth, &c.' (continued). — H. Hoffmann, 'On leaf-persistence.'— E. Warming, 'Supplementary notes on development of *Cycadeæ*.'— F. Ludwig, 'On sexual generation of *Platyserium*, *Lycopodium* and *Gymnogramme*.'

Bull. Bot. Boc. France (vol. xxiv., Session Extraord. a Corse).—E. Olivier, 'Works on the botany of Corsica.'—L. Marchand, 'Organogeny of ovaries of *Datura Stramonium* and *Nicandra physaloides*' (tab. 9, 10).—J. Poisson, 'Seat of colouring matters in the seed.'—'Report of Commission to inquire into the state of the Vines of Corte affected with *Phylloxera*.'—C. Remouf, 'Plants found in environs of Corte.'—Reports of the Society's excursions.

Bot. Notiser.—O. Nordstedt, 'Ædogoniæ Americanæ, hucusque cognitæ.'—J. N. Scheutz, 'Various localities.'—J. E. Zetterstedt, 'On some hybrids of the genus *Salix* found in S. Sweden in 1878.'—Swedish botanical literature for 1877.

Bot. Tidskrift (ser. 3, vol. ii., pt. 3).—J. Lange, 'New species from the Copenhagen Bot. Garden' (tab. 2-5).—A. Jurgensen, 'On roots of *Bromeliaceæ*' (tab. 6-11).—J. Lange & H. Mortensen, 'Review of new or rare species of the Danish Flora, 1872-8.'

Magyar Novenytani Lapok.—F. Suss, 'A new self-directing microtome.'—V. de Janka, 'Botanical travels in Turkey' (I. Rustchuk, Tirnova).

Monthly Microsc. Journ.—P. Petit, 'New genera and species of *Diatomaceæ*' (tab. 14, 15).

American Naturalist.—L. F. Ward, 'On the natural succession of the Dicotyledons.'—G. E. Davenport, '*Aspidium spinulosum* and its varieties.'

Journ. Linn. Soc. Lond. (no. 99, Nov. 5).—E. Lockwood, 'Note on the Mahwa tree, *Bassia latifolia*.'—F. Meehan, 'On the laws governing production of seed in *Wistaria sinensis*.'—J. G. Baker, 'Synopsis of *Hypoxidaceæ*.'—J. Miers, 'On some genera of *Olacaceæ*' (tab. 5-7).—M. C. Cooke, 'Fungi of Texas.'—R. J. Lynch, 'Mechanism for fertilization of *Meyenia erecta*.'—Id., 'Seed-structure and germination of *Pachira aquatica*' (tab. 8).—J. Miers, 'On *Marupa*, a genus of *Simarubaceæ*' (tab. 9).—J. Stirton, 'Remarks on Mr. Crombie's paper on the "Challenger" Lichens.'—J. G. Allman, 'Note on probable migration of *Pinguicula grandiflora* through agency of birds.'—C. B. Clarke, 'On two kinds of dimorphism in *Rubiaceæ*.'—N. E. Brown, *Stapelieæ* of Thunberg's herbarium, with descriptions of four new genera of *Stapelieæ*' (tab. 11, 12).

Proceedings of Societies.

LINNEAN SOCIETY OF LONDON.

November 7, 1878.—Prof. G. J. Allman, F.R.S., President, in the chair.—The following gentlemen were elected Fellows of the Society:—The Rev. W. W. Fowler, Repton, Burton-on-Trent; Wilfred Huddleston, Esq., 23 Cheyne Walk, S.W.; and Thomas Moss Shuttleworth, Esq., Howick, Preston, Lancashire.—Sir

Joseph D. Hooker, C.B., presented to the Society, in the name of a Committee of gentlemen, a large oil painting of the Rev. M. A. Berkeley, painted by Mr. Peel. The gift of the portrait was subject to only one condition, viz., the Society's permitting free access of anyone desirous of inspecting it, during reasonable hours.—Dr. Thomas Boycott exhibited and made some remarks upon a great matted sheet of *Nitella translucens*, which had been got from a dried-up pond in St. Leonard's Forest, Sussex, June 1877.—Mr. Thomas Christy called attention to two living examples of West African India-rubber trees, *Urostigma Vogelii* and another still undetermined *Ficus* only recently arrived; and to large fruits, flowers and leaves of *Landolphia florida*.—Dr. R. C. A. Prior exhibited a specimen of *Colletia cruciata* in blossom, grown out of doors at Langford-Budville, Wellington, Somerset, by the Rev. W. Sotheby.—Dr. Maxwell Masters read an extract from a letter of Dr. Beccari, describing a gigantic Aroid, found by him in Sumatra, side by side with the *Rafflesia Arnoldi*. The species—which is called by Beccari *Conophallus? Titanum*—is like *Amorphophallus* and has a large tuber five feet round, from which is pushed up a single leaf with a long stout petiole, the divided blade covering an area of forty-five feet or fifteen metres. Seedlings have been raised from this plant in the garden of the Marquis Corsi-Salviato, at Florence.*—The following papers were read:—"Notes on Euphorbiaceæ," by George Bentham, F.R.S. This paper treats of the history, nomenclature, systematic arrangement, and the origin and geographical distribution of the order. Among Dicotyledons, *Euphorbiaceæ* stands fourth in point of numbers, having above 3000 species in 200 genera. On investigating the origin of the order, the geological record unfortunately is of no assistance. Their evident generally tropical nature is a striking feature, and judging from various data it is conjectured that their most ancient home was in the Old World. Their affinities have repeatedly been discussed by botanists, but though there are individual genera which may exhibit some one character supposed to be allied to other Orders, yet no real connection has hitherto been pointed out. Their isolation is produced not so much by any one special character as by a special combination of several. As to position in the linear series, unless the order be broken up it must practically remain among the *Monochlamydeæ* in spite of the occasional presence of a corolla in some forms.—"On the existence of *Carpesium cernuum*, Willd., in Queensland." The author suggests its being indigenous to Australia.—"Notes on Cleistogamic Flowers; chiefly of *Viola*, *Oxalis* and *Impatiens*," by Alfred W. Bennett. Glancing at investigations already made in this field, the author proceeds to detail his own observations on *V. cucullata*, *V. sylvatica*, *V. floribunda*, *V. sagittata*, *V. elatior*, *O. Acetosella*, *I. Noli-me-tangere* and *I. parviflora*; he states that *I. glandulifera* does not bear Cleistogamic flowers. In his concluding remarks, he says, Cleistogamic flowers are of two kinds: first,

* For further particulars see 'Gardeners' Chronicle,' December 21st, p. 788 and fig. 127.

those which hardly differ from the perfect open flowers in any other respect than the partial or entire suppression of the corolla, and the closing of the calyx (= *homocleistogamic*); and second, those in which there is a distinct modification of one or more parts of the flower, to aid in the process of self-fertilization (= *heterocleistogamic*). There is, however, no sharp line of demarcation, but intermediate forms occur. He is partly disposed to regard these two kinds as having arisen in different ways, one by degradation, the other by a rudimentary form of the organ. Another curious point is the large number of organs which have been correlatively modified in the extreme Cleistogamic flowers. Extremely interesting phenomena occur in the mode of emission of the pollen tubes, these travelling a considerable distance through the air in a straight line from the anther, vertically upwards in the case of *Oxalis*, horizontally in others, while according to Mohl they creep along the surface, and even back of the ovary in *Viola canina*. None wander with uncertainty, but seem guided by an unseen agency in the required direction. This seems the more remarkable, for when not in proximity to the stigma the pollen grains protrude their tubes in all possible directions.—“On the Absorption of Dew and Rain by the green parts of Plants,” by the Rev. G. Henslow. The first part of this communication consists of a *resumé* of the opinions of Vegetable Physiologists, from Hales (1781) to the present day, in which it appears that earlier experimenters were fully persuaded that leaves could and did absorb dew and rain. The chief objector was Duchartre, who in 1857 reversed this view. The author combats, first, his objection to cut leaves and shoots being used for experiments, proving that the natural functions *do* proceed identically as when attached to growing plants. He then describes Duchartre's experiments, and shows that while the French savant was right in concluding that dew was not absorbed by saturated tissues at night, yet on the contrary, according to Mr. Henslow's investigations, absorption takes place soon after the sun has risen, when transpiration recommences, and an indraught is caused by water whenever lingering on the leaves. Mr. Henslow further corroborates Boussingault's views, that when leaves are purposely or naturally killed by excessive drought, then they *do* absorb water as dew or rain, a fact proved by the balance and otherwise. It results then, that in opposition to the current doctrine taught by science, that gardeners practically are right, that the green parts of plants can and do absorb moisture on their surfaces.

Nov. 21.—Dr. Gwyn Jeffreys, F.R.S., Vice-President, in the chair.—Mr. Thomas Davidson, F.R.S., Brighton, and Mr. Frederick James Faraday, Manchester, were elected Fellows of the Society.—Dr. W. P. Kesteven exhibited specimens of the so-called “*Tête Anglaise*” (*Melocactus communis*) from Vieuxfort St. Lucia.—There were also exhibited roots, tendrils and tubers, in different stages of growth, of *Vitis gonyglodes* and *V. cuspidata*, in illustration of the paper immediately read, viz., “On Branch-tubers and Tendrils of *Vitis gonyglodes*,” by Mr. J. Irwin Lynch. Subterranean tubers are

not uncommon among plants, *e. g.*, the potato, but in contrast, those of *V. gongylodes* pre-exist on the stem, are aerial at a height, and when the branches decay these fall and the tubers strike root. They are cylindrical oblong, of considerable relative size and tenacious of life, and doubtless are an additional means of propagating the plant in the event of drought or other deteriorating causes applied to the seed. The tendrils are interesting in possessing terminal adhesive disks formed without the stimulus of contact with any substance as is the case in certain other climbers mentioned by Mr. Charles Darwin. The aerial roots are of enormous length, spring from each node, and in summer, when growing, are of a crimson colour, and attract attention, as seen in the Victoria House at Kew.—“On the *Symplocaceæ*,” by John Miers, F.R.S. The author attributes to Mr. Benthams our earliest accurate knowledge of the structure of true *Symplocaceæ*, and urges the complete separation of this family from that of the *Styracææ*; two natural Orders previously confounded together. Under the conviction of this necessity he details at length the essential characters of the two Orders, as given in Lindley’s ‘Veg. Kingdom,’ p. 593 (1853), and he repeats his reasons for this recommendation in 1859 (Contrib. i., p. 159). More recently the authors of the ‘Genera Plantarum,’ without offering reasons, adopt the example of Prof. A. DeCandolle, who regarded the *Symplocaceæ* as a mere tribe of the *Styracææ*. They embrace under *Symplocos* all the species of the Order in sections, which, however, in some degree correspond with the original genera. This plan appears to Mr. Miers objectionable, as several of the genera present features utterly irreconcilable with *Symplocos*. He, therefore, adopts the plan of describing the eleven already recorded genera in succession, giving their history, a detailed generic diagnosis of each, followed by the enumeration of their several species, their synonyms, referring to the works in which they are severally described. Thus in the paper there is arranged in a systematic form all that hitherto has been recorded of the *Symplocaceæ*. In a tabular way these may be given thus:—*Symplocos*, 17 sp.; *Ciponima*, 2; *Protohopea*, 2; *Præalstonia*, 14; *Barberina*, 11; *Decadia*, 1; *Dupatris*, 1; *Dicalix*, 1; *Palura*, 2; *Lhodhra*, 51; *Bobua*, 23; in all, therefore, 125 species.—“On the Algæ of Lake Nyassa,” by Prof. Dickie. These had been obtained through Dr. Laws, of the Livingstonian Mission. The series was not large, and it is remarked that all the Algal genera are known European forms, while the *Diatomaceæ*, with few exceptions, are likewise widely-diffused species. The only peculiar new form is *Epithemia clavata*.

December 5.—Prof. Allman, F.R.S., President in the chair.—Messrs. G. F. Dowdeswell, Arthur Hammond, Thomas Hanbury, Joseph Sidebotham, William Thomson and Charles A. Wright were elected Fellows of the Society.—Dr. I. Bayley Balfour demonstrated the peculiarities of a rare *Mycomycetes*, a species of *Heterodictyum*, which he showed to have characters intermediate between *Cribraria* and *Dictydium*.—Mr. George Murray called

attention to a recently discovered fungus (*Hygrophorus Wynnii*, Berk. (?), obtained at Bridlington, Yorkshire.—Examples of a moss new to Britain, *Aulacomnion turgidum*, were shown by Mr. E. Holmes, who stated that they were collected in Yorkshire by Mr. West, a Bradford amateur botanist, along with Mr. F. Arnold Lees. Mr. Holmes drew a short running diagnosis and comparison between the above and the common *A. palustre*.—Mr. C. B. Clarke read a "Note on *Gardenia turgida*, Roxb." He mentioned that in books the calyx of males alone was described, while all herbaria specimens are dioecious, and males and females have been referred by able botanists to different genera. The precise characters, &c., of each sex were denoted and shortly commented on by him.

Dec. 19.—Prof. Allman, F.R.S., President, in the chair.—Messrs. F. M. Campbell, Hoddesdon, Herts; J. Laurence Hamilton, Gloucester Terrace, Hyde Park; and J. J. MacAndrew, Ivy Bridge, South Devon, were elected Fellows of the Society.—The only botanical paper read was a note on South African Orchids by Mr. W. Mansell-Weale. He points out that the supposed generic characters of *Mystacidium* and *Polystachyon*, founded on the "two-legged" caudicles of the pollinia, are fallacious.

Botanical News.

THE death is announced at Vienna, on November 22nd, of JACOB JURATZKA, the bryologist, æt. 59. He was the author of numerous papers, some of great value, on the Austrian Moss-Flora, including that of the Tyrol, Bohemia, &c., as well as papers on critical forms of Phanerogamia in Skofitz' 'Journal,' and the publications of the Zoological-botanical Society of Vienna.

DR. J. PEYRITSCH, of Vienna, has been appointed Professor of Botany in the University of Innsbruck.

WE hear that the Rev. M. J. Berkeley has presented his valuable collection to the Kew Herbarium.

THE herbarium of the late Baron Hausmann, of Bozen in Tyrol, author of the well-known 'Flora von Tirol,' which contains nearly all the varieties of Tyrol, Switzerland, Lombardy and South Germany, is for sale either as a whole or separately. Particulars may be obtained from Herr B. Stein, Garten-inspector of the Botanical Garden, Innsbruck.

AFTER twenty-six years of disinterested work in conducting the journal 'Hedwigia,' of which he was the founder, S. Rabenhorst, in consequence of age and sickness, is forced to abandon the editorship. We understand that Dr. G. Winter will carry it on, and it is hoped that Cryptogamists will generally continue their support to this useful repertory.

Original Articles.

ELIAS FRIES.

FRIES was born at the parsonage of Femsjo, in a wooded country, in Småland, in the southern part of Sweden, on the 15th of August, 1794. He became at an early age a student at the University of Lund, and graduated *Philosophie Magister* at the age of twenty, was appointed *Docens* in 1814, Junior Professor ("Adjunkt") in 1819, and received the title of Professor in 1834. Later in the same year he was appointed ordinary Professor of Practical Economy at the University of Upsala, and in 1851 became Professor of Botany there, succeeding Wahlenberg; in 1859 he retired and received a pension. It would be vain endeavouring to enumerate all the marks of distinction he received. He was a member of so many learned societies, Swedish and foreign, that neither himself nor any one else remembered them all.*

The pursuers of science had, since the death of Linné, almost exclusively worked at those branches with which the great master had most occupied himself, and neglected those to which he had given less attention. This was the case with the Lichens, and especially with the Fungi. No one had had the courage to try to arrange the Fungi; it seemed as though the words of Linné, calling them "a pack of rovers, robbing what Flora leaves when she retires into her winter quarters," had alienated his disciples' minds from the wish to make their acquaintance. Thus Fries entered an almost unbeaten track, and he followed the study of these plants with such energy and success that his labours are the basis upon which all later workers must ever build. This being his greatest merit, we will give a more particular account of his mycological studies.

Fries was already in his earlier years well acquainted with the realm of Flora. Lacking in his childhood the company of brothers and sisters, and of playmates belonging to his own class of society, his father had brought him out into nature that he might feel this want less, and that the children of Flora might be to him in the place of friends—"friends who did not afterwards desert him, but were always true," as he says himself in one of his writings. At the age of twelve he knew many of the plants growing in his part of the country. It was when accompanying his mother gathering strawberries in 1806 that his attention was attracted by the large and peculiar *Hydnum coralloides*, and it was this discovery, he tells us,

* So long ago as 1835 Fries was elected a Foreign member of the Linnean Society of London, and in 1875 he received the distinction of a similar honour from the Royal Society. [*Ed. Journ. Bot.*]

which awakened a wish to study the Fungi. With the aid of Liljeblad's 'Swedish Flora' he learnt the next day the few genera of Fungi then known; but the species were more difficult, for he could not doubt that they were all described in that book. In the year 1808, when Sweden was ravaged by unlucky wars and wasting sickness, it became necessary to close the school at Wexio, at which Fries studied. He therefore remained in the country and began to describe all the Fungi he could find, and to distinguish them by temporary names. Thus he had learnt to distinguish three or four hundred species before quitting the gymnasium in 1811, to go to the University of Lund. Although the nature of the part of Sweden in which this town is situated is not at all so attractive as that of the wooded and hilly part of Småland, still it seemed to him the Elysian fields because of the many new plants it offered to his observation. But it was in the library of the university that he found his chief delight. Although there was no specially mycological literature to be found, it was his dearest occupation to sit, every hour the library was open, seeking in the 'Flora Danica,' the works of Jacquin, and the engravings of Buxbaum, the many species so well known to him before, but without names. At this time there lived in Lund two distinguished followers of natural science, Retzius and Agardh, who showed him great kindness, and who put into his hands the mycological works of Persoon and Albertini, the best then existing. In 1812 Fries occupied himself with *Hypodermia* (*Ustilaginea*, *Æcidiomycetes*). The year 1813 was a very rainy one, and consequently very profuse in Fungi. Fries, who was earnestly studying for his degree in philosophy, was obliged to divide his time between the Fungi and Homer, but neither was neglected, and next year he passed his examination, and was nominated Docens of Botany. He had now full leisure to direct all his powers to the study of Fungi. He made a sojourn at Copenhagen in order to study the richer mycological literature to be found there. There he delivered to the printer the first part of his 'Observationes Mycologicæ' (1815), for which the harvest of Fungi of 1813 had supplied the chief materials. In 1814 he began, principally by the counsel of Ol. Swartz, to write his 'Monographia Pyrenomycetum Sueciæ,' which work he presented in parts from 1816 to 1819 to the Academy of Sciences in Stockholm. Shortly before he had published the second volume of his 'Observationes Mycologicæ' (1818).

In this manner Fries began his mycological studies. But soon he found that the method pursued till now in describing and systematizing was not at all satisfactory, and therefore he commenced, in 1816, to work out a new system, and subject *all* the Fungi to a fresh investigation—a labour connected with the greatest difficulties, both because the construction of the microscope was at this time very imperfect, and because no good method for the conservation of Fungi was known. This new system was based upon a minute examination of the appearance of the Fungi in different stages of their development, and of the

morphological importance of the different parts. It was received with universal approbation, and became the foundation of a new science.

A great number of works on the different groups of Fungi and the first part of his 'Systema Mycologicum' (1821) came next. Every summer he explored the woods in the southern part of Sweden. In vain he longed to extend his excursions to foreign countries, but his own resources were too small, and there was no public stipend to be had. But Fungi in great quantities were sent him from foreign countries, and of some of these he gave descriptions in his 'Elenchus Fungorum' (1828). In 1828 he was at length able to visit the northern part of Germany and the museum at Berlin, where he had opportunities of enlarging still more his knowledge of lichens, of exotic Fungi, and of the literature of these plants. During the following years he completed his 'Systema Mycologicum,' (vol. iii., 1829), and having done this he subjected the Fungi once more to a close investigation, comparing them with his own descriptions. When they had been thus revised and completed, the *Discomycetes* separated from the *Hymenomycetes*, &c., the results of his observations were published in his 'Flora Scanica' in 1835. When, in 1834, he changed his abode to Upsala, Fries found new fields for mycological studies, and was as indefatigable as before in his excursions. Working industriously and making his researches most conscientiously, he wrote 'Epicrisis Systematis Mycologici seu Synopsis Hymenomycetum,' which was published in 1836—1838. He intended also to give a new revision of the *Ascomycetes* with several hundred determinations of species, but this group of the Fungi not being much esteemed by his contemporaries he never carried out his plans, but continued his work at the *Hymenomycetes*, which were looked upon with greater interest.

In the year 1844 the Academy of Science in Stockholm resolved to be at the expense of a series of engravings of all the species of Fungi—principally belonging to *Hymenomycetes*—that could not be preserved in a natural state, and gave the superintendence and direction of this work to Fries. It was the fourth time he had occasion to subject these Fungi to close observation. The collection, containing now from 1600 to 1700 coloured figures, is one of the richest and most extensive existing. Eleven parts, with 110 plates, have been published, under the title 'Icones selectæ Hymenomycetum nondum delineatorum.' The last large work of Fries was the 'Hymenomycetes Europæi sive Epicriseos Systematis Mycologici editio altera,' published in Upsala in 1874.

He had also, at an early age, studied the Lichens not less thoroughly, and he essentially reformed the descriptions and systematic arrangement of these plants. His 'Lichenographia Europæa reformata,' published in Lund, 1831, was for a long time regarded as a principal work in lichenographical literature, and the numerous fasciculi of his 'Lichenes exsiccati Sueciæ' form one of the most valuable series in existence.

The literary activity of Professor Fries has brought forth fruit in almost all the fields of botany. He has published explanations and critical examinations of some of the more difficult genera among the higher plants; for instance, *Hieracium*, *Salix*, *Carex*, and several others; he has written Floras of the whole of Scandinavia and of separate parts of it; he has given (in 'Novitiæ Floræ Sueciæ,' 'Botaniska Notiser,' &c.) descriptions of a great many new plants discovered by him; he has written treatises on agriculture and practical botany, on the nomenclature of plants, and on the history of botany. I may also mention the 'Botaniska Utflugter' (Botanical Excursions, 1852—64), in which he has in a very happy manner popularised this science, and which has been read with a lively interest beyond his own country. All these works prove a scientific productiveness and versatility for which it is not easy to find many parallels in botany.*

Fries was also eminent as a systematic botanist, and the Friesian system is still followed by some Swedish writers.† It is true that other principles and different views will probably take its place, but nevertheless it had a great importance and must be counted among the most excellent of natural systems. With regard to the relationship of species, the same point of view has been taken that Linné describes in these words, as being his own:—"A species is each form brought forth by the Creator in the beginning." It is but natural that some of the books of Fries have not now the same authority as when they first appeared, science having since then sped forward with such swiftness that some of them belong now only to the history of botany. But this rapid progress is indeed the highest proof of the value of his works, for it was they which gave the great impulse to the labours that have in our days brought such a change in these separate branches of botany.

The power that Fries possessed of giving in writing clear and well-defined expressions of his scientific opinions, distinguished

* The titles and dates of some of his most important contributions to Phanerogamic Botany are:—'Novitiæ Floræ Sueciæ' (1814—23), edition 2 (1828); 'Continuatio, sistens Mantiss. i., ii., iii. (1832—42); 'Flora Hallandica' (1817—18); 'Corpus Flor. Provinc. Sueciæ,—Flora Scanica' (1835—36); 'Summa Vegetabilium Scandinaviæ' (1846—49); 'Symbolæ ad Hist. Hieraciorum (1847—48); 'Botaniska Utflugter' (1852—64); 'Observationes criticæ plant. Suecicæ illust.' (1854); 'Epicrisis gen. Hieraciorum' (1862). The list of his smaller contributions to Societies and Journals (chiefly Swedish) given in the Royal Society's 'Catalogue of Scientific Papers,' extends (to end of 1873) to 85 articles. The valuable series of exsiccata of Scandinavian plants, the Herbarium Normale, was issued in 15 fascicles during a period of over twenty years, the last being dated 1857. This collection of critical plants is of the highest value for the study of the plants of Northern Europe, and as it is quoted by Fries throughout the first part of his 'Summa,' the specimens show clearly what he intended by his names. As to their bearing upon British botany as illustrating our Flora, it is shown by the use always made of them by Prof. Babington in his various papers on critical questions.—[*Ed. Journ. Bot.*]

† Published first in the 'Flora Scanica' (1835). An outline will be found in Lindley's 'Vegetable Kingdom,' p. xlv. Such valuable books as Hartman's 'Skandinaviens Flora' and Nyman's 'Sylloge Flor. Europææ' are arranged on this system.—[*Ed. Journ. Bot.*]

him also in his lecturing, and had a great influence in gathering round him large numbers of disciples. The foreign votaries of science who have visited Upsala during the last forty years of his life seldom neglected making the personal acquaintance of the celebrated botanist. His lively interest in his science and his affectionate regard for every one who pursued it, procured him the veneration and love of all, and those who participated in a more confidential intercourse with him cannot praise their good fortune enough in having had the happiness of the acquaintance of a man so noble and good as Fries.

His enthusiastic love of his science followed him as it were from the cradle to the grave. He continued his useful scientific labours, even as an author, during the last years of his life. In his eightieth year he published a new and improved edition of his extensive work, '*Hymenomyces Europæi*,' and about a week before his death he completed an essay for a foreign periodical. Far even into his last hours he contemplated with interest and comprehended clearly the figures in the second number of Mr. M. C. Cooke's '*Mycographia*,' which had arrived that day, and said that some of the Fungi were unknown to him, but others known. "England," he said, "has more numerous and more remarkable *Discomycetes* than Sweden, but as regards *Hymenomyces* we take by far the lead."

He died on the evening of the 8th of February, 1878.

Our portrait is from a photograph by Osti, of Upsala, and is the last that was taken of Fries.

A. N. LUNDSTRÖM.

REPORT ON A COLLECTION OF FERNS MADE IN THE NORTH OF BORNEO BY MR. F. W. BURBIDGE.

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

MESSRS. VEITCH AND SON have placed in my hands, for working out, a collection of Ferns made by Mr. F. W. Burbidge, whilst exploring for them in the north-west corner of Borneo. The following is a complete list of the species gathered, which were all obtained in the neighbourhood of Labuan and Kina-balu. To the new species I have prefixed numbers, showing the position in which they fall, according to the sequence followed in our '*Synopsis Filicum*'; and I have marked with a * the names of those which, so far as I am aware, have not been gathered in the island before. I may mention that a complete catalogue of the Ferns of Borneo was published in 1876 by Baron Vincent de Cesati, with a special account, with figures of some of the novelties, of those gathered by Professor Beccari.

**Gleichenia circinata*, Sw. var. *borneensis*, Baker. A stiff erect-growing form, with the final bipinnate divisions unusually long (sometimes a foot in length), the leafy portion between the primary and secondary forkings also unusually long, the rachises glabrous,

the texture more rigid, and the ultimate segments smaller and more bullate than in the Australian type, thus approximating to some of the varieties of *dicarpa*.

Gleichenia dichotoma, Hook.

**Gleichenia vestita*, Blume, var. *paleacea*, Baker. A form differing from the Javan type by its lamina very glaucous on the under surface and narrower ultimate segments, with rachises densely clothed with spreading or deflexed linear-subulate ferruginous paleæ.

Alsophila glabra, Hook.?

Alsophila latebrosa, Hook.

59.* *ALSOPHILA BURBIDGEI*, Baker, n. sp. Frond ample, tripinnatifid, moderately firm in texture, green on both sides, paler beneath, the under side strongly ciliated on the midrib of the pinnules, for the rest nearly glabrous, both surfaces and rachises entirely free from scales, the latter without prickles, those of the pinnæ clothed throughout with fine spreading hairs. Pinnæ oblong-lanceolate, a foot or more long. Pinnules sessile, lanceolate, two to two and a half inches long, half an inch broad, cut down to a narrow wing into ligulate subentire obtuse tertiary segments about a line broad. Veins four-to five-jugate, distant, simple or forked. Sori medial. Allied to *A. latebrosa*, *Oldhami* and *Wallacei*.

Hymenophyllum Blumeianum, Spreng.

**Hymenophyllum Smithii*, Hook. The plant so called in Cesati's list proved to be *Trichomanes denticulatum*, Baker.

**Hymenophyllum sabinæfolium*, Baker.

Hymenophyllum Neesii, Hook.

**Hymenophyllum formosum*, Brack.

**Hymenophyllum obtusum*, Hook. Gathered lately in New Guinea by Beccari.

Trichomanes Filicula, Bory.

Trichomanes pallidum, Blume.

Trichomanes digitatum, Sw. Two different forms, one lengthened out with remote branches, the other short, with close branches.

Trichomanes javanicum, Blume.

Trichomanes pyxidiferum, Linn. A handsome variety, with unusually compound rather crisped fronds.

Trichomanes rigidum, Sw.

Trichomanes maximum, Blume.

**Trichomanes apiifolium*, Presl.

Trichomanes hispidulum, Mett. This was only known before from a single sheet of specimens in the Kew herbarium, gathered by Thos. Lobb.

Trichomanes feniculaceum, Bory.

Trichomanes Pluma, Hook. We did not know the definite station of Lobb's specimens, from which this was described and figured by Hooker. Beccari has gathered it near Sarawak.

Trichomanes trichophyllum, Moore. With the last, with which I am now inclined to think it will prove to be conspecific.

Davallia angustata, Wall.

Davallia heterophylla, Smith.

Davallia parvula, Wall.

Davallia luzonica, Hook.

**Davallia contigua*, Sw.

**Davallia Emersoni*, Hook. & Grev.

Davallia pedata, Sm.

**Davallia ciliata*, Hook.

Davallia elegans, Sw.

Davallia Spelunca, Baker.

Davallia tenuifolia, Sw.

49.* *DAVALLIA (Eudavallia) VEITCHII*, Baker, n. sp. Rhizome thicker than a quill, epigæous, wide-creeping, clothed with small shining linear acuminate castaneous paleæ. Stipes naked, erect, slender, castaneous, one foot to one and a half long. Lamina oblong-deltoid, decomposed, one foot to one and a half long, about half a foot broad, quite glabrous on both surfaces, subcoriaceous in texture. Pinnæ distant, deltoid, stalked, erecto-patent, many of the lower ones subequal, four to five inches long by half as broad. Pinnules and tertiary segments subpetioled, rhomboid, cuneately cut away on the lower side at the base. Ultimate lobes subremote, ligulate or rather broader towards the truncate tip, one-eighth to one-sixteenth of an inch long, one-quarter to one-third of a line broad, with only a single central vein, the tip denticulate. Sori minute, oblong, usually immersed in the tip of the segments, rarely free and terminal. Involucre free at the end only.—A well-marked plant, reminding one in cutting and habit of the barren fronds of *Onychium japonicum* or *auratum*.

5.* *LINDSAYA JAMESONIODES*, Baker, n. sp. Rhizome short-creeping, as thick as a quill, clothed with minute subulate rigid nearly black scales. Stipes wiry, nearly black, one to three inches long. Fronds linear, simply pinnate, three to five inches long, under half an inch broad, composed of sessile contiguous roundish alternate deciduous entire pinnæ one-sixth to one-fifth of an inch broad, those of the upper third of the frond growing gradually smaller. Rachis wiry, dark chestnut-brown. Veins quite hidden. Texture rigidly coriaceous; both surfaces quite free from hairs or scales, the upper side much wrinkled. Sorus continuous round all the pinna except its base. Inner valve of the involucre equalling the outer, broad, chartaceous, persistent glabrous.—A most distinct novelty, with the habit of *Asplenium Trichomanes* or *Jamesonia imbricata*.

7.* *LINDSAYA CRISPA*, Baker, n. sp. Caudex short-creeping. Stipe wiry, naked, castaneous, one to nine inches long. Lamina simply pinnate, lanceolate, about half a foot long, half to three-quarters of an inch broad. Pinnæ not crowded, all sessile, dimidiate-deltoid, truncate and entire on the inner and patent or erecto-patent lower edge, irregularly inciso-cremate on the upper one, glabrous, bright green, membranous in texture, with the free very distinctly marked flabellate veins radiating from the inner half of the lower edge. Involucre undulated, with two distinct nearly equal cartilaginous valves.—Habit of the small tender forms of *Adiantum caudatum*, but the fronds neither at all hairy nor rooting at the tip.

**Lindsaya pectinata*, Blume.

Lindsaya cultrata, Sw.

Lindsaya borneensis, Hook.

Lindsaya trapeziformis, Dry.

**Lindsaya flabellulata*, Dry.

Lindsaya davalloides, Blume.

Lindsaya ensifolia, Sw.

Lindsaya divergens, Wall.

**Adiantum diaphanum*, Blume.

**Cheilanthes tenuifolia*, Sw.

Pteris aquilina, L.

Pteris semipinnata, L.

Pteris quadriaurita, Betz., var. *digitata*, Baker. A digitate form, like the Indian *P. Grevilleana*, Wall., but the barren and fertile fronds not dimorphic. The texture firmer than usual. The rachis with a broad wing, as in *P. biaurita*, and the veins crowded and obscure.

**Lomaria procera*, Spreng.

Asplenium Nidus, L.

Asplenium tenerum, Forst.

Asplenium squamulatum, Blume.

**Asplenium caudatum*, Forst.

Asplenium cuneatum, Lam.

Asplenium laserpitiifolium, Lam.

Asplenium affine, Sw.

Asplenium dichotomum, Hook. Kina-balu. The only known station. The plant has been twice gathered previously.

203.* **ASPENIUM** (*Diplazium*) **PORPHYRORACHIS**, Baker. Caudex suberect, producing many short-stiped barren fronds to a few long-stiped fertile ones. Stipes purple, of the barren frond two to three inches, of the fertile six to twelve inches long, clothed throughout with spreading black linear-subulate paleæ. Frond lanceolate, six to twelve inches long, one to two inches and a half broad, cut down throughout to a narrow wing to the rachis, which is purplish in colour and clothed on the under side with spreading paleæ, like those of the stipe. Pinnæ lanceolate, one-quarter to one-third of an inch broad, toothed towards the tip, several of the lower ones reduced in size. Texture moderately firm. Both surfaces glabrous. Veins fine, close, distinct, erecto-patent, usually once forked. Sori reaching from the midrib to the edge, few double. Involucre narrow, persistent, glabrous.—This is the plant described by Sir. W. Hooker from a single barren frond without fruit gathered by Mr. A. R. Wallace, as *Polypodium subserratum* (Hook. and Baker Syn. Fil., p. 325). In *Asplenium* that specific name is already occupied. Of the present plant *A. zeylanicum*, Hook., is the only near ally. The same species was gathered by Beccari near Sarawak.

**Asplenium porrectum*, Wall.

**Asplenium tomentosum*, Hook.

207.* **ASPENIUM** (*Diplazium*) **XIPHOPHYLLUM**, Baker, n. sp. Caudex suberect. Stipes close, reaching a foot in length, naked except at

the base, where they have a tuft of large brown linear scales. Lamina oblong-deltoid or deltoid, simply pinnate, one foot to one and a half long, with an end pinna like the side ones. Pinnæ thirteen to twenty-five, subsessile, lanceolate, reaching a length of eight to nine inches, and a breadth of nine to fifteen lines, toothed and much acuminate at the point, cuneate at the base. Texture subcoriaceous. Both surfaces glabrous and free from scales. Veins in the fully developed pinnæ in pinnate groups of three to four. Sori running all the way from the midrib to the edge, few diplazoid. Involucre narrow, glabrous, persistent.—Comes near *A. pallidum*, *porrectum*, and *cultratum*.

**Asplenium latifolium*, Don.

Asplenium cordifolium, Mett.

**Didymochlæna lunulata*, Desv.

**Aspidium aculeatum*, Sw.

**Nephrodium calcaratum*, Hook.

**Nephrodium pteroides*, J. Sm.

**Nephrodium unitum*, R. Br.

**Nephrodium cucullatum*, Baker.

**Nephrodium* near *pennigerum*? Probably new, but specimens not complete enough to characterise it.

Nephrodium molle, Desv.

**Nephrodium Haenkeanum*, Presl.

**Nephrodium singaporianum*, Baker.

Nephrodium ternatum, Baker. A fine series of specimens of this endemic species.

219.* *NEPHRODIUM* (*Sagenia*) *NUDUM*, Baker, n. sp. Rhizome not seen. Stipe about two feet long, pale brown, naked. Frond oblong-deltoid, one and a half to two feet long, a half to one foot broad, with nine to eleven distant pinnæ, the lowest two to four two- or three-forked from the base, the rest simple; the end one like the others, but larger, lanceolate, six to twelve inches long, three-quarters to one inch broad, very acuminate, narrowed gradually to the base, not repand, all except the lowest sessile. Texture membranous. Both surfaces and rachis free from hairs and scales. Main veins erecto-patent, distinct to the edge at a distance of a quarter to one-third of an inch from each other; copious small irregular areolæ between them furnished with free included veinlets. Sori middle-sized, in regular rows near the main veins. Involucre glabrous, persistent.—Allied to *N. pachyphyllum*, Baker.

**Nephrodium polymorphum*, Baker.

Nephrolepis volubilis, J. Sm.

Polypodium Barberi, Hook.

Polypodium urophyllum, Wall. A variety with many of the sori confluent.

91.* *POLYPODIUM* (*Eupolypodium*) *MINIMUM*, Baker, n. sp. Densely tufted. Fronds simple, sessile, ligulate, half to one inch long, under a line broad, entire, obtuse, subcoriaceous in texture, glabrous on the upper surface, slightly pubescent beneath, narrowed gradually from the middle to the base. Veins simple, erecto-patent,

extending from the midrib beyond the sori, but stopping short of the margin. Sori round, superficial, close, forming a single row close to the midrib in the upper half or two-thirds of the frond, in the finest fronds eight to twelve in a row.—Allied to the Andine *P. Sprucei*, Hook., and Mascaren *P. Gilpinæ* and *synsorum*, Baker.

131.* POLYPODIUM (*Eupolypodium*) BURBIDGEI Baker, n. sp. Caudex suberect, its paleæ clathrate, large, linear, membranous, brown, distinctly ciliated. Fronds tufted, sessile, lanceolate, once deeply pinnatifid, reaching a foot in length, twelve to fourteen lines broad at the middle, cut down to a broad wing to the rachis into numerous close entire obtuse ascending segments one-eighth of an inch broad at the base, the lower segments growing gradually smaller downwards and the basal third of the rachis bordered only by an entire wing, which is one-sixth of an inch broad at the top and narrowed gradually downwards. Texture subcoriaceous. Under surface slightly pubescent on the rachis, the rest glabrous. Veins distant, simple, erecto-patent, falling short of the edge. Sori globose, slightly immersed, mainly in a single row in the wing of the main rachis, not forming papillæ on the face of the frond.—Habit and texture of *Davallia Emersoni*.

Polypodium alternidens, Cesati, Fil. Born., p. 25, tab. 2, fig. 4. Of this Burbidge's bundle contains a single specimen. It is a well-marked new species, discovered by Signor Beccari in the neighbourhood of Sarawak.

**Polypodium cucullatum*, Nees. A small slender form.

132.* POLYPODIUM (*Eupolypodium*) STREPTOPHYLLUM, Baker, n. sp. Densely tufted. Stipe scarcely any. Lamina linear, three to four inches long, one-fifth of an inch broad, cut down to the main rachis into very numerous ligulate entire slightly twisted adnate contiguous pinnæ one quarter of a line broad, with a single medial nerve, and a single superficial sorus at the tip, firm in texture, green and glabrous on both surfaces, the lower pinnæ gradually reduced in size.—Allied to *P. cucullatum*, but the pinnæ are narrower and reach down to the main rachis and bear the sorus at their tip.

**Polypodium minutum*, Blume.

**Polypodium papillosum*, Blume. The plant so-called by Cesati, gathered by Beccari near Sarawak, I hold to be quite distinct from Blume's Javan type, and propose to call it *P. Cesatianum*.

**Polypodium clavifer*, Hook.

210.* POLYPODIUM (*Eupolypodium*) TAXODIODES, Baker, n. sp. Rhizome filiform, creeping widely below the surface of the ground. Stipes wiry, brown, one inch to one and a half long, clothed like the rachis with fine spreading brown hairs. Frond lanceolate, regularly bipinnate, six to eight inches long, eighteen to twenty-one lines broad. Pinnæ numerous, close, lanceolate, one-quarter of an inch broad, regularly pectinato-pinnate, with narrow linear parallel erecto-patent one-nerved secondary segments not more than one-eighth of a line broad. Texture rather rigid. Both surfaces glabrous. Sori confined to a few of the uppermost pinnæ, placed singly in the centre of the secondary segments.—Very near

the Javan *P. tenuisectum*, Blume, in size, shape, texture and cutting, but that has tufted fronds and sori placed at the base of the pinnules.

Polypodium soridens, Hook.

297.* POLYPODIUM (*Phymatodes*) STENOPTERIS, Baker, n. sp. Rhizome like that of a hare's-foot *Davallia*, wide-creeping, epigæous, as thick as a quill, densely clothed with squarrose linear bright brown paleæ. Fronds nearly sessile, entire, linear, glabrous, very rigid in texture, eight to twelve inches long, one-eighth to one-sixth of an inch broad at the middle, narrowed gradually to the tip and the base. Veins quite invisible. Sori round, immersed, distant, uniseriate, confined to the upper third or half of the frond, which is repand, the sori being placed in the projections of the waves and causing prominent papillæ on the face.—Allied to the last species.

Polypodium longifolium, Mett.

**Polypodium oodes*, Kunze. Matches exactly Cuming's Philippine specimens, which were all that were previously known.

301.* POLYPODIUM (*Phymatodes*) HOLOPHYLLUM, Baker, n. sp. Rhizome wide-creeping, not more than half a line in diameter, clothed with dense erecto-patent minute linear-subulate paleæ. Stipes subdistant, brown, polished, very slender, naked, one to two inches long. Lamina entire, roundish or ovate, one-third to half an inch long and broad, crenulate round the edge except towards the base, glabrous, rigid in texture, without any distinct midrib, the veins flabellate from the apex of the stipe, forming copious irregular areolæ without any free included veinlets. Sori few, round, superficial, scattered irregularly.—Like *P. oodes* in its rhizome, stipe and sori; differing by its smaller frond, crenulate border and flabellate veining.

Polypodium acrostichoides, Forst.

**Polypodium angustatum*, Sw.

Polypodium Dipteris, Blume.

Polypodium bifurcatum, Baker.

Polypodium Phymatodes, L.

**Polypodium ebenipes*, Hook.

Gymnogramme avenia, Baker.

Gymnogramme borneensis, Hook.

Gymnogramme Wallichii, Hook.

Gymnogramme Feei, Hook.

Antrophyum reticulatum, Kaulf.

Vittaria debilis, Kuhn.

Vittaria elongata, Sw.

Tenitis blechnoides, Sw. Both the type and well-marked variety, *T. interrupta*, H. and G.

Acrostichum sorbifolium, L.

**Acrostichum scandens*, J. Sm.

**Acrostichum subrepandum*, Hook.

Acrostichum drynarioides, Hook.

**Acrostichum bicuspe*, Hook. The typical form, which has only been once gathered before by Thomas Lobb in Java.

Platyserium biforme, Blume.

- **Platyserium grande*, A. Cunn.
Schizæa malaccana, Baker.
Schizæa dichotoma, Sw.
Schizæa digitata, Sw.
Lygodium dichotomum, Sw.
Lygodium scandens, Sw.
 **Equisetum elongatum*, Willd.
Lycopodium cernuum, L.
Lycopodium casuarinoides, Spring.
Lycopodium carinatum, Desv.
Lycopodium Phlegmaria, L.
 **Lycopodium macrostachys*, Hook. & Grev.
 **Lycopodium volubile*, Forst.
 **Selaginella atroviridis*, Spring.
Selaginella caulescens, Spring.
Selaginella inæqualifolia, Spring.
 **Selaginella Willdenovii*, Baker.
 **Selaginella flabellata*, Spring.
 **Selaginella suberosa*, Spring.
Psilotum triquetrum, Sw.
Psilotum complanatum, Sw. = *P. Zollingeri*, Cesati.

It will be seen that altogether Mr. Burbidge has added above fifty species to the Fern-Flora of the Island. His exploration quite bears out the idea that we previously entertained, that the Fern-Flora of the Island is very rich, and that there is still a plentiful harvest to await the exploration of the interior. The added species which are not new are nearly all already known in Java and the Philippine Islands, frequently in both. After leaving Borneo he visited the Sulu Archipelago, and of what he met with there I hope to give an account in a future paper.

SHORT NOTES.

GENTIANA PNEUMONANTHE IN BERKS.—Mr. C. R. Ashbee has shown me specimens of this plant collected by him last summer at Wildmoor Bottom, near Wokingham, Berks. The plant was included in Mr. Flower's 'Catalogue of Reading Plants,' published in Robertson's 'Environs of Reading' (1843), but without definite locality, nor have I been able to meet with one, although it is recorded for the county in 'Topographical Botany.' It may be well to note that some error is to be suspected with regard to the Bucks locality, for this plant given in 'Journ. Bot.,' 1875, p. 295, as the specimen in the British Museum Herbarium, sent by Miss Williams from Wendover, represents *G. ciliata*.—JAMES BRITEN.

SHORTIA GALACIFOLIA REDISCOVERED.—In 1839 Dr. Asa Gray found, in Michaux's herbarium, a specimen of a Pyrolaceous-looking

plant with the corolla fallen, collected somewhere in the mountains of North Carolina about one hundred years ago; and in 1842 he founded on it the genus *Shortia*. Since then all endeavours at rediscovery have been in vain, and the very existence of the plant has been doubted. But now at length a flowering specimen has been sent by Mr. Hyams, of Statesville, gathered in McDowell County, North Carolina, in May, 1877. Dr. Gray determined in 1868 that *Schizocodon uniflorus*, Maxim., of Japan, of which also the corolla was unknown, was probably congeneric, and in 1870 he ventured to place *Galax* and *Shortia* together as a tribe of *Diapensiaceæ*. Maximowicz, in 1871, decided the two genera *Shortia* and *Schizocodon* to be distinct, founding his views to a considerable extent on a rough Japanese figure of the flower-details. Dr. Gray is now able to confirm this, and gives, in 'Silliman's Journal' for December last (p. 484), some details of the floral structure of the North Carolina species, which correct those given by Maximowicz and by the authors of the 'Genera Plantarum.'

EXTIRPATION OF A CYCAD.—The Coontie, *Zamia integrifolia*, Willd., extends in Florida as far north as Alachua, Bradford, and adjoining counties, and was at one time most abundant. Though still common in Southern Florida it is now comparatively rarely met with in the districts above-mentioned, and has totally disappeared over large tracts. Mr. H. Gillman, in the 'American Naturalist' for December (p. 818), traces this destruction to the practice in Florida of allowing hogs to roam at large. These animals ravenously devour the *Zamia* for the sake of the starch in the caudex (from which the coarser Florida arrowroot is made). As the State becomes more thickly settled it is probable that, except where taken into cultivation, this handsome plant will become totally extirpated.

Notices of Books and Memoirs.

ON SOME POINTS IN BOTANICAL NOMENCLATURE.

[THE following remarks are extracted from the very valuable and interesting memoir by MR. BENTHAM, entitled 'Notes on *Euphorbiaceæ*,' in the last number of the 'Journal of the Linnean Society.' They express with clearness and accuracy the views supported in the Journal of Botany by several botanists, including the Editor, who is desirous that their great authority and weight should be brought to bear upon the discussion lately carried on in these pages.]

"Were every one agreed as to the plant to be designated by a particular name, the binomial appellations devised by Linnæus would be quite sufficient in all cases where a species is referred to for comparison, or is otherwise spoken of, as in catalogues, treatises, &c.; and even now the reference to *Helianthus annuus*,

Mathiola tristis, &c. can lead to no mistake. But it so frequently happens that different authors have given the same name to different plants, that the addition of a third word (the abbreviated name of the author) has become indispensable in some instances, and advisable in most cases, to avoid uncertainty, but *for no other object*. Although much credit may be due to the collector or botanist who has discovered or distinguished really new species (and it is but fair that their discovery should be commemorated), yet it is only second-rate botanists who pride themselves on the number of names, good or bad, to which their initials can be attached. In all cases, therefore, where the object is only to speak of a plant, as in catalogues, references, physiological treatises, or even local Floras, for practical use one cannot attend too closely to the observations of De Candolle ('Lois,' p. 52; Engl. edit. p. 58) and say *Mathiola tristis* or *Mathiola tristis*, Br., without any addition (such as *Linn.*, *sub Hesperide*), explanatory of the history of the name. Such a history, absolutely necessary in a full monograph for instance, should always be considered as belonging to the description and history of the species, not as forming part of its name. It is also with sincere regret that we see distinguished botanists endeavouring to combine rejected with adopted names by the obviously false nomenclature exemplified in *Mathiola tristis*, Linn.

* * * * *

"We have made it a rule in our 'Genera Plantarum' to yield no right of priority to ante-Linnean names, *i. e.* those published before the adoption of the Linnean system of nomenclature. If once we give this right to Tournefort or Rumphius there is no reason for not going back to Bauhin or Clusius, or even to Pliny or Dioscorides, to the utter confusion of all synonymy. Linnæus, by the establishment of the binomial nomenclature, made an epoch in the study of systematic botany; and it is by far the most conducive to the facility of that study (the great object of nomenclature) to give up all search after previous names, and take all genera as adopted by him or satisfactorily modified by subsequent botanists. We therefore cannot, for instance, give Patrick Browne the precedence over Linnæus in the case of *Adelia*, as proposed by Mueller. Browne's first edition was ante-Linnean. He there gave the name of *Adelia*, not to a genus, but to a plant which afterwards entered into the genus to which Michaux gave the name of *Adelia*, but only after this name had been appropriated by Linnæus to a different genus; and I can see no sufficient excuse for the great disturbance resulting from the replacing Linnæus's *Adelia* by the new name *Ricinella* in order to restore the post-Linnean name *Adelia* to the *Forestiera* of Poiret or *Adelia* of Michaux.

* * * * *

"The question of specific nomenclature is not directly connected with a 'Genera Plantarum;' but there is one practice which has grown up of late years, adding largely to the number of useless synonyms, against which I cannot refrain from taking this

opportunity of entering a strong protest. I mean that of creating a new name in order to combine an old specific with a new generic one. In ferns, the wanton multiplication of ill-defined or undefinable genera, according to the varied fancies of special botanists, has had the effect of placing the same species successively in several, sometimes seven or eight, different genera; and it is proposed to maintain for the specific appellation the right of priority, not in the genus alone in which it is placed, but in the whole of the genera to which, rightly or wrongly, it has been referred. This has been carried to such a degree as to give to the specific name a general substantive aspect, as if the generic ones were mere adjuncts—a serious encroachment on the beautiful simplicity of the Linnean nomenclature; and it is to be feared that there is a tendency in that direction in phænogamic botany. When a botanist dismembers an old genus, rule 57 requires that he should strictly preserve the old specific names in his new genera; and when he has wantonly and knowingly neglected this rule it may be right to correct him. But where a botanist has established what he believes to be a new species, and has therefore given it a new name, the changing this name after it has got into general circulation, because it has been discovered that some other botanist had previously published it in a wrong genus, is only adding a synonym without any advantage whatever, and is not even restoring an old name; for the specific adjective is not of itself the name of a plant. Ask a seedsman for some *Canariensis* and he will probably give you *Tropaolum peregrinum*, not *Phalaris canariensis*. A generic name is sufficiently indicated by one substantive, for no two genera in the vegetable kingdom are allowed to have the same name; but for a species the combination of the substantive and adjective is absolutely necessary, the two-worded specific name is one and indivisible; and the combining the substantive of one name with the adjective of another is not preserving either of them, but creates an absolutely new name, which ought not to stand unless the previous ones were vicious in themselves, or preoccupied, or referred to a wrong genus. It is probably from not perceiving the difference between making and changing a name that the practice objected to has been adopted by some of the first among recent botanists, such as Weddell, though under protest (see the note in DC., Prod. xvii. 1, 73). To give a couple of instances among hundreds that have lately presented themselves to me: Wight published a Nilgherry plant which he believed to be new, and was certainly a new genus, under the name of *Chamabainia cuspidata*, in all respects a legitimate name; and he could not be expected to identify it with *Urtica squamigera* of Wallich's 'Catalogue,' as the plant is not an *Urtica*. Wight's name was therefore adopted in Weddell's excellent monograph; but in the 'Prodromus' he thought himself obliged, in spite of his better sense, to call it *Chamabainia squamigera*, which is neither Wallich's faulty name nor Wight's correct one, but an entirely new name, to be rejected by the law of priority, which requires the adoption of the oldest correct name. So, again, an Indian

grass was first named and described by Willdenow as *Coix arundinacea*, then named in the 'Hortus Benghalensis' and distributed by Roxburgh as *Coix barbata*, and entered in Sprengel's 'Systema' with Willdenow's character as *Coix Koenigii*. All these names were defective as referring to a wrong genus. Brown corrected the error by creating the new genus *Chionachne*, and selected Roxburgh's specific name as the one most generally known and the least liable to misinterpretation; and Brown's *Chionachne barbata* is therefore the *first correct* name, for which Thwaites afterwards substituted *Chionachne Koenigii*, an entirely new and useless name, which falls by the law of priority. It should be well borne in mind that every new name coined for an old plant, without affording any aid to science, is only an additional impediment.'

The same distinguished botanist elsewhere condemns "the modern very objectionable practice of detaching the adjective of an old incorrect name to combine it with the substantive of a more recent but correct name, and thus frame a third new one which cannot record the old one without explanation, and only adds a perfectly useless synonym."—(Bentham in 'Hook. Ic. Plant.' sub. t. 1279 *Lachnostylis capensis*.)

ON THE VEGETABLE REMAINS IN THE EGYPTIAN MUSEUM AT BERLIN.

BY ALEXANDER BRAUN.

Edited from the Author's MSS. by P. ASCHERSON and P. MAGNUS.
('Zeitschrift für Ethnologie,' ix., 1877).

(Continued from p. 23.)

Our interest is farther bound up with our knowledge of the old Egyptian Flora, since extraordinary differences in the distribution of several species are the result of the comparison of it with the present. We find now cultivated and naturalised in Egypt many plants, no trace of the existence of which in times of antiquity can be proved. On the other hand, there existed in ancient Egypt several plants which have now vanished from the region of the Lower Nile. Of course it should be remarked that among the plants of the old Egyptian tombs a few appear to have reached Egypt by means of trade, and not to have been a product of the land, as for instance was most probably the case with the fruits of a certain species of *Sapindus*. The most widely distributed fruit trees of the Egypt of to-day are, according to a communication from the late Professor Bilharz, the Date-palm, true Sycamore, *Zizyphus Spina-Christi*, Willd. *Opuntia* is used to mark the boundaries of fields at Alexandria and Cairo; the fruits are brought to market. In the gardens there are grown oranges, lemons, apricots, peaches, almonds, vines, figs, mulberries, pomegranates, bananas, as a rarity *Anona squamosa*, L. Apples, pears and plums are bad, and are brought mostly from Syria and Greece, as also cherries, walnuts, hazel and pistacio nuts, which are rarely

cultivated in Egypt. Cucumbers, melons and water-melons come to market in a great number of varieties. Of all these fruits there have been proved to have existed in ancient Egypt, only the date-palm, sycamore, fig, vine, pomegranate and water-melon. The majority of the species now cultivated were certainly unknown to the ancient Egyptians. Among the old Egyptian plants which have now vanished, the *Papyrus* and *Nelumbium* are to be especially noted (to which might be added the *Mimusops*, to be treated of farther on). If all the plants recorded from ancient Egypt had been indigenous, the number of these would reach 60-70 species. But it must be observed, that the authenticity of the objects in the collections must be very cautiously inquired into. Even in the collection of Passalacqua, on the genuineness of which on the whole doubt can with difficulty be cast, the undoubtedly modern seeds of *Nigella sativa*, L., which still retain the well-known aromatic taste, have been introduced by some accident. The trade in false antiquities, which is in a flourishing state throughout Egypt, had a particularly easy field of operations in this class of objects. It is therefore very much to be regretted, if, on suspicious discoveries of this nature, comprehensive conclusions are arrived at as to the geographical distribution of plants, as for instance the account of the maize by the French traveller Rifaud.*

We will now deal more particularly with some species of plants.

Of grains, we have in this museum, wheat (*Triticum vulgare*, Vill.), with which a few barley grains are mixed. According to Unger,† there were also cultivated in ancient Egypt *Triticum turgidum* (still existing in Egypt) and spelt (*T. Spelta*, L., perhaps also *T. monococum*, L., both now no longer used). Unger has ascertained from an examination of the bricks of the Dahschûr pyramid‡ that wheat and barley were cultivated on a most extensive scale in ancient times since the straw of both species of grain was used in the composition of the bricks. There were also found in the bricks numerous grains of wheat, *Triticum vulgare, antiquorum*, Heer. (which was found as well in the Swiss Lakewellings). The barley was determined from the remains of the spike to be *Hordeum hexastichon*, L. We may here call attention to the fact that in no country in the world are wheat and barley cultivated under so many varieties as in Abyssinia, although the home of these grains, originally coming from Asia Minor, is scarcely to be sought there.

It is well known that the statement that grains of wheat taken from ancient Egyptian tombs had been caused to germinate, was for a time universally believed. This statement was long ago

* Notwithstanding the detailed inventory printed in Bonafous 'Histoire Naturelle du Mais,' Paris et Turin, 1836, p. 16, the possibility can scarcely be got rid of, that the traveller was deceived by the inhabitants of Qurnah, whose help he employed in his excavations.

† L. c., xxxviii. 23, p. 97, 98.

‡ L. c., liv. 1, p. 41.

refuted on the ground of intentional deceit on the part of the gardener entrusted with the cultivation. Still less does the statement mentioned by Unger* as a curiosity, that a bulb found in the hand of a mummy developed, require refutation.

The Papyrus plant (*Cyperus Papyrus*, L.) has particular interest on account of the controversy raised about twenty years ago on the supposed difference between the African species and that in our Botanic gardens. According to the researches of Parlatore,† the latter, which it is well known is naturalized very completely at Syracuse, and occurs at other places in Sicily, in Malta, and in Syria, under the name of *Cyperus syriacus*, Parl., differs in the drooping branches of the umbel, from the old Egyptian *Cyperus Papyrus*, Parl., still occurring on the Upper Nile, which has stiff, erect umbel-branches. At any rate the *Papyrus* is always represented on monuments with an erect top. Nevertheless, Caspary showed soon afterwards from specimens of the Egyptian Museum here the untenability of the difference insisted on by Parlatore. Oliver‡ later expressed himself of a similar opinion, and the specimens from the Upper White Nile, collected by Schweinfurth, are in no way different from those of Sicily. [Schweinfurth himself, who had the opportunity of examining the Sicilian Papyrus a few months after the Soudanian one, expresses his firm conviction of the identity of both plants.] The Papyrus, which was much cultivated in Lower Egypt, where it presumably occurred wild§ in ancient times, and for which region it appears as the hieroglyphical symbol, was employed as a textile material in addition to its best known use in the manufacture of paper; its rhizome, which is rich in starch, served also in ancient times as a means of nourishment. Strabo|| has stated, that the Egyptians intentionally restricted its cultivation to a few localities. In later times, after the invention of rag-paper, the Papyrus was completely abandoned. At the time of the French occupation Delile¶ mentions it as still at Damietta. Since then no one has met with it again in Egypt, and it may very probably have quite died out in the land in which it was formerly so extensively cultivated, while it still persists in Sicily and Syria, into which lands it was probably introduced in course of the Middle Ages, presumably from Egypt. In order to find it wild, one must now penetrate to the Upper Blue or White Nile. It is generally distributed in tropical Africa,

* L. c., xxxviii. 23, p. 108.

† 'Mémoire sur le Papyrus des anciens et sur le Papyrus de Sicile.' Extrait du Tome xii. des mém. prés. par divers savans à l'academie. Paris, 1853.

‡ 'Kew Gardens Guide,' 25 ed. p. 21.

§ The precious naive picture of a Hippopotamus-hunt in the Mastaba of the Ti in Saqqarah shows us a Papyrus thicket, on the tops of which numerous birds were resting and being taken by surprise by marten-like beasts of prey. Such a representation cannot from its nature refer to cultivated objects.

|| P. 799, Casaub. Comp. E. Meyer, 'Botan. Erläuterungen zu Strabon's Geographic,' Königsberg, 1852, p. 152.

¶ 'Descr. de l'Égypte, Hist. Nat.' ii. p. 50.

and south as far as Natal.* Among the plants of the Berlin Egyptian Museum there is another species of *Cyperus* (*Cyperus esculentus*, L.). The tuberous root-stocks of this plant, which is not at all rarely cultivated in Egypt at the present day under the name of *Habb-el-Asis*, and in cultivation scarcely ever flowers, are a savoury food; they contain fatty oil and sugar. The tubers in the Museum, like those at present cultivated in Egypt, are as a rule rounder and smaller than those of the plant cultivated in the botanic gardens of Germany, which has usually long tubers and may possibly belong to a variety. They resemble much more the tubers of the form of *Cyperus esculentus* frequently growing wild in the Mediterranean region and also in Egypt, which has been described as a separate species under the names of *Cyperus aureus*, Ten., and *Cyperus melanorrhizus*, Del.

The cultivation of the date-palm (*Phoenix dactylifera*, L.) was presumably as widely carried on in ancient times as now. The region of the cultivation of this palm, the true home of which is unknown, stretches over the whole of North Africa and a part of Asia Minor. Whether a small form occurring on Mount Sinai is a stray wild form or originally indigenous is difficult to ascertain—the fruits are esculent. Among the findings in the tombs the date occurs abundantly.

There occur no less numerous in the tombs the fruits of another palm (*Hyphæne thebaïca*, Mart.), on the occurrence of which in Egypt the old writers have given us exhaustive information. These fruits, which are of considerable size, have the peculiarity that of the three parts of which palm-fruits consist, two or three are very often developed, while in most palm-fruits, *e. g.*, date, cocoa-nut, only one is developed. The rather thin, tender outer layer of the fruit has a sweet taste like gingerbread, and is chewed by the natives. The stony shell lying under this layer encloses the hard kernel, the albuminous body of which is hollow within. The Doum Palm is distributed over most parts of Africa; it is found both in Guinea and South Africa. Different species of *Hyphæne* have been determined from different parts of Africa, but the late Dr. Seemann, who worked a great deal at the palms, after examining a great quantity of material, expressed the opinion that the differences were not real.

A third palm-fruit, present in the Passalacqua collection, and found also in old Egyptian tombs,† remained for a long time doubtful as to its origin. Kunth‡ named it *Areca Passalacqua*, and it certainly has a striking characteristic in the possession of ruminated albumen, *i. e.*, with the mass of albumen traversed by brown wrinkles, as in the East Indian genus *Areca*, but is distin-

* Compare Thiselton Dyer in 'Gardener's Chronicle.' 1875, i. p. 78, translated in the 'Monats-schrift des Vereins zur Beförderung des Gartenbaues,' 1876, p. 17-23.

† Unger (*loc. cit.* xxxviii. 23, p. 107) obtained it from tombs at Thebes. It is also preserved in the Egyptian Museum at Florence, according to the specimens sent to us by Dr. Levier.

‡ 'Passalacqua Catal.' p. 228. 'Ann. Sc. Nat.' viii. p. 420.

guished from the latter genus by the want of the fibrous layer to be found directly under the thin outer skin of the fruit. The albumen of *Areca Catechu*, L., is, as is well known, generally chewed in India with the leaves of *Piper Betle*, L.; it is said to preserve the teeth, though it colours them black, and the saliva red. [Disks of the unripe albumen of this palm of the consistency of leather are strung together and exposed for sale in the seaport-towns of Arabia. They are to be found in the Berlin Agricultural Museum, sent by J. M. Hildebrandt.—*A.*] Unger was the first to perceive the identity of *Areca Passalacqua*, Knth., with the fruit of *Hyphane Argun*, Mart., a palm which inhabits several valleys of the Nubian desert within the great bend of the Nile between Qorosgo and Abu-Hammed, nearly under the twenty-first degree of latitude. The unripe fruits of this palm, which is called Argun or Dellâch* by the natives, is, according to the notes of the Belgian traveller, E. de Pruyssenaere† buried by the natives for a time, by which the albumen acquires a pleasant taste, similar to that of the cocoa-nut. The finding of this palm-fruit in old Egyptian tombs has the greater interest from the fact that the plant is not cultivated now in Egypt, and this was perhaps also the case in times of antiquity. Its present range is touched by the desert road, traversed from the earliest times, which connects Lower Nubia with that tract of the Nile Valley in which the ancient kingdom of Meroë flourished, the relations of which to Egyptian culture are well known.

Of the cultivation of the olive (*Olea europea*, L.) in ancient Egypt we possess various accounts; for instance, Strabo‡ tells us of the extensive cultivation of the olive tree in Nomos of Arsinoe—the modern Fajum; and Theophrastus§ mentions the occurrence of the olive tree in the oases of the Libyan desert, where it may still be met with in abundance. Fruits of the olive tree have not yet been found in the tombs, although the hard stone would have lasted well. On the other hand, there is to be found in the Berlin Egyptian Museum an object consisting of five bundles each of three olive twigs bound together by strips of palm leaves and united into one whole bundle. The twigs were easily recognised, from a few leaves still remaining, as those of the olive. The scaly hairs, appearing under the microscope like ornamental stars, which cause the silvery glitter on the under side of the leaf, were in good preservation. Lepsius conjectures that this bundle (*Passalacqua Cat.*, No. 1597), which recalls the rods used in our days in the punishment of children, had been used for a similar

* The chief locality bears after the palm the name of Wadi Dellâch. (On page 4 of Petermann and Harsenstein's map of Central Africa this valley is called, according to Von Beurmann [Text, p. (2)], 'Dolla.')—*A.*

† [Compare Ascherson, 'Sitzungsbericht der Gesellsch. naturf. Freunde, 1877. Page 144.—*A.* and *M.*]

‡ P. 809, Casaub. Comp. E. Meyer, *l. c.* p. 154, 155. [This place is incorrectly referred by Dr. Pfund (*Flora*, 1874, p. 413) to Arsinoe on the Red Sea (in district of the modern Suez).—*A.* and *M.*]

§ 'Hist. Plant.' Lib. iv. cap. 2, 9.

purpose. It might also have been used as a hand-broom. [In the Leyden Museum there are funeral wreaths of olive leaves, of which Conservator Pleyte has kindly sent a specimen.—*A. and M.*]

Among the fruits of the Passalacqua collection there are also juniper berries, which Kunth* derives from *Juniperus phænicea*, L., a determination the accuracy of which may be uncertain, since several nearly related species occur in the neighbouring lands (for instance, *Juniperus excelsa*, M. B., in Asia Minor, on the island of Thasos and in Abyssinia). *Juniperus phænicea*, which is distributed throughout the whole Mediterranean region, is absent, like all conifers, in modern Egypt, and scarcely occurred in times of antiquity wild or cultivated. It is therefore to be supposed that the fruits, as also the coniferous woods occurring as parts of Egyptian antiquities were imported in commerce from Syria or Asia Minor. The fruits of *Juniperus* were used presumably (like our juniper berries) in fumigation, &c.

The fruits of a species of *Balsamodendron*, likewise in the Passalacqua collection, were probably imported into Egypt from the coast of the Red Sea. This suggests the naval expedition of the Queen Misaphris (Hatasu), the natural-history collection of which is so characteristically illustrated on the walls of the Temple of El-Dêr-el-bachri.†

The Sycamore (*Ficus Sycomorus*, L., *Sycomorus antiquorum*, Miq.) was, as is well-known, one of the most widely-distributed trees in ancient Egypt, as it still is. On the religious worship, which was paid to the sacred Sycamore tree of Nutpe, Hathor or Isis, Unger‡ has collected much information in speaking of *Balanites*, which refers mostly to the former and not to the latter tree. [In the 'Book of the Dead' it is mentioned that the soul receives the "crown of justification" under the sacred Sycamore tree (compare the communication of Pleyte, p. 302.) *A. and M.*] The largest part of the wooden objects contained in the Museum are made of sycamore wood. The fruits of this tree are likewise in the Passalacqua collection. They are smaller than, and not so agreeable to the taste as, the common fig, but are nevertheless eaten in Egypt. They are not smooth like the common figs, but covered with woolly hairs, and they are not placed singly on the leafy twigs, but in clusters directly on the old wood.

[That often-mentioned object which was considered to be an orange by Kunth,§ has been proved to be a sycamore fruit. That botanist certainly gives this determination with a doubt, justified by the historical accounts of the successful introduction of *Citrus Aurantium*, L., into the Mediterranean region for the first time

* 'Passalacqua, Catal.' p. 228. 'Ann. des. Sc. Nat.' viii. p. 423.

† Dümichen, 'Die Flotte einer ägyptischen Königin,' Taf. ii. xv., xvii., where the transport of living trees in tubs is represented, which by the inscriptions (p. 19) is denoted as "living incense trees, 31 specimens."

‡ 'L. c. xxxviii. 23, p. 126, 127.

§ 'Passalacqua Catal.' p. 228. 'Ann. des. Sc. Nat.' viii. p. 421.

in the Middle Ages, and complains that he was not permitted to attain certainty by making a section through the fruit. Through the liberality of the present administration of the Egyptian Museum, this scientific demand has now been satisfied. Professor Lepsius had the kindness to permit the decisive section being made, which was undertaken with the assistance of Dr. Stern, who showed the most friendly interest in our work generally. Besides, the late Professor A. Braun had already compared with it the fruit of *Ficus Carica*, L., about to be mentioned, from which it appears he had already guessed their near relationship.—*A.* and *M.*]

In the tomb opened by Passalacqua (mentioned in the introduction), a cake was found resting on an underlayer of sycamore twigs, which are indeed very much broken, but still possess distinct remains of leaves. The leaves show on young shoots only an indication of the lobes so characteristic of the leaves of the ordinary fig-tree.* The other leaves are undivided. The common fig tree, *Ficus Carica*, L., was also cultivated in ancient Egypt, as the figure given by Unger† proves. The Passalacqua collection also contains such a fruit, recognised by Kunth as that of *Ficus Carica*, L.

The Castor Oil (*Ricinus communis*, L.), was cultivated for the oil under the name of *Kiki* in even as great abundance then as now. The figures which Unger‡ takes as those of this plant, permit of other interpretations. The seeds have often been found in tombs, and in part look so well preserved that Kunth§ was led to make a naturally fruitless attempt at cultivation. The existence of a fatty oil has been proved by the Parisian chemist, Julia-Fontenelle.|| The mottling of the *Ricinus* seed may still be clearly made out.

Cordia Myxa, L., Arabicé *Muchét*, is the name of a fruit tree of medium size, which is abundantly cultivated in the gardens of Egypt, and a form of it with smaller seeds grows wild in Abyssinia. The fruit is a drupe with a comparatively large stone excavated above and below, and a sweet mucilaginous flesh. It was formerly to be found in our apothecaries' shops under the name of "sebestenen" or black jujubes, and was employed in the same way as the true jujubes (from *Zizyphus Jujuba*, Lamk.). Particularly characteristic of the *Cordia* fruit is the basin-shaped calyx which surrounds it at the base. According to Unger¶ the fruits of this tree are to be found in the Vienna Egyptian Museum, and in the Florentine Museum also fruits are preserved under this name. On the other hand, Unger's interpretation of an antique

* In Egypt there is cultivated also a form of *Ficus Carica*, L., with undivided leaves. Compare Ascherson in 'Garten-Flora,' 1876, p. 70.—*A.* and *M.*

+ *L. c.*, xxxviii. 23, Taf. iv., Fig. 41.

‡ *L. c.*, xxxviii. 23, Fig. 86, 87.

§ 'Ann. des. Sc. Nat.' viii, p. 422.

|| 'Passalacqua Catalogue,' p. 292.

¶ *L. c.*, xxxviii. 23, p. 113.

figure* as the inflorescence of *Cordia* seems very risky. In no case, however, was Unger justified in declaring the fruits preserved in the Berlin Museum and determined by Kunth† to be those of *Mimusops Elengi*, L. (*Sapotaceæ*), to be the fruits of *Cordia*. These fruits have proved, on a more exact comparison, not to be those of the tree mentioned, which is a native of India, but those of another species, *Mimusops Kummel*, Hochst., a native of Tropical Africa. They have, according to Schweinfurth's notes, the form and colour of hips. The rather thin flesh of the fruit, which according to Schimper‡ has a mealy sweet taste and is pleasant to eat, surrounds a very large stone which encloses a seed with a hard testa and a bitter kernel. The seeds determined by Kunth§ to be those of a species of *Diospyros*, have turned out to belong to the same species of *Mimusops*.

[It is certainly a noteworthy coincidence that the leaves of this tree, the fruits of which are preserved in the Berlin Museum (and presumably also in the Florentine Museum, as *Mimusops Elengi*, L.) have been found in another Egyptian collection. In a short visit to the Leyden Museum, P. Ascherson|| noticed a box full of leaves, which according to the kind information of the conservator, Mr. Pleyte, belonged previously to different funeral wreaths found with several mummies of the same museum. These leaves, for the most part folded together and strung on strips of split-up palm leaves, turned out to be those of *Mimusops Kummel*, from several specimens kindly sent by Mr. Pleyte.

This use of the leaves makes it highly probable that *Mimusops Kummel* was cultivated in ancient Egypt, a fact, which even from the occurrence of the fruits in tombs could not be inferred, since these might very well have been imported from their native land, *e. g.*, Abyssinia. In modern Egypt this tree is not to be found¶, and ranks therefore in some degree with the *Papyrus* and *Nelumbium*, which from discontinued use have likewise disappeared from Egypt in the course of the century. About the funeral wreaths of the Leyden Museum, Mr. Pleyte has made the following communication to P. Ascherson:—"The mummies, which were adorned originally with crowns of *Mimusops* leaves, belong to later epochs, partly to the first Græco-Roman times. These crowns were ornamented with different flowers.

In the specimens sent, the following species were distinguished:—

* *L. c.*, Fig. 35.

+ 'Passalacqua Cat.', p. 228. 'Ann. Sc. Nat.' viii., p. 421.

† 'Schweinfurth, Beitrag zur flora Aethiopiens,' p. 85.

§ 'Passalacqua Catal.', p. 228. 'Ann. Sc. Nat.' viii., p. 420.

|| 'Sitzungsber. d. Ges. naturf. Freunde', Berlin, 15 Mai, 1877, p. 159.

¶ *Mimusops Elengi*, L., is found as a rarity in the garden Maniel on the Island of Rodah, near Cairo, where Ibrahim-Pasha caused to be planted about thirty years ago a number of trees imported direct from the East Indies. Delchevallerie (Cat. rais. prod. d'hist. et. d'agric. exp. par la direction des domaines du Khedive d'Egypte à Cologne 1875, p. 6), gives as the Arabian name Sagar indy, *i. e.*, Indian tree.

(1.) *Acacia nilotica*, Del. "Cant." The employment of the flowers of this tree, which was generally distributed throughout ancient Egypt, as it is now, in the making of wreaths, was mentioned by Theophrastus.*

(2.) *Chrysanthemum coronarium*, L. This plant, which grows wild generally over the Mediterranean region, and is not rarely cultivated in our gardens, is found in Egypt only at Alexandria, but may possibly have been grown in the flower gardens of the ancient Egyptians.

(3.) A species of *Centaurea*, which from the small fragments at command have never been determined with certainty.—A.]

Other wreaths are ornamented with the leaves of *Nymphaea caerulea* or the blue Lotus. [The specimens sent were ascertained by Prof. R. Caspary to be the petals of a *Nymphaea*; about the species nothing nearer could be made out.—A.]

Funeral wreaths of mummies of an older period, for instance, of the time of Oskaron (22nd Dynasty), and of the time of the 25th Dynasty, consist of olive leaves. [Mr. Pleyte has sent a specimen of these also.—A.] These funeral wreaths were a symbol of the justification of the departed before the judgment seat of Osiris. This "Crown of Justification" is mentioned several times in the 'Book of the Dead,' *e. g.*, in cap. 19, which however in the editions of the 'Book of the Dead' first appears after the 27th Dynasty, In the 97th chapter, it is said that the justified receives the crown under the holy Nehet-tree (*i. e.*, the Sycamore). Also in other writings of the time of Ptolemy, these crowns of justification are mentioned. Unfortunately nothing is said of what these crowns were composed, and it still therefore remains an open question what tree-name handed down from antiquity relates to *Mimusops*.

Among the Passalacqua seeds there are to be found under No. 459 the seeds of a species of *Cucurbitaceæ*, which Kunth† has not determined more exactly. These belong undoubtedly to the water-melon, *Citrullus vulgaris*, Schrad., and the establishing of the existence of these seeds in ancient Egyptian tombs is all the more important since it has of late been clearly shown that this plant has its home in Africa. Not only in the Upper Nile region‡ but also in different other districts in West and South Africa have water-melons been met with, the fruits of which are much smaller and less juicy than those of the cultivated plants. [However, E. de Pruyssenaere§ states that these wild water-melons, after a short time of continued cultivation, assume all the properties of the cultivated plants].

It can therefore scarcely be doubted that the water-melon was early cultivated in Egypt, and that it spread from there to Asia Minor, and later to south and south-east Europe (South Russia, Hungary). This fruit is expressly named in that well-

* 'Hist. Plant. Lib.' iv., cap. 2, 8.

† 'Passalacqua Catal.' p. 229. 'Ann. Sc. Nat.' viii., p. 423.

‡ Compare Schweinfurth, 'Beitrag zur Flora Aethiopiens,' p. 250.

§ 'Sitzungsber. der Ges. Naturf. Freunde,' Berlin, 15 May, 1877. p. 148.

known passage in the Bible in Numb. chap. xi. v. 5, in which the vegetables of Egypt are mentioned, to which the children of Israel languishing in the Sinai desert looked back with longing, although this is not to be found in the Lutheran translation. The Hebrew word *abattichim*, incorrectly rendered by Luther, "Pfeben" (an old word denoting a species of Gourd, derived from the Latin Pepo), means, undoubtedly, the water-melon, which still bears the same Arabic name *battich*. This interpretation appears to us so correct that we may look upon it as sufficient testimony that the word used by the LXX at this place means water-melons. Also the name of the second *cucurbitaceous* plant mentioned in this passage of the Bible, viz., *kischuim* is incorrectly translated by Luther by the word *Kurbis* (the pumpkin); it means rather a kind of cucumber, as appears from the translation of the LXX, *σικίλος*. In modern Arabic the word *kischuim* (sing. *kischu*) is *qittâ*. Under this name "Chate" Prosper Alpinus figures the fruit so common in Egypt, which when unripe is called *adjur*, and when ripe *âbd-el-awî*.* It is similar in appearance and taste to a cucumber, but in foliage and flowers to the melon, so that the plant, described by Linnæus as *Cucumis Chate*, is to be regarded only as a subspecies of *C. Melo*, L. Whether this naming of Prosper Alpinus is based on a mistake, or whether the usage of the word has since changed, is difficult to decide; all the later authorities, Forskal,† Delile‡ and Schweinfurth (in a letter) denote by *qittâ* a form of our common cucumber (*C. sativus*, L., Arabic, *chiâr*). According to Dr. Wetzstein,§ a thorough syriologist, the *qittâ* is more than an ell long, but only five-fourths of an inch thick, is ribbed, and its pliability proverbial. It often grows considerably in length in a single night, and on this account is cried (in the market) as "tender and fresh, and has stretched itself in the night."—*A. and M.]*||

It is well known how important a part was played by the two species of *Nymphaea*, the famous Lotus flowers, widely distributed in central Africa and particularly plentiful now in the Nile Delta, in the religious observances of the ancient Egyptians. From the oldest times, the seeds and rhizome (*κόρσιον*, Arabic

* [According to Unger this is mentioned in Exodus, cap. ix., verse 32. This citation depends, however, on an error, as only one word of disputed meaning occurs there, *kussemet*, on the meaning of which (at this place, probably, spelt, at any rate not rye as Luther translates) ["rye" also in English version] Dr. Wetzstein expressed his opinion; in this 'Zeitschrift,' v. (1873), p. 281, 282. There is only to be added to his explanation, that the leguminous plant now called in Syria *Kursennah* is not a variety of *Vicia sativa*, L., but according to the specimens brought by Dr. Kersten *V. Ervilia*, Lk.—*A. and M.]*

+ Fl. aeg. arab., p. 169.

† 'Descr. de l'Égypte.' Hist. nat. ii., p. 77.

§ 'Der markt von Damascus. Zeitschr. der Deutschen Morgenländ.' Ges. xi. (1857), p. 522, 523.

|| The English version is more correct in its rendering of the fruits mentioned in this passage:—"We remember the fish, which we did eat in Egypt freely; the cucumbers, and the melons, and the leeks, and the onions, and the garlick."—[*Ed. Journ. Bot.*]

biari) served for food, a use which tradition carries back to the first king, Menes. The employment of the seed as a means of nourishment is no longer the custom in Egypt, but according to Schweinfurth* survives in the region of the Upper Nile among the inhabitants of Bachr-el-Rhasal. On the other hand, according to Delile† the rhizome is still boiled and eaten. Both species are figured frequently on monuments. The blue flowers of *Nymphaea carulea*, Savigny, with entire foliage-leaves, are easily recognised in several representations. Two well-preserved flower-buds of this species are, according to a communication of Prof. R. Caspary, in the British Museum.

As to the remains of *Nymphaea* flowers in the Leyden Museum, see above.]

The far more frequently represented white-flowered *Nymphaea Lotos*, L., is easily to be distinguished from our native *Nymphaea alba*, L., by the sharply dentate leaves. The old Egyptian name of the Lotos flower "*seschnin*" is preserved in the Arabic speech of the modern Egyptians in the form of "*bischnin*." The white one, according to Delile,‡ is distinguished as *bischnin-el-chansir* (Swine's Lotos), while the blue is called *bischnin arabi* (Arabian Lotos). The monographer of the *Nymphaeaceae*, Prof. R. Caspary, who has closely studied the monumental representations of the Egyptian *Nymphaeaceae*, will treat exhaustively of this subject in his expected work.

In this place there is another water-plant, *Nelumbium speciosum*, Willd., closely related to *Nymphaea*, to be mentioned, which possesses a wide distribution in Asia, and also occurs on the lower Volga at Astrachan. This Asiatic form, which is not rarely cultivated in our greenhouses, has rose-red flowers, while a very closely allied American form has yellow flowers. The frequent occurrence of *Nelumbium* in Egypt is certified by several accounts of the old writers, as also by monumental representations, at least in later times. The beautiful mosaic in the Museo Borbonico in Naples is well-known, on which a Nile-landscape is indicated by crocodiles and *Nelumbium*. Herodotus§ characterises the *Nelumbium* very strikingly by comparing the fruit with a wasp-nest. He mentions that the seeds which are sunk in cavities of the receptacle are eaten. Yet more exhaustively does Theophrastus|| describe this plant under the name of κίαμος (*faba Aegyptia*), used by most writers of antiquity. Strabo¶ has left us

* 'Im Herzen von Africa,' i., p. 130.

† L. c., p. 306.

‡ Loc. cit.

§ Lib. II., Cap. 92, κηρίω σφηκῶν ἰδέειν ὁμοιώτατον. What Herodotus meant by the statement ὁ καρπὸς ἐν ἄλλῃ κάλυκι παραφυσομένη ἐκ τῆς ῥίζης γίνεται remains uncertain if one translates κάλυξ by calyx, or as Lhardy (Herodotus, i. 207) by stem.

|| 'Hist. plant.' Lib. iv., cap. 8, 7 and 8.

¶ P. 799, Casaub. Compare E. Meyer, l. c., p. 151 ff.

a picturesque description of a *Nelumbium* thicket at Alexandria, which in his time was often the object of boat excursions on the part of the inhabitants who liked to take breakfast under the shadow of the large leaves. The same author describes in a figurative way the manifold uses of these leaves (compared by Theophrastus to a Thessalian hat) as drinking vessels, &c.

It has already been mentioned that this plant, which in the time of the Roman Empire was so abundant in Egypt, has now completely vanished. As E. Meyer conjectures, it was very probably generally planted, since it is nowhere indigenous in Africa.

Balanites aegyptiaca, Del., Arabic *Hedjlidj*, a moderately large tree or shrub, widely distributed in North Tropical Africa from Senegal to Abyssinia, of the family of *Olcaceæ*, is planted very rarely in Egypt now, and only single specimens are to be met with in the gardens of the larger towns. Delile* knew of only one tree in Cairo and a few shrubs near Siut; Ungert† saw only one tree also in Siut, and Ascherson‡ a tree in the Khedive's garden at Esneh. The latter has met with the plant in greater numbers in the Great Oasis (Chargeh), wild, but, however, only shrub-like. In the region of Qoçêr, according to Klunzinger,§ isolated trees of *Balanites* are to be found, and probably quite wild. In ancient Egypt this tree at any rate possessed a wider distribution, since the kernel of its fruit has been found repeatedly in tombs. They are to be found in the Florentine Museum (besides the Passalacqua collection), and were brought back by the expedition of Rohlfs from a stone tomb in the oasis Dachel,|| where the tree was not met with. The yellow stone-fruit is extensively eaten in Central Africa, although European travellers,¶ *e. g.*, Rohlfs, do not find the taste agreeable. It has before maturity a sour taste; it afterwards becomes sweet with a peculiar bitter medicinal taste. The stone varies somewhat in its shape. Among the specimens of the Passalacqua collection there are some shorter than others and some more slender; most are punctured by a small weevil.

The cultivation of the Vine was extensively carried on by the Egyptians. The representations of vine-leaves and grape-gathering on the monuments are numerous** in which the drawing of the leaves†† at all events leaves nothing to be desired. As numerous are the accounts of the old writers about the cultivation

* *L. c.*, p. 223, 224.

† *L. c.*, xxxviii. 23, p. 126.

‡ 'Garten Flora,' 1876, p. 70. [The statement of the same (Verhandl. der anthropol. Ges. Berlin, 1875, p. 58) that *Balanites* is plentifully cultivated in Upper Egypt is incorrect.—A. and M.]

§ 'Bilder aus Oberägypten der Wüste, und dem Rothen Meere. Stuttgart, 1877, p. 235.

|| 'Sitzungsberichte der Berl. anthropol. Gesellschaft,' 1875, p. 58.

¶ 'Quer durch Africa,' Bd. ii., p. 11.

** 'Unger *l. c.*, xxxviii. 23, Fig. 39, 40 and 42. Compare also Fig. 38.

†† Compare, *e. g.*, Fig. 40.

of the vine and the enjoyment resulting from its use in Egypt. The consequences of the latter are immortalised in different old representations.* Grapes appear in different Egyptian collections. Those in this museum are of the size of moderately large raisins, somewhat long (unpointed); 0·01–0·018 m. long, of a black colour, not brown like our raisins, which is foreshadowed by the originally dark-blue colour of the grapes, as may be recognised on several of the coloured representations mentioned by Unger. Several grapes which have been examined contained not one but three seeds each, although Kunth† denotes it as *Vitis vinifera* var. *monopyrena*. After lying for four days in water and having hot water poured on them three times, these fruits were not softened, and did not in any way assume the fleshy and tender consistency of softened grapes, but under powerful pressure they crumbled to pieces like rotten wood. They coloured the water rather dark chestnut-brown. The seeds on drying became cracked, and the cell-layer began to come off so that they had to be fastened with gum; they behave themselves, therefore, like *fossil* seeds.

The size of the seeds agrees with that of the seeds of large raisins, but are somewhat flatter, in the upper part rather broader and more deeply hollowed, bilobed, and rather suddenly diminished in the lower beak-shaped end. They are about 0·007 m. long and from 0·0045 to 0·005 m. broad.

The chemist Julia-Fontenelle did not succeed in proving the existence of sugar in the flesh of the fruit.‡

The pomegranate (*Punica Granatum*, L.) is abundantly represented on the monuments, *e. g.*, Unger, *loc. cit.*, xxxviii. 23, Figs. 85, 89. In the Passalacqua collection there are fruits somewhat smaller and of more simple structure than those of to-day. The latter have usually 6–8, the old ones on the other hand only 4–6 cells. One of the Passalacqua fruits is “bitten so that that the impression of both rows of teeth of a human being may be recognised; a way of opening these fruits which is still the custom among the common people in Egypt”—(Ehrenberg, in a letter to Passalacqua).

No. 452 of the Passalacqua collection is denoted “fruits inconnus” in the Catalogue, pp. 22, 228. These fruits prove to be those of a *Sapindus*. Prof. Radlkofer, the well-known monographer of the *Sapindaceæ*, has had the kindness to determine the species and to make the following communication as to its nomenclature and use. According to his investigations these fruits belong to *Sapindus emarginatus*, Vahl, which form, like *Sapindus laurifolius*, Vahl, is, according to Hiern, with whom Radlkofer entirely agrees, not to be separated from *Sapindus trifoliatus*, L. The fruits of this East Indian tree are used in their native land, as in other lands further west, in washing the head and hair as well as ornamental articles of dress, *e. g.*, silken materials. They bear in

* Unger, *l. c.*, p. 116.

† ‘Passalacqua Cat.’ p. 229. ‘Ann. Sc. Nat.’ viii., p. 422.

‡ ‘Passalacqua Cat.’ p. 293.

Sanskrit the name *Phenila*, which means "froth," and is repeated in the Singalese name *Sas-penela* (*Sas* means tree in this language). Another Sanscrit name *Arischta*, literally "unhurt," is in Hindustanee *Riitha*, in Bengalee *Burra-Reetha* (the latter according to the English way of writing it), and has passed over into the West Asiatic tongues. In Persian these fruits are called *Rita*, or *Bundugi-Hindi*, *i. e.*, Indian hazel-nut; in Arabic *Ryteh*; under the latter name they are mentioned by Forskål* and Delile† (" *Sapindus Ryteh* ") as purchasable in the apothecaries' shops in Cairo. Corinaldi‡ has also met with it in druggists' shops there. He declares this fruit to be *Sapindus Mukorossi*, Gaertn.; Radlkofer has however recognised in the specimens brought back by him *Sapindus emarginatus*. It appears probable to Professor Radlkofer that the ancient Egyptians, whose mercantile connections with India are not to be doubted, received this drug from India as at present, and used it for similar purposes.

The Nile Acacia (*Acacia nilotica*, Del., ἀκάνθη Αἰγυπτία and *Spina aegyptia* of Greek and Roman authors), which still bears in Egypt the old Egyptian name *çant*, was not less widely distributed in times of antiquity than at present. Its firm and tough bright-red wood takes a beautiful polish, and is the only native wood suited for ship-building, although its extraordinary curved fibrous texture permits of pieces 3 m. long at the most being cut; it is the subject of a quite peculiar industry, described by Herodotus§ with his usual exactness. The bark and the necklace-like pods are very rich in tannin, and the latter are employed under the name of *Qarrad* in the preparation of leather, and are also used for medicinal purposes. These fruits are in the Minutoli collection, the authenticity of which, as fully discussed above, is very doubtful. In the Hieroglyphic writing, a figure representing one of the fruits serves as these determinative of the name of the Acacia. [A piece of wood of the *çant* tree was brought by Ascherson from the temple in the Oasis Dachel.|| As to the employment of the beautiful golden yellow flower-heads in the making of wreaths, see above. Kunth¶ mentions "*Mimosa Farnesiana*, Linn., some flower-heads united to form a garland, communicated by M. Jomard." But these flower-heads belonged,

* 'Materia Medica,' p. 151.

† 'Description d'Egypte, Histoire Naturelle,' ii., p. 81.

‡ 'Memorie Valdarnesi,' p. 75.

§ Lib. ii., cap. 96. A comparison of this original description with that of Schweinfurth (Im Herzen von Africa, Pt. i., p. 56) of the ship-building in Khartoum, shows that the mode of ship-building has not altered there in the slightest for 2300 years. Without knowing the description of his predecessor, Schweinfurth has chosen the same comparison as Herodotus for the joining together "of the planks united by dove-tailing:" πλινθηδὸν συντιθεῖσι. The want of ship-ribs, the employment of "gigantic iron nails" and plugs (γόμφους πυκνοὺς καὶ μακροὺς) are rendered prominent by both travellers in the same way.

|| 'Verhandlungen der anthropol. Ges. von Berlin,' 1875, p. 58.

¶ 'Ann. D. Sc. Natur,' viii., p. 422.

if genuine, certainly to *Acacia nilotica*, since *Acacia Farnesiana*, Willd. (arab. *fitn*), is indeed cultivated abundantly in Egypt as in the Mediterranean countries generally, on account of the delicious violet smell of their flowers, but has been introduced there lately, and probably comes originally from tropical America.—*A. and M.*]

(To be continued.)

PART 89 of Baron von Mueller's 'Fragmenta Phytographiæ Australiæ' contains some of the results of his recent expedition to the subtropical parts of Western Australia, including many species not previously known to grow there, and several novelties. Among these is a small prostrate yellow-flowered *Capsella*; to this genus are also referred the Australian species hitherto placed in *Thlaspi*. A description is given of the extra-tropical West Australian palm, *Livistona Maria*, identical with Giles' Central Australian one. The Palms called *Areca Normanbyi* and *Arenya (Saguerus) australasica* are now both referred to *Ptychosperma* after an examination of flowers, hitherto unknown. *Phacellothrix* is a new genus of *Compositæ* founded on *Helichrysum cladochatum*, F. M., and differing from the latter genus in its tailless anthers. The smallest Orchid in the world, formerly placed in *Dendrobium*, is fully described as *Bolbophyllum minutissimum*.

A SECOND edition of Mr. Edgeworth's book on "Pollen" (Hardwicke and Bogue), has been published. It has been revised throughout, and the greater part of the errors and misprints of the previous edition have been corrected. But there still remain some curious and confusing names, and some transpositions or misplacements, such as *Astilbe* for *Astelia*, and *Corispermum* for *Comesperma*.

THE January part of 'Hooker's Icones Plantarum' contains Plates 1276-1300. The order *Euphorbiaceæ* is chiefly illustrated. *Choriophyllum* (tab. 1280) is a new genus of *Phyllanthæ* from the Malay Peninsula and islands; and *Dicalia*, from Borneo, and *Mesobotrya*, from Central Africa, belong to the same tribe. The curious short-podded *Cardamine paradoxa*, Hance, is figured (tab. 1285), and the remarkable *Euphrasia disperma*, Hook., f. (tab. 1283), is made a subgenus under the name *Anagosperma*.

WE learn from the Annual Report for 1878 of the Royal Botanic Society, that seeds of the *Victoria regia*, which were sent to Zanzibar for introduction into Lake Nyassa, have vegetated there, and the experiment likely to be successful. The Society has received from Mr. G. Waller a living plant of the African India-rubber plant, *Landolphia florida*.

THE Botanical Locality Record Club has issued its Report for 1877, the fifth year of its existence, and concludes with it its first volume. Among the "new county records" the most interesting are those from South Lincolnshire, the flora of which has been largely increased. In the "general locality list" are included several Channel Islands records. How long will it be before British botanists generally will be able to resist entering these French

localities in books devoted to the English Flora? Some of the S. Hants localities printed are familiar, and have been already published. Does restricted *Ulex nanus* occur there? It is surely *U. Gallii* that is the abundant heath plant. Prof. Babington communicates a list of the distribution of the British species of *Chara*, as shown by specimens in his herbarium; it must be considered as but a small first instalment of what is known. The latter part of the Report is occupied by a summary of County distribution forming a sort of supplement to Watson's 'Topographical Botany.' With the view of attempting to adhere to the spirit of that work, it is stated that those County records only are entered which have been vouched for by specimens sent either to Mr. Lees of the Record Club, or to the Curator of the Exchange Club. Some, however, seem to be admitted on the authority of MS. Catalogues, and it is not easy to see in what respect such can be considered as having claims to recognition superior to published ones, all of which, except those of the Exchange Club, are purposely ignored. This summary or supplement to 'Topographical Botany' is also issued and sold separately, and the separate copies contain a list, not given in the Report, of some of the persons cited in its pages; it is noteworthy that they are there described as "senders of specimens or other material."

In the 'Proceedings of the Literary and Philosophical Soc. of Manchester' (Nov. 4, 1878), Mr. J. Cosmo Melvill gives an account of the Flora of the Breidden Hills, Montgomeryshire. Over three hundred species were observed in the summer of 1877, and a list of the rarer ones is given. A form of *Arabis hirsuta*, considered to approach "*A. arcuata* of Grenier and Godron, and *A. alpestris*, Gor.," was observed; and *Potentilla rupestris* still occurs in almost inaccessible spots near the waterfall.

Mr. E. J. BAILLIE gives in the 'Proceedings of the Chester Society of Natural Science', Pt. 2, 1878, an interesting Catalogue of the plants found within the boundaries of the City of Chester. But it seems a pity that the species of the specially urban genera, *Rumex*, *Atriplex* and *Chenopodium*, should not have been sufficiently examined to be included.

NEW BOOKS.—B. VERLOT, 'Le Guide du botaniste herborisant,' Ed. 2. (Bailliere, Paris, 1879.)—J. SCOTT, 'Manual of Opium Husbandry.' (Calcutta, 1877.)—J. D. HOOKER & J. BALL, 'Journal of a tour in Morocco and the Great Atlas.' (Macmillan, 1879).—P. G. LORENTZ, 'La Vegetacion del Nordeste de la Prov. de Entre-Rios.' (Buenos Aires, 1878).

ARTICLES IN JOURNALS.—DECEMBER, 1878.

Botanische Zeitung.—H. Bauke, 'On sexual generation in *Platycerium*, *Lygodium* and *Gymnogramme*' (continued).—O. G. Petersen, 'On the development of the stem in *Mesembryanthemum*.'—J. Borodin, 'On the physiological rôle and the distribution in the vegetable kingdom of Asparagin.'

Flora.—K. Prantl, 'On the arrangement of the cells in the flask-shaped prothallia of Ferns' (continued).—P. G. Strobl, 'On the flora of the Nebrodes' (continued), (*Equisetum longevaginatum*, n. sp.)—S. Schulzer, 'The genus *Damnosporium*, Corda.'

Oesterr. Bot. Zeitschr.—J. Pantocsek, '*Trifolium Haynaldianum*, n. sp.'—W. Voss, 'Mycological notes from Carinthia.'—L. v. Vukotinovic, 'Notes on Croatian flora' (*Astrantia croatica*, Tommas., n. sp.)—Von Borbas, 'Botanical notes.'—S. Schulzer, 'Mycological notes' (*Kalchbrenneria*, n. gen.)—J. Wiesner, 'The cycle of matter in the plant-world' (continued).—R. F. Solla, 'Flora of neighbourhood of Görz' (continued).

Grevillea.—M. C. Cooke & J. B. Ellis, 'New-Jersey Fungi.'—H. L. Smith, 'New Diatoms.'—'Notes on Rehm's *Ascomycetes*.'—M. C. Cooke, 'Himalayan Fungi.'—P. A. Karsten, 'Fungi novi in Fennia detecti.'—P. T. Cleve & F. Kitton, 'New Diatoms.'—C. B. Plowright, 'Californian *Sphæria*.'—W. Phillipps, '*Hygrophorus fetens*, n. sp.'

American Nat.—J. M. Anders, 'The beneficial influence of plants.'

Magyar Nov. Lapok.—F. Porcius, 'On some incorrectly named mountains in the Enum. Pl. Naszod.'—F. de Janka, 'Travels in Turkey' (II. Timova, Sipka-Balkan, Kalofer).

Botaniska Notiser (Dec. 16).—N. Wille, 'On swarm-cells of *Trentepohlia* and their copulation' (tab. 1).—O. Nordstedt, 'Algalogical notes' (tab. 2).—A. P. Winslow, '*Potamogeton trichoides*, Ch. & Schl., found at Göteborg.'

Journ. Linn. Soc. Lond. (no. 100, Dec. 31).—R. Abbay, 'Observations on *Hemileia vastatrix*, the so-called coffee-leaf disease' (tab. 13, 14).—G. Bentham, 'Notes on *Euphorbiaceæ*.'—L. A. Bernays, 'On the existence of *Carpesium cernuum* in Queensland.'

Botanical News.

DR. URBAN has been appointed First Assistant in the Botanic Gardens at Berlin, *vice* K. Koch; and M. KURTZ Second Assistant, in place of W. Vatke.

THE death of DR. J. B. M. RIPART occurred at Bourges, on October 17th, at the age of sixty-four. He was a student of the Roses of France, and of Freshwater Algæ.

DR. J. E. LEBEL died on November 17th, at Valogne, Manche. He was well known as a critical worker at the flora of Normandy, and has published several papers of value, including a monograph of *Callitriche* in the Mémoires of the Cherbourg Society of Nat. Science for 1863.

WE have also to record the death of LOUIS BOUTON, Curator of the Colonial Museum and Secretary to the Royal Society of Mauritius. He was the author of '*Plantes Médicinales de Maurice*,' 1857 (a second edition in 1864), and an active collecting botanist.

Original Articles.

REPORT ON BURBIDGE'S FERNS OF THE SULU ARCHIPELAGO.

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

AFTER leaving Borneo Mr. Burbidge spent a month in the Sulu Archipelago, a group of small islands lying between Borneo and the Philippines. They are for the most part under cultivation, but there are two mountains which attain an elevation of between two thousand and three thousand feet. So far as I am aware their botany is entirely unknown. The following is a full catalogue of the ferns which he gathered in the group, with descriptions of the novelties:—

38.* *CYATHEA SULUENSIS*, Baker, n. sp. Fronds ample, tripinnatifid or tripinnate, moderately firm in texture, green and glabrous on both surfaces, with naked pale brown unmuricated rachises, the midrib of the pinnules and tertiary segments furnished with many small white bullate scales. Pinnæ sessile, oblong-lanceolate, a foot or more long, five to six inches broad. Pinnules lanceolate, sessile, half to three-quarters of an inch broad, cut down to a narrow wing or occasionally at the base to the rachis into close ligulate-oblong toothed tertiary segments one-sixth of an inch broad. Veins five- to six-jugate, erecto-patent, distinct, deeply forked, the lowest posterior veinlet springing from the costa of the pinnule, not from that of the tertiary segment. Sori rather small, placed at the forking of the lower veins, medial as regards the segment. Involucre persistent, hemispherical, entire or slightly broken up as it matures.—Allied to *C. integra*, J. Sm., of the Philippine Islands and Amboyna.

Hymenophyllum dilatatum, Sw., var. *H. formosum*, Brack.

Trichomanes javanicum, Blume.

Trichomanes maximum, Blume.

Trichomanes rigidum, Sw.

Davallia pinnata, Cav., and its variety *luzonica*.

Pteris quadriaurita, Retz.

4.* *PTERIS TREACHERIANA*, Baker, n. sp. Caudex erect. Stipes densely tufted, very slender, naked, purple-black, four to eight inches long. Fronds oblong-lanceolate, simply pinnate, six to eight inches long, quite glabrous throughout, moderately firm in texture, green on both sides. Pinnæ seven to thirteen, linear, one-eighth to one-sixth of an inch broad, two to three inches long, the end one like the others, all the side ones except the one to three lowest pairs simple, the uppermost pair dilated and decurrent at the base, the others sessile, narrowed to the base, the lowest

pair shortly petioled, two- to three-forked from the base. Margin of the barren segments sharply toothed. Veins distinct, erecto-patent, usually once forked, rarely simple or twice forked. Involucre narrow, distinct.—Near *P. cretica*, but much more slender and delicate in general aspect, with the lowest one to three pairs of pinnæ two- to three-forked. Named at the request of Mr. Burbidge in compliment to the Honourable W. H. Treacher, acting-governor of Labuan, whose kindness and help contributed materially to the success of his expedition.

Lindsaya cultrata, Sw.

Lindsaya pectinata, Blume.

Lindsaya flabellulata, Dryand.

Lindsaya lobata, Poir.

Lindsaya davallioides, Blume.

Asplenium persicifolium, J. Sm. An endemic Philippine species.

Asplenium resectum, Smith.

Asplenium falcatum, Lam.

Asplenium hirtum, Kaulf.

Asplenium cuneatum, Lam.

Asplenium Belangeri, Kunze.

Asplenium pallidum, Blume.

Asplenium bantamense, Baker.

Asplenium cordifolium, Mett.

Nephrodium melanocaulon, Baker.

27.* POLYPODIUM (*Phegopteris*) OXYODON, Baker, n. sp. Rhizome short-creeping. Scales small, erect, lanceolate, membranous, dark brown. Stipes tufted, naked, substramineous, half to one foot long, slightly scaly only near the base. Lamina deltoid-oblong, half to one foot long, bipinnatifid, moderately firm in texture, green and quite glabrous on both sides. Pinnæ nine to seventeen, lanceolate, three to four inches long, one to one and a half inch broad, cut down to a broad wing into lanceolate-oblong sharply-toothed segments one-sixth of an inch broad, the end one like the others, the upper side ones sessile, the lower side ones distinctly petioled, the two to three lower pairs about equal in size. Veins in pinnate groups in the secondary segments, with veinlets ten- to twelve-jugate in those that are most fully developed, many of them two- to four-forked. Sori small, round, medial, placed on the anterior fork of the veinlets.—A very distinct plant, allied to *P. caudatum* of Tropical America.

175.* POLYPODIUM (*Eupolypodium*) LEYSH, Baker, n. sp. Rhizome as thick as a goose's quill, short-creeping. Scales small, dense, dark brown, lanceolate. Stipe winged nearly or quite down to the base, one to two inches long to where the pinnæ begin. Lamina lanceolate, firm in texture, minutely pubescent only on the rachis beneath, green on both surfaces, six to nine inches long, one to one and a quarter inch broad above the middle, narrowed gradually from the middle to the base, cut down to the rachis into very numerous crowded adnate linear subentire or slightly repand pinnæ one-twelfth of an inch broad. Veins simple, erecto-patent, ten- to twelve-jugate in the central pinnæ, rather indistinct, not

reaching the margin. Sori terminal on the veins, globose, marginal, distinctly immersed.—Allied to *P. taxifolium* and *apiculatum* of Tropical America. Named at the request of Mr. Burbidge in compliment to the Honourable Peter Leys, M.B., Colonial Surgeon, Labuan, who materially aided him during his residence there, and accompanied him on one of his expeditions into the interior.

Polypodium albo-squamatum, Blume.

Polypodium palmatum, Blume.

Vittaria elongata, Sw.

Antrophytum reticulatum, Kaulf.

Tænitis blechnoides, Sw.

Gymnogramme Wallichii, Hook.

Osmunda javanica, Blume.

Lycopodium Phlegmaria, Linn.

Selaginella caulescens, Spring.

Selaginella Willdenovii, Baker.

Selaginella conferta, Moore.

Selaginella caudata, Spring.

Selaginella atroviridis, Spring.

A FEW LAST WORDS ON CHARA.

BY ALFRED W. BENNETT, M.A., B.Sc., F.L.S.

IN my paper "On the Structure and Affinities of *Characeæ*," which appeared in the number of the 'Journal of Botany' for July, 1878, I attempted to establish the following points:—1. That the assignment of *Characeæ* to a position among Thallophytes, and especially in the class *Carposporeæ*, is an erroneous one. 2. That their nearest alliance is with *Muscineæ*. 3. That the use of the term pro-embryo (Vorkeim), in relation to *Characeæ* and *Muscineæ* is a misleading one, the organ in question having no relationship to the pro-embryo or suspensor (Vorkeim) of Phanerogams and *Selaginellaceæ*. 4. That the so-called pro-embryo is homologous to the protonema of *Muscineæ*. 5. That the designation of the unfertilised archegonium as 'sporangium' is altogether erroneous. 6. That *Characeæ* exhibit an absence of alternation of generations, by the suppression of the non-sexual generation. I venture to think that the interesting discussion which has followed has at all events done something to settle at least some of these points. The 5th point will be so generally admitted as to need no further discussion. On the 1st I have the satisfaction of being supported by both Prof. Caruel and Mr. Vines; and on the 2nd by Mr. Vines. The best solution of the taxonomic question is probably to retain, as he proposes to do, *Characeæ* in their ancient position as a distinct group next to *Muscineæ*. My 3rd proposition will probably not meet with many disputants; and there remain therefore the 4th and 6th, which are chiefly dwelt upon in Mr. Vines's able paper in

the 'Journal' for Dec. 1878. This botanist dissents from the view adopted by Pringsheim and myself that the so-called 'pro-embryo' of *Chara* is homologous to the protonema of *Muscineæ*. While admitting the apparent cogency of some of his objections, which deserve at all events a very careful consideration, I am quite unable to adopt his view that this organ is the true embryo of the plant. The first division of the central cell of the germinating oospore of *Chara* is, as has frequently been described, into three cells, a large basal and two apical cells. The basal cell appears to play the part (functionally but not homologically) of the endosperm or prothallium, in supplying the young plant with nutriment. From *one of the two apical cells* is produced the so-called 'pro-embryo'; from the other the first root; and it appears to me unimportant for our present purpose whether we call this a primary or an adventitious root. Now I know of no better definition of the term embryo than that of Sachs, ('Text Book,' English ed., p. 421):—"The [first] result of the development of the oospore"; and to alter the use of a term the acceptance of which has hitherto been practically universal, by limiting it, in a particular case, to the result of the development of a small portion only of the oospore, seems to me an innovation open to grave objection. Should Mr. Vines's view of this structure not be accepted, his assumption of an alternation of generations in *Chara* will also fall to the ground. The fertilised oospore of *Chara* develops into the sexual individual just as (disregarding minor differences) the spore of a moss does; the whole of the processes which take place in the moss between the development of the embryo and the germination of the spore—in other words, the whole of the sporophore—being suppressed in the case of *Chara*. In assuming the existence of a sporophore which has never been known to produce spores, the writer evidently perceives that he is advancing a proposition which will not be accepted unless supported by the most cogent arguments. The analogies he brings forward are the production, under abnormal circumstances, of a protonema from the seta of mosses, and the production of certain species of fern by a process of non-sexual budding from the prothallium. In stating that "this is the only means by which these ferns are reproduced," Mr. Vines has possibly overlooked that Farlow states "In the present instance certain examples [of *Pteris serrulata*] bore archegonia with embryonal outgrowth"; and in his elaborate paper on Apogamous Ferns in the 'Botanische Zeitung' (1878, p. 449 *et seq.*) De Bary says that *Asplenium falcatum* produces perfectly formed archegonia, which it is quite possible may be occasionally fertilised, although he had not observed this to be the case, either in this species or in the others on which his observations were based. To establish the existence of a 'non-sporiferous sporophore,' occurring normally throughout a whole class, would seem to require further proofs than the analogy of a few morbid and exceptional developments. I do not think therefore that sufficient reason has been shown for departing from the following statement:—In *Muscineæ* and Vascular Cryptogams we have the typical alternation of

generations. In *Characeæ* the non-sexual generation is altogether suppressed. In Phanerogams (at all events in those Angiosperms which are altogether destitute of endosperm) we have precisely the opposite phenomenon of the complete suppression of the sexual generation, the coalescence of the male and female elements taking place within the non-sexually produced embryo-sac of the ovule which corresponds to the spore.

ON THE FRUIT OF *TECOMA GRANDIFLORA*, *Delaun.*

BY H. F. HANCE, Ph. D., &c.

THE fruit of *Tecoma grandiflora*, Delaun., is, according to the 'Genera Plantarum,' quite unknown to European botanists; and Mr. Bentham, who revised the order *Bignoniaceæ* for that work, questions the *Campsis adrepens* of Loureiro being the same, owing to his erroneous character; though I believe there is no doubt on the point, as DeCandolle apparently saw Loureiro's specimen; the plant bears the Chinese name given by him, *Ling siu* or *Ling sùt*, (*Liên siêu*, as he writes it),—and there is nothing else resembling the character he assigns the genus known from these regions. At the request of the late Dr. Seemann I sent him specimens several years ago, but he appears never to have used them. It may therefore be as well here to note the characters. Capsula sublignosa, lineari-oblonga, recta v. subfalcata, glaberrima, maturitate fusco-castanea, levis, $3\frac{1}{2}$ -5 poll. longa, semipollicem lata, apice obtusa, basi sensim in stipitem ancipitem $1-1\frac{1}{2}$ poll. longum angustata, loculicide dehiscens; valvis post dehiscentiam immutatis, dorso rotundatis, marginibus in carinam semilinealem productis; septo valvis contrario, coriaceo, basi longe attenuato, medio per totam longitudinem nervis duabus elevatis approximatis percurso, juxta margines vix punctato. Semina pluriseriata, paulo intra septi margines adfixa; nucleo triangulari-subcordato, ala hyalina erosa eo duplo latiore marginato; hilo inconspicuo.

The fruit differs from that of *T. radicans*, Juss., as described and figured by Bureau,* by its greater size, much longer stipes, absence of beak, and by the septum wanting the little dots on its edges, which however shows scars here and there, and are always studded by minute abortive seeds.

I do not understand what Mr. Bentham means, by calling the convex capsule-valves of *T. radicans* 'dorso carinatae.' † The remark too, under the section *Pandorea*, 'flores quam in præcedentibus minores,' is not applicable to *T. jasminoides*, Lindl., the flowers of which are decidedly larger than those of *T. (Tecomaria) capensis*, Lindl.

* 'Monogr. des Bignoniacées,' 48, t. 14.

† 'Gen. Plant.,' ii. 1045.

THE CRYPTOGAMIC FLORA OF KENT—*FUNGI*.

By T. HOWSE, F.L.S.

THE County of Kent does not possess many observers in this branch of botany. The neighbourhood of London and the country around Sevenoaks have been worked by the writer and Mr. Holmes, and Tunbridge Wells by Mr. T. Walker. A few species are recorded from Canterbury and Goudhurst, and these are without doubt the richest districts. Mr. A. S. Bicknell, who resided some time in the neighbourhood of Goudhurst, states that he observed more Fungi there than in any other part of England; unfortunately it is difficult of access. With the view of having this class of Cryptogams more completely represented, the writer will be glad to receive specimens, for determination, of hymenomycetous and gasteromycetous Fungi from any part of the county. When the species is common throughout the county a few localities near London only are here given.

The following books and papers have been consulted for localities:—

- Berk. Outl.*—‘Outlines of British Fungology.’ By the Rev. M. J. Berkeley. (1860).
Huss.—‘Illustrations of British Mycology.’ By Mrs. Hussey. (1847).
Sparkes.—‘List of Agarics found near Bromley.’ G. Sparkes in ‘Phytologist,’ 1844, p. 1001.
W. T. T.—‘List of Fungi found near Tunbridge.’ W. T. T. in ‘Gardeners’ Chronicle,’ 1875, vol. ii. p. 689.
Berk. Engl. Fl.—Rev. M. J. Berkeley in ‘English Flora,’ vol v., pt. 2. (1836).
Cooke.—‘Handbook of British Fungi.’ By M. C. Cooke. (1871).
Berk. & Br. in A. N. H.—Berkeley and Broome in ‘Annals of Natural History.’ (Various years).
Forst. Fl. Tonbr.—T. F. Forster, ‘Flora Tonbridgensis. (1816).
Jenner Fl. Tunbr.—Jenner, ‘Flora of Tunbridge Wells.’ (1845).
Smith, Draw.—Worthington G. Smith’s drawings of Fungi (in Botanical Department, British Museum).

Fam. 1.—HYMENOMYCETES.

Order 1.—AGARICINI.

Genus 1.—AGARICUS, *L.*Subgenus 1.—*Amanita*.AGARICUS PHALLOIDES, *Fr.* Fr. Sv. Svamp., t. 84.

In woods; common. Joyden’s Wood, Bexley, *Holmes*; Bostol Wood, Chislehurst; Witley Scrubs, *Holmes*.

A. MAPPA, *Batsch.* Vitt., t. 11.

Knowle Park, Sevenoaks; Sandwich; wood near Dunton Green.

Like a small *A. phalloides*, but margin only of volva free.

- A. *MUSCARIUS*, *L.* Grev., t. 54.
Sydenham Hill; generally common under birch trees, but rare in some seasons.
- A. *PANTHERINUS*, *DC.* Kromb., t. 29, f. 10-18.
St. Paul's Cray Common, Chislehurst.
Similar to last, but brownish and flesh-white beneath the cuticle.
- A. *RUBESCENS*, *P.* Kromb., t. 10.
In woods; edible. Sydenham Hill; very common.
Known by its reddish colour when bruised.
- A. *ASPER*, *Fr.* Vitt., t. 43.
Near Bromley, *Sparkes*.
- A. *VAGINATUS*, *Bull.* Bull., t. 98, f. 512.
Common.
- A. *EXCELSUS*, *Fr.* Kromb., t. 29, f. 14-17.
Shorne Wood, *Berk. Engl. Fl.*, p. 5.
Resembling *A. rubescens*, but flesh not turning red.

Subgenus 2.—*Lepiota*.

- AGARICUS PROCERUS*, *Scop.* Fr. Sv. Svamp., t. 3.
In pastures; edible. Sydenham Hill; near Jackswood, Tunbridge Wells, *T. Walker*; Crystal Palace grounds; Deal.
Distinguished by its tall, bulbous, spotted stem.
- A. *REACODES*, *Vitt.* Berk. Outl., t. 3, f. 6.
Sydenham Hill.
Similar to last, but at first globose, and stem not spotted.
- A. *ACUTESQUAMOSUS*, *Weinm.* Huss. ii., t. 5.
In a conservatory, Rosebank, Tunbridge Wells, *T. Walker*.
- A. *CLYPEOLARIUS*, *Bull.* Bull., t. 405, 506, f. 2.
Deal; Canterbury; *Berk. Engl. Fl.*, p. 8.
Ring floccoso-squamose.
- A. *CRISTATUS*, *Fr.* Huss. i., t. 48.
Common.
Sydenham Hill; Rosebank, Tunbridge Wells, *T. Walker*.
Somewhat similar to last, but ring entire, soon disappearing.
- A. *GRANULOSUS*, *Batsch.* Huss. i., t. 45.
Sydenham Hill; Rosebank, Tunbridge Wells, *T. Walker*; Joyden's Wood, *Holmes*.
Varying much in colour, but always mealy in appearance. A white variety near Bromley, *Sparkes*.
- A. *AMIANTHINUS*, *Scop.* Bull., t. 362.
Knowle Park, Sevenoaks.
Probably a variety of the last, but always ochraceous, and with a more slender stem, which is floccose below ring.
- A. *HOLOSERICUS*, *Fr.* Saund. & Sm., t. 23, f. 1.
Staplehurst; *Cooke*.
- A. *NAUCINUS*, *Fr.* Vent., t. 48, f. 6.
Tunbridge Wells, *Currey*; Hawkhurst, *Smith, Draw*.

- A. MELEAGRIS, *Sow.* Sow., t. 171.
On hotbeds; *Herb. Deakin.*
Not well known. Berkeley places it under *Tricholoma.*

Subgenus 3.—*Armillaria.*

- AGARICUS MELLEUS, *Vahl.* Bull., t. 377.
On and near dead stumps; very common.
Sydenham Hill.

- A. MUCIDUS, *Fr.* Saund. & Sm., t. 5.
Very abundant on beech-trees in Knowle Park; Goudhurst
A. S. Bicknell.

Subgenus 4.—*Tricholoma.*

- AGARICUS NICITANS, *Fr.* Huss., ii., t. 46.
Wood near Shoreham; Hayes, *Huss.*
- A. FLAVO-BRUNNEUS, *Fr.* Fr. Icon., t. 27, f. 1.
Sydenham Hill; St. Paul's Cray Common; Tunbridge Wells,
T. Walker.
Gills yellowish.
- A. ALBO-BRUNNEUS, *P.* Barla, t. 12.
Sydenham Hill; Tunbridge Wells, *T. Walker.*
Somewhat like last, but has white gills.
- A. SEJUNCTUS, *Som.* Sow., t. 126.
Woods near Bayham Abbey, *Herb. Deakin.*
- A. RUTILANS, *Schæff.* Sow., t. 31.
On pine stumps; one of the most beautiful of Fungi. Syden-
ham Hill; common.
Easily recognised by its purple down.
- A. COLUMBETTA, *Fr.* Fr. Icon., t. 29, f. 2.
Chislehurst; near Bromley, *Sparkes.*
- A. VACCINUS, *P.* Fr. Icon., t. 2, f. 1-4.
Joyden's Wood; Bexley.
- A. TERREUS, *Schæff.* Sow., t. 76.
Sydenham Hill.
Common; gills bluish grey.
Var. *argyraceus*; gills white. Bromley, *Sparkes.*
- A. IMBRICATUS, *Fr.* Fr. Icon., t. 30.
Near Bromley, *Sparkes*; Goudhurst, *A. S. Bicknell.*
- A. SAPONACEUS, *Fr.* Fr. Icon., t. 32.
Chislehurst; Shoreham; Starvecrow Wood, *W. T. T.*; Goud-
hurst, *A. S. Bicknell.*
Soap-scented.
- A. CUNEIFOLIUS, *Fr.* Bull., t. 580, A. B.
In pastures; Crystal Palace grounds; Tunbridge Wells, *T.*
Walker; Margate, *Berk. Engl. Fl.*, p. 44.
- A. LASCIVUS, *Fr.* Fr. Icon., t. 38, f. 1.
In woods; Canterbury, *Berk. Outl.*

- A. *SULPHUREUS*, *Bull.* Sow., t. 44.
Rusthall Common, *Holmes*; St. Paul's Cray Common, Chislehurst; near Pembury, Tunbridge Wells, *T. Walker*; near Bromley, *Sparkes*.
Gills sulphur-coloured; smells of gas-water.
- A. *ALBUS*, *Fr.* Fr. Icon., t. 43, f. 1.
Crofton Woods, *Holmes*.
- A. *GAMBOSUS*, *Fr.* Huss., i., t. 83. Sow., t. 281.
Edible, in pastures; May. Near Shoreham; Keston Common. *Holmes*.
Pileus thick, moist, ochraceous white.
- A. *PERSONATUS*, *Fr.* Berk. Outl., p. 5, f. 1.
Field near Shortlands; near Bromley, *Sparkes*; meadows, Lydd, *F. J. Hanbury*.
- A. *NUDUS*, *Bull.* Berk. Outl., p. 4, f. 7.
Sydenham Hill; Shoreham; Starvecrow Wood, *W. T. T.*; near Bromley, *Sparkes*.
Distinguished from last by its brighter colour. Both are placed by some authors in *Lepiota* from the structure of the trama.
- A. *GRAMMOPODIUS*, *Bull.* Bull., t. 548, 585, f. 1. Huss., ii., t. 41.
Sydenham Hill; Shoreham; Otford; near Bromley, *Sparkes*.
- A. *MELALEUCUS*, *P.* Fr. Icon., t. 44, f. 1.
Sydenham Hill.
- A. *SUBPULVERULENTUS*, *P.* Huss., ii., t. 39.
Sydenham Hill; Sandwich; Deal.
- Subgenus 5.—*Clitocybe*.
- AGARICUS NEBULARIS*, *Batsch.* Grev. t. 9.
Common. Sydenham Hill.
It is not generally known that this is one of the best of the edible species. It has the same flavour as the common mushroom.
- A. *CANDICANS*, *P.* Saund. and Smith., t. 39, f. 1.
Sydenham Hill; Hadlow, *Holmes*.
- A. *GIGANTEUS*, *Sow.* Sow., t. 224.
Sydenham Hill; Camden Park; Tunbridge Wells, *T. Walker*.
- A. *INFUNDIBULIFORMIS*, *Schæff.* Schæff., t. 212.
Shoreham; Bostol Wood; Camden Park; Tunbridge Wells, *T. Walker*; near Bromley, *Sparkes*; Knowle Park.
- A. *GEOTRUPUS*, *Bull.* Grev., t. 41.
Starvecrow Wood, *W. T. T.*; near Bells'-ewe Green, Tunbridge Wells, *T. Walker*.
Similar to last, but larger and strongly umbonate.
- A. *INVERSUS*, *Scop.* Sow., t. 186.
Chislehurst; near Pembury, Tunbridge Wells, *T. Walker*.
- A. *FLACCIDUS*, *Sow.* Sow., t. 185.
Sydenham Hill; Paul's Cray Common, Chislehurst; Goudhurst, *A. S. Bicknell*.

- A. *CYATHIFORMIS*, *Fr.* Sow., t. 363.
Shoreham; Bromley, *Sparkes*; near Hawkenbury, Tunbridge Wells, *T. Walker*.
Very common late in the year.
- A. *BRUMALIS*, *Fr.*
Shoreham; Canterbury, *Berk. Outl.*
- A. *FRAGRANS*, *Sow.* Sow., t. 10.
Sandwich; Deal; N. Frith Wood, *Holmes*; Bromley, *Sparkes*; Larch Wood between Shoreham and Dunton Green.
- A. *LACCATUS*, *Scop.* Grev., t. 249.
Very common. Sydenham Hill.
On account of its peculiar habit and its globose echinulate spores this should be separated from the genus *Agaricus*. There are numerous varieties.
- A. *INORNATUS*, *Sow.* Sow., t. 342.
On old trees, *Herb. Deakin*.
- A. *ODORUS*, *Bull.* Bull., t. 556, f. 3.
Near Bromley, *Sparkes*.
Has a strong smell of aniseed.
- A. *PHYLLOPHILUS*, *Fr.* Fl. D., t. 1847.
Crofton Woods, *Holmes*; Cobham, *Holmes*.
- A. *DEALBATUS*, *P.* Sow., t. 123.
Near Bromley, *Sparkes*.
- A. *GILVUS*, *P.* Fl. D., t. 1011.
West Farleigh, *Berk. and Br. in A. N. H.*
Subgenus 6.—*Collybia*.
- AGARICUS RADICATUS*, *Relh.* Grev., t. 217.
Sydenham Hill; Pembury Woods, Tunbridge Wells, *T. Walker*; Wrotham and Ide Hill, *Holmes*; Bromley, *Sparkes*.
- A. *PLATYPHYLLUS*, *Fr.* Bull., t. 594.
Sydenham Hill.
- A. *FUSIPES*, *Bull.* Hus., ii., t. 48.
Joyden's Wood, Bexley, *Holmes*; near Bromley, *Sparkes*; Chislehurst; Hurst Wood, Tunbridge Wells, *T. Walker*.
- A. *MACULATUS*, *A. & S.* Sow., t. 246.
Joyden's Wood; Bostol Wood.
Chislehurst, *Holmes*; Hurst Wood, Tunbridge Wells, *T. Walker*.
- A. *BUTYRACEUS*, *Bull.* Bull., t. 572.
Common. Sydenham Hill.
- A. *VELUTIPES*, *Curt.* Fl. Lond., t. 70.
Common. Sydenham Hill.
The only *Agaric* which remains throughout the winter and resists frost.

- A. *CONFLUENS*, *P.* Pers. Ic. Pict., t. 5, f. 1.
Shoreham.
- A. *CONIGENUS*, *P.* Fr. Icon., t. 65, f. 4.
Bostol Wood; Hurst Wood; Tunbridge Wells.
- A. *TENACELLUS*, *P.* Sow., t. 206.
Hurst Wood; Tunbridge Wells; Sydenham Hill.
On fir cones.
- A. *ESCULENTUS*, *Jacq.* Bull., t. 422, f. 2.
Sydenham Hill; near Bromley, *Sparkes*.
Similar to last, but not growing on fir cones; it has a long
rooting stem, and occurs in the spring.
- A. *DRYOPHILUS*, *Bull.* Sow., t. 127.
Common. Sydenham Hill.
One of the first in early summer, but occurs all through the
autumn.
- A. *EXSCULPTUS*, *Fr.* Fr. Icon., t. 67, f. 1.
Sydenham Hill; Knowle Park; Sevenoaks.
In May. Gills yellowish.
- A. *ATRATUS*, *Fr.* Fr. Icon., t. 70, f. 1.
On burnt soil in woods, Bromley, *Sparkes*. Wood near Bells'-
ewe Green, Tunbridge Wells, *T. Walker*.
- Var. *caulicinalis*, *Bull.* Margate, on *Clematis*, *Berk. Eng. Fl.*,
p. 54.

Subgenus 7.—*Mycena*.

- AGARICUS ROSELLUS*, *Fr.* Fl. Dan., t. 2025, f. 2.
Wood near Shoreham.
- A. *PURUS*, *P.* Bull., t. 507.
Common.
- A. *FLAVO-ALBUS*, *Fr.* Fr. Icon., t. 79, f. 5.
Wood near Shoreham; Crystal Palace Grounds.
- A. *LACTEUS*, *P.* Fl. Dan., t. 1845, f. 1.
Otford; Paul's Cray Common; Chislehurst; Bromley, *Sparkes*;
Margate, Canterbury, *Berk. Eng. Fl.*, p. 60.
- A. *GALERICULATUS*, *Scop.* Schæff., t. 52.
Sydenham Hill.
Extremely common on trunks of trees.
- A. *POLYGRAMMUS*, *Bull.* Sow., t. 222.
Common. Sydenham Hill.
Distinguished from last by its silvery, grooved stem.
- A. *ALCALINUS*, *Fr.* Fr. Icon., t. 81, f. 3.
Sydenham Hill; Bostol Wood; Shoreham; Cobham, *Holmes*;
near Bromley, *Sparkes*; Starvecrow Wood, *W. T. T.*
- A. *FILOPES*, *Bull.* Bull., t. 320.
Common. Sydenham Hill.
- A. *VITILIS*, *Fr.* Sow., t. 385, f. 5.
Sydenham Hill.

- A. SANGUINOLENTUS, *A. & S.* Fr. Icon., t. 83, f. 3.
Sydenham Hill; Knowle Park, Sevenoaks; Canterbury,
Berk. Eng. Fl., p. 69.
- A. GALOPUS, *Schrad.* Berk. Outl., pl. 6, f. 2.
Common. Sydenham Hill.
- A. EPIPTERYGIUS, *Scop.* Sow., t. 92.
Common. Sydenham Hill.
- A. VULGARIS, *P.* Berk. Outl., pl. 6, f. 4.
Sydenham Hill.
- A. TENERRIMUS, *Berk.* Berk. Outl., pl. 6, f. 6.
St. Paul's Cray Common, Chislehurst; Wood near Otford.
- A. SACCHARIFERUS, *B. & Br.*
Lower Sydenham.
- A. CITRINELLUS, *Pers.* Fr. Icon., t. 11, f. 3.
Hillydeal Wood, near Otford.
- A. ELEGANS, *P.* Fl. Dan., t. 2024.
Canterbury on bramble, *Berk. Eng. Fl.*, p. 59; Bromley,
Sparkes.
- A. PTERIGENUS, *Fr.*
Canterbury on oak leaves, *Berk. Eng. Fl.*, p. 63.
- A. METATUS, *Fr.* Paul., t. 99, f. 8.
Wrotham, *Berk. & Br. A. N. H.*
- A. DEBILIS, *Fr.* Fr. Icon., t. 82, f. 4.
In a chestnut wood near Wrotham, *Berk. & Br. in A. N. H.*
- A. PSAMMICOLA, *B. & Br.*
Addington, *Berk. & Br. in A. N. H.*
- A. COLLARIATUS, *Fr.* Fr. Icon., t. 82, f. 5.
Addington, *Berk. & Br. in A. N. H.*
- A. CORTICOLA, *Schum.* Fr. Icon., t. 85, f. 2.
On bark of trees, Shortlands; Knowle Park.
- A. CAPILLARIS, *Schum.* Fr. Icon., t. 84, f. 6.
On dead leaves, Shoreham; Darenth Wood.

Subgenus 8.—*Omphalia*.

- AGARICUS PYXIDATUS, *Bull.* Berk. Outl., p. 6, f. 8.
Wood near Dunton Green; Tunbridge Wells Common, *Jenner*
Fl. Tunbr.; Bromley, *Sparkes.*
- A. MURALIS, *Sow.* Sow., t. 322.
Ightham; Hurst Wood, Tunbridge Wells.
- A. UMBELLIFERUS, *L.* Fl. D., t. 1015, A.
Ightham, *Holmes*; Sydenham Hill; Canterbury, *Berk. Engl.*
Fl., p. 65; Starvecrow Wood, *W. T. T.*

- A. FIBULA, *Bull.* Sow., t. 45.
 Sydenham Hill. Crystal Palace grounds.
 Var. *Swartzii*, Fr. Disk dark.
 A. CAMPTOPHYLLUS, *Berk.*
 Margate, *Berk. Outl.*

(To be continued.)

ON THE FLORA OF NORTH-WESTERN DONEGAL.

BY HENRY CHICHESTER HART, B.A.

(Late Naturalist on board H.M.S. 'Discovery'.)

So little is known botanically of the wilds of Donegal that I venture to offer a list of the flowering plants and ferns to be met with in the north-western part of that county.

This is the most inaccessible and the least visited portion of the county, and has, I believe, never been thoroughly examined by any competent botanist. The district over which my investigations extended is bounded on the north and west by the Atlantic Ocean, on the south by a line drawn roughly from Dunglow on the Atlantic or western side to Ramelton on the Lough Swilly or eastern side, while the eastern boundary may be taken as Lough Swilly itself, though my rambles include the opposite or Innishowen coast-line of that magnificent inlet.

My family being resident in the county, I have enjoyed unusual opportunities for observation; my head-quarters during the summer have usually been at Carrablagh, in the northern part of Fanet, or at Glenalla on its borders, and thus Fanet has received the most attention. This is the name given to the peninsula lying between Lough Swilly and Mulroy Bay, and bounded on the south by the Knock Alla Mountains.

The surface of the country is, for the most part, moor and mountain sprinkled over with a number of lochs and tarns; the geological formation is almost entirely granite or quartzose, with basalt and trap-dykes. Limestone is scarce, and nowhere crops out to any extent; this naturally modifies and reduces the flora considerably. The characteristic features will, however, become more apparent from the following analysis.

Classing the plants under Mr. H. C. Watson's "Types," we obtain the following results: out of four hundred and twenty species the Highland Type will be found to include seventeen species, viz. :—

<i>Thalictrum alpinum.</i>	<i>Salix herbacea.</i>
<i>Subularia aquatica.</i>	<i>Juniperus nana.</i>
<i>Silene acaulis.</i>	<i>Carex rigida.</i>
<i>Sedum Rhodiola.</i>	(<i>Polystichum Lonchitis</i>).
<i>Saxifraga stellaris.</i>	<i>Asplenium viride.</i>
" <i>oppositifolia.</i>	<i>Lycopodium alpinum.</i>
<i>Arctostaphylos Uva-ursi.</i>	" <i>selaginoides.</i>
<i>Vaccinium Vitis-idaea.</i>	<i>Isoetes lacustris.</i>
<i>Oxyria reniformis.</i>	

To the Scottish Type belong twenty-seven species :—

<i>Trollius europæus.</i>	<i>Galeopsis versicolor.</i>
<i>Drosera anglica.</i>	<i>Mertensia maritima.</i>
<i>Sagina subulata.</i>	<i>Pinguicula vulgaris.</i>
<i>Rubus saxatilis.</i>	<i>Utricularia intermedia.</i>
<i>Callitriche autumnalis.</i>	<i>Empetrum nigrum.</i>
<i>Saxifraga hypnoides.</i>	<i>Listera cordata.</i>
<i>Ligusticum scoticum.</i>	<i>Habenaria albida.</i>
<i>Crepis paludosa.</i>	<i>Carex dioica.</i>
<i>Antennaria dioica.</i>	<i>Elymus arenarius.</i>
<i>Lobelia Dortmanna.</i>	<i>Polypodium Phegopteris.</i>
<i>Pyrola media.</i>	<i>Equisetum umbrosum.</i>
„ minor.	‡ „ hyemale.
<i>Orobanche rubra.</i>	<i>Eriocaulon septangulare.</i>
<i>Lamium intermedium.</i>	

To the English Type belong thirty-five species :—

‡ <i>Papaver Rhœas.</i>	<i>Scrophularia aquatica.</i>
<i>Nuphar luteum.</i>	<i>Centunculus minimus.</i>
<i>Drosera intermedia.</i>	<i>Samolus Valerandi.</i>
<i>Lythrum Salicaria.</i>	<i>Polygonum minus.</i>
<i>Epilobium hirsutum.</i>	<i>Euphorbia amygdaloides.</i>
<i>Trifolium filiforme.</i>	„ exigua.
<i>Eryngium maritimum.</i>	<i>Taxus baccata.</i>
<i>Helosciadium nodiflorum.</i>	<i>Epipactis palustris.</i>
<i>Œnanthe Phellandrium.</i>	<i>Juncus glaucus.</i>
„ <i>Lachenalii.</i>	<i>Arum maculatum.</i>
<i>Inula dysenterica.</i>	<i>Potamogeton lucens.</i>
<i>Anthemis nobilis.</i>	<i>Cladium Mariscus.</i>
<i>Bidens cernua.</i>	<i>Phleum arenarium.</i>
<i>Carduus tenuiflorus.</i>	<i>Melica uniflora.</i>
<i>Carduus pratensis.</i>	<i>Sclerochloa loliacea.</i>
<i>Convolvulus sepium.</i>	<i>Ceterach Officinarium.</i>
† „ <i>arvensis.</i>	<i>Polystichum angulare.</i>
<i>Linaria repens.</i>	

To the Atlantic Type belong fourteen species :—

<i>Raphanus maritimus.</i>	<i>Statice occidentalis.</i>
<i>Viola Curtisii.</i>	<i>Euphorbia portlandica.</i>
<i>Hypericum Androsæmum.</i>	<i>Scirpus Savii.</i>
„ <i>Elodes.</i>	<i>Lastræa æmula.</i>
<i>Sedum anglicum.</i>	<i>Hymenophyllum Wilsoni.</i>
<i>Crithmum maritimum.</i>	„ <i>tunbridgense.</i>
<i>Pinguicula lusitanica.</i>	<i>Ophioglossum lusitanicum.</i>

To the Germanic Type belongs one species only :—

Orchis pyramidalis.

Saxifraga umbrosa is the only exclusively Irish plant in the list, unless *Ophioglossum lusitanicum* be regarded as a species.

The remainder belong to the British type.

In these lists the “characteristic” plants are printed in italics. By “characteristic” I mean such plants as are not very rare in the

district, and are at the same time good representatives of the type to which they belong.

On comparing the total number of species belonging to the different types in the 'Cybele Hibernica' and 'Cybele Britannica' with those given above, we find that the several elements of this Flora may be arranged according to their importance in the following order, viz. :—

Scottish	27	out of a total of	66	Irish and	117	British.
Atlantic	14	„ „	41	„ „	70	„
Highland	17	„ „	40	„ „	113	„

while the plants belonging to the English and Germanic types form proportions comparatively unimportant.

We may give the following values to the above results :—Of the Scottish, Atlantic, and Highland type plants (as given above) the North-Donegal Flora contains about two-fifths respectively from the entire number of each of those types to be met with in Ireland; while these quantities bear to the whole British Flora ratios which give nearly one-fourth Scottish, one-fifth Atlantic, and one-ninth Highland; so that Atlantic and Scotch plants are almost equally represented, as regards the British Flora, with a slight preponderance in favour of the former.

From the above it will be seen that the North Donegal Flora mainly consists of species belonging to the British type; next in order come those belonging to the Scottish or Northern type; next the Atlantic, which form a fair proportion considering the latitude, and testify to the mildness of the climate; and last comes the Highland group, which is far less numerous than might have been expected from the northern position and large extent of the mountain districts.

Among the most interesting additions to the Flora of Donegal are *Thalictrum alpinum*, *Linaria repens*, *Oxyria reniformis*, *Euphorbia amygdaloides*, and *Ophioglossum lusitanicum*; while the following are now for the first time recorded as occurring in District 11 of Moore and More's 'Cybele Hibernica':—

[Papaver Rhœas.]	Anthemis nobilis.
‡Lavatera arborea.	‡Lamium intermedium.
*Geranium pyrenaicum.	*Plantago media.
Ulex Gallii.	Atriplex Babingtonii.
†Trifolium filiforme.	‡Euphorbia exigua.
Vicia angustifolia.	Allium ursinum.
Myriophyllum spicatum.	Luzula pilosa.
*Sedum reflexum.	

As Fanet forms a very natural and definite district, and the one which I have most carefully explored, I have placed the letter F after those plants which occur there.

The signs used will be † for plants which appear native, but may possibly have been introduced at a remote period; ‡ for plants probably introduced, but where some doubt exists; * for plants certainly introduced, but which are now thoroughly established beyond the influence of man; [] for plants certainly introduced and not thoroughly established.

Ranunculaceæ.

Thalictrum alpinum, L. Extremely rare. The Poisoned Glen ; in a gully next to the south of Ballygeeha Gap, by which this glen is reached from Glenveagh, in considerable quantity ; and in smaller quantities in a gully to the west of this in the same glen.

Anemone nemorosa, L. Frequent, F.

Ranunculus heterophyllus, Sibth. Frequent, F.

R. heterophyllus, var. *trichophyllus*, Chaix., Ballyhernan ; rare, F.

R. hederaceus, L. Frequent.

R. sceleratus, L. Not common ; Doaghbeg and Drimmacraig, F.

R. Flammula, L. Abundant, F.

R. Ficaria, L. Common, F.

R. acris, L. Common, F.

R. repens, L. Abundant, F.

R. bulbosus, L. Rare ; Greenfort and Glenalla, F.

Caltha palustris, L. Common, F.

Trollius europæus, L. In several places along the river Lennan from Gartan Lough to Ramelton, and at Lough Gartan ; Rev. L. O'Brien. This plant is believed to be confined to the County Donegal in Ireland.

Nymphæaceæ.

Nymphæa alba, L. Frequent, F.

Nuphar luteum, Sm. Of these two the white water-lily is the commoner ; they seldom grow together, the former preferring a stonier bottom than the present, which thrives best in turfy bog lakes, F.

Papaveraceæ.

[*Papaver Rhœas*, L.] Very rare, and, I have no doubt, introduced ; two or three plants between Ray and Rathmullan were all I have ever seen in the county.

P. dubium, L. Rare ; occurs in two or three places in Fanet and by Lough Fern, but always sparingly. As an ornament to the corn-fields, the poppies are, in Donegal, replaced by the corn marigold, *Chrysanthemum segetum*.—F.

Fumariaceæ.

† *Fumaria capreolata*, L. Frequent, F.

† *F. capreolata*, var. *pallidiflora*, Jordan. Frequent, F.

† *F. officinalis*, L. Common, F.

Cruciferaæ.

Nasturtium officinale, R. Br. Common, F.

Barbarea vulgaris, R. Br. Frequent, F.

Arabis hirsuta, R. Br. Very rare. Pastures between Doaghmore and Glinsk ; Horn Head. F.

Cardamine hirsuta, L. Abundant, F.

C. pratensis, L. Common, F.

† *Sisymbrium officinale*, Scop. Not common, and usually near cabins, &c., Arryheernabin, F.

† *Sinapis arvensis*, L. Common, F.

- Draba verna*, L. Near Rathmullan; rare.
Cochlearia officinalis, L. Common, F.
C. officinalis, var. *alpina*. Very rare; Poisoned Glen.
C. danica, L. Rare; Horn Head; *Flor. Ulst.*
Capsella Bursa-pastoris, DC. Abundant, F.
Cakile maritima, Scop. Local, F.
(*Crambe maritima*, L. Recorded in Dickie's 'Flora of Ulster' as found in Tory Island by Mr. Hyndman; probably some mistake, as I could find no trace of the plant, nor could my friend, Mr. R. M. Barrington, who spent several days there).
† *Raphanus Raphanistrum*, L. Frequent, F.
Raphanus maritimus, Sm. Very rare; shore to the east of Dunaff Head.

Violaceæ.

- Viola palustris*, L. Frequent, F.
V. sylvatica, Fries. Common, F.
V. Curtisii, Forst. Local; Horn Head; "Bottom" Shore, Fanet, F.
V. tricolor, L. Corn-fields, &c.; frequent, F.

Droseraceæ.

- Drosera rotundifolia*, L. Common, F.
D. intermedia, Hayne. Rare; near Lough-an-Ure, Rosses; in a small marsh to the west of Murren, called Campbell Lake, F.
D. anglica, Huds. Locally common; Rosses; Glenveagh, &c.

Polygalaceæ.

- Polygala vulgaris*, L. Typical at Kindrum and Murren; frequent, F.
P. vulgaris, var. *depressa*, Wend. The commonest form, F.

Caryophyllaceæ.

- † *Silene inflata*, Sm. Not unfrequent as a weed of cultivation. "Between Waters;" Kindrum, &c. F.
S. maritima, With. Local. Dunaff Head; Horn Head; The Bin. F.
S. acaulis, L. Very rare; in one place on Dunaff Head, on the north-western face, above the "Black Rocks."
Lychnis Flos-cuculi, L. Common, F.
† *L. vespertina*, Sibth. Rare. Kinnalough; Horn Head, near the house; near Lough-an-Ure, Rosses. F.
L. diurna, Sibth. Rare; about Kindrum Lake, F.
† *L. Githago*, Lam. Local; Glinsk, near Carrowkeel; abundant at Horn Head; a corn-field weed. F.
Sagina procumbens, L. Common, F.
S. maritima, Don. Frequent, F.
S. nodosa, E. Meyer. Local; Fahan; Ballyvicstocker; Doaghmore, &c., F.
S. subulata, Wimm. Very rare; Dunaff Head.

- Honkencja peploides*, Ehrh. Rather rare; Ballyvicstocker; Bottom Shore. F.
Arenaria serpyllifolia, L. Local along the coast, Bottom Shore. F.
Stellaria media, L. Very common, F.
S. holostea, L. Frequent, F.
S. graminea, L. Rare; Glenalla.
S. uliginosa, Murr. Common, F.
Cerastium glomeratum, Thuil. Common, F.
C. triviale, Link. Common, F.
C. tetrandrum, Curt. Scarce; Dunree; Ballyvicstocker. F.

Malvaceæ.

- † *Malva sylvestris*, L. Rare; Upper Carrablagh; but always near houses. F.
 † *Lavatera arborea*, L. Rathmullan Castle and about Rathmullan, probably introduced long ago; not met with on the Donegal Cliffs elsewhere.

Hypericaceæ.

- Hypericum Androsæmum*, L. Frequent, F.
H. humifusum, L. Local, F.
H. pulchrum, L. Frequent, F.
H. perforatum, L. Frequent, F.
H. quadrangulum, L. Common, F.
H. Elodes, L. Not unfrequent, F.

Geraniaceæ.

- † *Geranium dissectum*, L. Local; Kindrum; Tamney; Ballyhooriskey; near Horn Head House; always in cultivated ground; gardens, &c., F.
G. molle, L. Common, F.
G. Robertianum, L. Abundant, F.
 * *G. pyrenaicum*, L. Drimnacraig, F.
Erodium cicutarium, Sm. Common, F.
 [*E. moschatum*, Sm. Very rare; not native. I could only meet with it in one place by a gateway on the skirts of Rathmullan, leading into Mr. Batt's place.]

Linaceæ.

- Linum catharticum*, L. Common, F.
Radiola Millegrana, Sm. Common in Fanet and at Horn Head; Tory Island. F.

Oxalidaceæ.

- Oxalis Acetosella*, L. Common, F.

Leguminosæ.

- † *Ulex europæus*, L. Common, F.
U. Gallii, Planch. Local; with the last, from Carrowkeel to Glenalla; Murren, F.
Sarothamnus scoparius, Koch. Carrowkeel; Glinsk, F.
Medicago lupulina, L. Not common. Carrablagh; Glenalla, F.
Trifolium pratense, L. Common, F.

- T. medium*, L. Local and rare. Dunaff Head. In great profusion at Leenane, Lough Swilly, where it forms beautiful masses of flowers.
- T. repens*, L. Common, F.
- T. minus*, Sm. Frequent, F.
- T. filiforme*, L. Rare. Glenalla.
- Lotus corniculatus*, L. Abundant, F.
- L. major*, Scop. Frequent, F.
- Anthyllis Vulneraria*, L. F.
- Vicia Cracca*, L. Common, F.
- V. sepium*, L. Common, F.
- V. lathyroides*, L. Very rare. Dunaff Head.
- ‡ *V. hirsuta*, Koch. Rare. Cornfield near Rosskirk; near Croaghross. Never apart from cultivation, F.
- V. angustifolia*, Roth. Rare and very local. Leenane, Lough Swilly.
- Lathyrus pratensis*, L. Not common. Leatbeg; Ballyhooriskey, F.

Rosaceæ.

- Prunus communis*, Huds. Frequent, F.
- Spiræa ulmaria*, L. Common, F.
- Agri-monia Eupatorium*, L. Rather rare. Between Rathmullan and Knock Alla; at Carrigart; Drimnacraig; Kindrum; near Rowross, F.
- Alchemilla vulgaris*, L. Common, F.
- A. arvensis*, Scop. Frequent, F.
- Potentilla anserina*, L. Common, F.
- P. reptans*, L. Common, F.
- P. Tormentilla*, Nestl. Abundant, F.
- P. Fragariastrum*, L. Frequent, F.
- Comarum palustre*, L. Local. Lough Fern; Ballyvicstocker Lake; Kinnalough, F.
- Fragaria vesca*, L. Local. Carrablagh; Glenalla, F.
- Rubus Idæus*, L. Not unfrequent. Glenalla; Drimnacraig; Leat, F.
- R. fruticosus*, L. Common, F.
- R. saxatilis*, L. Bunlinn, between Mulroy Lake and Lough Keel, and on the borders of Lough Keel; near Drimnacraig, F.
- Geum urbanum*, L. Frequent, F.
- G. rivale*, L. Rare. Glenalla by the mill-dam, and in the Poisoned Glen up to 1000 feet.
- Rosa spinosissima*, L. Locally abundant. Macamish Point; Croghan; Horn Head, &c., F.
- R. canina*, L. Common.
- R. tomentosa*, Sm. Frequent. Croghan; Lough Columbkille; Carrablagh, F.
- Cratægus Oxyacantha*, L. Common, F.
- Pyrus Aucuparia*, Gært. Frequent. There is a small grove of these trees high up in the Poisoned Glen, F.

(To be continued.)

SHORT NOTES.

DISTRIBUTION OF *ULEX EU-NANUS* IN ENGLAND.—In the notice of the Bot. Record Club Report for 1877 (p. 63), the occurrence of restricted *U. nanus* in South Hampshire appears to be questioned. This induces me to forward for critical inspection the Record Club specimen so named, gathered by E. D. Marquand, and localised as from “Brockenhurst.” Permit me to point out that this is not the first report of the plant for the vice-county in question; in ‘Topographical Botany’ (part ii., p. 609) the *Ulex eu-nanus* of Syme is recorded for South Hants on the excellent “personal authority” of Mr. Frederick Townsend. Mr. Marquand adds, in a recent letter to the writer, that he finds “*U. Gallii* comparatively rare on the heaths about Sway, Brockenhurst and Beaulieu plain, where *U. eu-nanus* is very abundant.” My experience in North and Mid England is the reverse, but I, nevertheless, know the dwarf *eu-nanus* in S.W. Yorks., S. Stafford and also N. Lincoln. I send specimen from the race-course at Doncaster, and from a warren near Gainsborough. The plant in the former locality is dwarfed, unhealthy, and likely to be extirpated; in the Gainsborough station it attains a large size and is perhaps too near *Gallii*,—as to this Dr. Trimen will, perhaps, kindly express his opinion. I have in former years found *U. eu-nanus* in Glamorgan and South Stafford, so that its distribution is pretty wide horizontally; although everywhere, so far as my experience goes, local, and much less plentiful as regards number of individual plants than *U. Gallii*. Here, near Rasen, *U. Gallii* is the only Whin on the sandy heaths of the Greensand stratum.—F. A. LEES.

ULEX NANUS IN SOUTH HANTS.—In answer to the enquiry contained in the notice of the Report of the Bot. Record Club in the last No. of the ‘Journal of Botany’ (p. 63), “Does restricted *Ulex nanus* occur in South Hampshire?” I find I have recorded it on personal authority for the following stations;—Bournemouth; Ringwood; Burley; Lyndhurst; Holmsley; Beaulieu; Romsey; Miller’s Pond, near Southton; Fisher’s Pond, between Owlesbury and Bishopstoke; Shedfield; Botley; Titchfield Common; Southwick Common; (in these last three neighbourhoods it is more frequent than *U. europæus*). I have it recorded by other botanists (exclusive of Dr. Bromfield and Mr. Notcutt, who may not have distinguished it from *U. Gallii*) from thirteen other localities in South Hants. I have only two records of *Ulex Gallii*, viz., Bournemouth and the Lymington district.—F. TOWNSEND.

ULEX NANUS IN SOUTH HANTS.—All doubt as to the occurrence of *U. eu-nanus* in South Hants is very completely done away with. What is more surprising to me is to find it apparently so very frequent a plant there. My query at p. 63 was based on my remembrance of the great heath-district of South-west Hants (and Dorset), where *U. Gallii* occurs in profusion,

but where I have no remembrance of meeting with restricted *U. nanus*; nor have I any specimens thence, save of *U. Gallii*. The plant collected by Mr. Marquand in the New Forest district is clearly correctly named *eu-nanus*, and I may say that I agree completely with Mr. Lees in the names of all the specimens mentioned in his note, and so kindly sent to me by him, except that I should call his Gainsborough plant *U. Gallii* rather than *U. eu-nanus*. The distribution of these two furzes through England requires full working out; generally speaking I have hitherto considered *U. Gallii* a western or "Atlantic" plant, and *U. eu-nanus* eastern or "Germanic," but this will probably not hold good very far.—H. TRIMEN.

ON *SYMPHYTUM ASPERRIMUM*.—In the report of the Botanical Exchange Club for 1876 there is a reference, at p. 29,* to a *Symphytum* gathered by me near Youlgrave (misprinted "Yurlgrave"), Derbyshire. I think it may be well to state that I saw only one root or small patch of the plant, and that it appeared to have evidently originated from a garden not far off. I had, however, previously met with the same plant in considerable quantity near Grange Mill, a hamlet two miles south of Winster, Derbyshire, at the upper part of the picturesque line of road called the Via Gellia. A streamlet here runs by the roadside, and on its wet grassy banks this *Symphytum* grows in plenty for more than twenty yards, evidently brought down from the gardens at Grange Mill. I have sent to the Bot. Exch. Club a small supply of this Grange Mill plant which I obtained last summer, so that a portion at least of the members will be able to see what is the form to which these notes apply. As to the question whether it should be regarded as a form of *S. asperrimum* or as distinct therefrom, I think it may be well here to quote the remarks of Mr. J. G. Baker on this plant (in a letter of Feb. 14th, 1877):—"I cannot quite make up my mind about your *Symphytum*. The true *S. asperrimum* has strong retrorse white prickles on the stem and leaves, not mere setæ; your plant has not these, but in everything else agrees with *S. asperrimum*. . . . We have precisely your plant from Besser as *S. asperrimum*, and Planchon has marked it '*S. Donii* D.C.?' I incline to think the plant a var. of *asperrimum*." The Derbyshire plant does not well agree with Curtis's, or rather Sims's, figure of *S. asperrimum* in 'Bot. Mag.' xxiv. 929, for the corolla is there represented as much more open at the mouth than in my plant. The description also states that the stems are "not merely hispid, but covered with small curved prickles." The Derbyshire plant shows no disposition to vary even when reproduced from seed. I have found it not only in the two stations already mentioned, but I find it also in cultivation in a cottage garden in this N. Staffordshire parish (Ashbourne), each station being some miles from the others. It grows fully five feet high, in this respect resembling true *S. asperrimum*. The corollas are pinkish before and at the first opening, afterwards of a

* See 'J. Bot.' 1878, p. 253.

pale porcelain-blue, and, although constricted at the mouth, are considerably larger and wider in outline than those of *S. officinale*. A large *Symphytum* of similar appearance and stature is often seen in old gardens in the S. Western counties of England: perhaps this is the true *S. asperrimum*; I have no opportunity of comparing it with the Derbyshire plant, but if my memory serves me aright, the flowers of the latter are much paler in colour (see Dr. Boswell's remarks Bot. Exch. Club Report for 1876, *loc. cit.*)—W. H. PURCHAS.

NAIAS FLEXILIS, *Rostk.*—This plant has been supposed to be diœcious in Britain; Dr. Boswell Syme says he could find no male flowers on his specimens of the Irish plant collected by Mr. T. Kirk, (see 'Eng. Bot.' ed. 3, x. p. 63); and Sir Joseph Hooker states it is the female plant only that is found there ('Stud. Flora,' ed. 2, p. 399). Last autumn I collected a quantity of the plant in Loch Cluny with ripe fruit and many flowers. On examination I find plenty of male flowers in their normal position at the base of lateral shoots as described by Magnus. The plant is therefore monœcious. As it seemed extraordinary that Irish plants should be diœcious, I examined some of Oliver's original specimens, and also some collected by Mr. T. B. Kirk (I suppose the same as those referred to by Boswell Syme), and on them also I had no difficulty in finding male flowers. I suppose they had been previously overlooked, from their occurrence at the base of young shoots and their rapid withering. *Naias flexilis*, then, is monœcious in Britain, as it is elsewhere, and as it has been described by Braun and by Magnus.—BAYLEY BALFOUR.

Extracts and Notices of Books & Memoirs.

HILDEBRANDT'S AFRICAN TRAVELS.

[The following condensed account of the explorations of Herr J. M. Hildebrandt in Eastern Tropical Africa, and summary of some of the botanical results, is translated from a paper by Herr F. Kurtz, of the Berlin Botanic Garden, and was read at the "Pfungstversammlung" of the Brandenburg Botanical Society at Oderberg, May 27, 1877. It is printed in the "Verhandlungen" of the Society, vol. iii.-ix.; we are indebted to Mr. George Murray for the translation.

Hildebrandt made extensive botanical collections, the enumeration of his specimens realising nearly 3000. He was very successful in discovering novelties, not a few of which have been described in the pages of this Journal; there are, however, yet many interesting new plants, especially among the Somali gatherings, which have not been worked out.

The traveller has recently spent a short time in London and Paris, and has now again left Europe to proceed to Madagascar. In a country where so little botanical investigation has yet been systematically carried out, a naturalist of his knowledge, energy and

experience cannot fail to reap a rich harvest; and the little that is at present known of the botany of that great island warrants the expectation of many interesting and important discoveries.]

Hildebrandt left Berlin on the 5th March, 1872, and after a short stay in Egypt went *via* Djiddah, Hodeidah, and Mochah, to Aden, which he reached in June, 1872. Here he used the opportunity of a passage in a vessel of the English navy to visit Massûa, where he arrived in July. At this place he made the acquaintance of Munzinger-Bey, who was about to depart to the countries on the northern boundary of Abyssinia on a military expedition to seize Bogos at the command of Egypt, and who invited Hildebrandt to accompany him. Accepting this invitation Hildebrandt travelled from July to October, 1872, through the countries of Habab, Bogos, Bedjûk, and Az-Temmariam, and made from them a rich collection of objects of Natural History. The botanical part of these contained, besides the remarkable *Hydnora abyssinica*, A. Br., a number of new species (*Crotalaria emarginella*, Vatke, *Heliotropium abyssinicum*, Vatke, *H. Steudneri*, Vatke, *Astephanus Schimperii*, Vatke). A description of this journey, by the author himself, will be found in the 'Zeitschrift d. Ges. für Erdkunde zu Berlin,' Jahrg. 1875, pp. 449-470 (with a map; compare also Just, 'Botan. Jahresber.' ii., 1874, p. 1154, No. 149). Communications on the agriculture and cattle-breeding of Abyssinia were also published by Hildebrandt in the Berlin 'Zeitschr. f. Ethnologie,' Bd. vi., 1874, pp. 318-340.

Having returned in October, 1872, to Massûa, Hildebrandt visited the volcanic peninsula Buri, and then set out by ship to Aden. At Hamfale he landed, and visited the Salt Plain of Ragad, two hundred feet beneath sea-level (west of Ragad), and climbed Oerteale, the first African volcano ascertained to be still active. Compelled by want of stores to give up his land expedition, Hildebrandt proceeded with his voyage. After putting into Assab Bay he came to the Straits of Bab-el-Mandeb, and once more touched Arabian ground at Raç-Arâr, whence he travelled by Camel to Aden.* Hildebrandt has described the excursion to the Salt Plain of Ragad in the 'Zeitschr. d. Ges. f. Erdkunde zu Berlin,' Bd. x., 1875, pp. 1-38. Among the plants collected at Aden, besides those characteristic of the flora of the place, such as *Euphorbia systyla*, Edgew. (which also occurs on the Somali coast), *Salvia papposa*, Moq.-Tand., &c., there was found a new *Heliotropium* (*H. paradoxum*, Vatke).

Hildebrandt then undertook two excursions from Aden to the Somali coast,—one short one to Berbera and Bulhâr, and the other longer to Lasgori. From the latter place, situated in the district of Wer-Singelli-Somâl, he visited the Ahl mountains, of which the limestone ridges, reaching a height of two thousand metres, possess a particularly interesting flora, which shows some analogies to the vegetation of South Arabia, but is, on the other

* The plants (about one hundred and twenty in number) of this portion of the journey were unfortunately washed away and lost. [ED. JOURN. BOT.]

hand, very different from the flora of the granite mountains of Abyssinia. Here Hildebrandt and others found the following plants, determined to be new:—*Indigofera somalensis*, Vatke, *Burus Hildebrandtii*, Baill., *Triumfetta actinocarpa*, S. Moore, *Barleria Hildebrandtii*, S. Moore, *Urbania lyperiaeflora*, Vatke, *Solanum Hildebrandtii*, A. Br. & Bouché, *Heliotropium hirsutissimum*, Vatke, *H. somalense*, Vatke, *Ballota Hildebrandtii*, Vatke & Kurtz, *Lasiorcorys argyrophylla*, Vatke, *Pluchea heterophylla*, Vatke, *Pulicaria Kurtziana*, Vatke, *P. Hildebrandtii*, Vatke, *Inula somalensis*, Vatke. Hildebrandt has given a description of the excursion to Lasgori and the Ahl mountains in the tenth volume of the 'Zeitschr. d. Ges. f. Erdkunde zu Berlin' (1875), pp. 266–295 (see also Just, 'Botan. Jahresber.' iii., 1875, p. 752, No. 49).

After his return to Aden, Hildebrandt made an excursion to Kurratschi and up the Indus for the sake of his health. He then went to Zanzibar, where he arrived in July, 1873. From here he visited, partly in company with Hagenbeck (the dealer in animals), the rivers Wami and Kingani, made an excursion to Baraua, on the south coast of Somali, and formed on these expeditions, as well as on the island of Zanzibar, exceedingly rich collections of natural history objects. Of the remarkable plants brought by Hildebrandt from this region (some as herbarium specimens, and others alive) there may be named, *Crotalaria pseudo-eriosema*, Vatke, *Indigofera palustris*, Vatke, *Æschynomene cristata*, Vatke, *Dalbergia vacciniifolia*, Vatke, *Clitoria zanzibarensis*, Vatke, *Vigna Benthami*, Vatke, *Milletia piriifolia*, Valke, *Clathrospermum biovulatum*, S. Moore, *Grewia ectasicarpa*, S. Moore, *Nymphaea zanzibariensis*, Casp. (one of the most beautiful ornaments of the Victoria-house in the Bot. Gardens, Berlin), *Sebaa oldenlandioides*, S. Moore, *Trianolepis Hildebrandtii*, Vatke, *Psychotria punctata*, Vatke, *Plectronia zanzibarica*, Vatke, *Chasalia umbraticola*, Vatke, *Polyspharia parvifolia*, Hiern, *Gardenia zanzibarica*, Hiern, *Enterospermum micranthum*, Hiern, *Hedyotis flosculosa*, Hiern, *H. fugax*, Vatke, *Torenia ramosissima*, Vatke, *Leucas densiflora*, Vatke, *Æolanthus zanzibaricus*, S. Moore, *Vernonia Hildebrandtii*, Vatke, *Laggera sordida*, Vatke, *Gynura filiformis*, Vatke, *G. microcephala*, Vatke, *Encephalartos Hildebrandtii*, A. Br. & Bouché. Partly on account of the exhausted condition of his health, and also for the purpose of preparing for his long-planned expedition to Kenia, the northern rival of the Kilima' Ndjaro, Hildebrandt returned to Europe in August, 1874. However, in the early part of the following year, he began his second expedition, leaving Aden, which he reached in February 1875, first for Meith in the province of Habr-Gehardyis-Somal. From here he visited the Serrut Mountains, (about 2000 m.) in which he found, besides *Burus Hildebrandtii*, Baillon, observed before in the Ahl Mountains, *Hydnora abyssinica*, A. Br. (of which a specimen with a pentamerous perigone was found) and *Boswellia Carteri*, Birdwood, the plant which yields frankincense, the following new plants:—*Indigofera umbraticola*, Vatke, *I. Sedgewickiana*, Vatke et Hildebrandt, (named in compliment to Dr. Sedgewick who afterwards treated the traveller on board H.M.S. 'London', on the Zanzibar Station),

Boswellia neglecta, S. Moore, *Adhatoda barlerioides*, S. Moore, *Tinnea heterotypica*, S. Moore, *Hildebrandtia africana*, Vatke, (see A. Braun in 'Sitzungsber. d. naturforsch. Freunde zu Berlin,' 18th Jan. 1876), *Leptadenia? visciformis*, Vatke, *Pulicaria Renschiana*, Vatke, *Psiadia incana* Oliv. & Hiern, *Iphiaea microphylla*, Vatke, *Sericocoma somalensis*, S. Moore, *S. pallida*, S. Moore, *Ulothrix Vatkeana*, Rehb., f., *Dracena schizantha*, Baker (which affords 'Dragon's blood';—see Hildebrandt in 'Sitzungsber. d. naturforsch. Freunde zu Berlin,' 19th March, 1878, and in 'Monatshrift d. ver. zur Beförd. d. Gartenbaues', July, 1878), *Anthericum inconspicuum*, Baker, and *A. corymbosum*, Baker. The most remarkable discovery was, however, the new genus of *Convolvulaceæ*, *Hildebrandtia*, a small shrub with twigs thorny at the ends, and habit recalling that of a *Lycium*, the tetramerous flowers of which are distinguished by the two outer calyx-leaves growing in the shape of disproportionately large wings when the fruit ripens.

After returning to Aden, Hildebrandt went to Zanzibar, from which he, according to his plan, set out to the Comoro Island, Johanna, on which he spent the interval between June and September, 1875. The luxuriant vegetation of this island, according to Hildebrandt one of the loveliest in the world, of the natural history of which he has given a sketch in the 'Zeitschr. d. Ges. f. Erdkunde zu Berlin,' Bd. xi., 1876, pp. 37-49 (compare also Just, 'Botan. Jahresber.' iv., 1876, p. 1161, No. 161), included a number of new plants:—*Mucuna comorensis*, Vatke, *Crinum Hildebrandtii*, Vatke, *Ravenea* (nov. gen. Palmarum) *Hildebrandtii*, Bouché, *Balanophora Hildebrandtii*, Rehb. fil., *Cyathea Hildebrandtii*, Kuhn, *Trichomanes Hildebrandtii*, Kuhn, *Selaginella Hildebrandtii*, A. M., *S. amphirhizos*, A. Br., of which especially worth mention is *Trichomanes Hildebrandtii*, of which the circular fronds, as big as a thaler, are closely pressed in series to the tree trunks, and much suggest a great liver-moss.

Among the fifty-four species of mosses which the traveller collected on Johanna, forty-seven were new (according to the determination of C. Müller (Halens.), who has described the Hildebrandt mosses in 'Linnæa,' xl., pp. 225-300); the island has only three in common with Madagascar and only one with Africa. Among the Algæ of Johanna there is a new *Chroolepus* (inhabiting trees), and the remarkable *Dictyonema sericeum*, Montagne, of which Bornet has given a figure in his 'Recherches sur les gonidies des lichens' ('Ann. Sc. Nat.' 5 ser., tome xvii., 1870). The lichens collected in East Africa by Hildebrandt were worked up by Krempelhuber ('Linnæa,' xli., pp. 135-144).

When he came back to Zanzibar, Hildebrandt engaged his men and supplied himself with what was necessary for his projected journey into the interior of the dark continent to Ndur Kenia. He went first to Pangani; and since he could not follow out his plan from this place he went to Lamu, in order to try to penetrate from there through the South Gala countries up the Tana to Kenia. Here also all the attempts of the traveller to form a caravan were thwarted through the fear entertained by the Gala of

the Somalis, who had penetrated into the neighbouring Gala provinces and had laid them waste. Sick with fever, and impeded by scorbutic ulcers in the legs, Hildebrandt returned, in December, 1875, to Mombassa. Since he did not recover here he went on to Zanzibar, where he—as already mentioned—was carefully nursed on board H.M.S. 'London.' Completely recovered, he set out again from Zanzibar, where he engaged fresh followers, to Mombassa. Here he made an excursion to Mawéni, in Durúma, in order to exercise his followers, and on the 10th January, 1877, set out from Mombassa into the interior to reach Kenia. He traversed in succession the provinces of Taita, Ukamba, and Kitui, stopping now and then to collect natural history specimens, and to make different scientific observations. Through the fear his people had of the Wakwafi on the one hand and the Wakamba (the inhabitants of Kitui) on the other, as also through the hostile behaviour of the latter towards himself, Hildebrandt was compelled to return with a heavy heart when only three days' journey from Kenia, the goal of his journey. In August, 1877, he arrived again at Mombassa, paid off his people, and, compelled by shattered health, returned by Zanzibar to Europe. Among the highly interesting plants collected on this journey may be mentioned:—*Galactia argenteifolia*, S. Moore, *Dalbergia brevicaudata*, Vatke, *Ormocarpum Kirkii*, S. Moore, *Pithecolobium zanzibaricum*, S. Moore, *Ammannia Hildebrandtii*, Koehne, ined., *Tristillateia africana*, S. Moore, *Cladostemon paradoxus*, A. Br. & Vatke, *Uvaria Asterias*, S. Moore, *Blepharis pratensis*, S. Moore, *Notonia Hildebrandtii*, Vatke, *Vernonia amulans*, Vatke, *Aspilia wedeliaformis*, Vatke, *Hydrosme maxima*, Engler, *Ouvirandra Hildebrandtii*, Hort. Berol.,* *Selaginnella eublepharis*, A. Br.

On the highly remarkable new Capparideous genus, *Cladostemon paradoxus*, and also on several other new plants collected by Hildebrandt, an exhaustive paper by A. Braun will be found in the 'Monatsberichten der Berliner Akademie der Wissenschaften,' (1876, pp. 855–867; comp. also 'Sitzungsber. der Naturf. Freunde zu Berlin,' 1876, pp. 6–8, pp. 113–123, and Just, 'Botan. Jahresber.' iv., 1876, p. 558, No. 149, and p. 1122, No. 75). *Ouvirandra Hildebrandtii*, Hort. Berol., is a readily flowering plant in the Berlin Botanic Garden, which the traveller found in Kitui in shallow pools filled only during the rainy season. During the dry season only the coarse rhizome of the *Ouvirandra* is found; in the rainy season it develops quickly a large number of leaves and numerous long-stalked violet flowers, which after flowering sink down into the water.

Hildebrandt has given a review of his second journey in a lecture to the Berlin Gesellschaft für Erdkunde ('Verhandl.,' Bd. iv., pp. 284–295).

* This name was given by Ascherson, and the plant was described by Eichler at the October meeting of the 'Gartenbauverein' and November meeting of the 'Gesells. Naturf. Freunde' (see 'Sitzungsber.', 19 Nov., 1878, p. 193). It is identical with *Aponogeton subcorjugatus*, Schum. (*A. leptostachyus*, E. M.) (See Trimen in 'Gard. Chron.' 1879, p. 149). [ED. JOURN. BOT.]

ON THE VEGETABLE REMAINS IN THE EGYPTIAN MUSEUM AT BERLIN.

BY ALEXANDER BRAUN.

Edited from the Author's MSS. by P. ASCHERSON and P. MAGNUS.
(‘Zeitschrift für Ethnologie,’ ix., 1877).

(Concluded from p. 62.)

[In order to finish all together the plants preserved in the Egyptian Museum, we may mention No. 1596 of the Passalacqua collection,* which is not spoken of by Kunth, and does not occur in the notes left by A. Braun. This object consists for the most part of remains of grass-like leaves repeatedly bound together and mostly broken, in examining which three small bulbs, about 0·008 m. long and 0·004 m. broad were found, which, confirmed by the microscopic examination of the leaves, were the means of the determination of the plant as a species of *Allium*. Towards recognising the species, the small specimens in question gave no sure data. Nor was Prof. Irmisch of Sondershausen, the highest authority on bulb and tuber-bearing plants, able to give a decided judgment in regard to the species.

The predilection of the ancient Egyptians for species of *Allium* is repeatedly certified. Apart from the numerous figures of bulbs on the monuments,† and the statements of Roman writers about the religious worship of this plant (according to information received from Lepsius, not yet confirmed by old Egyptian text) which was invoked in swearing,‡ it will suffice to recall the passage already cited, Numbers, chap. xi., vers. 5, in which three species of *Allium* are mentioned, of which two are called in modern Arabic by the names occurring in the Hebrew text. Only the leek, *Allium Porrum*, L. (Greek *πράσον*, Hebrew *châtzir*), is called differently *korrat* in Arabic; while the onion, *Allium Cepa*, L. (Greek *κρόμμυον*, Hebrew *betzel*, Arabic *baçal*), and the garlic, *Allium sativum*, L. (Greek *σκόροδον*, Hebrew *schûm*, Arabic *tûm*), have not altered their nomenclature in the South Semitic languages. Another well-known literary testimony to the extensive use of species of *Allium* in ancient Egypt is the account of Herodotus, § that in the building of the pyramid of Cheops radishes, onions and garlic to the value of 1600 silver talents were consumed by the workers. The modern Egyptians do not depart in this respect from the predilection of their forefathers, although Unger|| has made the declaration (difficult to prove) that garlic and onions are now cultivated far less than in times of antiquity. Onions are cultivated in the greatest abundance in modern Egypt [an exact description of their cultivation is given by Figari¶]; they are to

* ‘Comp. Sitzungsber. der Ges. naturf. Freunde Berlin,’ 15 Mai, 1877, p. 157.

† Unger, *l. c.*, xxxviii. 23, Figs. 22-24.‡ Hehn, *Cultur pflanzen und Hausthiere*, ii Aufl., p. 169.§ *Lib.* ii., cap. 125.|| *L. c.*, xxxviii. 23, p. 108.

¶ ‘Stud. scient. sull’ Egitto,’ tom. ii., pp. 140, 141.

be found even in the remote oases of the Libyan desert. Garlic is likewise cultivated in the Nile Valley generally; besides, Ascherson met with it in the large and small oases, and Rohlfs* in Sinah and Audjila.

Of the finding of the stems of the poisonous shrub *Oshar* (*Calotropis procera*, R. Br.) in a stone tomb of the oasis Dachel, Ascherson† has given a full account. It may be added that these stems have still a distinct bitter taste. The bitter principle and the fat prove, therefore, far more persistent than sugar, and, of course, ether oils. In the Florentine Museum there are the remarkable distended, almost globular fruits of this plant, which are called in Arabic, *béd-el-óschar*, "the egg of the oshar." This additional discovery is less remarkable than the stem, since the wool of the seed was presumably, as to-day in Soudan, employed in stuffing pillows.—*A.* and *M.*]

Dictionary of English Plant-Names. By JAMES BRITTEN, F.L.S., and ROBERT HOLLAND. Part I. [A—F.] London: published for the English Dialect Society by Trübner and Co. 1878. (pp. 197).

THIS is the first portion of a work long announced, and its comprehensive character justifies delay. It is over ten years since the authors commenced their collection of local names, and though it is probable that even another decade might add a good many more words to the collection here duly marshalled in alphabetic sequence, yet it is well to hasten the publication. It is the nature of such compilations to be never complete, and no doubt botanists and others in all parts of England will be able to add a few names or varieties of names. But it may be safely said that such an extensive series of the names of English plants has never before been seen. This Part only extends to the letter F, but there must be at least three thousand names given. They are drawn from so many and such varied sources that it is clear that the danger has been that of including too much, and failing to draw the line at real names and keep out those invented by individual writers or by children. The names are evidently of very unequal value in area of use, authenticity, and genuineness. The authors have, however, endeavoured to comprehend all the names now or at any time actually in the mouths of the country people, and the old writers on plants have been exhaustively consulted for such, many of which have become extinct. No "deliberately coined" modern names are included. The earliest occurrence of a name in print is often indicated, but a great portion of the provincial words here catalogued must be hitherto unpublished, being gathered together at first-hand from the people. The names in the various extant MSS. dating before the era of the invention of printing are not included unless subsequently printed.

The book is not more than it professes to be, a dictionary.

* 'Von Tripolis nach Alexandrien,' Bd. ii., p. 56, 119.

+ 'Verhandlungen der anthropol. Ges. Berlin,' 1875, S. 58.

Under each name is given an indication of the districts or counties where it is known to be in use, and the plant to which it refers. It is in the latter point especially that the book is much in advance of any previous partial catalogues of a similar kind. Great care has evidently been bestowed on the correct determination of the species, and the scientific names of these are always given. Many errors of previous writers—who have usually been philologists or antiquarians rather than botanists (always excepting Dr. Prior, who is all combined)—are corrected, and it is the accuracy of the book in this particular which is one of its strongest features. A (temporary) index of the scientific names of the species is given, under each of which are to be found all the names contained in this First Part. Some of the very common, remarkable, or useful plants have a large number of these local names. This list, when completed for the whole book, will be of great utility. Besides our native flora a good many garden favourites and kitchen herbs are included.

Explanation of the names has not been systematically attempted. Dr. Prior's useful and well-known volume is always referred to when he includes the name, and the authors comment judiciously on some of his derivations. They have also given explanations whenever local information enabled them to do so satisfactorily, and in many cases give a great deal of curious information from out-of-the-way sources. The continuation of the Dictionary may be expected during the current year. H. T.

Jemförande undersökningar öfver Bladets anatomi. Af F. W. C. ARESCHOUG. (Kongl. Fysiografiska Sällskapets i Lund minneskrift 1878).

THIS fine memoir of two hundred and forty-two quarto pages embodies the researches on leaf-anatomy in vascular plants which Prof. Areschoug has been carrying on for many years. After an introduction on the general structure of the cellular and vascular tissues, a comparative examination of the leaves of numerous selected types is very fully given, and the results are summed up in a final *résumé*. The paper is, unfortunately, wholly in Swedish, but it is illustrated with eleven excellent plates exhibiting the structure by various sections of the following leaves:—*Narcissus poeticus*, *Anthericum Liliago*, *Agapanthus umbellatus*, *Erythronium Deniscanis*, *Phormium tenax*, *Luzula multiflora*, *Arundo Donax*, *Uncinia rubra*, *Triglochin maritimum*, *Potamogeton natans*, *Zostera marina*, *Philodendron pertusum*, *Ilex Aquifolium*, *Burus sempervirens*, *Rosmarinus officinalis*, *Littorella lacustris*, *Dracophyllum Traversi*, *Franciscea* sp., *Rochea falcata*, *Limnanthemum nymphaeoides*, *Salsola Kali*, *Elatine Hydropiper*, *Eryngium paniculatum*, *Adiantum macrophyllum*, *Platyserium alaicorne*. H. T.

On the genus Halophila. By BAYLEY BALFOUR, D.Sc. ('Transactions of the Botanical Society of Edinburgh,' 1877-8). 1879.

THIS memoir is illustrated with five quarto plates from the author's drawings. The investigations recorded were

for the most part carried on in Prof. de Bary's botanical laboratory at Strasburg, and the whole is an excellent piece of work. The morphology of the vegetative organs is treated of in great detail, especially the leaf arrangement, a brief account of which was communicated by Dr. Balfour to this Journal last year (1878, p. 290). The structure of the flowers is fully described for the first time; they are unisexual, but it is not determined whether monœcious or dicecious. The pollen-cells are united to form chains, but are not so long as in the allied genera *Zostera* and *Cymodocea*. The female flower has an inferior ovary with numerous ovules on three parietal placentas; this is terminated by a slender process (perianth-tube?), which bears at its apex the three small perianth-segments alternating with the carpels, and within these three long filiform stigmas. The fruit is a globular capsule; the seeds exalbuminous; the large macropodous embryo with a coiled cotyledon at the summit. In his remarks on the systematic position of the genus, the author observes that, though possessing many of the characteristic marks of the *Naiadaceæ*, where it is usually placed, *Halophila* by the structure of its ovary and in other points agrees with the *Hydrocharideæ*, and must be regarded "as a form breaking down the artificial distinction separating the two families, unless indeed one places it altogether in the *Hydrocharideæ*." The species examined by the author, *H. ovalis* and *H. stipulacea*, were both collected at Rodriguez. Dr. Balfour attaches great importance to the foliage, and in opposition to Ascherson and Bentham would remove both *H. spinulosa* and *H. Beccarii* from the genus on account of their very different leaves. H. T.

THE number of special cryptogamic periodicals is on the increase; besides the old established 'Hedwigia' and 'Grevillea' we have the 'Revue Bryologique' of M. Husnot and the 'Brebis-sonia' or 'Revue d'algologie' of M. Huberson, and now, with the title of 'Revue Mycologique,' a new journal, devoted to the study of Fungi, has appeared under the editorship of M. C. Roumeguère. It is a quarterly, and the first number was issued on January 1st containing forty-four pages and a plate. The subscription is 12 fr. a year. Address, M. C. Roumeguère, Rue Riquet 37, Toulouse.

THE collection of plants made by Prejevalsky in his last expedition, together with the rich one of Potanin made on the borders of Mongolia, is being worked out by Maximowicz and Regel, and the results will be embodied in an illustrated work on the Flora of Mongolia and Kansu, a large number of the plates for which are ready.

THE Rev. W. A. Leighton announces that he has nearly completed the printing of the third edition of his 'Lichen-Flora of Great Britain, Ireland, and the Channel Islands,' which it is expected will be ready for issue early in March. This new edition is rendered necessary by the numerous discoveries of Mr. Larbalestier in the West of Ireland; those of Mr. Crombie,

Dr. Stirton, and others in the North of Scotland; and his own researches in North and South Wales; whereby the lichen-flora of the former edition, amounting to 1156, has been raised to 1706, thus rendering our lichens in number, rarity, and novelty, quite equal to those of any country in Europe.

ARTICLES IN JOURNALS. — JANUARY, 1879.

Botanische Zeitung. — K. Goebel, 'On development of leafy shoots from leaves of *Isoetes*.' — P. F. Reinsch, 'Researches on entophytic and entozootic plants' (tab. 1). — T. W. Engelmann, 'On the movements of *Oscillariæ* and *Diatoms*.' — H. Wendland, 'On *Brahea* or *Pritchardia filifera*, Hort.' — J. C. Döll, 'On the history of botanical morphology.'

Flora. — W. J. Behrens, 'On the nectaries of flowers' (tab. 1-5). — C. Kraus, 'On the tissues composing foliage and flower-leaves.' — H. Bauke, 'A Reply.'

Hedwigia. — G. Winter, 'On a natural system of Thallophytes.' — A. Fischer v. Waldheim, '*Ustilago Aschersoniana*,' n. sp.

Magyar Nov. Lapok. — L. Simkovics, 'The moss-flora of Buda-Pest.'

Oesterr. Bot. Zeitschr. — J. A. Knapp, 'Biography of Ludvig von Vukotinovic' (with portrait). — M. Wyppl, 'Researches towards an accurate knowledge of nutation.' — F. v. Thueman, '*Vossia*, n. gen. *Ustilaginearum*.' — M. v. Hutten, 'On flora of upper valley of Neutra.' — F. W. Lorinser, '*Agaricus* (*Lepiota*) *rugoso-reticulata*.' — A. Peter, 'Excursion to the Babia-Gora.'

Nuov. Giorn. Bot. Ital. — T. Caruel, 'On some reversed flowers in *Phaseolæ*.' — Id., 'Illustration of *Arisarum proboscideum*, Savi' (tab. 1). — Id., 'On fruits of *Pomiferæ*.' — Id., 'On structure and affinities of several lower Families of *Dicotyledons*' (tab. 2). — G. Archangeli, 'On flowers of *Dracunculus vulgaris*.' — M. Lo Jacobo, 'Influence of exposure considered in relation to vegetation of the higher mountains of Sicily.' — F. Baglietto, 'Lichens of island of Sardinia.'

Scottish Naturalist. — J. Keith, 'Supplementary list of Fungi found within the province of Moray.' — J. Stirton, 'Description of new Scottish Lichens.' — Rev. J. Stevenson, 'Report of Cryptogamic Society's Exhibition of Fungi, 1878.'

Botanical News.

DR. J. PEYRITSCH has been appointed Professor of Botany in the University of Innsbruck in place of Prof. Kerner, who has gone to Vienna.

DR. V. B. WITROCK has become Reader of Botany in the University of Upsala, and Keeper of the botanical section of the Royal Museum at Stockholm.

THE place of the late PROF. BORSZCZOW in the University of Kiew has been filled by the appointment of DR. J. SCHMALHAUSEN.

PROF. BALFOUR has resigned the chair of Botany in the University of Edinburgh, which he has held for thirty-four years. His failing health is, we regret to hear, the cause of this step.

ADAM WHITE, late of the Zoological Department of the British Museum, died at Glasgow on December 30th, at the age of sixty-two. Though chiefly devoted to Entomology (especially the *Coleoptera*), he was a thorough naturalist, and possessed an excellent knowledge of British plants; a good many specimens from him are in the British Museum Herbarium.

THE death is announced, on January 10th, of DR. JACOB BIGELOW, at Boston, U.S.A., where he was an eminent physician and distinguished as an artist, a scholar, and a naturalist. In Botany he was the author of a 'Florula Bostoniensis,' dated so long ago as 1814 (a third edition in 1846); and his 'American Medical Botany' (1817-21) is well known. DeCandolle in 1836 dedicated to him the Compositous genus *Bigelovia*.

ANOTHER American botanist, DR. JAMES WATSON ROBBINS, has also recently died. He was a close student of the Flora of the Northern States and had a critical knowledge of the different genera. The monograph of *Potamogeton* in 'Gray's Manual' is from his pen. He died on January 9th, at the age of seventy-seven.

HERMANN ITZIGSOHN, who died on January 4th at Schöneberg, near Berlin, *atat.* 65, was a cryptogamist of eminence. He had especially worked at Mosses and Algæ, and is the author of numerous memoirs on these plants. His name is especially connected with his researches on spermatozoids in the lower plants.

WE regret to have to make the announcement that unless some competent botanist who is able to spare the necessary time can be found, the Botanical Exchange Club will be compelled to discontinue its annual distribution. Mr. Briggs has for several years efficiently performed the large amount of work which the curatorship involves, but last year felt compelled to resign. The stock of specimens sent in are in the charge of Mr. Baker, at Kew, and the London members of the Club will make up the return parcels as soon as their other engagements will permit, and will have the assistance of Mr. Briggs, who intends to visit London. The Report will be sent out as usual, but it is not intended to issue a list of desiderata this spring.

Original Articles.

ON *SPENCERIA*, A NEW GENUS OF *ROSACEÆ*, FROM WESTERN CHINA.

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

(TAB. 201.)

AMONG a few specimens brought home by Capt. Gill, R.E., from his journey in Western China in 1877, are some interesting species collected on Ra-Ma-La, a mountain between the towns of Ta-Chien-Lu* and Lit'ang, close to the frontiers of Thibet, and in latitude about 30° N. Capt. Gill informs me that the precise locality was a hut called La-ni-ba, at an altitude of 14,335 feet, a little below the crest of the mountain which is at an elevation of 14,915 feet. The line of perpetual snow in this latitude is certainly not lower than 17,000 feet.

Of the plant here figured the specimens are unfortunately incomplete, and I am unable to describe the fruit, but its floral characters are sufficiently remarkable to show it to form a distinct genus of *Rosaceæ*. I believe it to be undescribed, and have therefore the pleasure of connecting with it the name of my friend and coadjutor, Mr. Spencer Moore, of the Kew Herbarium, author of several valuable papers in different departments of Botany, including more than one on the plants of China. It would have been very fitting to have commemorated the discoverer by dedicating this novelty to him, but the existence of the well-known genus *Gilia* prevents the formation of another of precisely similar sound.

SPENCERIA, *gen. nov.* Flores hermaphroditi. Calycis persistentis tubus turbinatus; segmenta 5, valvata, bracteolis 5 stipulaceis parvis rotundatis extus donata; faux vix constrictus; discus tubum calycinum vestiens supra in tubum conicum truncatum stylos includens prolongatus. Petala 5, ampla, rotundata, basi angustata, breviter unguiculata. Stamina circa 30, uniseriata, disco inserta; filamentis basi parum dilatatis connatisque; antheris rotundatis oculis valde curvatis. Carpella 2 (vel abortu 1) tubi calycis basi inserta et eo inclusa, perbreviter stipitata, ad apices pilis longissimis coronata; styli terminales filiformes, elongati, ex ore disci tubularis longe exserti; stigmata simplicia acuminata; ovula in singulis carpellis unica, pendula. Fructus -?

S. ramalana, sp. unica. Herba perennis, erecta, in omnibus partibus valde piloso-villosis. Folia caulina parva, simplicia, in bracteis transientia; stipulæ -? Flores mediocres, potentilloideæ, longe pedicellati, erecti, pedicellis sub flore

* Wrongly spelt Ta-tsien-lu, and in many other ways, on maps.

involucro vel hypocalyci ex duo bracteis 5-fidis arcte connatis formato infundibuliformi suffultis.

Hab. In monte dicto Ra-Ma-La, Chinæ occidentalis, altit. circa 14,300 ped. legit Gul. Gill. [Tab. 201.]

The material at my disposal is unfortunately insufficient to determine completely the habit of the plant. The specimen figured is the best of three, all very similar, and each with two simple leaves irregularly cut, sessile and apparently without stipules; probably the plant possesses basal leaves of a higher degree of development which were not collected. Hairs soft, white, spreading, except on the pedicels where they are subadpressed. Flowers about 12 in a rather dense erect raceme, rather large, about $\frac{3}{4}$ inch wide. Sepals lanceolate, acute, with long silvery hairs externally. Petals not emarginate, very finely veined, yellow. Stamens about half as long as the petals, filaments flat. Hairs from the top of the carpels very long, projecting for some distance out of the mouth of the disk-tube as a shining snow-white pencil or tuft. None of the flowers are withered, but in the oldest ones there is an evident commencement of hardening in the calyx-tube, which probably increases in size and durability, and incloses one or two achenes.

The large flowers of this plant at first sight suggested *Potentilla* or *Geum* as a near ally, but from the above description it will be seen that the affinity of *Spenceria* is with the *Poteriæ* (*Agrimoniæ*). Of the genera included in this tribe it comes nearest to *Aremonia*,—a monotypic Mediterranean and Eastern genus placed under *Agrimonia* both by Baillon* and Hooker,† but retained by Nyman,‡—distinguished by the want of spines on the outside of the calyx-tube, fewer stamens (5 instead of 15), and the possession of a funnel-shaped involucre or hypocalyx§ of two connate bracts just below the flower, as in *Spenceria*. The new genus differs from *Aremonia* in the remarkable development of the disk, which is carried out into a long tube round the styles, in the more numerous (30) stamens, in the simple not capitate stigmas, and in the possession of stipular bractlets between the calyx-segments; as well as by the large flowers, and probably quite different habit and foliage. The tubular persistent disk is a remarkable development of a structure of special interest in this Order, in no other genus of which is it so produced beyond the flower. The nearest approach to such a development appears to be in the remarkable Japanese genus *Rhodotypos*,|| but even there it is not prolonged into a tube.

DESCRIPTION OF TAB. 201.—*Spenceria ramalana*, Trimen. Drawn from one of Capt. Gill's specimens.—1. A specimen with raceme of flowers. 2. The involucre or hypocalyx. 3. The same, seen from beneath. 4. The calyx. 5. A petal. 6, 7. Anthers. 8. Section of the calyx-tube and disk, showing the carpels *in situ*. 9. Vertical section of ovary. (All the figures but 1 enlarged.)

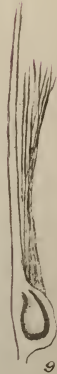
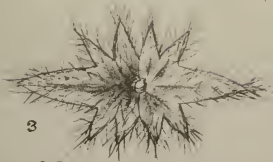
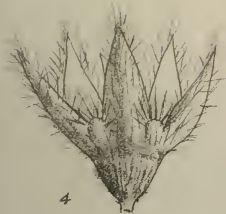
* 'Hist. des Plantes,' i., p. 352.

+ 'Gen. Plant.,' i., p. 623.

‡ 'Conspect. Flor. Europ.,' p. 238.

§ Mr. S. Moore has suggested to me the use of this convenient term.

|| Sieb. & Yucc., 'Fl. Japon.,' t. 29.



H. Olson del.

West, Newman & Co. imp.

Spenceria ramalana, Trim.

ON THE SOURCES OF THE "CHINA MATTING" OF COMMERCE.

By H. F. HANCE, Ph.D., F.L.S., Member of the Imperial Academy
Naturæ Curiosorum, &c.

THE manufacture of matting is one of the most important industrial occupations of Southern China. The foreign traveller arriving on the coast is struck by the novel sight of large heavy-looking trading junks and myriads of lighter fishing craft, all furnished with enormous mat sails; and, if his destination be Canton, or any of the ports situated on the many outlets of the vast delta of the Canton River, he will meet wherever he goes thousands of boats engaged in traffic, all using sails made of the same material. In addition to this, the main and most important use to which matting is put, it is largely used for dollar-bags,* bed-mats, bags for packing salt, and as covering for the boxes in which tea, cassia, sugar-candy and other articles are packed for exportation; so that the number of persons to whom this branch of industry affords employment must be very large indeed.

Some years since, I ascertained from my friend the Rev. R. H. Graves, who has a mission station in the departmental city of Shiu-hing (in the Court dialect Chao-ch'ing), on the West River, about seventy-five miles from Canton, that this is the chief seat both of cultivation and manufacture of the plant furnishing the material for the matting; and he was so kind subsequently as to procure for me the living plant, and to give me the following memorandum regarding it:—"This plant is known among the Chinese at Shiu-hing as T'ó, which is defined in Kang-hi's dictionary as 'an aquatic grass used by the people of Southern China for making mats.' In Canton, however, the matting made of this plant is known only under the term P'ó or 'rush.' This latter Williams defines as the cat's-tail rush, or *Typha*.† It seems to be used in Canton as a generic rather than a specific term. It is cultivated almost exclusively in Shiu-hing, especially in the country to the south of the department city; of late years, however, it has been introduced into the Sz-ui district. It grows in poor soil, and though it gains in height by manuring, it loses so much in strength as to be unfit for making mats. It is grown in fields flooded with water, much as rice. No care is required in the cultivation, as it propagates itself by sprouts from the root; it reaches a height of six or seven feet. The rush is brought to Shiu-hing in large bundles, about one foot

* Owing to the mischievous and (so far as the prevention of fraud is concerned) really useless practice adopted by the Chinese of "chopping" dollars, or stamping them with a steel die, by which they gradually get worn into holes, and ultimately broken up, it is customary amongst mercantile firms to weigh these, a certain number of taels (usually 71·7) in weight being reckoned as equal to 100 dollars, and weights of broken silver dollars corresponding to 100 and 50 clean dollars are usually put up in mat bags, ready for payment by the "shroff" or Chinese accountant and treasurer of the establishment.

† But no species of *Typha* is known from Southern China.

in diameter when bound, and sells at about twenty cents a bundle, for good quality. One of these will make four bed-mats when woven. The rush, being round, must be flattened before used; this is accomplished by beating it with a heavy piece of wood, about four feet long, bearing a general resemblance to a stout paviour's rammer, or a small pile-driver. As you approach some of the villages near Shiu-hing the noise of beating the rushes resounds on every side, and reminds one of the busy hum of a factory. This work of flattening the rush, as well as the subsequent plaiting, is done by women and girls, who receive from seventeen to nineteen cash* for making a mat for salt-bags, &c., and twenty-two to thirty cash for making a bed-mat. The rush is given out by the shops, and the women are paid according to the work done. The shop-keepers make a good profit, as they pay twenty cents a bundle to the cultivator, and about ten cents for making five mats, which will sell for from sixty to seventy-five cents. These mats are used for making the mat sails of all the native junks in this part of China."

It was with no small surprise that I found, on examining the plant submitted to me, that it was referable to *Lepironia mucronata*, Rich., variously located by authors in the tribes *Chrysitricheæ*, *Hypolytreæ*, or *Sclerieæ* of *Cyperaceæ*, and recorded as a native of Ceylon, several islands of the Indian Archipelago, Australia and Madagascar, but nowhere, so far as I can find, regarded as a "planta usualis." Of this a carefully drawn up character was given ten years ago by that excellent botanist the late Mr. Kurz; † but as, in view of the acute arguments of Mr. Bentham, ‡ and the manifest affinity of the genus with *Mapania* and *Diplasia*, it seems impossible to adopt R. Brown's view § of the floral structure, acquiesced in by Kurz, I think it may not be amiss to subjoin the one noted down by myself in 1874, from the living plant, unbiassed by theoretical considerations as to homologies, and without having read Kurz's character; and I should add that my friend the Rev. J. C. Nevin, whose departure for California is a sad loss to Chinese botany, carefully investigated, later than and independently of myself, the structure of the flowers, of which he kindly gave me nicely executed analyses, accurately drawn to scale:—Rhizomate repente squamis nigricantibus dense obsesso deorsum fibras fili emporetici crassitie emittenti, culmis confertissimis basi squamis 4–6 ovatis v. ovato-lanceolatis acutiusculis fusco-nigricantibus circumdatis vaginisque 2–3 eos arcte amplexantibus (quarum suprema semipedalis apice sphacelata) auctis ceterum aphyllis 4–7 pedalis teretibus isthmis cellulosis intervallo 3–6 linearum sejunctis articulatis siccatione inde subnodulosis basi pennæ anserinæ circiter crassitie apicem versus sensim attenuatis, spicula laterali solitaria sessili oblonga obtusa 6-lineali pollicem circiter a

* Twenty-five cash are about equal to one penny.

† 'Journ. As. Soc. Bengal,' xxxviii. pt. ii., 77.

‡ 'Journ. Linn. Soc.' Bot., xv. 511.

§ 'Prodrom. fl. Nov. Holl.,' sub *Chondrachne*. (Isis ed. p. 833.) Miscell. Works. ed. Bennett, i. 145.

culmi apice distante multiflora, floribus inferioribus et superioribus deminuto squamularum staminumque numero sæpius plus minus imperfectis intermediis perfectis, squamis obtusissimis inferne albidis apice badiis margine sublaceris infimis vacuis, bracteolis binis intra squamam lateraliter dispositis navicularibus carinatis secus carinam subtiliter spinuloso-ciliatis utraque stamen stipante, squamulis hypogynis in mediis floribus 24-26 in reliquis 12-20 ligulatis tenuiter membranaceis hyalino-badiis achæmium subdimidio superantibus ciliatis v. glaberrimis, staminibus in normalibus floribus 6-8 præter duo bracteolis stipata cum squamulis inordinatim vel si certo quidem saltem haud facile recognoscendo ordine dispositis antheris breviter rubenti-mucronatis, stylo superne bifido inferne cum achæmii juvenilis vertice glanduloso-puberulo longitudinaliter striato-nervoso anguste alato-marginato pallide brunnescente styli basi persistente apiculato.

The natural colour of the matting made from this plant is a pale brown, and I am not aware that it is ever dyed; nor is it, I believe, exported to foreign countries, except, doubtless, in the form of bed-mats for Chinese residing in Australia and California. It is certainly remarkable that a plant of comparatively limited geographical distribution, and in none other apparently of its native localities turned to any account, should furnish the raw material for a vast manufacturing industry, and perhaps still more strange that the source of this should not before have been discovered. As in the case of *Hydropyrum latifolium*, Griseb., which supplies thousands of tons of a favourite vegetable, it shows how much we may have still to learn, even at the oldest and most frequented marts of trade, concerning the uses to which many apparently insignificant plants are put. The attention of the authorities in our possessions in the Straits of Malacca and of those of Netherlands India might be advantageously directed to encouraging the cultivation of this plant, and so developing a large and profitable manufacture.

But, in addition to the matting used for sails, Canton and the large district city of Tung-kun, on the south branch of the East River, are the seats of an extensive manufacture of floor-matting, almost all of which is exported, and mainly to the United States of America, where it is universally used in summer, carpets being found too hot. So large indeed is the export that it ranks in point of value about sixth or seventh of all articles shipped to foreign countries from Canton. The Rev. W. Dilthey, of the Rhenish Missionary Society, then stationed at Fú-mún (in the Court dialect 'Hu-mên'), a town situated on the left bank of the Canton River, just at its mouth, a little way inland, and about twelve miles from Tung-kun, in which neighbourhood a large quantity of the plant from which this matting is woven is grown, was so obliging as to send me copious specimens of it, in the early part of 1875. It is called *Lú-ts'ao*, and Mr. Dilthey informs me that it is grown in fields provided with narrow channels, which allow the water to flow in and out with the rising and receding tides. This water must be brackish, but not too salt, or the plant will be killed, so that it can

only be grown near the mouth of the river.* It is cultivated as follows:—In the 5th moon (June) the young slips are planted, and after one and a half to two months those which have grown are taken up and replanted in rows, in like manner as is done with rice. No other care is needed than the occasional weeding of the ground, which is usually manured with "bean cake," the marc or refuse of *Soja* beans, from which the oil has been expressed, a substance largely imported from northern China as a fertilizer. The plant can be cut in the 5th Chinese moon of the succeeding year, and again three months later; but if cut only once in the year, in the eighth or ninth moon (October, November) it will attain a height of six to seven and a half feet. In subsequent years the matting plant sends up fresh culms, only requiring to be kept clear of weeds, and to be manured; but it gradually becomes coarser and more dwarfed, so that, after the lapse of five or six years, it is necessary to plant fresh shoots. After being cut down, the triangular culms are split in two with a knife and exposed to the sun, the edges in drying curling up and meeting together, so that each piece or half section of the culm appears cylindrical in shape; these are sorted according to colour and length, and made up into bundles. The paler kinds are reserved for white matting; those of lower quality are dyed.

The plant from which this floor-matting is woven, proves on examination to be referable to *Cyperus tegetiformis*, Roxb.,† an abundant weed on the muddy banks and in the shallow creeks of the Canton River, and also common in Bengal. In none of the numerous specimens I have examined, Chinese or Indian, have I ever succeeded in finding properly developed achænia.

The following notes on the dyeing and manufacture of floor-matting‡ were drawn up by Dr. Friedrich Hirth, of the Chinese Imperial Customs:—"To produce the different musters, some of which have a very handsome and tasteful appearance, the reeds

* I am informed that, in the United States, it is customary to clean and freshen up the matting by rubbing it with salt and water.

† Roxburgh states ('Fl. Ind.', i. 208) that the "elegant, useful, durable, large mats" used to spread on the floors of houses in Calcutta are woven from the culms of his *C. tegetum*, which are split into three or four pieces (not two, as in the Chinese manufacture). Nees v. Esenbeck referred *C. tegetum*, Roxb., to *C. corymbosus*, Rottb., and Dr. George King, director of the Calcutta Gardens, to whom I am indebted for as full a set as he could spare of Bengal *Cyper*, tells me he has no doubt this view is correct; but the late Prof. Walker-Arnott considered it the same as *C. Pangorei*, Rottb. Both Nees and Arnott (Wight, 'Contrib. Bot. India,' 88) speak of the latter as having a 'culmus aphyllus,' whilst Kunth ('Enum. Plant.' ii. 57) locates it amongst the 'foliati.' Dr. Thwaites' Ceylon specimen (C. P. 813) has a single well-developed leaf; hence it seems likely that the latter is referable to *C. dehiscens*, N. ab E., and is rather Roxburgh's than Rottbell's *C. Pangorei*. It will be seen that the nomenclature and synonymy of the Indian species of the section *Papyrus* are not free from obscurity. *C. corymbosus*, *C. Pangorei* (? *dehiscens*), *C. tegetiformis* and *C. tenuiflorus*, Rottb., are very much alike indeed.

‡ Originally printed in the 'Catalogue of articles collected by order of the Inspector-General of Customs for transmission to the Austro-Hungarian Exhibition of 1873,' and reprinted in the 'China Review,' vol. i., 254 (1873).

have to be dyed before being woven. The usual colours are red, green, yellow, and a very dark blue (also called brown and black). Of these colours red is by far the most used. Of musters, plain white is manufactured in greater quantities than all the others, and checkered comes next; and, besides these, several hundred fancy patterns are manufactured, in which the above colours are applied in different proportions, the above order of colours giving an idea to what extent they are in favour. These colours are produced in the following way:—For red, Sapan wood, cut up in chips, is kept boiling one day in water (fifty pounds Sapan wood to about one hundred and fifty gallons of water), in large wooden tubs with iron bottoms. After the water is cooled it is poured into earthen jars, and mixed with two pounds of alum to about forty gallons of the decoction. In this solution the reeds are soaked three times, six days each time, and dried after each immersion. At the first soaking the dyeing solution is mixed with equal quantities of pure water; the second time with only one-third; and, at the third bath, the solution is applied without mixing any water. The whole process of dyeing red takes about three weeks. For dyeing dark blue or black, the process is the same as with red; but being completed, the reeds have to undergo a fourth bath of one day in the same solution, to which half a catty* of sulphate of iron is added. For yellow, thirty catties of *Sophora japonica* † are boiled in about one hundred and fifty gallons of water for one day. When cooled the decoction is poured into smaller earthen jars, and mixed with four pounds of alum to about forty gallons. In this solution the reeds are bathed three times, three days each time, and dried after each immersion. At the first and second baths pure water is to be added in the same proportions as in dyeing red. The whole process takes ten days. For green, one tub (about forty gallons) of pure cold water is mixed with twenty-four pounds of the leaves and tender twigs of the *Lam-yip* ‡ (*i. e.*, Blue Leaf) plant, growing on the White Cloud Mountains, Honam Island, and other plants of Kwang-tung, and belonging to the natural order *Acanthaceæ*; the mixture is kept so for eight days in cold weather, or from three to four days in hot weather. After this the leaves are taken out, and two pounds of alum added, together with half a pound of sulphate of copper. The reeds are soaked in this solution, the first time three days; then dried and

* One catty = 1½ lb.

† Hirth says "probably the seeds;" but, unless I err, it is the dried flowers which are used.

‡ I endeavoured in vain to determine this for Dr. Hirth, but have never been able to get a specimen in flower. I doubt its being wild on the White Cloud hills. Mr. Sampson and I only know it in cultivation for tinctorial purposes, and under these circumstances it is invariably flowerless. It is quite different from the "Room," *Strobilanthes flaccidifolius*, N. ab E., which is wild in Southern China, and, though certainly *Acanthaceæ*, I cannot, after comparison with the specimens in my herbarium, guess at the genus to which it belongs.

again soaked four days; at the third bath one and a half to two taels (or one to one and a half oz.) of sulphate of iron are added, the reeds are kept soaking for six days, and then dried. The process of dyeing green takes from seventeen to twenty-two days.*

"The loom for weaving matting is very simple. It consists of two uprights, being about five feet distant from each other, and connected by cross-bars three feet apart. The warps, being strings made of Chinese hemp, are fastened by one end to a small piece of bamboo passed through the weaving-bar, round the two cross-bars, and fastened by the other end to the small bamboo. Being ready so far, the loom may be used for weaving. The reeds are woven while damp and pliable, in lengths of two yards. A flat bamboo stick of about the length of the reeds, which are fastened on a notch on one end of the stick and thus drawn between the strings of the warp, takes here the place of a shuttle. The woven matting is then dried, first in the sun and afterwards over a slow fire, and as the drying makes the reeds liable to shrinkage, the matting is stretched over a frame, where the irregular parts of the texture are pressed down by hand. The projecting ends of the warps are then trimmed to a uniform length of about three inches, and passed between the reeds of some other piece of the same muster, thus joining the pieces of matting, twenty of which make one roll of forty yards in length."

In conclusion I append a return of the export of matting from Canton during the last eight years, which will give some idea of the importance of this flourishing branch of industry.

In the table facing (p. 105), drawn up from the official returns of the Imperial Customs, Hong-Kong can, of course, only be regarded as a depôt or port of distribution, and most of the matting consigned there is destined for the United States. The export duty is two mace (ten mace = one tael) per roll of forty yards. At present there are three large steamers, built on the American model, with beam engines, two running daily, one on alternate days, from Canton to Hong-Kong; and these convey cargo at rates which, taking into consideration loss of time, pilotage, and tonnage dues payable by vessels entering the Chinese port, render it more economical for ships to lie in the free port of Hong-Kong, where no dues or duties are levied, and to have their cargoes brought down to them and transhipped.

* Mr. Dilthey wrote me that in his neighbourhood the matting was boiled once only, for six or seven hours, washed in fresh water, and dried in the sun, after which it was fit for weaving; and he gave this as the process when writing of all the colours. But Dr. Hirth visited the Canton factories, and saw the processes he described. I suspect, therefore, that Mr. Dilthey's informants misled him, either from ignorance, carelessness, or design.

Table showing the Export of Matting from the Port of Canton from 1870 to 1877 inclusive:—

Destina- tion.	1870.		1871.		1872.		1873.		1874.		1875.		1876.		1877.	
	Rolls.	Value.	Rolls.	Value.	Rolls.	Value.	Rolls.	Value.	Rolls.	Value.	Rolls.	Value.	Rolls.	Value.	Rolls.	Value.
Gt. Britain	3,154	18,924	5,448	32,688	7,563	30,252	6,274	25,096	10,482	41,928	11,844	39,369	6,990	20,970	"	"
America	55,483	332,898	90,682	544,092	86,726	346,904	62,244	248,976	61,908	247,632	42,833	139,508	13,243	41,494	"	"
S. America	3,942	23,652	4,395	25,770	6,767	27,068	4,731	18,924	2,715	10,860	"	"	2,138	4,333	"	"
Europe ..	10	60	247	1,482	1,125	4,500	908	3,632	1,100	4,400	1,230	4,152	1,350	6,414	1,438	4,314
India	200	1,200	200	1,200	"	"	"	"	"	"	"	"	"	"	"	"
Straits ..	"	"	"	"	600	2,400	"	"	"	"	"	"	"	"	"	"
Colombo	"	"	"	"	200	800	"	"	"	"	"	"	"	"	"	"
France ..	"	"	"	"	"	"	22	88	"	"	"	"	"	"	"	"
Hoo-Kong	9,320	55,920	10,552	63,312	9,734	38,936	16,382	65,528	21,982	87,928	20,764	81,227	38,160	117,807	106,813	320,439
Coast Pts.	15	83	79	474	2,505	10,020	15	60	42	168	15	57	27	86	12	36
Total..	72,124	432,737	111,503	669,018	115,220	460,860	90,576	362,304	98,229	392,916	76,686	264,313	61,908	191,104	108,263	324,785

Hae-kwan Taels 100 = Shanghai Taels 111.4 = Dollars 150.

ON THE FLORA OF NORTH-WESTERN DONEGAL.

BY HENRY CHICHESTER HART, B.A.

(Continued from p. 83).

Lythraceæ.

Lythrum Salicaria, L. Abundant. A highly characteristic and ornamental plant throughout the county: it is not uncommon to see whole fields covered with its rich red and purple flowers. F.

Peplis Portula, L. Local. Glenalla; Seatbeg, &c. F.

Onagraceæ.

Epilobium hirsutum, L. Not common. Doaghmore stream; Horn Head; Leenane. F.

E. parviflorum, L. Commoner than the last. Doaghmore; Glenalla, &c. F.

E. montanum, Schreb. Common. F.

E. obscurum, Schreb. Common. F.

E. palustre, L. Abundant. F.

† *E. angustifolium*, L. Errigal, near Gweedore; Flora of Ulster.

Circæa lutetiana, L. Common. F.

Haloragaceæ.

Myriophyllum spicatum, L. Local. Kindrum. F.

M. alterniflorum, DC. Not unfrequent. F.

Hippuris vulgaris, L. Scarce. Lake near Ballyhooriskey; Lough Furnegan. F.

Portulacææ.

Montia fontana, L. Common. F.

Paronychiaceæ.

Lepigonum rupicola, Le Gall. Frequent. Dunaff Head; The Bins; Horn Head. F.

L. salinum, Presl. Local. Mulroy, Lake near Rossnakill. F.

† *Spergula arvensis*, L. Abundant, and a great pest in corn-fields; appears to be a weed of cultivation. F.

Scleranthus annuus, L. Very rare. Sandy ground near Croaghross; roadside near Docrabeen. F.

Crassulacææ.

Sedum Rhodiola, DC. Frequent. Coasts of both sides of Lough Swilly; Dunaff Head; Melmore Point; Horn Head; Tory Island; also inland, in the Poisoned Glen; on Errigal; Slieve Snacht West, &c. F.

S. anglicum, Huds. Common. F.

S. acre, L. Common. F.

[*S. reflexum*, L. Ray and Ramelton. Well established on old walls, &c., but with no pretensions to being native.]

Cotyledon Umbilicus, Huds. Common. F.

Saxifragaceæ.

- Saxifraga umbrosa*, L. Locally abundant. Errigal; Muckish; Slieve Snacht West, and the Poisoned Glen. Also naturalized and growing freely through the woods at Glenalla. Descends to about 500 feet in the Poisoned Glen, and reaches the summit of Errigal (2466 ft.)
- S. stellaris*, L. Local. Muckish; Dooish; Errigal; abundant on Slieve Snacht W., and in the Poisoned Glen.
- S. hypnoides*, L. Singularly rare in Donegal, and possibly introduced in the one locality where I have met with it, viz., amongst rocks, &c., almost at sea-level at the Little Bins, Ballyvicstocker Bay; I have observed it there for upwards of ten years. *Inula Helenium* (a very doubtful native) grows not far off, and the station is somewhat unusual; nevertheless, I am inclined to think the Saxifrage is indigenous.
- S. oppositifolia*, L. Very rare. In the Poisoned Glen, in the two deepest gullies on the southern side, in profusion. I have explored the western Innishowen Mountain without success, but it is recorded on good authority as growing on Bulbein Mt.
- S. tridactylites*, L. Macamish Pt., Rathmullan; Mr. T. Batt. (*S. sarmentosa*, L., is well established at Fort George, Rathmullan.)
- Chrysosplenium oppositifolium*, L. Not unfrequent. Little Bins, &c. F.

Umbelliferaæ.

- Hydrocotyle vulgaris*, L. Common. F.
- Sanicula europæa*, L. Frequent. F.
- Eryngium maritimum*, L. Local. Melmore Pt.; Leenane; Horn Head; Ballyvicstocker; Doagbeg; Dunaff and Dunree. F.
- [*Carum Carui*, L. Carrablugh, near the house. Introduced. F.]
- Helosciadium nodiflorum*, Koch. Frequent. F.
- H. inundatum*, Koch. Frequent. Kindrum; Fallaneass Lake. F.
- Ægopodium Podagaria*, L. In most of the gardens or pleasure grounds through the county, and no doubt formerly introduced; but now a troublesome and ineradicable weed. F.
- Bunium flexuosum*, With. Common in Fanet, &c. F.
- Pimpinella Saxifraga*, L. Rare about Rossnakill and Tamney. F.
- Ænanthe Phellandrium*, Lam. Very rare; ditch by the roadside, between Rathmullan and Ray.
- Æ. Lachenalii*, Gmel. Rare; Horn Head, near the bridge; Mulroy Lake, at Bunlinn.
- Haloscias scoticum*, Fries. This plant is characteristic of the Donegal maritime cliffs; I observed it in the following localities this year (1878):—Dunaff Head and cliffs of Erris; Fanet Point; Shores of Mulroy at Glinsk, and Ballyhooriskey; Melmore Point end at Gortnaloghogue; Horn Head

and to the east of Dunfanaghy; Tory Island. I have before recorded it from Downing's Bay, near Carrigart. Tory Island seems to be its western limit in Ireland. F.

Crithmum maritimum, L. Very rare; a few plants at Fanet Point, near the lighthouse, were all I have ever seen in the country; but until lately, I believe, it was gathered and sold for pickles under its Irish name 'Greirig' at Gortnaloghogue and Melmore; but as a good price was given, it is probably exterminated. F.

Angelica sylvestris, L. Common in many places on the cliffs in Fanet; at Horn Head and Dunaff Head. F.

**Pastinaca sativa*, L. Very rare; ditch-bank near Drimnacraig, where I have observed it for many years (it is also well established on Donegal Castle, in the southern part of the county).

Heraclium Sphondylium, L. Common. F.

Daucus Carota, L. One of the most abundant weeds. F.

Torilis Anthriscus, Gært. Very local; roadsides between Ray and Rathmullan; between Ray and Glenalla; between Rathmullan and Fort George; about Ramelton. F.

‡*Scandix Pecten-veneris*, L. Frequent in cornfields and introduced with the crop. F.

Anthriscus sylvestris, Hoffm. Frequent. F.

†*Conium maculatum*, L. Not common; Kindrum; Ballyheerin Lower, &c.; in or about villages, or roadsides by cabins. F.

Hederaceæ.

Hedera Helix, L. Common. F.

Caprifoliaceæ.

(*Adoxa Moschatellina*, L. This pretty little plant has been established by Mr. Batt in his woods at Rathmullan. I mention it lest future botanists fall into any error.)

‡*Sambucus nigra*, L. Scarce, and usually in suspicious localities. F.

Lonicera Periclymenum, L. Common. F.

Rubiaceæ.

†*Sherardia arvensis*, L. Common; dry cultivated ground, ditch-banks, &c. F.

Asperula odorata, L. Frequent; a large and luxuriant form amongst loose rocks by the stream near Bunlinn. F.

†*Galium Aparine*, L. Common, but perhaps a colonist; it is never to be found in a station that could not be challenged. F.

G. verum, L. Common. F.

G. saxatile, L. Common. F.

G. palustre, L., var. *Witheringii*; this is the commonest form. F.

G. palustre, var. *elongatum*, Presl. In a bog on Melmore Point.

Valerianaceæ.

Valeriana officinalis, L. Frequent. F.

Dipsacæ.

Scabiosa succisa, L. Abundant. F.

Compositæ.

- Eupatorium cannabinum*, L. Very rare; in a gully in the little bay next to the north of Carrablagh House. F.
- **Petasites vulgaris*, Desf. Greenfort; Ballyheerin Lower, &c.; always about houses and in suspicious localities, it having been formerly much used medicinally. F.
- Tussilago Farfara*, L. Frequent; a most injurious weed. F.
- Aster Tripolium*, L. Frequent by the sea, whether on rocks or in marshes; Drimnacraig, Bunlinn, &c.; Horn Head, and Dunaff Head. F.
- Bellis perennis*, L. Abundant. F.
- Solidago Virga-aurea*, L. Frequent; common in Fanet. F.
- **Inula Helenium*, L. The Little Bins, Fanet, and between Kindrum and Ballyhooriskey; thoroughly established, but not a native. F.
- Pulicaria dysenterica*, Gært. Very rare; Leenane, in some quantity, and I think I gathered it some years ago between the Fanet Lighthouse and Doaghbeg, but have no note of it. F.
- Bidens cernua*, L. Very local; Lough Finnegan; Ballymagahy Lake, &c. F.
- Achillea Ptarmica*, L. A plentiful and very characteristic plant. F.
- A. Millefolium*, L. Common. F.
- Anthemis nobilis*, L. Very local and rare; Lower Carrablagh by the roadside; Loughsalt Mountain, from about 500 feet above sea-level up to the lakes (an unquestionably native station); and near Clontallagh, in the district called Mevagh, Rossgull. F.
- †*Matricaria inodora*, L. Not common, and probably in all cases a weed of cultivation; Glenalla, Rossnakill. F.
- M. inodora*, var. *maritima*. Frequent; Gortnaloghogue; Dunaff Head; Bin. F.
- †*Chrysanthemum Leucanthemum*, L. Common. F.
- C. segetum*, L. Abundant. Its rich golden flowers form a highly ornamental feature in the summer cornfields; it is however, I think, merely a colonist. F.
- **Artemisia Absinthium*, L. Near the village of Kindrum. F.
- A. vulgaris*, L. Common. A variety with very finely cut leaves occurs here and there, as at Knockbrack. F.
- **Tanacetum vulgare*, L. Kindrum and Glenalla; only an escape from cultivation. F.
- Filago germanica*, L. Rare. Between Kindrum and Ballyhooriskey, on the sand-hills of the Bottom Shore. F.
- Gnaphalium uliginosum*, L. Common. F.
- G. sylvaticum*, L. Local. The Bin; fields on the south side of Murren; Aughterlinn; Doaghbeg; Kindrum end of Mulroy. F.

- Antennaria dioica*, Gært. Frequent. F.
- †*Senecio vulgaris*, L. In waste places; always by cottages or in or about cultivated ground; a doubtful native. F.
- S. sylvaticus*, L. Rare. Dunaff Head; Kindrum, near the well. F.
- S. Jacobæa*, L. Common. F.
- S. aquaticus*, Huds. Common. F.
- Arctium minus*, Schk. Common. This is, I believe, *A. intermedium*, Lange. F.
- Centaurea nigra*, L. Common. F.
- †*C. Cyanus*, L. Frequent in Fanet. "Corn" Cockle is a misnomer in Fanet, as I have always noticed it amongst the flax; an introduced plant. F.
- Carduus tenuiflorus*, Curt. Local. Drimnacraig &c.; Horn Head. F.
- C. lanceolatus*, L. Common. F.
- C. arvensis*, Curt. Common. F.
- C. palustris*, L. Frequent. F.
- Carduus pratensis*, Huds. This handsome thistle is one of the most characteristic plants in the bogs of North-west Donegal. It has a peculiar habit of forming circular patches of growth, which on account of its pale-coloured leaves, closely adpressed to the ground, cause it to be noticed at a considerable distance, whether in flower or not. F.
- Lapsana communis*, L. Common. F.
- Hypochaeris radicata*, L. Common. F.
- Apargia autumnalis*, Willd. Common. F.
- Leontodon Taraxacum*, L. Common. F.
- L. Taraxacum*, var. *palustre*, Smith. Frequent. Lake Columbkil, near Milford and Lough Golagh, Fanet. F.
- Sonchus oleraceus*, L. Very common. F.
- S. asper*, Hoffm. Local; Kindrum, &c.; apparently a well-marked species. Typical plants occur upon the sand-hills at the Bottom Shore. F.
- †*S. arvensis*, L. Common; generally amongst the corn. F.
- Crepis virens*, L. Rare. Horn Head.
- C. paludosa*, Mönch. Local. Glenalla; Glenvar, &c. F.
- Hieracium Pilosella*, L. Common. F.
- H. murorum*, L. Rare. Knockalla, along the summit; Crog-hanmore, near Glenalla. F.
- H. vulgatum*, Fries. Scarce. Near Lough Doira; Murren, and elsewhere in Fanet. F.

Campanulaceæ.

- Lobelia Dortmanna*, L. Local and rather rare; Kindrum Lake (but seldom flowering there); Loughs Keel, Fern and Colombkill. Glenveagh Lake; Lough Attirive on Slieve Snacht, W. &c. F.
- Jasione montana*, L. Common. F. Grows as freely in alpine situations (Slieve Snacht, W.; Errigal, &c.) as upon sand-hills, &c., on the sea coast. F.

Campanula rotundifolia, L. Common. The remark upon the last plant applies equally well to this. F.

Ericaceæ.

Arctostaphylos Uva-ursi, Spr. Local. Lerrig-a-cloghan; Murren; Knockalla; Horn Head; Muckish; Errigal. F.

Calluna vulgaris, Salisb. Common. F.

Erica cinerea, Linn. Common. F.

E. Tetralix, Linn. Common. F. These last three occur white.

Vaccinium Myrtillus, Linn. Common. F.

V. Vitis-idaea, Linn. Errigal. Singularly rare in the county.

Pyrola media, Sm. Rare and very local. Carrablagh; Lerrig-a-Clochán; Leat-beg, and on a hill (Craig Madher-rhu), between Ray and Glenalla. This plant has not only a similar appearance to that of the Lily of the Valley, but has also the same sweet smell. F.

P. minor, Linn. Ards; Flora of Ulster.

Aquifoliaceæ.

Ilex Aquifolium, L. Common. F.

Gentianaceæ.

Erythræa Centaurium, Pers. Common. F.

Gentiana campestris, L. Local, but not uncommon. F.

Menyanthes trifoliata, L. Common. F.

Convolvulaceæ.

Convolvulus sepium, L. Common. The pink variety grows about Kindrum. F.

†*C. arvensis*, L. Very rare; near Horn Head House, and on the road-side near Croghan, Fanet; both suspicious localities. F.

Boraginaceæ.

**Anchusa sempervirens*, L. Well established in Fanet Church-yard and at Glenalla. F.

Lycopsis arvensis, L. Rare. Lighthouse in Fanet; Leenane. F.

**Symphytum officinale*, L. Very rare and introduced. Well established at Drimnacraig. F.

Lithospermum officinale, L. Rare. Rathmullan and near Carrigart.

Mertensia maritima, Don. Very rare. Dunaff Head, Mr. Batt. I have not seen it there.

Myosotis repens, Don. Frequent. F.

M. arvensis, Hoffm. Common. F.

M. versicolor, L. Frequent. F.

Orobanchaceæ.

Orobanche Hederae, Duby. Very rare; along the shore near Drumalla, about a mile and a half from Rathmullan, upon ivy. It is also recorded from Ramelton in Dickie's 'Flora of Ulster.'

O. rubra, Sm. Very rare. On thyme at Fanet Point, on the same rocks with *Crithmum maritimum*. Professor E. Murphy has previously recorded it from Ards. F.

Scrophulariaceæ.

Digitalis purpurea, L. Common. F.

Linaria repens, Ait. Extremely rare. About three-quarters of a mile from Ramelton, on the upper road to Glenalla, by the roadside; and on a little rocky hillock to the west of the road, extending thence to adjoining fields, in profusion, and with all the appearance of being native.

Scrophularia nodosa, L. Fort Royal, &c. Frequent. Drimnacraig. F.

S. aquatica, L. Local. The Little Bins. F.

Melampyrum pratense, L. Frequent. F.

M. pratense, var. *montanum*, Johnst. Knock Alla; Slieve Snacht, West; Errigal. F.

Pedicularis palustris, L. Frequent. F.

P. sylvatica, L. Common. F.

Rhinanthus Crista-galli, L. Common on banks, rocky hillocks, &c. F.

Euphrasia officinalis, L. Abundant; reaching two thousand feet on Slieve Snacht West, and to the summit of Errigal. F.

E. Odontites, L. Waste places, fields, &c. F.

Veronica scutellata, L. Local. Kindrum; Ballyhernan; Loughs Finnegan and Colombkill, &c. F.

V. Anagallis, L. Frequent. F.

V. Beccabunga, L. Frequent. F.

V. Chamædrys, L. Frequent.

V. officinalis, L. Common. F.

V. serpyllifolia, L. Common. F.

V. arvensis, L. Frequent; native on seaside, sand-hills, &c. F.

† *V. agrestis*, L. Frequent; perhaps a colonist. Fields, &c. F.

V. polita, Fries. Frequent; Glenalla and Rossnakill. F.

[*V. Buxbaumii*, Ten. Very rare. Near Rathmullen, and no doubt introduced.]

V. montana, L. Poisoned Glen. Rare.

* *V. peregrina*, L. This plant, which I first noticed in Donegal, eight years ago, is now the commonest weed in many kitchen gardens, as at Glenalla, Horn Head, &c. F.

* *Mimulus luteus*, Willd. Established for many years by a stream near Tamney in Fanet; also in great profusion on ditch-banks at the upper end of Glenveagh. F.

Labiatae.

Mentha aquatica, L. Common. F.

M. sativa, L. Very local. Croghan, &c., Fanet. F.

† *M. arvensis*, L. Frequent throughout Fanet, &c., but always amongst the crops. F.

Lycopus europæus, L. Very rare. Drimnacraig. F.

Thymus Serpyllum, L. Abundant. A very pretty white variety occurs at the Bottom Shore, and elsewhere. F.

Scutellaria galericulata, L. Very rare; Shore of Mulroy Lake near Carrowkeel.

- Prunella vulgaris*, L. Common. F.
 **Nepeta Cataria*, L. Thoroughly established about Ballyheerin Lower. F.
N. Glechoma, Benth. Frequent. F.
 †*Lamium amplexicaule*, L. Rare; near the Fanet Lighthouse, in cultivated ground. F.
L. purpureum, L. Common. F.
 †*L. intermedium*, Willd. Near the house, Glenalla. F.
Galeopsis Tetrahit, L. Common. F.
 ‡*G. versicolor*, Curt. Very local, and always in cultivated ground; Arryheernabin; Knockbrack; Horn Head. F.
Stachys sylvatica, L. Frequent. F.
S. palustris, L. Abundant and characteristic. F.
 †*S. arvensis*, L. Not unfrequent. Ballyhooriskey; Croaghross; Drimnacraig; Leenane; Horn Head; perhaps only a colonist, and has spread much during the last few years. F.
Teucrium Scorodonia, L. Common. F.
Ajuga reptans, L. Frequent. Greenfort; Glenalla; Bunlinn; &c. F.

Lentibulariaceæ.

- Pinguicula vulgaris*, L. Common. F.
P. lusitanica, L. Frequent; comes into flower when the last is nearly over. F.
Utricularia intermedia, Hayne. Very rare. Kindrum; The Rosses. F.
U. minor, L. Local. Bog by Lough Golagh, and Campbell's Lough, Fanet. Bogholes, &c., on Errigal, Aghla, Muckish and Slieve Snacht West. F.

Primulaceæ.

- Lysimachia nemorum*, L. Common. F.
 †*Anagallis arvensis*, L. Common. Scarcely native. F.
 **A. arvensis* var. *cærulea*. Very rare; with the last in the garden at Horn Head; as a weed.
A. tenella, L. Common. F.
Centunculus minimus, L. Very local and rare. Kindrum, near where the boat belonging to the hotel is kept; near Lough Finnegan; by Gortlough, Rathmullan. F.
Glaux maritima, L. Frequent. In various places along the shores of Mulroy and Lough Swilly; at Horn Head, &c. F.
Samolus Valerandi, L. Frequent in Fanet; Horn Head, &c. F.

Plumbaginaceæ.

- Statice occidentalis*, Lloyd. Very rare; near MacSwine's Gun, Horn Head.
Armeria maritima, Willd. Common on the Coast; also in alpine situations on Muckish, Errigal, &c., up to 2400 feet. F.

Plantaginaceæ.

Plantago Coronopus, L. Frequent. F.

P. maritima, L. Common. F.

P. lanceolata, L. Common. A large shaggy form with very broad coarse leaves occurs at Dunaff Head, Fanet Point, and the Bins. F.

**P. media*, L. This plant which is not known as a native in Ireland, appeared last summer (1878) on ground, near the house at Glenalla, which has not been broken up for a number of years. (My brother tells me that he gathered it once on Bell's Island, Donegal Bay, where search should be made for it).

P. major, L. Common. F.

Littorella lacustris, L. Common. F.

Chenopodiaceæ.

Chenopodium album, L. Frequent; cultivated ground, and about houses. F.

Suaeda maritima, Dum. Rare. Horn Head, near Dunfanaghy; near Rosnakill. F.

Salsola Kali, L. Local. Horn Head; Bottom Shore, Fanet; Dunree, &c. F.

Atriplex hastata, L. Frequent; Fanet Lighthouse, &c.; Horn Head. F.

A. Babingtonii, Woods. Frequent; Drimnacraig; shore near the Light-house, Fanet; Horn Head. F.

A. angustifolia, Sm. Rare; with the last at the Lighthouse. F.

(*A. littoralis*, L. Formerly recorded from Fanet in error; the plant found was *A. Babingtonii*.)

(To be continued.)

CORRELATION OF THE LICHENS IN ROBERT BROWN'S 'CHLORIS MELVILLIANA.'

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

IN the above treatise on the flora of Melville Island (1824), R. Brown records (*vide* 'Miscellaneous Botanical Works,' vol. i., pp. 250-252) the Lichens collected there by Capt. Parry, Lieut. Ross, and Dr. Fischer. Having recently been engaged in arranging the specimens of these preserved in the herbarium of the British Museum, I here give the results of my examination of this small but interesting collection of Arctic Lichens.

No. 100, s. n. *Gyrophora proboscidea*. — There are two different species here, of which *a.* = *G. discolor*, Fr. fil., and *b.* = *G. proboscidea*, DC. Both are very sparingly fertile.

No. 101, s. n. *Lecanora elegans* = *Lecanora (Placodium) elegans*, Ach. — Of this there are three specimens. One of these is muscicole and sterile, corresponding exactly with the observation of Acharius

upon *L. elegans*, in 'Prodr.,' p. 102—"as if intermediate between *L. murorum* and *L. parietinus*." In one of the other two specimens the apothecia are crowded, with the margins in most cases beautifully crenulated (f. *crenata*, Cromb.)

No. 102, s. n. *Borreria? aurantiaca*, R. Br., sp. n. = *Physcia nodulifera*, Nyl.—Sterile. Although the locality on the accompanying label is Winter Harbour, yet, having regard to the distribution of this species, I cannot but think that the specimen got accidentally mixed up with the Lichens of Melville Island, and that it really belongs to Gardner's Brazil Lichens, which I found in close proximity.

No. 103, s. n. *Cetraria juniperina*, Ach. = *Platysma juniperinum*, (L.)—Stunted and sterile, with the laciniae much congested.

No. 104, s. n. *Cetraria nivalis*. = *Platysma nivale* (L.)—Sterile.

No. 105, s. n. *Cetraria cucullata* = *Platysma cucullatum* (Bell).—Sparingly fertile. Along with the type are also two fragments of f. *tapeina*, Ach.,—a stunted and broader state of the plant.

No. 106, s. n. *Cetraria islandica*.—Here are two specimens, of which *a*. = *Cetraria Delisei*, Schær., sterile; and *b* = var. *fastigiata* (Del.), Nyl., sparingly fertile.

No. 107, s. n. *Cetraria odontella*, Ach. = *Cetraria Delisei*, var. *submedia*, Nyl., in 'Norrl. Lapp.,' p. 323.—Sterile.

No. 108, s. n. *Peltidea aphthosa* = *Peltidea aphthosa* (L.)—A small sterile specimen.

No. 109, s. n. *Cornicularia ochroleuca* = *Alectoria ochroleuca*, (Ehrh.)—Sterile specimens with the thallus less robust than we have seen from other Arctic regions.

No. 110, s. n. *Cornicularia lanata* = *Alectoria divergens*, Ach.—Sterile.

No. 111, s. n. *Cerania vermicularis* = *Thamnomia vermicularis*, (Sw.)—Sterile. A form with the stipites more robust (turgid), shorter, often deformed, and less cornuted than in the type (f. *Melvilliana*, Cromb.), but probably not constant. The supposed apothecia described by R. Brown in the specimen gathered by Dr. Fischer are not anything rightly evolute, the black spots being caused by the presence apparently of some minute alga.

No. 112, s. n. *Cenomyce pyxidata* = *Cladonia pyxidata*, L.—Fragmentary and sterile.

No. 113, s. n. *Stereocaulon paschale* = *Stereocaulon tomentosum*, Laur.—Sterile.

No. 114, s. n. *Usnea sphacelata*, R. Br. = *Neuropogon melananthus*, f. *sphacelata*, sorediiferous.—Sterile, as the plant always is in Arctic regions.

In addition to these there occur in the herbarium from Melville Island the two following species not enumerated by him in the 'Chloris':—

1. *Dactylina arctica* (Hook.)—A fragmentary infertile specimen.
2. *Parmelia centrifuga* (L.)—Sterile.

Arranged in order the above Lichens will, therefore, stand as follows:—

Tribe STEREOCAULEI.

Stereocaulon tomentosum, Laur.

Tribe CLADONIEI.

Cladonia pyxidata (L.)

Tribe SIPHULEI.

Thamnomia vermicularis (Sw.), f. *Melvilliana*, Cromb.

Tribe RAMALINEI.

Dactylina arctica, Hook.

Tribe ALECTORIEI.

Alectoria ochroleuca (Ehrh.)*Alectoria divergens*, Ach.*Neuropogon melaxanthus* (Ach.), f. *sphaclata*, R. Br.

Tribe CETRARIIEI.

Cetraria Delisei, Schær.,, var. *fastigiata*, Del.,, var. *submedia*, Nyl.*Platysma nivale* (L.)*Platysma cucullatum* (Bell.), f. *tapeina*, Ach.*Platysma juniperinum* (L.)

Tribe PARMELIEI.

Parmelia centrifuga (L.)

Tribe PELTIGEREI.

Peltidea aphthosa (L.)

Tribe PHYSCIEI.

? *Physcia nodulifera*, Nyl.

Tribe GYROPHOREI.

Gyrophora discolor, Fr. fil.*Gyrophora proboscidea*, DC.

Tribe LECANOREI.

Lecanora elegans, Ach., f. *crenata*, Cromb.

NOTES ON THE GENUS BLEPHAROCARYA.

BY BARON FERD. VON MUELLER, C.M.G., M.D., F.R.S.

It fell to my share, not very long ago, to make known a remarkable genus of *Sapindaceæ* from North-east Australia, in some respects allied to *Dobinea*, but the staminate flowers of the only species remained at the time unknown. Very recently, however, this previously wanting material has also been obtained, and I beg now to offer some additional notes, in order that the position of this genus in the natural series may be fully established.

BLEPHAROCARYA INVOLUCRIGERA, *F. v. M., Fragm. Phytogr. Austral.*, xi., 15-16.—Arbor circiter 50-pedalis, dioica nisi monoica. Cortex cinereus, lævis. *Folia opposita*; foliola interdum elliptica, nonnunquam tantum modo trijuga retusa et ad 2'' abbreviata, vel

ima passim sesquipollicaria. *Panicula mascula flores in glomerulis gerens*, opposita ramosa, spithamæa nisi longior; rami sive pedunculi compressi, primum subtiliter puberuli, demum glabrescentes. Glomeruli capituliformes, multiflori, solitarii vel 3-5 conferti. *Bractea imæ 4 et geminate oppositæ*, cuique glomerulo generali arcte suppositæ, puberulæ, deltoideo-cordatæ, 1-1½" metientes. Glomeruli secundarii bracteis pauciseriate imbricatis ovatis vel lanceolatis puberulis ½-1" longis suffulti et aliis interspersis muniti. Flores inter bracteas sessiles vel pedicello usque ad lineam longo pertenui præditi. Sepala 4, rhombeo-vel lanceolato-ovata, extus breviter appresso-pilosula. Petala 4, æstivatione imbricata calycem fere semisuperantia, ovalia, sessilia, membranæa, albida, uninervia, exappendiculata, vix lineam longa, extus parve et perbreviter puberula. Stamina octo, breviter exserta, sepalina petalinis paulo longiora; filamenta capillari-linearia; antheræ pallide flavæ, vix ¼" longæ, cordato-ovatæ, prope basim dorsifixæ, longitudinaliter dehiscentes. Pollinis granula lævia, ellipsoidea, rimulis longitudinalibus aperta, circiter .00112" longa, .00053" lata, madefactione ovato-sphærica. Germinis rudimentum astyle pilosulum.

It will be observed that the male flowers tend to confirm the affinity of *Blepharocarya* to *Dobinea*, and that the extraordinary character of the female inflorescence finds to some extent, though on a small scale, a repetition in the staminate flowers also.

Melbourne, 12th December, 1878.

THE CRYPTO GAMIC FLORA OF KENT—FUNGI.

By T. HOWSE, F. L. S.

(Continued from p. 74.)

Subgenus 9.—*Pleurotus*.

AGARIOUS DRYINUS, *P.* Huss., ii., t. 29, 33.

Hayes, *Huss.*

A. OSTREATUS, *Jacq.* Huss., ii., t. 19.

Sydenham Hill; Bromley, *Sparkes*; Hayes, *Huss.*

Edible.

A. EUOSMUS, *Berk.* Huss., i., t. 75.

Hayes, *Huss.*; West Wickham.

Spores pinkish.

A. ALGIDUS, *Fr.* Fl. Dan., t. 1552, f. 1; t. 1556, f. 2.

On a mountain-ash in garden, Sydenham Hill.

A. CORTICATUS, *Fr.*

Staplehurst, *J. Ward*.

A. TREMULUS, *Schæff.* Sow., t. 242.

Woods near Langton Green, *Herb. Deakin*.

A. HYPNOPHILUS, *P.*

Joyden's Wood, Bexley, *Holmes*.

- A. *CIRCINATUS*, *Fr.* *Fr. Icon.*, t. 88, f. 1.
 Staplehurst, *Smith, Draw.*
- A. *ULMARIUS*, *Bull.* *Sow.*, t. 67.
 On Elm-trunks, Beckenham churchyard, *P. Bicknell.*

Subgenus 10.—*Volvaria.*

- AGARICUS BOMBYCINUS*, *Schæff.* *Schæff.*, t. 98.
 Near Bromley, *Sparkes.*
- A. *VOLVACEUS*, *Bull.* *Bull.*, t. 262.
 Near Bromley, *Sparkes.*
- A. *TAYLORI*, *Berk.* *Saund. & Sm.*, t. 33, f. 1.
 Near Sandwich.

Subgenus 11.—*Pluteus.*

- AGARICUS CERVINUS*, *Schæff.* *Schæff.*, t. 10.
 Sydenham Hill; Chislehurst; Knowle Park.
- A. *CHRYSOPHÆUS*, *Schæff.* *Schæff.*, t. 253.
 Wood near Shoreham; wood near Otford.

Subgenus 12.—*Entoloma.*

- AGARICUS CLYPEATUS*, *L.* *Bull.*, t. 534.
 Sydenham Hill.
- A. *RHODOPOLIUS*, *Fr.* *Fl. Dan.*, t. 1736.
 Sydenham Hill; Chislehurst; Darenth Wood, *Smith, Draw.*
- A. *COSTATUS*, *Fr.*
 Maidstone, *Smith, Draw.*
- A. *SERICEUS*, *Bull.* *Bull.*, t. 413, f. 2.
 Sydenham Hill; Knowle Park.
- A. *NIDOROSUS*, *Fr.* *Fr. Icon.*, t. 94, f. 2.
 Knowle Park, *C. E. Broome*; Rosebank, Tunbridge Wells,
T. Walker.
- A. *THOMSONI*, *Berk. & Br.*
 Amongst grass. West Farleigh, *Berk. & Br. in A. N. H.*

Subgenus 13.—*Clitopilus.*

- AGARICUS PRUNULUS*, *Scop.* *Fr. Sv. Svamp.*, t. 19.
 Near Bromley, *Sparkes.*
 Pileus compact, cinereous.
- A. *ORCELLA*, *Bull.* *Bull.*, t. 573, f. 1, 591.
 Sydenham Hill.
 Pileus white, lobed; smaller than last.
 Both these are included by some authors in one species,
A. prunulus, but they are quite distinct; *A. Orcella* is the more
 common species. Both are edible.

Subgenus 14.—*Leptonia.*

- AGARICUS INCANUS*, *Fr.* *Sow.*, t. 162.
 The Lawn, Marten's Grove, Crayford, *Smith, Draw.*

Subgenus 15.—*Nolanea*.

- AGARICUS PASCUUS, *P.* Bolt., t. 35.
Sydenham Hill; common in pastures.
- A. PICEUS, *Kalch.* Kalch., t. 12, f. 3.
In a wood near Otford.

Subgenus 16.—*Pholiota*.

- AGARICUS DURUS, *Bolt.* Bolt., t. 67, f. 1.
Sydenham Hill.
- A. PRÆCOX, *P.* Berk. Outl., t. 8, f. 1.
Sydenham Hill; Knowle Park, near Pembury, *T. Walker.*
In pastures. Spring.
- A. RADICOSUS, *Bull.* Bull., t. 160.
Hillydeal Wood, near Otford, *A. S. Bicknell.*
- A. PUDICUS, *Bull.* Huss., ii., t. 31.
On an elder stump near the Barracks, Canterbury, *Berk. Engl.*
Fl., p. 90; Hayes, *Huss. Ill.*
- A. SQUARROSUS, *Müll.* Sow., t. 284.
Knowle Park; Chislehurst; Cobham, *Holmes*; Bromley, *Sparkes.*
- A. SPECTABILIS, *Fr.* Huss., i., t. 71.
Between Shoreham and Dunton Green; Chislehurst; St. Paul's
Cray Common.
- A. ADIPOSUS, *Fr.* Berk. Outl., pl. 8, f. 2.
Knowle Park, Sevenoaks.
On beech and ash trunks.
- A. MUTABILIS, *Schæff.* Berk. Outl., p. 8, f. 3.
Sydenham Hill. Common on and near trunks of trees.
- A. MARGINATUS, *Batsch.* Batsch, f. 207.
In a fir-wood near Shoreham.
- A. HETEROCLITUS, *Fr.* Hoff. Icon., t. 14, f. 2.
Bromley, *Cooke.* On poplar, *Gard. Chron.*, 1868.
- A. TERRIGENUS, *Fr.*
West Farleigh, *Berk. & Br. in A. N. H.*
Var. *minor.* Amongst chips of hop-poles.
- A. CAPERATUS, *P.* Fl. D., t. 1675.
Near Bromley, *Sparkes.*

Subgenus 17.—*Inocybe*.

- AGARICUS PYRIDORUS, *P.* Bull., t. 532, f. 1.
Canterbury, *Berk. Engl. Fl.*, p. 96; near Langton Green,
Jenner Fl. Tunbr.
Smell like that of decaying pears.
- A. SCABER, *Müll.* Sow., t. 207.
In a fir-wood near Otford.
- A. FLOCCULOSUS, *Berk.*
Near Bromley, *Sparkes.*
- A. RIMOSUS, *Bull.* Bull., t. 388.
Common.

- A. *FASTIGIATUS*, *Schæff.* Fr. Icon., t. 108, f. 1.
Starvecrow Wood, *W. T. T.*
- A. *TRECHISPORUS*, *Berk.* Berk. Outl., t. 8, f. 6.
Sydenham Hill.
- A. *SINDONIUS*, *Fr.* Sow., t. 365.
Rosebank, Tunbridge Wells, *T. Walker.*
- A. *GEOPHYLLUS*, *Sow.* Sow., t. 124.
Bromley, *Sparkes.*

Subgenus 18.—*Hebeloma.*

- AGARICUS CRUSTULINIFORMIS*, *Bull.* Berk. Outl., p. 9, f. 1.
Sydenham Hill; Shoreham; Otford.
Forming large rings in woods.
- A. *FASTIBILIS*, *Fr.* Schæff., t. 221.
Sydenham Hill; Starvecrow Wood, *W. T. T.*; Bromley,
Sparkes; Sandwich.
Roadsides and banks. Resembling last, but often not bulbous.
- A. *ELATUS*, *Fr.* Saund. & Sm., t. 42, f. 1.
Buckland, *W. W. Saunders.*

Subgenus 19.—*Flammula.*

- AGARICUS CARBONARIUS*, *Fr.*
On burnt soil in a wood near Bell's-ewe Green, Tunbridge Wells,
T. Walker.
- A. *LUBRICUS*, *Fr.*
On trunks. Tunbridge Wells, *Grevillea*, i., p. 85; *Berk. & Br.*
in A. N. H.
- A. *FLAVIDUS*, *Schæff.* Schæff., t. 35.
On and near trunks of trees.
Sydenham Hill.
- A. *SAPINEUS*, *Fr.*
Bostol Wood.

(To be continued).

SHORT NOTES.

DR. NYMAN'S 'CONSPECTUS FLORE EUROPEÆ.'—As it seems inevitable that there should be an Appendix of 'Addenda et Corrigenda' to so exceptionally interesting and valuable a work as this, a corner may perhaps be found in the 'Journal of Botany' for the following notes, as supplying one small contribution towards such an Appendix:—1. British plants not given as British by Dr. Nyman:—*Barbarca intermedia*, Bor., *Iberis amara*, Linn., and *Rosa andegavensis*, Bast.—2. Plants given as British by Dr. Nyman, but not considered natives by British botanists:—*Barbarea præcox*, Br. ('Hibern., Angl.' given); *Alyssum calycinum*, Linn. ('Eur. plur. exc. Hibern., Norv.' &c., are Dr. Nyman's words, implying that Scotland and England are not among the exceptions); *Isatis tinctoria*, Linn. ('Eur. omn. exc. Hibern., Scot., Dan.,' &c., England not

being included in the exceptions); *Spergula vernalis*, W.; *Geranium nodosum*, Linn.; *Geranium phæum*, Linn.; *Dictamnus albus*, Linn.; *Melilotus arvensis*, Wallr.; *M. alba*, Desv. (England not excluded); *Vicia hybrida*, Linn.; *Fragaria elatior*, Ehrh.; *Rosa gallica*, Linn., and (as varieties of *R. tomentella*, Leman.) *R. sclerophylla*, Scheutz., and *R. Bloudæana*, Rip. The above, it will be observed, are in addition to the species already pointed out in the notice of the work which appeared in this Journal (1878, p. 349). For *Silene Otites*, Sm., 'Angl. mer.' is given instead of 'Angl. or.'—3. Those who know more of the genus *Rubus* than I do may perhaps be able to account for *R. affinis*, Wh., *R. fusco-ater*, Wh. N., *R. Koehleri*, Wh. N., and *R. Guentheri*, Wh., not being considered British by Dr. Nyman, while *R. nitidus*, Wh., has 'Angl. (r.)' after it.—4. The following species were all gathered by me in North Italy (between Genoa and San Remo) in April and May, 1875. For some of them Italy is one of the countries altogether excluded in the 'Consp. Flor. Eur.'; for the rest other portions of Italy are given, excluding North Italy. The place named after each species is that of the station where I gathered it:—(a). Not recorded as Italian in 'Consp. Flor. Eur.' *Astrocarpus sesamoides*, Gay., stony hills behind Arenzano and Pegli. *Linum campanulatum*, Linn., near Pegli. *Medicago præcox*, DC., near Pegli. *Dorycnium suffruticosum*, Vill., sea-coast between Arenzano and Voltri.—(b). Recorded in 'Consp. Flor. Eur.' as found in parts of Italy other than North Italy (as shown by the quoted abbreviations bracketed after each name). *Helianthemum glutinosum*, Pers. ('Ital. med., mer., ins. '), sea-coast near Arenzano. *Linum nodiflorum*, Linn. ('Ital. med., mer. '), sea-cliffs between Arenzano and Voltri. *Geranium striatum*, Linn. ('Ital. mer. '), near Pegli; possibly introduced. *Ruta bracteosa*, DC. ('Ital. mad., mer., ins. '), near Pegli. *Medicago sphaerocarpa*, Bert. ('Ital. med., mer., ins. '), near Pegli. *Trifolium Cherleri*, Linn. ('Ital. med., mer., ins. '), near Pegli. *Lotus edulis*, Linn. ('Ital. med., mer., ins. '), near Pegli. *Hippocrepis unisiliquosa*, Linn. ('Ital. exc. bor. '), sea-coast, San Remo. *Ervm parviflorum*, Bert. ('Ital. med., mer., ins. '), near Pegli.—W. MOYLE ROGERS.

Notices of Books and Memoirs.

Malesia. Publicata da ODOARDO BECCARI. Vol. i., part 3, Genoa, 1878.

The 3rd part of Prof. Beccari's valuable work contains some very interesting articles. Five new species of *Osmoxylon* are described, and no less than nine of *Rhododendron*. There is a long dissertation on the relationships of the Malayan flora *apropos* of the distribution of the three species of *Nepenthes* found in New Guinea; and an account, illustrated by five excellent plates, of the *Burmanniaceæ* of Malaya. Of this curious family, two new genera of the tribe *Thismieæ* are described, *Bagnisia* (dedicated to Dr. Carlo Bagnis,

the mycologist), and *Geomitra*; there are also three new and remarkable species of *Thismia*. But the most interesting plant here described and figured is *Corsia*, a new genus, from the north coast of New Guinea, of very anomalous structure. It is a small aphyllous parasite, with a scaly stem bearing a single terminal flower; the perianth is of six divisions, the upper one forming a large hood, the other five narrow and strap-shaped; there are six small stamens in two rows; the ovary is inferior, with three parietal placentas projecting into the centre, and giving the appearance of a trilocular condition; the style is short and thick, and the stigma 3-lobed; the elongated capsule is 3-valved, and the large fusiform seeds are pendulous on the hardened placentas. The author suggests that *Corsia* (which is dedicated to the Marquis Bardo Corsi Salviati, of Florence) may form the type of a new Natural Order, *Corsiaceæ*, distinct from, though allied to, *Burmanniaceæ*, *Hypoxidææ*, and *Orchidææ*.

Part 80 of the 'Flora Brasiliensis' (December, 1878) contains the *Lobeliaceæ* by A. Kanitz, with 7 plates; and the *Plumbagineæ* and *Plantagineæ* by J. A. Schmidt, with 2 plates. Part 81 (same date) consists of the *Erythroxylaceæ*, by J. Peyritsch, illustrated by 10 plates; the *Hypericaceæ* by H. G. Reichardt, with 7 plates; and the *Marcgraaviaceæ* by L. Wittmack, with 12 plates.

Baron von Mueller's 'Fragmenta Phytogr. Australiae' has reached its 90th part. A new genus of *Compositæ* from Western Australia, *Decazesia*, is dedicated to the Duc Decazes, President of the Paris Horticultural Society.

Dr. Bayley Balfour's account of the Botany of Rodriguez is published in the Royal Society's volume on the Transit of Venus Expedition. It consists of introductory observations on the past history, changes, and present condition of the flora of the island, comparisons with and relationship to the other islands of the Indian Ocean, as well as an account of the remarkable heterophylly of the foliage of many of the trees, to which he has already called attention elsewhere. A complete list of the species composing the flora follows, including the Cryptogamic ones. The memoir is illustrated by 22 fine quarto plates, four of which are devoted to mosses and Hepaticæ, and the remainder to Phanerogams. The plates are the only addition of importance, as the descriptions of the new flowering plants have been already twice published, first in the Journal of the Linnean Society, and then in Baker's 'Flora of Mauritius.' It is necessary to mention this, in consequence of there being no indication of it in the text of the present memoir, where Dr. Balfour's discoveries appear as if now published for the first time instead of having been made known to science nearly two years ago. Mr. Crombie's account of the Lichens, here given, was indeed published in 1876.

The last part of Prof. Baillon's 'Histoire des Plantes' commences the 7th volume. It contains accounts of the Orders *Melastomaceæ*, *Cornaceæ*, and *Umbelliferae*. Only eight genera are

included in the *Cornaceæ*, one being *Helwingia* (placed in *Araliaceæ* by Messrs. Bentham and Hooker); *Alangium*, *Marlea*, and *Nyssa* are excluded. The *Araliaceæ* form but a series of *Umbellifera*. The woodcut illustrations of the fruits of the latter Order are excellent for clearness and accuracy.

OTHER NEW BOOKS.—K. F. MEINSHAUSEN, 'Flora Ingridica'; St. Petersburg, 1878 (10s.)—'Encyclopædie der Naturwissenschaften,' C. MULLER and others, i. Handbuch der Botanik; Breslau, Trewendt (3 mk.)—E. FRIES, 'Icones Select. Hymenomycetum nondum delineatorum,' vol. ii., pts. 2 and 3 (tab. 111-130), Dec., 1878.—L. RADLKOFEK, 'Ueber Sapindus und damit in Zusammenhang stehende Pflanzen' (Sitz. der K. Bayer. Acad. d. Wissenschaft., 1878, heft 3).

ARTICLES IN JOURNALS.—FEBRUARY.

Trans. Linn. Soc. Lond. (ser. 2, i., pt. 6).—D. D. Cunningham, 'On *Mycoidea parasitica*, a new genus of parasitic Algæ' (tab. 42, 43).—Id., 'On the occurrence of conidial fructification in the Mucorini, illustrated by *Choanephora*' (tab. 47).—G. Henslow, 'On the self-fertilization of plants' (tab. 44).—M. J. Berkeley and C. E. Broome, 'List of Fungi from Brisbane, Queensland, with descriptions of new species' (tab. 45, 46).

Trans. & Proc. Soc. Bot. Edinburgh (xiii., pt. 2).—W. Lauder Lindsay, 'Growth in Britain of the New Zealand Kowhai (*Edwardsia grandiflora*, Salisb.)'—Id., 'Fossil Lichens.'—M. C. Cooke, 'Enumeration of *Polyporus*.'—J. H. Balfour, 'Notes of a Continental tour in 1877.'—J. T. Boswell, 'Description of *Hieracium Dewari*' (tab. 5).—J. Sadler, 'Description of *Agaricus Sadleri*, Berk.' (tab. 4).—Sir R. Christison, 'On the exact measurement of trees.'—G. Ross, 'On the flora of Mull.'—D. Christison, 'Journey in Uruguay' (tab. 6).—J. Buchanan, 'Notes on flora of Blantyre, Shire Highlands, Central Africa.'—J. McNab, 'Open-air vegetation at R. Botanic Gardens.'—I. B. Balfour, 'On the genus *Halophila*' (tab. 8-12).—T. A. G. Balfour, 'On effects of soot on some *Conifera*.'

Ann. Sc. Naturelles (ser. 6, vii., pts. 1 and 2).—L. Crié, 'Researches on the *Depazeæ*' (tab. 1-8).—C. E. Bertrand, 'On the seed-coverings of Gymnosperms' (tab. 9-14).—G. Bonnier and C. Flahault, 'Modifications in plants dependent on their physical environment.'

Bull. Bot. Soc. France (xxv., pt. 1).—Buchinger, 'Changes in the flora of Alsace.'—Timbal-Lagrave, *Ligularia sibirica*, Coss., in the Pyrenees.—F. Townsend, 'On a new species of *Veronica* (*V. lilacina*)' (tab. 1).—Leuduger-Fortmorel, 'List of marine Diatoms from Bay of St. Brieuc and coast of Cotes-du-Nord.'—E. Fournier, 'On some genera of *Agrostideæ*.'—J. Poisson, 'The seat of the colouring matters in seeds.'—Prillieux, 'On the stains and cracks on pears.'

Bull. Bot. Soc. Belgique (xvii., pt. 1).—‘ Report of demonstration in honour of Du Mortier, 5 May, 1878 ’ (with portrait).—L. Errera and G. Gervaert, ‘ On the structure and modes of fecundation of flowers, and especially on the heterostyly of *Primula elatior* ’ (tab. 1).—L. Errera, ‘ On *Pentstemon gentianoides* and *P. Hartwegi*. ’

Flora.—W. J. Behrens, ‘ On the nectaries of flowers ’ (contd.)—C. Kraus, ‘ On the tissues composing foliage and flower-leaves ’ (continued).

Botanische Zeitung.—E. Godlewski, ‘ On the causes of the change of form in etiolated plants. ’—E. Stahl, ‘ On the resting-state of *Vaucheria geminata* ’ (tab. 2).

Magyar Nov. Lapok.—J. L. Holuby, ‘ Mycological Notes, ’ iii.

Proceedings of Societies.

LINNEAN SOCIETY OF LONDON.

January, 16, 1879.—William Carruthers, Esq., F.R.S., Vice-President, in the chair.—The following gentlemen were elected Fellows of the Society:—George Brook, Esq., Huddersfield; Arthur Pearce Luff, Esq., Marylebone; John Edward Griffiths, Esq., Bangor; Charles Sharpe, Esq., Liverpool; and John Woodland, Esq., Kilburn Park.—Prof. Allen Thompson exhibited and made some remarks on a block of wood, during the growth of which a portion of the shank-bone of an ox had become centrally enclosed. He also called attention to an imperfect frond of a palm (*Chamærops?*), asserted to have been discovered within a plank of rosewood.—Mr. Christy made some observations upon the Chalmugra tree (*Gynocardia odorata*) and its therapeutical properties.—The following paper was read:—‘ On the *Colchicææ* and aberrant tribes of the *Liliacææ*, ’ by J. G. Baker. This forms the sixth of the author’s monographs on the *Liliacææ*. *Colchicææ* is the smallest of the three sub-orders of *Liliacææ*, and includes 39 genera and 153 species. In its typical form it is marked by extrorse anthers, a septical capsule, and three distinct styles; but as twenty-four out of the thirty-nine genera do not possess all these three characters in combination, but recede more or less decidedly from the type in the direction of true *Liliacææ*, it seems injudicious to follow those who have proposed to keep up *Colchicææ* or *Melanthacææ* as a distinct Natural Order. The tribes adopted by the author are:—1, *Colchicææ*, marked by the type-characters of the sub-order in combination with a gamophyllous perianth and bilocular anthers; 2, *Merenderææ*, with the type-characters of the sub-order in combination with a polyphyllous perianth and bilocular anthers; 3, *Veratreeæ*, with the type-characters of the suborder in combination with unilocular anthers; 4 and 5, *Anguillariewææ* and *Helonicææ*, which recede from the type by their loculicidal capsule; 6, *Urulariewææ*,

which recedes from the type by its united styles ; and 7, *Tofieldiæ*, with a loculicidal capsule, anthers slit down the edge or face, and equitant distichous leaves. This sub-order includes several genera which recede in a striking manner from the general Liliaceous type ; as for instance, *Hewardia*, which connects *Liliaceæ* with *Iridaceæ* ; *Petrosavia*, a saprophyte with three apocarpous carpels ; and *Scoliopus*, with a unilocular ovary and three parietal placentas. In geographical dispersion *Colchicaceæ* agree completely with the true *Liliaceæ*, as they enter, broadly speaking, into all the floras of which the order as a whole forms an element. The three aberrant tribes of *Liliaceæ* are *Conantherææ*, a connecting-link between *Liliaceæ* and *Amaryllidaceæ*, marked by its partially inferior ovary, and anthers dehiscing by terminal pores ; *Liriopeæ*, and *Gilliesiæ*. *Liriope* is an older name for *Ophiopogon*. These two last sub-orders contain genera which recede widely from the Liliaceous type, and others which bridge over the interval between the extreme form and the ordinary Lilies ; of *Gilliesiæ*, which are almost exclusively Chilean, we now know seven genera ; of *Liriopeæ* three.

February, 6, 1879.—Prof. Allman, F.R.S., President, in the chair.—Mr. J. R. Jackson, in illustration of the paper by A. Braun recently translated in the pages of this Journal, exhibited a collection of fruits, seeds, &c., from the tombs of ancient Thebes, sent to the Kew Museum by Mr. Consul Calvert, of Alexandria. In this collection were the fruits of *Hyphane Argum*, formerly thought to be a nutmeg, in consequence of its ruminated albumen. Mr. Jackson considered the juniper berries in the collection to be those of *Juniperus phænicea*, and not of *J. excelsa*. A flat cake had been found to be composed of the fruit of *Hyphane thebaica*, the Doum Palm ; and the dark-coloured contents of a small flask, on examination, had proved to be olive oil.—Mr. J. G. Baker showed some dried specimens and a living bulb of *Buphane toxicaria* from Kew. This furnishes one of the principal ingredients of the poison with which the Bushmen tip their arrows, and it is remarkable structurally for the very numerous tunics of its bulb. The plant has been long known and often imported, but has only flowered in this country very rarely. Recent travellers have much extended its known geographical range, which reaches from the central Cape Karoo to Angola and Lake Tanganika. Sir C. W. Strickland mentioned that he had been successful in flowering the plant last year, and explained his plan of treating it.—Mr. Theselton Dyer showed specimens of and drew attention to the more important features of a new fodder grass, *Euchlana luxurians* ; [since figured in the 'Botanical Magazine' for March, tab. 6414.]—He also exhibited instruments used for weaving the fibre of *Curculigo latifolia* by the natives of Borneo.—Mr. Thos. Christy drew attention to a sample of Tea grown in Natal, and to a bottle containing the milky juice of *Landolphia* as freshly drawn from the tree.—The Rev. G. Henslow passed round for examination a specimen of a female Mistletoe bearing male shoots. The opinion of the botanists present was that it was an androgynous condition, rather than a male parasitic on a female plant, as supposed by Mr.

Corderoy, of Didcot, from whom the specimen was received.—Mr. R. Irwin Lynch exhibited and made some remarks on parts of the Bull's Horn Acacia (*A. sphaerocephala*), the Imbamba tree (*Cecropia peltata*), and a couple of Orchids (*Epidendrum bicornutum*, and *Schomburgkia tibicinus*), as exemplifying their economy in affording hollows of protection and so-called "food bodies" for ants. The first two have already been described and figured by Mr. Francis Darwin (Linn. Soc., Journ. Bot., vol. xv., p. 398); the last two present chambers in the stems, the supposed residence of ants, as in the preceding better-known instances.

February, 20, 1879.—Prof. Allman, F.R.S., President, in the chair.—Messrs. Edward A. Fitch, Lawrence Scott, and William Stone were elected Fellows of the Society.—The Rev. G. Henslow exhibited a portion of the bough of an Elm with a small pulley imbedded in the centre of the wood. The rings of growth deposited indicated about thirteen years of growth subsequent to the entrance of the foreign body, and exteriorly all marks of its presence were completely obliterated.—Mr. W. Hood Fitch next drew attention to a coloured drawing of natural size of one of the remarkable crimson-coloured pitchers of *Nepenthes sanguinea*, from Malacca. This cylindrical pitcher measured twelve inches long and nine inches in circumference, and was grown at Bury by Mr. O. Wrigley.—The following papers were read:—'On the genus *Oudneya*, Brown,' by Dr. H. Trimen. This is a small cruciferous shrub discovered by Dr. Oudney in the desert between Tripoli and Mourzuk. The genus has been obscure in consequence of Brown's short and insufficient diagnosis, and his reference to it of *Hesperis nitens*, Viviani. This latter Cosson has shown to be a *Moricandia*; hence Brown's genus has been doubtfully referred to the same. The author shows from an examination of Oudney's herbarium in the British Museum, that *Oudneya* is identical with *Henophyton*, Coss., which name it will supersede, having the priority of thirty-one years.—'On some South American genera of plants of uncertain position,' by Mr. John Miers. The author refers the *Pleragina* of Arruda da Camara (who mentions three species) to the *Chrysobalanaceæ* but two only should be retained in that genus, the third belonging to the true *Couepia*, Aublet. Among *Parinarium*, the two species fully described and figured by Aublet alone ought to be retained. Those to be excluded are the two British Guiana species of Bentham, and seven others of Brazilian origin described by Dr. Hooker, and which, from their floral structure and development of fruit, do not differ from *Licania*. The Malayan species of Blume are shown to belong to the *Petrocarya*, Jack., while the African species enumerated by DeCandolle, together with five others yet undescribed, must be referred to *Griffonia*, Benth. & Hook., a genus notable for the conferrumination of the cotylédon of the embryo. The genus *Minquartia*, Aublet, belongs to the family *Crescentiaceæ*. *Senapea*, Aublet, is also of the same family and near to *Kigelia*. Bentham's and DeCandolle's *Kigelia* are widely different, the *K. africana*, Benth., properly belonging to *Tripinnaria*. The *Crescentiaceæ* would thus consist of six genera,

viz., *Crescentia*, *Parmentiera*, *Minquartia*, *Kigelia*, *Tripinnaria* and *Senapea*. The genus *Managa*, Aublet, Mr. Miers avers, belongs to the *Aurantiaceæ*. *Racceria*, Aublet, does not come under *Sapindaceæ*, as DeCandolle supposed, but under *Meliaceæ*, and is allied to *Melia* and *Aziderachta*, Juss.—‘On the Inflorescence of *Crassulaceæ*,’ by Dr. Maxwell Masters. Though devoted principally to the above named group, the paper discusses the schemes of classification proposed by Roeper, Bravais, and others, as also the emendations of Hofmeister, Sachs, and the modern German school of botanists. He proposes a rearrangement under the heads of Monopodial or indefinite, Choripodial or dichotomous, and Pleiopodial or definite, the latter comprising the sympodial varieties. The modifications brought about by suppressions, adhesions, congenital or otherwise, real or apparent, and by displacements of varying kind and degree, he alludes to, the general conclusion being that while suppressions and adhesions do occasionally occur, yet that in most instances the phenomena witnessed might easily be explained by displacement of parts, and especially by that process of elongation known as uplifting. The history of development as well as the internal structure he believes are constant with this latter view, but not, as a rule, with the theory of adhesion.

March 6.—William Carruthers, F.R.S., Vice-President, in the chair.—The following gentlemen were elected Fellows of the Society:—Prof. Joseph Reay Greene, Dr. Paul Henry Stokoe, Mr. Robert Johnston (Tasmania), Mr. B. S. Williams, and Prof. J. Wood-Mason.—Mr. Thos. Christie exhibited and made remarks on a series of specimens illustrating the Australian “Pituri.”—Mr. R. Irwin Lynch directed attention to a growing example, from Kew Gardens, and some of the dried leaves of *Xanthosoma appendiculatum*, on the under surface of which peculiar pouch-like excrescences emanate from the midrib. This pseudo-monstrosity is of remarkably constant occurrence.—A letter was read by the Secretary from Mr. J. Travers, in which allusion was made to the increased production (from 4 to 12 per cent) of beet-root sugar by a careful artificial selection of the plants. On the contrary, the saccharine produce of the sugar-cane remains stationary, if not retrograde, and its continuous multiplication from stolons some regard as giving rise to various diseases. Crossing and selection are suggested as worthy of a trial.—The following papers were read:—‘Observations on the Entozoic Floridæ growing in living Bryozoa and Sponges,’ by Dr. P. F. Reinsch. The parasitic growths described in this communication have already received elucidation by the same author in the ‘*Botanische Zeitung*’ for January.—‘Note on the fruiting of *Wistaria sinensis* in Europe,’ by W. T. Thiselton Dyer. In this the author was at variance with the statements and inference drawn by Mr. Thos. Meehan (‘*Journ. Linn. Soc. Bot.*,’ xvii., p. 93), and quoted by the Rev. G. Henslow (‘*Trans. Linn. Soc.*’ s.n., vol. i., p. 335). Mr. Dyer, from his own and others’ observations on the plant grown at Glyon, east end of the Lake of Geneva, asserts that *Wistaria* trained on the walls there yields annually abundance of brown tomentose pods. Near the town of

Geneva, however, fruiting is of rarer occurrence, but more frequent at Lyons and the Rhone Valley. Fruiting he suggests may be a question of temperature, and not of nutrition dependant on presence or absence of support. From these instances and other data, Mr. Dyer fails to see evidence of the antagonism of the vegetative and reproductive forces as implied and asserted in Mr. Meehan's observations. If such barrenness were the case, *W. sinensis*, with its scandent habit, would probably already be extinct.

March 20, 1879.—William Carruthers, F.R.S., Vice-President, in the chair.—The Rev. G. E. Commerford Casey, of Nottingham, was elected a Fellow of the Society.—Mr. W. T. Thiselton Dyer exhibited a very large and complete museum specimen of *Helichrysum vestitum*, from the Cape of Good Hope. The following botanical paper was read:—‘Some observations on the reproduction of Ferns by budding,’ by Mr. T. R. Sim. Among the great collection of living Ferns at Kew a marked feature is the large number of species that regularly bear adventitious buds. Of a thousand species there grown, about fifty are never found without buds, and some varieties produce them regularly, though the normal forms of the species do not. This number seems very high when compared with Phanerogams. Among viviparous Ferns, the buds are always on the same part of the plant in all the individuals of a species. *Polystichum angulare* bears a bud on the rachis in the axil of almost every pinna, generally on the lower part of the frond, but in some cases all up the rachis. Some *Aspleniums* produce them on the veins of the upper surface of the frond, and these, though often directly opposite to a sorus, are not connected with it. The *Hymenophyllea* rarely produce buds, but the author believes that the minute cellular bodies developed at the extremity of the divisions of the frond in *Trichomanes Kaulfussi* are organs of propagation, and describes their development.

Botanical News.

THE Botanical Department of the Imperial Museum of Vienna has been placed under the keepership of Prof. H. W. REICHARDT, with DR. GUNTHER BECK as assistant.

THE death of JOHAN ÅNGSTRÖM occurred on Jan. 19th, at Ömskiölsvik, Sweden, at the age of 65. He was a well-known bryologist, and had paid especial attention to the genus *Sphagnum* and the mosses of Finland and Lapmark. The moss-genus *Angstromia*, Bruch. & Schimp., was dedicated to him in 1846.

MR. CHARLES LARBALESTIER, B.A., announces his intention of issuing, in the course of the summer and autumn of the present year, a series of Fasciculi of the Lichens of West Ireland, England, and the Channel Islands. Intending subscribers should communicate at once with the author, Roche Vue, St. Aubin's, Jersey.

Original Articles.

A SYNOPSIS OF THE GENUS *ÆCHMEA*, R. & P.

By J. G. BAKER, F.R.S.

ALTHOUGH *Bromeliaceæ* are so much cultivated, there is no order of Endogens that has been so much neglected by botanists. Although the order is comparatively small, we have in the London herbaria a great many that have never been named nor described. There is no recent synopsis of the genera, and a considerable number have been founded of late years in the horticultural journals and elsewhere upon one or two species alone. In drawing up lately for the annual report a catalogue of the *Bromeliaceæ* cultivated at Kew, which are about one hundred and fifty in number, it became a question for consideration, both as regards the catalogue and the labelling of the living plants in the houses, which genera should be adopted. As in the suborder with an inferior ovary and indehiscent fruit, to which the great majority of the more showy species suitable for cultivation belong, doubts on this head had regard mainly to the limits to be assigned to the genus *Æchmea*, founded by Ruiz and Pavon in 1794,—of which the type of the original species exists in an excellent state of preservation at the British Museum—I have thought it best to define the genus in the sense in which I have understood it in the Kew catalogue, and at the same time to attempt a classification and synoptical description of the species that range under it, of which we have any definite knowledge in England. As will be seen, a good many of these are now described for the first time from specimens in the London herbaria—one of them, even, from that of Linnæus. The species mount up to nearly sixty, so that with the exception of *Tillandsia*, *Æchmea* is the largest genus in the Natural Order. There are several other species known by garden names, but these remain to be verified as to genus, and described by some competent botanist who gets an opportunity of seeing them in a flowering state.

ÆCHMEA, Ruiz & Pavon, *Fl. Peruv. et Chil.* 47, t. 8.—Calyx superior, coriaceous, the three subequal lanceolate or deltoid segments usually free down to the top of the ovary and furnished with a spiny mucro. Petals three, lingulate, obtuse or cuspidate, free down to the base, generally not more than two or three times as long as the sepals, and furnished with a couple of minute scales near the base. Stamens six, always shorter than the petals, three inserted at the top of the ovary and three at the base of petals between the scales; filaments short, filiform or a little flattened; anthers linear-oblong, versatile. Ovary quite inferior, three-celled;

ovules usually numerous, rarely only three or four, inserted at the middle or near the summit of the placentas, mucronate and shortly funiculate; style filiform; stigmas cuneate at the tip and spirally twisted. Fruit coriaceous or subbaccate, with few or many minute exappendiculate seeds.

Epiphytic herbs, with a sessile utricular rosette of numerous chartaceous or horny lorate or lanceolate leaves, which are nearly always serrated at the margin. Scape central, except in *Æ. paniculata*, its leaves except in § *Ortygesia* bract-like and scariosae, the upper ones usually bright red and ornamental. Inflorescence very various, multifarious or distichous, spicate or spicato-, racemoso- or cymoso-paniculate, each flower subtended by one or rarely two small navicular coriaceous bracts with a pungent cusp. Rachises of the inflorescence not bright-coloured as in *Lamprococcus*. Flowers small as compared with those of its neighbour *Billbergia*, red-purple, blue, yellow, greenish, or white. Fruit small, often bright-coloured and ornamental. Distinguished from every other genus of *Ananasseæ*, except *Billbergia*, by its free petals, conspicuously spirally-twisted stigmas and sessile leaves; from *Billbergia* by its smaller flowers, less exerted from the calyx and not opening out so widely when expanded, by its shorter filaments, much smaller anthers, and by its cuspidate sepals and copious coriaceous conspicuous navicular flower-bracts with a pungent mucro.

To *Æchmea*, as thus understood, the following genera, which have been proposed, belong, arranging them in order of date, viz.:

Hohenbergia, Schultes fil., Syst. Veg. vii., No. 1402.

Pothuava, *Pironneava*, and *Chevalliera*, Gaudich., Atl. Bonite (figures only, without descriptions).

Hoplophytum, Beer, Brom., 129.

Echinostachys, A. Brong.; Planch. Hort. Donat., 25.

Ortygesia, Regel, Gartenfl. xvi. 193, t. 547.

Canistrum, E. Morren in Belg. Hort., 1873, t. 15.

KEY TO THE SECTIONS AND SPECIES.

Section I. AMPHILEPIS. Inflorescence distichous. Each flower clasped by a couple of bracts, the inner one almost entirely adnate to the rachis.

1. *bracteata*. 2. *martinicensis*. 3. *dichlamydea*.

Section II. PLATYÆCHMEA. Inflorescence distichous. Each flower subtended on the outside by a navicular bract. = *Disquamia*, Lemaire.

Panicle small, dense, with all the branches simply spicate.

4. *Glaziorii*. 5. *distichantha*. 6. *excavata*.
7. *vriesioides*. 8. *tillandsioides*.

Panicle larger, laxer, with the lower branches compound.

9. *pubescens*. 10. *dactylina*.

Section III. CHEVALLIERA (*Gaudich.*) Inflorescence a multifarious simple spike. Ovary compressed, nearly flattened on the side nearest the rachis of the spike.

Flower-bracts toothed. 11. *Veitchii*.

Flower-bracts not toothed.

Head of flowers globose. 12. *sphærocephala*.

Head of flowers oblong.

13. *ornata*. 14. *Mariæ-reginae*.

Section IV. PIRONNEAVA (*Gaudich.*) Spikes numerous, multifarious, paniced. Ovary as in *Chevalliera*.

Calyx including ovary longer than the flower-bract.

15. *angusta*. 16. *Wrightii*.

Calyx including the ovary not longer than the flower-bract.

17. *glomerata*. 18. *distans*. 19. *lingulata*. 20. *polycephala*.

Section V. EUÆCHMEA. Inflorescence a lax panicle of multifarious racemes, with a lateral peduncle. Petals three to four times as long as the sepals, distinctly twisting after flowering. Ovary terete.

The only species . . . 21. *paniculata*.

Section VI. HOHENBERGIA (*Schultes fil.*) Inflorescence paniced, multifarious. Peduncle from the centre of the rosette of leaves. Petals generally not more than twice as long as the sepals, scarcely twisted. Ovary terete = *Hoplophytum*, Beer.

Flowers in large tripinnate panicles.

Flower-bracts obsolete. 22. *mexicana*.

Flower-bracts minute. 23. *spectabilis*. 24. *cymoso-paniculata*.

Flower-bracts one-sixth to one-third inch long.

25. *ramosa*. 26. *pyramidalis*. 27. *platynema*.

Flowers in a small tripinnate panicle. 28. *capitata*.

Flowers in an ample bipinnate panicle with racemose branches.

29. *parviflora*.

Flowers in an ample lax bipinnate panicle with spicate branches.

30. *laxiflora*. 31. *odora*. 32. *patentissima*.

Flowers in a small dense oblong-deltoid bipinnate panicle.

Flowers pedicellate on the secondary branches. 33. *cærulescens*.

Flowers sessile on the secondary branches.

Flowers ten to fifteen to the lower branches.

34. *Melinonii*. 35. *Cumingii*.

Flowers four to eight to the lower branches.

36. *subinermis*. 37. *calestis*. 38. *suaveolens*.

39. *floribunda*. 40. *regularis*.

Flowers in a cylindrical panicle with short cymose branches.

41. *spicata*. 42. *Mertensii*. 43. *paniculigera*. 44. *setigera*.

Section VII. *POTHUAVA* (*Gaudich.*) Inflorescence a dense simple multifarious spike, not overtopped by its bracts. Peduncle central. Stem-leaves bract-like and scariose. Ovary terete.

- Heads globose.
45. *fasciata.* 46. *Burchellii.* 47. *calyculata.*
- Heads oblong.
48. *Pineliana.* 49. *pectinata.* 50. *mucroniflora.*
 51. *Lindeni.* 52. *comata.* 53. *contracta.*
- Heads cylindrical. 54. *nudicaulis.*

Section VIII. *CANISTRUM* (*E. Morren.*) Inflorescence a dense multifarious capitulum, surrounded and overtopped by a whorl of large scariose bracts. Stem-leaves bract-like, scariose. Peduncle central. Ovary terete.

55. *aurantiaca.* 56. *viridis.*

Section IX. *ORTGIESIA* (*Regel.*) Inflorescence a dense multifarious capitulum, not overtopped by its outer bracts. Peduncle short, central, its leaves horny in texture, like those of the radical rosette. Sepals united in a tube above the ovary.

57. *Legrelliana.* 58. *Ortgiesii.*

1. *Æ. BRACTEATA*, Griseb. Fl. Brit. West Ind., 592. *Bromelia bracteata*, Swartz, Prodr., 56. *B. aquilegia*, Salisb. Parad., t. 40. *B. paniculigera*, Reich. Icon. Exot., t. 239-240, non Sw. *B. exulans*, Lodd. Bot. Cab., t. 801. *Hoplophytum paniculatum*, Beer, Brom., 130.—Leaves lorate, a foot and a half to two feet long, the oblong dilated base four to five inches long, three inches broad, the blade at the top of the base two inches broad, moderately firm in texture, rounded with a cusp at the tip, armed with close ascending horny prickles one inch and a half to two inches long. Peduncle stout, one foot to one foot and a half long, with many red ascending lanceolate bract-leaves three to four inches long. Flowers in a dense oblong panicle six to twelve inches long, with numerous ascending simply spicate distichous branches two to three inches long, subtended by lanceolate entire branch-bracts, of which the lowest are as long as the branches, the imbricated flowers each furnished with a pair of bracts, the outer one ovate-navicular, minutely cuspidate, under half an inch long, the inner one smaller and almost entirely adnate to the rachis. Calyx with ovary five-eighths of an inch long; sepals lanceolate, three-eighths of an inch long, with a distinct cusp. Petals ligulate, yellow, little longer than the sepals. Jamaica, Swartz. St. Lucia, Anderson! St. Vincent, Guilding! Trinidad, Prestoe! Houston's Vera Cruz plant, referred here by Schultes, is quite different, and will be found under the section *Hohenbergia*.

2. *Æ. MARTINICENSIS*, Baker, n. sp.—Leaves with a long entire oblong base three to four inches broad, the closely minutely serrated lamina not seen complete. Scape sheathed by many large imbricated lanceolate bract-leaves. Flowers in a very dense.

oblong bipinnate panicle four to six inches long, with crowded more or less ascending distichous spicate branches one inch to one inch and a half long, half inch broad, which are subtended by lanceolate branch-bracts nearly as long as the branches, with close minute horny serrations like the leaves. Flowers crowded, erecto-patent, each enclosed in two coriaceous navicular flower-bracts, the outer one under half an inch long, with a conspicuous pungent mucro, the inner one smaller, its back entirely adnate to the rachis. Calyx including the ovary one-half to five-eighths of an inch long; sepals lanceolate, distinctly mucronate, twice as long as the ovary. Petals not seen. Martinique, *Hahn*, 522! 581! (Herb. Kew.) Closely allied to *Æ. bracteata*, from which it may be recognised easily by its firmer pectinately-toothed branch-bracts.

3. *Æ. DICHLAMIDEA*, *Baker*, n. sp.—Leaves not seen. Panicle deltoid, a foot long, with ten to twelve ascending branches consisting of peduncled distichous spikes, subtended by lanceolate red bracts, of which the lower are nearly as long as the branch. Peduncles one to three inches long. Spikes dense, oblong, two to three inches long, an inch broad, each flower furnished with a pair of bracts, the outer one oblong-navicular, minutely cuspidate, half an inch long, the inner one much smaller and almost entirely adnate to the rachis. Calyx with ovary five-eighths of an inch long; sepals lanceolate, minutely cuspidate, rather longer than the ovary. Petals scarcely longer than the sepals. Tobago, *Grey*! (Herb. Mus. Brit.)

4. *Æ. GLAZIOVII*, *Baker*, n. sp.—Leaves lorate, one foot and a half long, three inches broad at the dilated base, two inches broad at the middle, obtuse with a cusp, armed with close ascending horny brown teeth a line long. Scape one foot and a half to two feet long, furnished with many lanceolate adpressed bracts. Panicle dense, oblong, bipinnate, four inches long by about half as broad, the crowded erecto-patent distichous branches about an inch long. Flower-bracts a quarter of an inch long, round-navicular, with a distinct mucro. Calyx with ovary under half an inch long; sepals lanceolate, a quarter of an inch long, minutely mucronate. Petals red-purple, lingulate, half as long again as the sepals. Rio Janeiro, *Glaziou*, 8986! (Herb. Kew.) Very like *distichantha* in panicle and separate flowers, but different in leaf. It may be *Hoplophytum polystachyum*, *Beer*, *Brom.*, p. 137, founded upon a very rough plate of the 'Flora Fluminensis,' vol. iii., tab. 138, called *Tillandsia polystachya*.

5. *Æ. DISTICHANTHA*, *Lemaire*, *Jard. Fleur.*, t. 269; *Hook.* in *Bot. Mag.*, t. 5447. *Billbergia polystachya*, *Paxt. Flow. Gard.*, iii., t. 80. *Hoplophytum distichanthum*, *Beer*, *Brom.*, 136. *Hohenbergia distichantha*, *Baker* in *Saund. Ref. Bot.* sub. t. 284.—Leaf with a dilated oblong base four to five inches long, two and a half to three inches broad, and an ensiform blade two to two and a half feet long, an inch broad at the bottom, tapering gradually to a pungent point, rigid in texture, channelled all the way down, back thinly

lepidote and finely striped, the edge-prickles horny, pungent and falcate, those near the base a line long. Scape one foot to one foot and a half long, with many adpressed large lanceolate bract-leaves. Flowers in a dense thyrsoïd bipinnate panicle four to seven inches long, two to two and a half inches diameter, with crowded erecto-patent distichous branches, each flower subtended on the outside by a pocket-like coriaceous bract a quarter of an inch long, with a distinct cusp, the outer edge almost entirely adnate to the rachis. Calyx with ovary half an inch long; sepals oblong, obtuse, with a distinct cusp, twice as long as the ovary. Petals lingulate, red-purple, a quarter to one-third of an inch longer than the calyx. South Brazil in the Province of St. Paulo, *Burchell*, 4556! 4654! Paraguay, *Balansa*, 610! Introduced into English gardens in 1852, and in cultivation at Kew at the present time.

6. *Æ. EXCAVATA*, *Baker*, n. sp.—Leaves not seen. Scape furnished with large lanceolate erect bract-leaves. Flowers in a dense thyrsoïd bipinnate panicle six to eight inches long, three to four inches diameter, with crowded erecto-patent branches, subtended at the base by small deltoid bracts, each flower placed in a pocket formed by a square mucronate coriaceous navicular bract, under half an inch long, entirely adnate to the rachis by its inner edges. Calyx including ovary five-eighths to three-quarters of an inch long; sepals lanceolate cuspidate, twice as long as the glabrous ovary. Petals lingulate, red-purple, a quarter to one-third of an inch longer than the sepals. Paraguay near Assomption, *Gibert*, 62! (Herb. Kew.)

7. *Æ. VRIESIOIDES*, *Baker*, n. sp.—Leaves eight to ten, with a dilated oblong entire base two to three inches long, one inch and a half to two inches broad, contracting suddenly to a linear lamina, two feet long, three-quarters to one inch broad low down, narrowed gradually to the point, armed with copious brown spreading lanceolate horny prickles half a line long. Peduncle a foot long, floccose, the red denticulate upper bract-leaves about two inches long. Panicle rhomboid, half a foot long, with five to six simply spicate erecto-patent distichous branches two to three inches long, three-quarters of an inch broad, the lower ones subtended by lanceolate acute bracts one inch to two inches long. Rachises one-sixth of an inch diameter, square, flexuose. Flower-bract round-navicular, one-half to five-eighths of an inch long, not mucronate, clasping tightly the calyx. Calyx with ovary five-eighths of an inch long; sepals lanceolate, one quarter of an inch long, with minute brown cusps. Petals not seen. Mosquito Shore, year 1774, *Captain Miller*! Kaieteur Falls, Demerara, 1872, *Appun*! (Herb. Mus. Brit.)

8. *Æ. TILLANDSIOIDES*, *Baker*. *Billbergia tillandsioides*, Mart. in Schultes fil., Syst. Veg., vii., 1269.—Leaves with a dilated oblong base two to three inches long, and a lanceolate lamina under an inch broad and about a foot long, narrowed gradually to the point and armed with minute horny prickles half a line long. Scape

above a foot long, thinly tomentose, its lanceolate nearly entire bract-leaves two inches long. Panicle four to five inches long, bipinnate, composed of about seven distichous-oblong spikes with bracts one inch and a half to two inches long. Flower-bract rhomboid, six to seven lines long, minutely mucronate. Calyx with ovary rather shorter than the flower-bract; sepals deltoid, mucronate, quarter of an inch long. Petals twice as long as the sepals, apparently not scaled at the base. North Brazil, on the banks of the Japura, *Martius*.

9. *Æ. PUBESCENS*, *Baker*, n. sp.—Leaf with a dilated entire oblong base four to five inches long, two and a half to three inches broad, and an ensiform lamina above a foot long, one inch and a quarter to one inch and a half broad at the base, narrowed gradually to the point, the basal prickles lanceolate, one-twelfth to one-eighth of an inch long, those of the upper half of the leaf very small. Scape a foot long, with many large lanceolate bract-leaves, the upper tinted red. Panicle six to twelve inches long, four to six inches broad, with floccose rachises, the upper branches dense and simple, subtended by small deltoid bracts, the lower branches lax, with forked or panicle spikes with a peduncle and large lanceolate bracts. Spikes distichous, one inch to one and a half inch long, three-quarters of an inch diameter, each flower subtended by an ovate cuspidate striated coriaceous navicular bract three-eighths to one-half of an inch long. Calyx including ovary three-eighths of an inch long; sepals deltoid-cuspidate one-eighth to one-sixth of an inch long. Petals pale, one-sixth of an inch longer than the calyx. Portobello, *Berghius!* (*Herb. Linn.*) Nicaragua, *Ralph Tate*, 416! Chagres, *Fendler*, 449! Panama, *Seemann*, 609! This very distinct plant, though known to Linnæus and preserved in his herbarium, seems never to have been named nor described.

(To be continued.)

A CHINESE FONTANESIA.

By H. F. HANCE, PH.D., F.L.S., &c.

RATHER less than three years ago Mr. W. B. Hemsley, in some notes on Chinese plants, printed in this journal, alluded to "a deciduous shrub (originally gathered by Fortune) having the general aspect of a *Ligustrum*, but with axillary flowers very closely resembling those of *Fontanesia phillyræoides*, the plant in some respects too resembling *Chionanthus* and *Osmanthus*,"* of which he had examined specimens from my friend, Mr. F. B. Forbes, of Shanghai.

Since his return to China it has been my privilege to enjoy a tolerably constant correspondence on botanical subjects with Mr. Forbes; and, amongst other plants of novelty or interest, I am

* Trimen, 'Journ. Bot.' xiv., 208.

indebted to him for excellent specimens of the shrub referred to by Mr. Hemsley. An examination of this proves unequivocally that it is in all respects a true *Fontanesia*, of which I subjoin a diagnosis.

FONTANESIA CHINENSIS, *sp. nov.*—Frutex v. arbuscula, ramis cortice cinereo obductis, ramulis erectis glaberrimis, foliis glaberrimis lanceolatis sensim acuminatis integerrimis penniveniis subtus pallidioribus $1\frac{1}{2}$ – $2\frac{1}{2}$ poll. longis infra medium 6–9 lin. latis petiolo lineali, floribus in racemos axillares et terminales folio breviores v. fere æquilongos dispositis subpolygamis aliis scilicet hermaphroditis aliis masculis ovario nunquam maturescenti, pedicellis flore subæquilongis, calyce brevi inæqualiter 4-lobo, petalis oblongis basi per paria connexis, antheris petala subdimidio excedentibus ipso filamento crassiusculo 5–6-plo longioribus, ovario florum fertilium calyci æquilongo orbiculari stylo eo triplo longiore coronato stigmatate bifido, loculis semper* uniovulatis, florum sterilium cito ad 5–6 lin. longitudinis excrescente oblongo fere ad medium usque in lobos 2 angustos acutos fisso loculis sæpissime vacuis nunc ovulum cassum gerentibus, samara quadrato-oblonga utrinque retusa 4 lin. longa.

In collibus Feng-wang-shan, provinciæ Kiang-su, florif. m. Maio, frf. mm. Octobri et Novembri, 1877–8, collegit mecumque communicavit amicissimus F. B. Forbes. (Herb. propr. n. 20725.)

The hills where this plant grows, I learn from Mr. Forbes, are those nearest to Shanghae, lying about twenty miles to the S.W. of that city. The highest is not more than 250 feet above the sea-level; and he tells me there is no doubt that they once belonged to the Chusan archipelago, of which another small group is to be found silted up at Cha-pu, on the coast S.E. of Shanghae, where the sea still washes their base.

In the herbarium—I have seen neither shrub alive—this species has the most striking resemblance to the Syrian *F. phillyræoides*, Labill., the only other one known; so great indeed that, without examination, the two might readily be supposed to be identical. But it differs by its more truly lanceolate rather than oblong or oblong-lanceolate leaves, its more fully developed inflorescence, the rather shorter pedicels, short filaments, uniovulate ovary-cells, longer style, and especially by its subpolygamous flowers,—perfect and imperfect ones intermingled,—with the curious rapidly growing abortive ovary of the sterile form. The occurrence of these sterile flowers is interesting, as showing apparently that the affinity of the genus is rather with *Frasinus*, next which it is placed by Bentham and Hooker in the “Genera,” than with the *Syringea*, where DeCandolle stationed it. But it must be acknowledged, I think, that the genera in this order cannot be marshalled into very well-marked tribes, and Boissier (excluding *Jasmineæ*) admits only two, *Oleinaæ* with a fleshy fruit, and *Lilaceæ* with a dry one.†

* Ex iteratis am. Forbesii observationibus.

† Fl. Orient. iv., 58.

The determination of this interesting plant adds another to the list of genera, often comprising very few species, common to the eastern shores of the Mediterranean and to the extreme east of Asia, some examples of which I adduced in this journal a few years since.* The most easterly station of *F. phillyræoides* is separated by no less than eighty degrees of longitude from the habitat of its now first-described and very near relative. As bearing more or less closely on this curious subject, the reader will do well to consult the remarks of M. Alphonse DeCandolle,† Prof. Asa Gray's 'Essay on *Sequoia*,' ‡ Sir Joseph Hooker's lecture "On the distribution of the North American Flora," delivered at the Royal Institution, on the 12th April, 1878, and that of Mr. Thiselton Dyer "On plant-distribution as a field for geographical research." §

POLYGALÆ AMERICANÆ NOVÆ VEL PARUM
COGNITÆ.

By ALFRED W. BENNETT, M.A., B.Sc., F.L.S.

THE vegetable productions of the vast territory of the American Continent have been arranged in systematic Floras chiefly as far as regards the Republic of the United States in the Northern, and the Empire of Brazil in the Southern, hemisphere. A fairly complete knowledge of the former may be obtained from Torrey and Gray's 'Flora of North America,' Wood's 'Class Book of Botany,' and Prof. Sereno Watson's 'Bibliographical Index to North American Botany,' or at least this will be the case as soon as all these works are completed; while Martius's 'Flora Brasiliensis,' should it ever be brought to a conclusion, will be the most magnificent and complete local Flora ever published. There is at present no means of obtaining a similar survey of the productions of the British and Alaskan territories of North America, Mexico, Central America, Peru, Chile, Patagonia, and the other independent states of South America, some of them possessing very rich and varied floras. The botanist in search of the diagnoses of the native plants of these regions has to run through a great number of publications, such as Humboldt, Bonpland and Kunth's 'Nova Genera et Species Plantarum,' Gray's 'Plantæ Wrightianæ, Fendlerianæ, & Lindheimerianæ,' Triana and Planchon's 'Contributions to the Flora of New Grenada,' Bentham's 'Plantæ Hartwegianæ' and 'Botany of the Sulphur,' Ruiz and Pavon's Flora of Peru, Gay's Flora of Chile, and many other books and detached papers.

In the following pages an attempt is made to supply this deficiency as far as regards a single genus, which is more or less

* Trimen, 'Journ. Bot.' xi., 169. + Geogr. Bot., ii., 1131.

‡ Darwiniana, 205.

§ Proc. R. Geogr. Soc., xxii, n. 6.

abundantly distributed through every portion of the Continent, from Canada to Patagonia. The herbaria at my disposal, besides those at Kew and the British Museum, have been those belonging to the Berlin, Vienna, Munich, and Brussels Collections, and that of M. Warming. Dr. J. Müller of Geneva has also kindly identified for me some of the species described in DeCandolle's 'Prodromus.' In these herbaria I have found materials for the description of fourteen new species, and of several others hitherto imperfectly known or described. Species named in Watson's 'Bibliographical Index' or in Martius's 'Flora Brasiliensis' are only referred to when some fresh fact has come to light respecting them. In the case of all others, either a full diagnosis is given, or reference is made to a sufficient one already published. The sign * prefixed to the name of a species signifies that it is a Brazilian species not named in the former, the sign † that it is a United States species not named in the latter publication. The greater number of the new species are the result of Balansa's visit to Paraguay in 1874-77; and as this collection has been very recently distributed, I have thought it might be useful to append at the end of the paper a complete nomination of the species obtained in that journey, as far as I have been able to determine them. If we add to the 35 species named in Watson's 'Index,' and the 86 in the 'Flora Brasiliensis' (one species only, *P. paniculata*, L., being common to the two*), the 34 additional ones referred to in this paper, we get 154 as the total number of species of *Polygala* at present known as natives of the American Continent. This does not include five species found in the West Indian Islands but not growing on the Continent, viz., *P. brachyptera*, Gris., *P. spathulata*, Gris., *P. squamifolia*, Wr., *P. saginoides*, Gris., and *P. erioptera*, DC. With the exception of *P. tenuis*, DC., of Brazil, which appears to be identical with *P. paludosa*, St. Hil., of Tropical Africa, and *P. erioptera*, DC., which has probably been introduced into the West Indies from India, there is no species of *Polygala* common to the Eastern and Western hemispheres.

The subdivision of the genus is that adopted by me in my monograph of the Brazilian species in Martius's 'Flora Brasiliensis;' the older subdivisions, especially that of DeCandolle's 'Prodromus,' being altogether useless. It is not pretended that the six divisions have all equal value, or that they will all maintain their place when a complete monograph of the genus comes to be written; the 5th and 6th especially are not satisfactory. But in the meantime it is the best for my present purpose.

SECTIO A.—Carina triloba, lobus medius integer, nec cristatus nec fimbriatus; sepala exteriora discreta; semina eximie strophiolata vel rarius estriophiolata. Frutices vel suffrutices, floribus magnis et nonnunquam speciosis.

This section belongs especially to Tropical America; most of the species are good-sized shrubs; and, in the case of the Brazilian

* Unless, as I suggest below, *P. grandiflora*, Walt. is identical with *P. hebeclada*, DC., and *P. angustifolia*, H. B. K. with *P. flabellata*, Shuttl.

P. spectabilis, DC., *P. grandifolia*, St. Hil., and some others, the flowers are equal in size and beauty to any of the better known South African species of the genus, and would be magnificent additions to our stove-plants. The southern limit of the section appears to be but little south of the tropics; northwards it extends through Central America into Mexico and Texas; but the northern species are less striking, both in the size of the plant and in that of the flower.

1. *P. americana*, Mill., Gard. Dict.; DC., Prodr., i., 330; Gris., Flor. W. I., 28. Caulis ascendens, lignosus; rami pubescentes. Folia ovato-lanceolata, acuta, in pedicellum brevem attenuata, læte viridia, glabra vel pubescentia; petiolus et vena folii media subtus pubescentes. Racemi terminales, sat laxiflori; pedicelli hirsuti; bracteæ lineari-lanceolatæ, deciduæ vel subpersistentes. Sepala exteriora omnino distincta sed approximata, acuta, hirsuta; alæ ovatæ. Carina ventricosa, ecristata, basi ciliata; petala lateralia ad carinam approximata. Ovarium dense hirsutum; stylus filiformis, rectangulo curvatus. Capsula magna, elliptica, valde emarginata, membranacea, leviter hirsuta, ciliata, pedicello brevi, hirsuto. Semina pyriformia, sericea; arillodium galeatum, semini æquilongum, inappendiculatum. *P. caracasana*, H. B. K., v., 407; DC., Prodr., i., 331; *P. rivinaefolia*, H. B. K., v., 409, t. 512; DC., Prodr., i., 331; *P. peduncularis*, A. Rich., Fl. Cub., i., 37, t. 12.

A most difficult species, from its variability, and consequent synonymy. It varies greatly in the size and shape of the leaves, which are from 1 to 2½ inches long, and from ½ to 1 inch broad, and in that of the flowers, which are usually about 2 lines long. Grisebach identifies with this Kunth's *P. caracasana*; and the *P. rivinaefolia* of the same author presents no difference either in the description or the drawing: It is perhaps best distinguished from its congeners by the ventricose lower portion of the corolla; and is usually a shrubby plant, perhaps 2 feet high. It appears to be abundant in Mexico, at all events within the Tropics, and extends southwards through the Isthmus to Venezuela, occurring also in San Domingo, Trinidad, and Cuba. The following numbers may be referred to it:—Bern., 120, 1092; Lindh., 174; Coult., 732; Gal., 879; Fendl., 1910; Wawr., 1080; Schied., 497; Liebm., 29, 30.

β *hebecarpa*; planta et præsertim fructus mollior. *P. hebecarpa*, DC., Prodr., i., 330; Venezuela, Fendl., 240; St. Domingo.

1 a. *P. platycarpa*, Benth., Pl. Hartw., 113, seems to me merely a form of *P. americana* with larger and broader leaves, and more hairy capsule; it is generally a larger plant. To it may be referred Hartw., 632; Liebm., 32–35; Gal., 881.

2. *P. obscura*, Benth., Pl. Hartw., 58, is a very good species, found only in Mexico, with the following numbers:—Hartw., 446; Gal., 883; Andrieux, 525; Coult., 728 (?); Liebm., 25, 26.

3. *P. hebantha*, Benth., Bot. Sulph., 67, is well distinguished, in its typical form, by its smaller size, more pubescent habit, and orbicular capsule, which is larger and more hairy; but in its larger

forms it approaches very near to *P. americana*. It occurs in Tropical Mexico, Honduras, and Guatemala, and doubtfully in Ecuador. Wawr., 804; Hook., 1843: Seem., 761 (?).

†4. *P. Nutkana*, DC., Prodr., i., 330. With this A. Gray has identified, and no doubt correctly, *P. cucullata*, Benth., Pl. Hartw., 299, from California, distinguished from all its allies, except the following, by the cucullate carina. It is recorded from California, Lobb, 277, and Sierra Nevada. *P. cornuta*, Kellogg in Proc. Calif. Acad., i., 61; *P. californica*, Nutt. in Geol. Surv. Calif., 59.

P. subspinosa, S. Wats. in Amer. Nat., vii., 299. Perennis, herbaceus, glaber vel plus minus pubescens. Caules 2-8 poll. alti, superne ramosi, rami sæpe spinosi. Folia sparsa, $\frac{1}{2}$ -1 poll. longa, elliptica vel oblanceolata, acuta vel obtusa, ad basim attenuata. Racemi laxi, pauciflori; bracteæ parvæ, scariosæ; pedicelli demum reflexi, floribus breviores. Sepala ciliata vel eciliata; alæ oblongæ, 4-5 lin. longæ, corollam æquantes. Carina cucullata, appendicem latam saccatam gerens. Stylus linearis. Capsula orbicularis, emarginata, breviter stipitata. Silver City, Nevada; Kanab Arizona; Southern Utah, Parry, 32. Central Mexico, Parr. et Palm. (1878), No. 42 (?). Obviously near *P. Nutkana* (*P. cucullata*, Benth.), with which it agrees in the structure of the carina. It is the only spiny Polygala of the Northern Continent; but in some of the localities the spines are only feebly or not at all developed.

5. *P. buxifolia*, H. B. K., v., 407; DC., Prodr., i., 331. The only specimen I have seen to which this name is attached, Graham, 134, from Mexico, doubtfully named by Mr. Bentham, in the Kew herbarium, answers fairly well to Kunth's description.

6. *P. glandulosa*, H. B. K., v., 404, t. 510; DC., Prodr., i., 331; Nova Hispania, I have never seen.

7. *P. Parryi*, A. W. Benn. in Hem. Diagn. Pl. nov. Mex., ii. Caulis basi perlignosus et ramosus; rami tenues, pubescentes. Folia lanceolata vel oblanceolata vel suborbicularia, apiculata, infra in petiolum brevem attenuata, sæpius pubescentia. Racemi brevissimi, pauciflori; bracteæ ovatæ, hirsutæ, usque ad anthesim persistentes. Sepala exteriora alas fere æquantia; superius viride et subbrevis; duo inferiora subpetaloidea, hirsuta, ciliata; alæ sepala exteriora vix excedentes, obovatæ, apiculatæ. Carina ecristata, ad apicem hirsuta; petala lateralia fere usque ad basim libera, carinam multo superantia. Ovarium subglobosum. Capsula rotunda, vel latior quam longa, hirsuta. Semina (immatura) hirsuta; arillodio galeato.

Central Mexico, Parr. et Palm. (1878), No. 40. The specimens are imperfect, and have apparently been browsed down, but the distinctly-stalked leaves (usually about 3 lin. long and 2 wide), comparatively large external sepals, and apiculate wing-sepals, clearly mark a distinct species.

To this section belong also—

P. ovalifolia, DC., Prodr., i., 331; Gray, Pl. Lindh., 151 (= *P. ovatifolia*, Gray, Pl. Wright., i., 39); very near to *P. americana*. It occurs also in Mexico; Parr. et Palm. (1878), No. 43; *et al.*

- P. Lindheimeri*, Gray, Pl. Lindh., 150; well distinguished by the remarkably geniculate rachis of the raceme.
- P. macradenia*, Gray, Pl. Wright., i., 39, with remarkably hoary habit.
- P. puberula*, Gray, Pl. Wright., i., 40, (= *P. pubescens*, Schlecht. in Linn., xiv., 160), not of Mart. MS.
- P. Xanti*, Gray, Proc. Amer. Acad., v., 153.

SECTIO B. Carina triloba, lobus medius integer, nec cristatus nec fimbriatus, e stylo rectangulo curvato longe productus; sepala exteriora duo inferiora plus minus coalita; semina cylindrica, sericeo-hirsuta, strophiolata; arillodium album, galeatum, nunquam appendiculatum. Herbæ vel suffrutices, floribus sat magnis.

The geographical distribution of this section is very nearly the same as that of the first, extending from Southern Brazil, throughout Tropical South America, the Isthmus, and the West Indies to Mexico and the Southern United States. The two inferior exterior sepals always more or less connate, frequently almost to the apex, the protruded apex to the carina, slender style remarkably bent at right angles and ending in a simple stigma, and remarkably large fleshy erect arillode, which is never appendiculate, are accompanied by a smaller and generally more pubescent habit. Only in the case of *P. floribunda* do we have a large woody shrub with conspicuous flowers.

*8. *P. monticola*, H. B. K., v., 405; DC., Prodr., i., 330, I have met with only in the Vienna herbarium (Endl., no. 1323), described as from "Peruvia subandina vulgaris ad vias Cuchero," and in the herbarium of M. Warming, collected at Lagoa Santa (no. 552). It must therefore be added to the Brazilian species described in the 'Flora Brasiliensis.' It is a good-sized shrub, well marked by its thin apiculate leaves, the racemes frequently not terminal, and the almost complete cohesion of the two inferior of the glandular-ciliate sepals. "*P. monticola*, H. B. K., Venezuela, Moritz, 221," in the British Museum herbarium, is certainly *P. americana*.

8a. *P. monninoïdes*, H. B. K., v., 408; DC., Prodr., i., 331, described from an imperfect specimen, appears to me identical with the last; but I have not seen it.

9. *P. floribunda*, Benth., Pl. Hartw., 58, is by far the handsomest and most showy plant of this section. It appears to grow both on the mountains and on the walls of temples, and has been gathered in Guatemala by Hartweg, 572; and in Mexico by Hartw., 447, Liebm., 22, and Wawra, as well as by Karwinski under the name *P. rivinaefolia*. Misled by a general resemblance in habit, Seemann (Bot. Her., 269) identifies Bentham's Central American plant with St. Hilaire's *P. ligustroides* and *P. oleafolia* from Brazil. Independently of other characters, it is, however, amply distinguished by its completely connate inferior sepals, which are distinct and imbricate in both these latter species.

P. grandiflora, Walt. Car., 179; Torr. & Gr., Fl. N. Am., i., 332. This species, which extends from South Carolina to Louisiana and Florida, is the only crestless *Polygala* found east of the Mississippi.

It appears to me absolutely indistinguishable from the Brazilian *P. hebeclada*, DC., except in the uncertain character that in the North American plant the bracts are always deciduous before flowering, while in the southern form they are almost always persistent. If the two are identified, DeCandolle's name must yield in priority to Walters's; but it is very remarkable that the species should occur abundantly in such widely separated districts, without any record of its occurrence in the intervening country from Texas to the Amazon.

P. angustifolia, H. B. K., v., 405, t. 511, a species widely distributed throughout South America, and occurring also in the West Indies, appears to extend to Southern Mexico (Liebm., 23, 24; Wawr., 117). *P. flabellata*, Shuttl., from Florida, is very nearly allied, if not identical.

The list of Sections A and B, comprising the whole of the crestless Polygalas known to the American Flora, is completed by the addition of the 22 species described by me in Martius's 'Flora Brasiliensis.'

SECTIO C.—Carina cristata. Caulis aphyllus vel subaphyllus, vel folia perpauca vel squamiformia. Herbæ floribus parvis, sive tenues haud ultra semipedales, sive majores, duræ, rigidæ, fragiles.

A section which has its centre in Tropical Brazil, and includes but few species beyond the bounds of that kingdom and Guiana.

10. *P. spinescens*, Gill. in Hook. Bot. Misc., iii., 146 (non Decaisne). Fruticulus rigidus ramosissimus; ramis in spinas aciculares currentibus. Folia parva, minutissima, linearia, subulata, 2 lin. longa. Flores pauci, solitarii, vel in racemos brevissimos congregati, 2 lin. longi, pedicellis glabris quam flores dimidio brevioribus suffulti; bracteæ minutissimæ, deciduæ. Sepala exteriora ovata, subæqualia, leviter ciliata; alæ obovatæ, subunguiculatæ, corollam parvo excedentes. Carinæ crista grandis, fimbriata; petala lateralia ascendentia. Ovarium ellipticum. Capsula (immatura) $2\frac{1}{2}$ lin. longa, anguste ovalis, truncata, glabra. Semina triplo longiora quam lata, hirsuta; arillodii appendices semine $\frac{2}{3}$ breviores.

Chile. Dry hills near Agua de los cielos, Mendoza, Gillies. The only spiny South American Polygala, and remarkably different from any other species. By some extraordinary blunder, Seemann (Bot. Her., 269) identifies Gillies' plant from Chile with Kunth's *P. scoparia* from Mexico! a confusion which is inexplicable to any one who has seen the two plants. The synonym under the latter name in Watson's 'Bibliographical Index' must therefore be expunged. Gillies described this plant in 1833. In the following year Decaisne (Fl. Sin., 51) gave the same name to a spiny *Polygala* from the Sinaitic Peninsula, which should be known by the specific name *Decaisnei*, subsequently given to it by Steudel.

P. incarnata, Linn.; Torr. & Gr., Fl. N. Am., i., 129. — This species extends from New Jersey and Missouri southwards to Florida, Texas, and Mexico. A Mexican form almost entirely

destitute of leaves is described in Hemsley's 'Diagnoses Plantarum novarum Mexicanarum' under the name "*P. microphylla*, A. W. Bennet." This was a misprint for *P. microptera*; but, under whatever name, the species must be sunk in Linnæus's. It includes the following Mexican localities:—Lindh., 74; Liebm., 16–18; Xalapa, Gal., 7096; Oaxaca, Herb. Vind., 212.

The other North American species of this section are *P. leptocaulis*, T. & Gr., from Texas, *P. setacea*, Mx., and *P. Chapmanni*, T. & Gr. (doubtfully), of the Southern United States.

Two Cuban species, *P. brachyptera*, Gris., and *P. squamifolia*, Wr., certainly belong to this section; as also does

11. *P. stenophylla*, A. Gr., in Bot. Wilkes' Exp., 103, from the Rio Negro, Northern Patagonia, which is very nearly allied to *P. juncea*, St. Hil., but a somewhat slenderer plant, and probably distinct.

(To be continued.)

ON THE FLORA OF NORTH-WESTERN DONEGAL.

BY HENRY CHICHESTER HART, B.A., F.L.S.

(Concluded from p. 114).

Polygonaceæ.

- Rumex conglomeratus*, Murr. Frequent. F.
R. sanguineus, L. Local. Greenfort, Glenalla, &c. F.
R. obtusifolius, L. Common; near Ballyhooriskey, &c. F.
R. crispus, L. Frequent by the shore. F.
R. Acetosa, L. Common. F.
R. Acetosella, L. Abundant. F.
Polygonum amphibium, L. Common. F.
P. lapathifolium, L. Not common. Carrablagh and Ballylar, Fanet. F.
P. Persicaria, L. Abundant. F.
P. Hydropiper, L. Very common. F.
P. aviculare, L. Common. F.
 †*P. Convolvulus*, L. Frequent. A bad weed in the crops. F.
P. minus, Huds. Very rare; between Gweedore and Dunglow.

Flor. Ulst.

Oxyria reniformis, Hook. Extremely rare. In the Poisoned Glen, in most of the gullies from about 500 feet to the ridge, more especially in the deepest one at the southern side with *Saxifraga oppositifolia*. Though I carefully examined the surrounding mountains, glens, &c., I could find no trace of the three alpine plants *Thalictrum alpinum*, *Saxifraga oppositifolia*, and *Oxyria reniformis*, except in the Poisoned Glen.

Empetraceæ.

Empetrum nigrum, L. Common. F.

Euphorbiaceæ.

Euphorbia hyberna, L. The original record of the occurrence of this plant in Donegal is Templeton's MS. note "C. Donegal, Mr. Brown." In Mr. More's "Recent additions to the Flora of Ireland, 1872," the plant is recorded, on the authority of Mr. Norman Moore, as occurring in the Poisoned Glen, "amongst large rocks and bushes on the south side," and this was believed to be a confirmation of Robert Brown's observation. This description confined my search within very narrow limits, "bushes" being by no means common in the Poisoned Glen, and in fact they only occur in one spot. However, though I spent several days in the Glen, and carefully examined the above-described situation, I could not find any trace of the Irish Spurge; and I could not help thinking it possible that *Myrica Gale* was mistaken for it, as I found it in the exact locality, and its barren shoots bear some resemblance to those of the Spurge: but on writing to Mr. Norman Moore on the subject, I find that he is still convinced of the correctness of his observation.

Euphorbia portlandica, L. Rare. Bottom Shore and Melmore Point. F.

‡ *E. Peplus*, L. Common as a colonist. F.

‡ *E. Helioscopia*, L. A colonist; not so common as the last. F.

E. amygdaloides, L. Extremely rare; in Glenalla Woods, occurring in variable quantities from year to year. I have not seen the plant elsewhere in the County, but I believe it to be native here. It has been known as a wild plant in these woods for upwards of twenty years, when an ancient gardener, on being questioned about it, recognised it as wild, saying "they almost call it a mare's tail." I cannot help thinking that this may be the plant which was gathered in the days of his youth by Robert Brown, and hastily named *E. hyberna*. At that time (when serving as an Army Surgeon) he was probably not well acquainted with either species; and moreover, Glenalla is a much more likely place for him to have visited than the Poisoned Glen. Brown's other record (*Saxifraga oppositifolia*) is also near Lough Swilly, and he could scarcely have visited the Poisoned Glen without observing some of the Alpine plants which I gathered there this year. The very Rev. Dean Gwynne was the first who sent specimens of this plant to Dublin from Donegal.

‡ *Euphorbia exigua*, L. Very rare; I gathered two small plants this year at Carrablagh, near the house. F.

Callitrichaceæ.

Callitriche verna, L. Common. F.

C. autumnalis, L. Very rare. In Kindrum Lake, near Ballyhernan Lodge. Ditch by the roadside near Dunfanaghy, C. Moore. F.

Urticaceæ.

- † *Parietaria diffusa*, Koch. Rare. Rathmullan Castle, 1867.
 † *Urtica urens*, L. Local; Kindrum, &c.; always near cottages. F.
U. dioica, L. Common. F.

Ulmaceæ.

- * *Ulmus suberosa*, Ehrh. Common but not native. F.

Amentiferaæ.

- Salix cinerea*, L. Common. F.
S. caprea, L. Frequent. F.
S. aurita, L. Local. Glenalla.
S. repens, L. Frequent. Murren, Carrablagh, &c. F.
S. herbacea, L. Rare. Near the summit of Slieve Snacht West,
 on the western side; summits of Errigal and Muckish.
Populus tremula, L. Common. Carrablagh, Bunlinn, &c. F.
Myrica Gale, L. Common. F.
Betula alba, L. Frequent. F.
Alnus glutinosa, Gært. Common. F.
Quercus Robur, L. Common and native along western shores of
 Lough Swilly, &c. F.
Corylus Avellana, L. Common. F.

Coniferæ.

- Taxus baccata*, L. Rare as a native. On an Island in a lake
 in 'The Rosses,' to which it gives its name "Lough-an-ure"
 or the Lake of the Yew tree. Also in Glenveagh; native?
Juniperus communis, L. Rare in this form; grows as an erect
 shrub at Greenfort, Fanet, reaching a height of three or
 four feet, and in Glenveagh I have seen it eight to ten feet
 high, while in one instance it was fully fifteen feet.
J. var. nana. This is the common form which grows in barren
 stony situations, from sea-level to the summits of the
 highest mountains, as on Errigal. It is especially
 abundant in Fanet. F.

MONOCOTYLEDONES.

Orchidaceæ.

- Orchis mascula*, L. Not unfrequent. Glenalla, &c. F.
O. maculata, L. Abundant. F.
O. latifolia, L. Abundant. F.
O. var. incarnata, L. Common on wet sandy soil between the
 Bottom Shore and Kindrum, and elsewhere. F.
O. pyramidalis, L. Rare and very local; between Kindrum and
 Ballyhernan; near Horn Head House. F.
Gymnadenia conopsea, R. Br. Rare; Glinsk; Horn Head. F.
G. albida, Rich. Rare; Carrablagh; Seven Arches. F.
Habenaria viridis, R. Br. Common in Fanet. F.
H. bifolia, R. Br. Rare; Kindrum; Glinsk. F.
H. chlorantha, Bab. Local; Glinsk; Kindrum; Glenalla. F.

Listera ovata, R. Br. Local and rare; Glinsk; Leenane; Horn Head. F.

L. cordata, R. Br. Local and rather rare. Knockalla, along the summit; Murren, east side; Croghanmore, and other mountains near Rathmullan; Aughterlinn; and at the extreme summit of Lough-Salt Mountain (1546 ft.) F.

Epipactis palustris, Sw. Very rare; eastern side of Horn Head, near the Islands.

Iridaceæ.

Iris Pseud-acorus, L. Common. F.

Liliaceæ.

Allium ursinum, L. Rare; Glenalla Woods; Rathmullan Woods.

Eudymion nutans, Dum. Common. F.

Eriocauloneæ.

Eriocaulon septangulare, With. Very rare; in two small lakes to the west of Lough-an-ure in the Rosses; Co. Donegal.

Juncaceæ.

Narthecium Ossifragum, Huds. Common. F.

Juncus maritimus, Sm.

J. effusus, L. Common. F.

J. conglomeratus, L. Common. F.

J. glaucus, Ehrh. Rare. Dunkineely Road; near Drumalla, Rathmullan.

J. supinus, Mœnch. Common. F.

J. squarrosus, L. Common. F.

J. bufonius, L. Abundant. F.

Luzula sylvatica, Bich. Common. F.

L. campestris, Willd. Common. F.

L. multiflora, Lej. Common. F.

L. pilosa, Willd. Local. Glenalla Woods, and thickets at Carrablagh. F.

Alismaceæ.

Alisma Plantago, L. Frequent. F.

A. ranunculoides, L. Frequent. F.

Triglochin maritimum, L. Frequent. F.

T. palustre, L. Frequent. F.

Typhaceæ.

Typha latifolia, L. Rare; Kindrum; Melmore Point; near Milford, and by the river near Ramelton. F.

Sparganium ramosum, Huds. Frequent. F.

S. natans, L. Rather rare. Loughs Keel, Golagh and Glenveagh. F.

S. minimum, Fries. Common. Ballyhooriskey; Glenalla. F.

Araceæ.

Arum maculatum, L. Rare. Croghan, Fanet; Horn Head. F.

Lemnaceæ.

Lemna minor, L. Common. F.

Potamogetonaceæ.

- Potamogeton natans*, L. Frequent in deep lakes, and adjoining ditches; Kindrum, Lough Golagh, &c. F.
P. polygonifolius, Pourr. Common on wet peat, &c. F.
P. lucens, L. Local; in deep lakes, growing from six to eight feet in length. Lough Golagh; Kindrum, &c. F.
P. pusillus, L. Scarce. Kindrum and Kinnalough. F.
P. perfoliatus, L. Rare. Kindrum. F.
Zostera marina, L. Common. F.

Cyperaceæ.

- Scheuchzeria palustris*, L. Frequent. F.
Cladium Mariscus, R. Br. Rather rare; Kindrum; Lough Golagh. F.
Rhynchospora alba, Vahl. Locally abundant; Glenveagh; The Rosses.
Fleocharis palustris, R. Br. Common. F.
Scirpus maritimus, L. Rare. In crevices of wet rocks at the Seven Arches, Fanet. F.
S. lacustris, L. Local. Kindrum, &c. F.
S. cæspitosus, L. Common. F.
S. fluitans, Hook. Local. F.
S. setaceus, L. Fields and ditches near Croaghross. F.
S. Savii, S. et M. Common. F.
Eriophorum vaginatum, L. Frequent. F.
E. angustifolium, Roth. Common. F.
Carex dioica, L. Rare; on banks below the house at Carrablagh. F.
C. pulcaris, L. Local. Carrablagh; Glenalla; Horn Head. F.
C. arenaria, L. Sandy sea-shores. Common. F.
C. remota, L. Local and rare. Glenalla. F.
C. stellulata, Good. Frequent. F.
C. ovalis, Good. Local. Glenalla. F.
C. rigida, Good. Very local. Muckish; Errigal and Bulbein Mts; *Flor. Ulst.*
C. vulgaris, Fries. Frequent; Magherawarden; Glenalla. F.
C. pallescens, Lam. Rare. Glenalla and "Between Waters." F.
C. panicea, L. Frequent. F.
C. præcox, Jacq. Common. F.
C. pilulifera, L. Rare. Glenalla.
C. glauca, Scop. Common. F.
C. flava, L. (including *C. lepidocarpa*, Tausch). Frequent; Glenalla; Carrablagh. F.
C. extensa, Good. Dunfanaghy, and near Horn Head, Mr. C. Moore; *Cyb. Hib.*
C. fulva, Good. Muckish; *Flor. Ulst.*
C. distans, L. Rare. Shore below Horn Head House.
C. binervis, Sm. Frequent. Glenveagh; Leatbeg; Erris, &c. F.
C. lavigata, Sm. Rare. Leatbeg, Fanet. F.
C. hirta, L. Rather rare. Glenalla; Glenveagh. F.

- C. sylvatica*, Huds. Local. Glenalla; Greenfort. F.
C. ampullacea, Good. Frequent. Glenalla, &c. F.

Gramineæ.

- Phalaris arundinacea*, Trim. Frequent. F.
Anthoxanthum odoratum, L. Common. F.
Phleum arenarium, L. Local. Melmore Point; Doaghmore Strand, and Glinsk in "Between Waters;" Ballyicstocker Strand in Fanet; Gortnaloghogue. F.
P. pratense, L. Rare. Glenalla.
Alopecurus pratensis, L. Frequent. F.
A. geniculatus, L. Not uncommon. F.
Nardus stricta, L. Common. F.
Phragmites communis, Trin. Common. F.
Psamma arenaria, R. et S. Common. F.
Agrostis canina, L. Frequent. F.
A. vulgaris, With. Common. F.
A. alba, L. Common. F.
Holcus lanatus, L. Common. F.
Aira cæspitosa, L. Very common. F.
A. flexuosa, L. Frequent. F.
A. caryophyllea, L. Frequent. F.
A. præcox, L. Frequent. F.
Arrhenatherum avenaceum, Beauv. Very common and a very troublesome weed. F.
Triodia decumbens, Beauv. Frequent. Kindrum; Carrablagh; &c. F.
Kæleria cristata, Pers. Rather local. Bottom Shore; Kindrum; Carrablagh; Glinsk; Dunaff Head, &c. F.
Melica uniflora, Retz. Very rare, Bunlinn at the Waterfalls.
Molinia carulea, Mænoch. Common. F.
Glyceria fluitans, R. Br. Common. F.
Poa annua, L. Common. F.
P. trivialis, L. Frequent. Glenalla, Greenfort. F.
P. pratensis, L. Common. F.
Sclerochloa rigida, Link. Rare. Ballyhooriskey. F.
S. loliacea, Woods. Local. Glinsk; Ballyhooriskey and Bottom Shore. F.
S. maritima, Lindl. Rare. Bunlinn.
Briza media, L. Very local. Glenalla; and noticed by Rev. L. O'Brien at Fortstewart near Ramelton. F.
Catabrosa aquatica, Presl. Rare. Doaghmore Strand, near Glinsk, and by Lough Trusnahan, Fanet. F.
Cynosurus cristatus, L. Common. F.
Dactylis glomerata, L. Common. F.
Festuca sciuroides, Roth. Local. Carrowkeel and near Arryheernabin. F.
F. ovina, L. Common. F.
F. rubra, L. Local. Dunree; Ballyhooriskey. F.
F. gigantea, Vill. Glenalla. F.
F. pratensis, L. Common. F.

- Bromus asper*, L. Local. Little Bins. F.
B. sterilis, L. Rare. Near Carrowkeel. F.
B. mollis, L. Frequent. F.
Brachypodium sylvaticum, R. et S. Common. F.
Triticum repens, L. Frequent. F.
T. junceum, L. Dunree; Doaghmore Strand, near Glinsk. F
Elymus arenarius, L. Aranmore. Prof. E. Murphy.
Lolium perenne, L. Frequent. F.

ACOTYLEDONES.

Equisetaceæ.

- Equisetum arvense*, L. Common. F.
E. sylvaticum, L. Frequent. Glenalla, &c. F.
E. umbrosum, Willd. Very rare. Between Dunfanaghy and
 Gweedore; *Flor. Ulst.*
E. limosum, L. Frequent. F.
E. palustre, L. Local. Loughs Fallaneas, Columbkil, and
 Kinnalough. F.
E. hyemale, L. Rare. Little Bins, Fanet. F.

Filices.

- Polypodium vulgare*, L. Common. F.
Asplenium Adiantum-nigrum, L. Common. F.
A. Trichomanes, L. Frequent. F.
A. viride, Huds. Very rare. Near the southern extremity of
 the large lake on Lough Salt Mountain.
A. marinum, L. Common along the sea-coast. F.
A. Ruta-muraria, L. Extremely rare. One luxuriant specimen,
 gathered by Mrs. Montgomery near Drumalla, is the only
 instance I have known of its growth in this part of Donegal.
Scolopendrium officinale, L. Frequent. F.
Ceterach officinarum, Willd. Very rare. Bridge over the
 Lennan between Lough Fern and Ramelton; Rev. L.
 O'Brien.
Blechnum boreale, Sw. Common. F.
Pteris aquilina, Sw. Common. F.
Hymenophyllum tunbrigense, Sm. Rare and very local; Glen-
 veagh by the lake-side, west of the Castle; and in
 the "Backwood," Carradoan.
H. Wilsoni, Hook. Local. Glenveagh; Poisoned Glen;
 Bunlinn Backwood, Carradoan; to the summit of Slieve
 Snacht West (2200 feet); and near the top of Errigal.
Osmunda regalis, L. Frequent. F.
Botrychium Lunaria, Sw. Local. Carrablagh; Seven Arches,
 Kindrum, Between Waters, and elsewhere in Fanet. F.
Ophioglossum vulgatum, L. Local. Carrablagh; Leenane;
 Glinsk; Horn Head, &c. F.
O. lusitanicum, L. In August, 1878, I found a few plants of this
 fern amongst short grass near the margin of a cliff on the
 northern side of Horn Head. The fronds were fertile at

the time. Mr. Moore, of Chelsea, to whom I sent specimens, informed me that a correspondent supplied him with flowering fronds from cultivated plants at about the same time; the plant has been usually quoted as flowering in January. Its claims to a place in the British Flora have hitherto rested upon its known habitat in Guernsey. It is important to notice that typical *O. vulgatum* grows luxuriantly in several places on Horn Head, and I saw no intermediate forms.

Lycopodiaceæ.

Isoetes lacustris, L. Rare. Kindrum; Lough Keel; and in a small tarn between Slieve Snacht and the Poisoned Glen. F.

Lycopodium Selago, L. Common. F.

L. alpinum, L. Very rare. Summit of Moylennanav Mountain, to the east of Slieve Snacht West across the Gartan Road; on the summit of Slieve Snacht West. Muckish; *Flora Ulst.*

L. selaginoides, L. Frequent. Lough Golagh; Melmore Point, &c. F.

ERRATUM.—Page 107, line 24., and page 108, line 19, instead of Fort George, read Fort Royal.

THE CRYPTOGAMIC FLORA OF KENT—*FUNGI.*

BY T. HOWSE, F. L. S.

(Continued from p. 120.)

Subgenus 20.—*Naucoria.*

AGARICUS MELINOIDES, *Fr.* Berk. Outl., p. 9, f. 3.

Sydenham Hill. Amongst grass; very common.

A. VERVACTI, *Fr.*

Near Bromley, *Sparkes.*

A. SEMIORBICULARIS, *Bull.* Bull., t. 422.

Brasted; Knowle Park.

A. PEDIADES, *Fr.* Letell., t. 675.

Sydenham Hill.

Resembling *A. semiorbicularis*, but with a bulbous stem.

Subgenus 21.—*Galera.*

AGARICUS LATERITIUS, *Fr.* Fl. Dan., t. 1846, f. 2.

Near Bromley, *Sparkes.*

A. TENER, *Scheff.* Sow., t. 33.

Common; amongst grass and on dung.

A. OVALIS, *Fr.* Bull., t. 552, f. 1.

Sydenham Hill.

A. HYPNORUM, *Batsch.* Sow., t. 282.

Sydenham Hill. Amongst moss; common.

Subgenus 22.—*Tubaria*.

AGARICUS FURFURACEUS, *P. Bull.*, t. 535, f. 3.

Sydenham Hill. On chips and sticks; common.

A curious monstrosity occurred in the writer's garden, with the pileus resupinate and gills anastomosing, so as to resemble a small morel.

Subgenus 23.—*Crepidotus*.

AGARICUS ALVEOLUS, *Lasch*.

On fir-stumps, Tunbridge Wells, *Dr. Deakin*.

A. MOLLIS, *Schæff.* *Schæff.*, t. 213.

Shoreham; Knowle Park.

Allied to last, but more watery and gelatinous.

A. VARIABILIS, *P. Berk. Outl.*, p. 10, f. 1.

Halstead; Otford; Sydenham Hill; Speldhurst, *Holmes*.

This gills are reddish; hence it is sometimes placed in another subgenus, *Claudopus*.

A. RUBI, *Berk. Berk. Outl.*, t. 9, f. 7.

Margate, *Berk. in F. B.*; on old bramble-branches, Tunbridge Wells, *Dr. Deakin*.

Subgenus 24.—*Psalliota*.

AGARICUS CAMPESTRIS, *L. Sow.*, t. 305.

Sydenham Hill; common. Edible.

Var. *silvicola*; Sydenham Hill.

A curious monstrosity occurred in a shrubbery on Sydenham Hill with pileus resupinate and gills broken up into segments, giving the fungus the appearance of a *Hydnum*.

A. ARVENSIS, *Schæff. Berk. Outl.*, p. 10, f. 4.

Sydenham Hill; Tunbridge Wells Common, *Jenner Fl. Tunbr.*; Chislehurst.

Edible; turns yellow when bruised.

Subgenus 25.—*Stropharia*.

AGARICUS ÆRUGINOSUS, *Curt. Fl. Lond.*, t. 309.

Sydenham Hill; common.

A. SQUAMOSUS, *Fr. Berk. Outl.*, p. 10, f. 6.

Knowle Park, Sevenoaks; Hurst Wood, Tunbridge Wells, *T. Walker*.

A. SEMIGLOBATUS, *Batsch. Batsch.*, f. 110.

Sydenham Hill; Bromley, *Sparke*; Ide Hill, *Holmes*.

Subgenus 26.—*Hypholoma*.

AGARICUS SUBLATERITIUS, *Fr. Huss.*, i., t. 60.

Crystal Palace grounds; common.

A. FASCICULARIS, *Huds. Huss.*, ii., t. 15.

Sydenham Hill; very common.

A. EPIXANTHUS, *Fr. Paul.*, t. 107.

Wood near Otford, *Rennie*.

Closely allied to the last, but gills yellow, whilst those of

A. fascicularis are greenish. There is another nearly-allied species, *A. capnoides*, Fr., with greyish-purple gills. These two, as is also *A. conissans*, with brown gills, may easily be taken for *A. fascicularis*, the colour of the pileus being the same in all.

A. LACRYMABUNDUS, Fr. Saund. & Sm., t. 34.

Crystal Palace grounds; common.

The variety, *velutinus*, with a more slender stem, has not been observed.

A. APPENDICULATUS, Bull. Bull., t. 392.

Sydenham Hill; common.

A. HYDROPHILUS, Bull. Saund. & Sm., t. 24.

Charlton Lane, near Dover, Huss.

A. CANDOLLIANUS, Fr. Saund. & Sm., t. 34.

St. Paul's Cray Common, Chislehurst.

Subgenus 27.—*Psilocybe*.

AGARICUS SPADICEUS, Schæff. Schæff., t. 60, f. 4–6.

Sydenham Hill; common.

A very variable species.

A. FÆNISECH, P. Fr. Icon., t. 11, f. 1.

Common amongst grass.

Much resembling the black-spored *Panæoli*.

A. SEMILANCEATUS, Fr. Sow., t. 284, f. 1–3.

Dartford Heath, Holmes. Knowle Park.

A. COMPTULUS, Berk.

Crofton Woods, Holmes.

A. STERCORARIUS, Schum.

On horse-dung near Cobham, Berk. Engl. Fl., p. 111.

This is probably *P. bullaceus*, Bull.

A. NUCISEDUS, Fr.

Amongst small chips in a wood, West Farleigh, Berk. & Br.
in A. N. H.

Subgenus 28.—*Psathyra*.

AGARICUS CORRUGIS, P. Holmsk., ii., t. 32.

Sydenham Hill.

A. SPADICEO-GRISEUS, Schæff. Schæff., t. 237.

Sydenham Hill.

A. FIBRILLOSUS, P.

Hurst Wood, Tunbridge Wells.

Subgenus 29.—*Panæolus*.

AGARICUS SEPARATUS, L. Berk. Outl., t. 11, f. 7.

Sydenham Hill.

A. CAMPANULATUS, L. Bull., t. 561, f. 2, L.

Sydenham Hill; Knowle Park.

A. FIMIPUTRIS, Bull. Bull., t. 66.

Sydenham Hill; Knowle Park; near Bromley; Sparkes.

- A. PAPILIONACEUS, *Bull.* Bull., t. 561, f. 2, N. M.
Hurst Wood, Tunbridge Wells; Sandwich.

Subgenus 30.—*Psathyrella*.

- AGARICUS GRACILIS, *Fr.* Saund. & Sm., t. 37a.
Near Bromley, *Sparkes*.

- A. ATOMATUS, *Fr.* Saund. & Sm., t. 37, inf.
Crystal Palace grounds; Bromley, *Sparkes*; Margate, *Berk. in Engl. Fl.*

- A. DISSEMINATUS, *P.* Sow., t. 166.
Wood near Dunton Green, *Holmes*; near Bromley, *Sparkes*.

(To be continued).

SHORT NOTES.

BOTANICAL RECORD CLUB CHARAS.—I have recently examined the specimens of *Chara* belonging to the Record Club, which are the vouchers of Records on pp. 228–9 in the Report for 1877, and I find that there are several which require comment:—

Chara syncarpa, Thuill. “Hants South” and “Essex North.”—I sent these under the aggregate name of *Chara syncarpa*, Thuill. (which includes *Nitella syncarpa*, *N. capitata*, and *N. opaca* of Braun), not knowing that it was intended to attempt giving the segregates separately. Both of these plants are doubtless *N. opaca*, “Ag.,” A. Br. I cannot satisfactorily reduce any English plant that I have seen to *C. syncarpa* (segr.). It is, I think, the rarest form.

C. glomerata, Desv. “York South-east, H. F. Parsons.”—Instead of a specimen there is a letter from Prof. Babington, in which he does not refer the plant sent him to *C. glomerata* with certainty.

C. crinita, Wallr. “Glamorgan, F. A. Lees.”—This is not *crinita*, but a form of *aspera* (if dioecious); it is very different from *C. crinita*, although it is remarkably like a plant recently distributed as such from Swan Pool, near Falmouth.

C. fetida, A. Br. “York South-east, Parsons.”—I do not find a specimen of this, but instead a memorandum, at the foot of the label of a specimen from South-west York, that a similar plant had been found at the locality given in South-east York.

C. aspera, Willd. “York South-west.”—Dr. Parsons’ plant is *Chara fragilis*, as he labelled it, but his name has been altered to “*aspera*,” and some *C. aspera* attached to the card bearing his specimen.

I may also mention a specimen from Mid-west York, F. A. Lees, labelled *Chara fetida*. This is—most of it at least—*Chara fragilis*; although one or two pieces look different, they may have come from another part of the “Dyke.” This plant, however, is of little importance, not representing a New County Record.—H. GROVES.

HORDEUM SYLVATICUM IN SURREY.—I found this plant in a wood not far from the northern end of the Merstham Tunnel, near Chipstead. This seems worth notice, additions to the Surrey Flora being now so rare, although it makes no difference to the range of the plant, but only fills a gap, it being recorded in 'Topog. Bot.' for North Hants and West Kent.—H. GROVES.

A CORRECTION.—There is a mistake in my note on Dr. Nyman's 'Conspectus Floræ Europææ,' printed at p. 120, for which I beg to apologise to Dr. Nyman and to the readers of the Journal. *Rosa Blondæana*, Rip., which I have there included among "Plants given as British in 'Conspectus Floræ Europææ,' but not considered natives by British botanists," is, I see, one of the many synonyms of our *R. marginata*, Wallr., in Baker's *subrubiginosa* series, under *R. canina*, L.—W. MOYLE ROGERS.

Extracts and Notices of Books & Memoirs.

NEW GENERA AND SPECIES OF PHANEROGAMOUS PLANTS PUBLISHED IN PERIODICALS IN GREAT BRITAIN DURING THE YEAR 1878.

THE periodicals consulted in the compilation of this list are:—'Botanical Magazine,' 'Gardeners' Chronicle,' 'Icones Plantarum,' 'Journal of Botany,' 'Transactions' and 'Journal of the Linnean Society of London.'

ACROSPIRA, *Welw.* (Liliaceæ).—**A. ASPHODELOIDES**, *Welw.* Angola. (Trans. Linn. Soc., 2, i., p. 255, tab. 34.)

AGANISEA OLIVERIANA, *Rehb. f.* (Orchideæ).—Brazil. (Gard. Chron., pt. i., p. 558).

AGAVE PAUCIFOLIA, *Baker* (Amaryllideæ). (Gard. Chron., pt. i., p. 266.)

ALBUCA CHLORANTHA, *Welw.* (Liliaceæ).—Angola. (Trans. Linn. Soc. 2, i., p. 251.)

A. GALEATA, *Welw.*—Angola. (Trans. Linn. Soc., 2, i., p. 251.)

A. MONOPHYLLA, *Baker.*—Angola. (Trans. Linn. Soc., 2, i., p. 251.)

A. MYOGALOIDES, *Welw.*—Angola. (Trans. Linn. Soc., 2, i., p. 250.)

A. SUBSPICATA, *Baker.*—Angola. (Trans. Linn. Soc., 2, i., p. 250.)

ALLIUM ANGOLENSE, *Baker* (Liliaceæ).—Angola. (Trans. Linn. Soc., 2, i., p. 262.)

ALOCASIA THIBAUDIANA, *Mast.* (Aroideæ).—Borneo. (Gard. Chron., pt. i., p. 527.)

ALOE ANDONGENSIS, *Baker* (Liliaceæ).—Angola. (Trans. Linn. Soc., 2, i., p. 263.)

- A. ANGOLENSIS, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 263.)
- A. LITTORALIS, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 263.)
- A. PALMIFORMIS, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 263.)
- A. PLATYPHYLLA, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 264.)
- A. ZEBRINA, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 264.)
- ANGRÆCUM HILDEBRANDTHI, *Rehb. f.* (Orchideæ).—Comoro Is. (Gard. Chron., pt. i., p. 725.)
- A. SCOTTIANUM, *Rehb. f.*—Comoro Is. (Gard. Chron., pt. ii., p. 556.)
- ANOIGANTHUS, *Baker* (Amaryllidaceæ).—*Cyrtanthus breviflorus*, Haw., and *C. luteus*, *Baker*. (Journ. Bot., p. 76.)
- ANTHERICUM ANDONGENSE, *Baker* (Liliaceæ).—Angola. (Trans. Linn. Soc., 2, i., p. 257.)
- A. ARENARIUM, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 259.)
- A. BENGUELLENSE, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 257.)
- A. CALYPTROCARPUM, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 258.)
- A. DISSITIFLORUM, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 257.)
- A. LIMOSUM, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 257.)
- A. MOLLE, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 259.)
- A. MONOPHYLLUM, *Baker*.—Trop. Africa. (Journ. Bot., p. 34.)
- A. OATESII, *Baker*.—E. Trop. Africa. (Journ. Bot., p. 324.)
- A. ORCHIDEUM, *Welw.*—Angola. (Trans. Linn. Soc., 2, i., p. 258.)
- A. PTEROCAULON, *Welw.*—Angola. (Trans. Linn. Soc., 2, i., p. 258.)
- A. PYRENICARPUM, *Welw.*—Angola. (Trans. Linn. Soc., 2, i., p. 259.)
- A. SUPERPOSITUM, *Baker*.—Trop. Africa. (Journ. Bot., p. 324.)
- A. TENELLUM, *Welw.*—Angola. (Trans. Linn. Soc., 2, i., p. 256.)
- A. USTULATUM, *Welw.*—Angola. (Trans. Linn. Soc., 2, i., p. 258.)
- ANTHOLYZA HUILLENSIS, *Welw.* (Irideæ).—Angola. (Trans. Linn. Soc., 2, i., p. 270.)
- ANTHURIUM INSIGNE, *Mast.* (Aroideæ).—N. Grenada. Gard. Chron., pt. i., p. 430.)
- A. TRIFIDUM, *Oliver*.—Patria ignota. (Bot. Mag., tab. 6339.)
- APODOLIRION, *Baker* (Amaryllidaceæ).—A. BOLUSII, *Baker*.—S. Africa. (Journ. Bot., p. 75.)
- A. MACKENII, *Baker*.—Natal. (Journ. Bot., p. 75.)
- APONOGETON SPATHACEUM, *E. Meyer* (Naiadeæ).—S. Africa. (Bot. Mag., t. 6399.)

ARGYROTHAMNIA CANTONIENSIS, *Hance* (Euphorbiaceæ).—China. (Journ. Bot., p. 14.)

ARISTEA ANGOLENSIS, *Baker* (Irideæ).—Angola. (Trans. Linn. Soc., 2, i., p. 270.)

ARISTOLOCHIA SOMALIENSIS, *Oliv.* (Aristolochiaceæ).—Somali-land. Ic. Plant., t. 1273.)

ARJONA LINEARIS, *Miers* (Olacaceæ).—Argentine Republic. Journ. Linn. Soc. xvii., p. 132.)

A. RIGIDA, *Miers*.—Argentine Republic. (Journ. Linn. Soc., xvii., p. 132.)

ASPARAGUS ANGOLENSIS, *Baker* (Liliaceæ).—Angola. (Trans. Linn. Soc., 2, i., p. 254.)

A. BENGUELLENSIS, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 253.)

A. DEFLEXUS, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 254.)

A. DREPANOPHYLLUS, *Welw.*—Angola. (Trans. Linn. Soc., 2, i., p. 254.)

A. EQUISETOIDES, *Welw.*—Angola. (Trans. Linn. Soc., 2, i., p. 253.)

A. PSILURUS, *Welw.*—Angola. (Trans. Linn. Soc., 2, i., p. 253.)

A. PUBESCENS, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 254.)

ASTER TURBINATUS, *S. Moore* (Compositæ).—China. (Journ. Bot., p. 132.)

ASTRAGALUS REINI, *Ball* (Leguminosæ).—Morocco. (Journ. Linn. Soc., xvi., p. 432.)

BATEMANNIA LEPIDA, *Rchb. f.* (Orchideæ).—Brazil. (Gard. Chron., pt. i., p. 588.)

BELLIS CÆRULESCENS, *Cosson* (Compositæ).—Morocco. (Journ. Linn. Soc., xvi., p. 495.)

BESLERIA LIRAY, *Hook.* (Gesneraceæ).—Dominica. (Bot. Mag., t. 6341.)

BIFRENARIA MELLICOLOR, *Rchb. f.* (Orchideæ).—Brazil? (Gard. Chron., pt. i., p. 622.)

BOLLEA LAWRENCIANA, *Rchb. f.* (Orchideæ).—Trop. America. (Gard. Chron., pt. ii., p. 266.)

BRACHYBOTRYS, *Maxim.* (Boragineæ).—B. PARIDIFORMIS, *Maxim.* Manchuria and N. China. (Ic. Plant., t. 1254.)

BULBOPHYLLUM PSYCHODON, *Rchb. f.* (Orchideæ).—Assam. (Gard. Chron., pt. ii., p. 170.)

BUPHANE ANGOLENSIS, *Baker* (Amaryllideæ).—Angola. (Journ. Bot., p. 197.)

BUPLEURUM OBLONGIFOLIUM, *Ball* (Umbelliferae).—Morocco. (Journ. Linn. Soc., xvi., p. 466.)

CALANTHE SEDENI, *Rchb. f.* (Orchideæ).—Hybrid. *Vestita* var. *× Veitchii.* (Gard. Chron., pt. i., p. 168.)

CAMPANULA MAROCCANA, *Ball* (Campanulaceæ).—Morocco. (Journ. Linn. Soc., xvi., p. 554.)

CAPPARIS FLEXICAULIS, *Hance* (Capparideæ).—China. (Journ. Bot., p. 225.)

CARDAMINE BRACTEATA, *S. Moore* (Cruciferæ).—Japan. (Journ. Bot., p. 130.)

C. CHELIDONIOIDES, *S. Moore*.—Japan. (Journ. Bot., p. 130.)

CASTANOPSIS MITIFICA, *Hance* (Cupuliferæ).—Sumatra. (Journ. Bot., p. 200.)

C. SCHEFFERIANA, *Hance*.—Sumatra. (Journ. Bot., p. 200.)

CENTAUREA EBENOIDES, *Heldr.* (Compositæ).—Eubæa. (Journ. Bot., p. 133.)

CHRYSANTHEMUM OREASTRUM, *Hance* (Compositæ).—China. (Journ. Bot., p. 108.)

CLEMATIS STRONACHII, *Hance* (Ranunculaceæ).—China. (Journ. Bot., p. 104.)

CHLOROPHYTUM ANDONGENSE, *Baker* (Liliaceæ).—Angola. (Trans. Linn. Soc., 2, i., p. 260.)

C. CILIATUM, *Baker*.—Trop. Africa. (Journ. Bot. p. 325.)

C. DEBILE, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 260.)

C. FILIPENDULUM, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 260.)

C. LANCIFOLIUM, *Welw.*—Angola. (Trans. Linn. Soc., 2, i., p. 260.)

C. LONGIPES, *Baker*.—Trop. Africa. (Journ. Bot., p. 325.)

C. MADAGASCARIENSE, *Baker*.—Madagascar. (Journ. Bot., p. 326.)

C. MICRANTHUM, *Baker*.—Trop. Africa. (Journ. Bot., p. 325.)

C. POLYSTACHYS, *Baker*.—Trop. Africa. (Journ. Bot., p. 326.)

C. PUSILLUM, *Baker*.—Trop. Africa. (Journ. Bot., p. 325.)

C. SUFFRUTICOSUM, *Baker*.—E. Trop. Africa. (Journ. Bot., p. 326.)

CŒLOGYNE MASSANGIANA, *Rehb. f.* (Orchideæ.) (Gard. Chron., pt. ii., p. 684.)

COMPARETTIA SPECIOSA, *Rehb. f.* (Orchideæ).—S. America. (Gard. Chron., pt. ii., p. 524.)

CRINUM AMMOCHAROIDES, *Baker* (Amaryllidaceæ).—N. Trop. Africa. (Journ. Bot., p. 195.)

C. BUPHANOIDES, *Welw.*—Angola. (Journ. Bot., p. 195.)

C. FIMBRIATULUM, *Baker*.—Angola. (Journ. Bot., p. 196.)

C. MACOWANI, *Baker*.—S. Africa. (Gard. Chron., pt. i., p. 298.)

C. PAUCIFLORUM, *Baker*.—N. Trop. Africa. (Journ. Bot., p. 195.)

C. VANILLODORUM, *Welw.*—Angola. (Journ. Bot., p. 196.)

CRYPTOSTEPHANUS, *Welw.* (Amaryllidaceæ).—C. DENSIFLORUS, *Welw.*—S. Angola. (Journ. Bot., 193., tab. 197.)

CYMBIDIUM LEACHIANUM, *Rehb. f.* (Orchideæ).—Formosa. (Gard. Chron., pt. ii., p. 106.)

CYPRIPEDIUM HINCKSIANUM, *Rehb. f.* (Orchideæ).—Cent. America. (Gard. Chron., pt. i., p. 202.)

C. LAURENCIANUM, *Rehb. f.*—Indian Archipelago. (Gard. Chron., pt. ii., p. 748.)

C. NITENS, *Rehb. f.*—Hybrid (*Insigne* var. *Maulei* × *villosum*). (Gard. Chron., pt. i., p. 398.)

C. PORPHYREUM, *Rehb. f.*—Hybrid (*Roeslii* × *Schlimii*). (Gard. Chron., pt. i., p. 366.)

CYRTANTHUS WELWITSCHII, *Hiern* (Amaryllideæ).—Angola. (Journ. Bot., p. 197.)

CYTISUS CINCINNATUS, *Ball* (Leguminosæ).—Morocco. (Journ. Linn. Soc., xvi., p. 404.)

(To be continued).

Flora Ingrica, oder aufzählung und Beschreibung der Blütenpflanzen und Gefäss-Cryptogamen des Gouvernements St. Petersburg. Bearbeitet und herausgegeben von KARL FR. MEINSHAUSEN. St. Petersburg, 1878. (8vo., pp. 512.)

This is a handy little descriptive Flora of the Province of St. Petersburg (Ingermanland), written entirely in German. The author, who is Curator of the herbarium at the Academy of Sciences, has already greatly contributed to our knowledge of the district by his excellent series of exsiccata, 'Herbarium Floræ Ingricæ,' published in ten Centuries, from 1860 to 1874; references to these are given throughout the present volume.

The species are arranged in the usual Candollean sequence, and amount to eight hundred and fifty-two Phanerogams and twenty-nine Ferns and allies, not a larger flora than that of many small English counties. The species are mainly the universal ones of the great European plain, but there is a strong admixture of more specially eastern types and a few local species; the high northern vegetation is very sparingly represented. Marsh, bog, and turf-moss plants form a large proportion of the flora. The district (which is almost entirely to the south of the city of St. Petersburg) is divided by the author into four botanical zones, and the species are traced through each. H. T.

An appreciative notice, from the pen of Dr. Asa Gray, of the venerable American botanist Dr. Jacob Bigelow, whose death we announced at p. 96, is printed in 'Silliman's Journal' for April. He had reached the age of ninety-two.

M. Marchal, in the 'Bulletin de l'Academie royale de Belgique,' (ser. 2, xlvii., No. 1), gives descriptions of eighteen new species of *Hederaceæ* from Tropical America, taken from specimens in the various European herbaria consulted in the preparation of a revision of the whole of the extra-Brazilian American species which he has undertaken. A new genus from Brazil is described,—*Coemansia*,—dedicated to Eugène Coemans, the well-known Belgian cryptogamist. It is allied to *Aralia*, but differs in having 8-merous flowers and in other respects.

We have received Part i. of 'Illustrations and Descriptions of American *Characeæ*,' by Dr. T. F. Allen, of New York. It contains a quarto plate, printed in colours, of *Chara gymnopus*, var. *elegans*, A. Br., with page of description. The work is intended to include every species and variety known to grow in America. The price is twenty-five cents for a single part; five parts for one dollar. The author's address is 10, East 36th Street, New York.

OTHER NEW BOOKS.—Rev. W. A. LEIGHTON, 'Lichen-Flora of the British Islands,' ed. 3. Shrewsbury, 1879.—DODEL-PORT, 'Anatomisch-physiologischer Atlas der Botanik,' 2 Lief. Esslingen, 1879.—'Botanischer Jahresbericht,' 1877, 1 abth. Berlin, 1879 (8 mk.)—A. FRANCHET & L. SAVATIER, 'Enumeratio Plant. in Japoniæ,' vol. ii., part 3.

ARTICLES IN JOURNALS. — MARCH.

Ann. & Mag. Nat. Hist.—M. J. Berkeley and C. E. Broome, 'Notices of British Fungi' (Nos. 1731–1832).

Journ. Quekett Micros. Club (No. 39).—W. H. Gilbert, 'On the floral development of *Helianthus annuus*.'

Flora.—A. Schmid, 'Biography of C. H. Funck.'—F. von Thuemen, 'Diagnoses of *Mycotheca universalis*.'—W. J. Behrens, 'On the nectaries of flowers' (contd.).—E. Hackel, 'Agrostological notes.'—S. Schulzer, 'Mycological notes.'—P. G. Strobl, 'On the flora of the Nebrodes' (contd.).

Bot. Zeitung.—H. Wendland, 'Characters of fan-leaved Palms, so-called Sabal Palms.'—L. Wittmack, 'Results of examination of 42 different qualities of paper.'—H. Hoffmann, 'Experiments in culture' (tab. 3 B.).

Oesterr. Bot. Zeitschr.—A. Kerner, '*Festuca amethystina*.'—C. L. Sanger, 'Observations on the so-called water-pores.'—A. Tomaschek, 'On pathogenic emergences in *Ampelopsis hederacea*.'—C. Haussknecht, '*Epilobia nova*' (contd.).—A. Oborny, 'Notes on flora of Lower Austria.'—Thuemen, 'Comments on De Bary's criticism of the "Pilze des Weinstockes."'

Magyar Nov. Lapok.—M. Staub, 'Notes on flora of Pest-Pilis-Solt.'

Grevillea.—M. C. Cooke and C. B. Plowright, 'British Sphæracei.'—M. C. Cooke, 'Some exotic Fungi.'—Id., 'Californian Fungi.'—J. M. Crombie, 'New British Lichens.'—Passerini, 'Two species of *Peronospora*.'—O. Comes, 'Observations on some species of Neapolitan Fungi.'

Ann. des Sc. Nat. (ser. 6, viii., pt. 3.)—P. Sagot, 'On a wild vine with polygamous flowers growing abundantly in woods round Belley (Ain).'—A. Gray, 'Note on *Shortia galacifolia*, and a revision of *Diapensiaceæ*' (tab. 15.).—P. von Tieghem, 'On the gomme de Sucrierie (*Nostoc mesenteroides*).'

Botanical News.

THE chair of Botany in the University of Edinburgh has been filled by the election of Dr. ALEXANDER DICKSON. His appointment renders vacant the chair at Glasgow which he held.

THE Rev. M. J. BERKELEY has been elected a Fellow of the Royal Society.

DR. HEINRICH WILHELM BUEK died at Hamburg on Feb. 10th, at the age of 83. His name will always be held in thankful remembrance by systematic botanists for the very useful index to DeCandolle's 'Prodromus' which he prepared.

THE death of Sir WALTER CALVERLEY TREVELYAN, Bart., who had attained to nearly 82, occurred at his house, Wallington, Northumberland, on March 23rd. To his numerous accomplishments he added an accurate and extensive acquaintance with natural science, and was a good botanist. His most important contribution to botanical literature is his catalogue of the plants of the Faroe Islands, first printed in the 'Edinburgh New Philosophical Journal' for 1835, the result of five months' sojourn in the islands in 1821. He was also an occasional contributor of notes to many scientific journals, including our own pages.

OUR obituary also contains the names of Prof. HEINRICH GOTTLIEB LUDVIG REICHENBACH, on the 17th of March, at Dresden, the most celebrated critical botanist of the continent, who had attained to the great age of 86; and of Dr. FERDINAND MORITZ ASCHERSON, on the 19th Feb., at Berlin, at the age of 81. Both of these botanists have left in their sons eminent successors.

WILHELM SCHIMPER, the well-known Abyssinian traveller and botanist, died at Adoa, in that country, last October, at the age of 74.

WILLIAM MUDD, who died at Cambridge, where he was Curator of the Botanic Garden, was a well-known Lichenologist; his 'Manual of British Lichens' was printed in 1861, accompanied by a series of illustrative specimens in 3 Fasciculi.

Mr. T. T. CHEESEMAN, of the Museum, Auckland, New Zealand, wishes to exchange the plants of that country for British ones. He is prepared to send any number up to 600 of well-dried and accurately named Phanerogams and Ferns.

It is with great satisfaction that we have received a circular from Mr. C. Bailey with reference to the Botanical Exchange Club, the critical condition of which was recently referred to here. He offers to undertake the Secretaryship of a revived Club on a narrower basis, and will receive the parcels; several other members having undertaken in turn the annual labour of making up the return parcels. It is proposed to limit the number of members, and for the present the membership will only be offered to those who contributed parcels to the last distribution. Mr. Nicholson of Kew, who has this year chiefly made the distribution, is preparing a list of desiderata for 1879. With reference to the Report, it is suggested that its publication in this Journal would save the Club the cost of printing and give the notes wider publicity, besides adding to the interest of our pages, where indeed the Report has always been reproduced. We trust that this Club, which has contributed so much to British Botany, will now take a fresh start of useful prosperity.

Original Articles.

A SYNOPSIS OF THE GENUS *ÆCHMEA*, R. & P.

By J. G. BAKER, F.R.S.

(Continued from p. 135).

10. *Æ. DACTYLINA*, Baker, *n. sp.*—Leaf with a dilated entire oblong base half a foot long, four to five inches broad, and ensiform lamina two feet long, two inches broad at the base, narrowed to the horny pungent point, the dark horny linear lower prickles one quarter to one-third of an inch long, those of the upper part of the blade minute, deltoid-cuspidate. Scape a foot long, with distant erect lanceolate bract-leaves. Panicle lax, deltoid, a foot long and broad, the rachises densely floccose, the upper branches simple and nearly sessile, the lower bearing two to four digitate spikes at the summit of a peduncle and subtended by red lanceolate branch-bracts three to four inches long. Spikes three to four inches long, distichous, half an inch in diameter, each flower subtended by an ovate-navicular cuspidate glabrous rigid bract half an inch long, acutely keeled. Calyx with ovary just as long as the flower-bract; sepals lanceolate, as long as the ovary, minutely cuspidate. Petals one-sixth of an inch longer than the sepals, the minute blade protruded beyond the tip of the bract. Chagres, Panama, Fendler, 450! (Herb. Kew.)

11. *Æ. VEITCHII*, Baker in Bot. Mag., t. 6329. *Chevalliera Veitchii*, E. Morren in Belg. Hort., 1878, p. 177, t. 9.—Leaves twelve to fifteen to a rosette, with an oblong entire dilated base, and a lorate lamina one and a half to two feet long, obtuse with a cusp, horny in texture, channelled all down the face, obscurely lepidote on the back, one and a half inch to two inches broad at the middle, with minute very close horny deltoid teeth. Scape above a foot long, entirely hidden by the lanceolate erect greenish serrated bract-leaves. Flowers in a dense oblong multifarious simple spike three to four inches long, two to two and a half inches in diameter, each flower clasped by a squarrose horny toothed deltoid acute scarlet bract half an inch to one inch long. Calyx with ovary five-eighths to three-quarters of an inch long, glabrous; ovary globose, much flattened on the side nearest the axis: sepals lanceolate. Petals pale, lingulate, a little longer than the sepals.—New Granada, on the western slope of the Andes near Popayan, Hartweg!—(Herb. Kew). Sent by Mr. Wallis to Messrs. Veitch in 1874, and in cultivation at Kew at the present time. It is the Bromeliaceous plant described but not named, Benth., Pl. Hartweg, 256; Walp. Ann., i., 841.

12. Æ. SPHEROCEPHALA, Baker.—*Chevalliera spheroccephala*, Gaudich., Atl. Bonite, tab. 61. Leaves ensiform, one and a half to two feet or more long, two inches broad, narrowed to the point, closely minutely serrated. Scape stout, furnished with several large lanceolate ascending serrated bract-leaves. Flowers in a dense globose multifarious spike about half a foot in length and breadth. Flower-bracts deltoid navicular, distinctly cuspidate, about an inch long. Calyx including ovary about as long as the bract; sepals lanceolate cuspidate.—South America. Known to me only from Gaudichaud's figure above cited, to which the text has never been published.

13. Æ. ORNATA, Baker.—*Chevalliera ornata*, Gaudich., Atlas Bonite, tab. 62.—Rosette at the top of a short produced stem sheathed by rudimentary leaves. Produced leaves with a dilated entire oblong base and an ensiform lamina one and a half foot long, an inch broad, narrowed to the point, minutely serrated. Flowers in a dense oblong multifarious spike five to six inches long, two inches in diameter, each flower clasped by an obovate navicular obtuse bract half an inch long, with a very large mucro. Calyx with ovary about an inch long: sepals lanceolate, cuspidate, shorter than the ovary.—South America. Like the last, known only from Gaudichaud's figure.

14. Æ. MARIE-REGINÆ, H. Wendl. in Hamb. Gartenzeit., ix. (1863), 32; Regel Gartenfl., xiii. (1864), 152; Floral Mag., n. s., t. 8.—Leaves fifteen to twenty in a rosette, with a dilated oblong base three to four inches broad and a lanceolate lamina, two to three feet long, two to three inches broad at the middle, thinly white-lepidote on both surfaces, tinted purple, texture moderately firm; tip lanceolate-deltoid; prickles deltoid-cuspidate, half to one line long. Scape about a foot long, very stout, stiffly erect, clothed with white tomentum, its numerous bright crimson lanceolate reflexing bract-leaves three to five inches long, toothed at the margin. Flowers in a dense oblong spike three to four inches long. Flower-bracts minute, subulate from a deltoid base. Calyx including ovary half an inch long; sepals very mealy, much imbricated, obtuse, with an erecto-patent white horny cusp. Petals lingulate, half as long again as the sepals, blue at the tip when young, fading to the same crimson as the bracts.—Costa Rica. Described in a plant that flowered with Mr. B. M. Williams at Holloway, in April, 1879.

15. Æ. AUGUSTA, Baker.—*Tillandsia augusta*, Vell. Fl. Flum., iii., t. 135.—*Hoplrophytum augustum*, Beer, Brom., 136.—*Hohenbergia augusta*, E. Morren, Cat. 1873, 9.—*Pironneava glomerata*, Gaudich., Atlas Bonite, t. 63.—Leaves lorate, three to four feet long, four to five inches broad, minutely serrated, deltoid-cuspidate at the tip. Peduncle about a foot long, sheathed by several lanceolate scarioso bract-leaves. Flowers in a deltoid panicle a foot long, the lower branches long and erecto-patent, the ultimate spikes dense, multifarious, globose, sessile or peduncled, an inch in diameter. Flower-bracts deltoid, one-quarter to one-third of an inch long.

Calyx including ovary one-half to five-eighths of an inch long. Petals shortly protruded.—South Brazil. This I know only from the two figures above cited. It seems to be a very close ally of *Æ. glomerata*, Hook., mainly distinguished by its small deltoid flower-bracts, which are much shorter than the calyx. It is included in Morren's Liege catalogue of 1873, but I have not seen it in England.

16. *Æ. WRIGHTII*, Baker.—*Æ. distans*, Griseb., Pl. Cub., 253.—Leaves with an oblong dilated base four to five inches broad, and a lorate lamina one foot and a half to two feet long, three to four inches broad, horny in texture, closely minutely serrated, rounded at the tip with a prominent cusp. Scape slender, reaching a length of two feet or more, sheathed by distant erect pale lanceolate bract-leaves. Panicle a foot long, composed of distant short spreading branches, subtended by lanceolate bracts and ending in dense oblong multifarious spikes one inch to one inch and a half long. Flower-bracts deltoid, with a horny mucro, a quarter of an inch long. Calyx including ovary three eighths of an inch long. Sepals deltoid-cuspidate, one-eighth of an inch long. Petals pale, twice as long as the sepals.—Cuba, *C. Wright*, 1525! Closely allied to *Æ. distans*, but the branches of the panicle much shorter, and flower-bracts and sepals both deltoid with a cusp.

17. *Æ. GLOMERATA*, Hook. in Bot. Mag., 5668.—*Hohenbergia stelata*, Schultes fil., Syst. Veg., vii., 1251.—*Hohenbergia erythrostachys*, A. Brong., Journ. Imp. Soc. Hort., July, 1864, cum icone; Carriere in Rev. Hort., 1869, 217, fig. 53.—*Pironneava roseo-carulea*, K. Koch; Regel, Gartenfl., xi. 71.—*P. Morreniana*, Regel, Gartenfl., 1874, 257, tab. 805.—Leaves twelve to twenty in a rosette, with a dilated entire deltoid base four inches broad, and a lorate lamina one foot and a half to two feet long, two to three inches broad at the middle, horny in texture, both sides bright green, deeply channelled down the face in the lower half, the tip obtuse with a cusp, the edges furnished with close minute brown horny teeth, those near the base of the leaf one-twelfth to one-eighth of an inch long. Scape one to one and a half foot long, sheathed by several adpressed pale lanceolate bract-leaves two to three inches long. Flowers in a narrow panicle about a foot long, composed of sessile or short peduncled clustered dense multifarious oblong or globose heads one to one and a half inch long. Flower-bracts deltoid-acuminate, one-half to three-quarters of an inch long; in one variety bright scarlet, in another greenish white. Calyx including the ovary one half to five-eighths of an inch long; ovary much compressed on the side nearest the axis: sepals lanceolate-cuspidate, twice as long as the ovary. Petals violet, one-third of an inch longer than the sepals.—Bahia; discovered by Martius; introduced about 1860, and now one of the commonest species in European gardens.

18. *Æ. DISTANS*, Griseb., Flor. Brit. West Ind., 592.—*Hohenbergia distans*, Baker in Ref. Bot., sub. t. 284.—Leaves lorate, one foot and a half long, two inches broad at the middle, not very

horny in texture, rounded at the tip with a distinct cusp, minutely toothed. Scape one foot and a half, sheathed by many pale large lanceolate adpressed bract-leaves. Panicle one foot and a half long, nearly a foot broad at the base, composed of numerous spreading branches subtended by large lanceolate bracts and ending in dense oblong multifarious spikes about an inch long. Flower-bracts ovate-lanceolate, navicular, three-eighths to half an inch long, striated, distinctly mucronate. Calyx including the ovary three-eighths of an inch long; sepals lanceolate-cuspidate, as long as the compressed ovary. Petals pale, twice as long as the sepals.—Jamaica, *Purdie!*

19. *Æ. LINGULATA*, *Baker.* *Bromelia lingulata*, Linn. Sp., 409 (Burm. Ic. Plum., t. 64); Miller, Dict., edit. vi., No. 2.—*Hoplophytum lingulatum*, Beer, Brom., 139.—*Lamprococcus ramosus*, Beer, Brom., 106.—*Chevalliera lingulata*, Griseb., Flor. Brit. West Ind., 591.—Leaves with a dilated oblong base four to five inches broad, and lorate obtuse cuspidate lamina about two feet long, two inches broad at the middle, with close minute brown teeth. Peduncle one foot and a half to two feet long, with distant lanceolate pale bract-leaves. Panicle a foot long, consisting of thirty to forty dense oblong multifarious heads about an inch long, the lowest only with short peduncles, subtended by lanceolate bracts one inch to two inches long. Flower-bracts coriaceous, striated, deltoid cuspidate, one-quarter to one-third of an inch long. Calyx including the ovary one-third of an inch long; ovary very much compressed on the side nearest the axis; sepals deltoid, mucronate. Petals pale, twice as long as the sepals.—Jamaica, *Robins!* (Herb. Mus. Brit.) Also Antigua, Guadeloupe, and Guiana, according to Grisebach. Not known to me as alive at the present time in England. Miller, in 1771, gives it as a garden plant, and I have seen it from the Berlin garden in the herbarium of Dr. Karl Koch.

20. *Æ. POLYCEPHALA*, *Baker.*—Leaves not seen. Flowers in a compound spike about a foot long, composed of thirty to forty subglobose sessile dense multifarious heads under an inch long, the branch-bracts of the lower exceeding, of the upper as long as the heads. Flower-bracts round-deltoid, navicular, firm and rigid in texture, not striated, minutely cuspidate, one-half an inch long and broad. Ovary with calyx three-eighths of an inch long; ovary globose, furfuraceous, much flattened on the side nearest the axis; sepals deltoid, as long as the ovary, not mucronate. Petals not seen.—Jamaica, *Dr. Wright!* (Herb. Mus. Brit.) A close ally of *Æ. lingulata*, from which it differs in its much larger flower-bracts of more rigid texture and sessile spikes.

21. *Æ. PANICULATA*, *Huiz. & Par.*, Fl. Peruv., iii., 37, t. 264; Beer, Brom., 11, fig. 4A.—Leaves twenty to thirty in a lax rosette, the outer ones short, the central ones longest, lanceolate, above a foot long, one inch and a half to two inches broad, narrowed gradually to the point, the close horny teeth one-sixth to one-quarter of an inch long. Scape lateral, much shorter than the ample panicle,

the lowest branch of which is a foot long, naked at the base, subtended by a large lanceolate bract. Secondary racemes oblong-cylindrical, three inches diameter, some of their branches bearing only one, but some two to three flowers, each clasped at the base by a round cordate obtuse coriaceous flower-bract a quarter of an inch long, half an inch broad, with a brown pungent spine nearly as long as the lamina. Calyx including ovary five-eighths to three-quarters of an inch long; ovary globose; sepals lanceolate, one-quarter to one-third of an inch long, minutely cuspidate. Petals about an inch long, greenish-yellow, twisted after flowering.—Andes of Peru, *Pavon!* (Herb. Mus. Brit.)

22. *Æ. MEXICANA*, Baker, n. sp.—Leaves with a dilated base half a foot long, four to five inches broad, and a lorate lamina above two feet long, three inches broad at the middle, with close horny deltoid spreading teeth not more than a line long. Panicle lax, deltoid, tripinnate, one foot and a half to two feet long, nearly a foot broad at the base, with stout floccose rachises, the lower branches erecto-patent, half a foot long, the lowest tertiary branchlets bearing three to four flowers each, with a furfuraceous pedicel one-quarter to one-half of an inch long, with a minute subulate deciduous bract at the base. Flower-bracts none. Calyx including ovary half an inch long; ovary oblong, furfuraceous; sepals one-eighth of an inch long, deltoid, with a distinct mucro. Petals one-sixth of an inch longer than the sepals.—Mexico, in the district of Orizaba, *Bourgeau*, 3106! Well-marked in the group by its obsolete flower-bracts.

23. *Æ. SPECTABILIS*, Brong.; Houlet in Rev. Hort., 1875, 311, with a coloured figure.—*Pironneara spectabilis*, K. Koch; E. Morren, Cat., 1873, 13.—*Guzmania spectabilis*, Hort.—Leaves with a dilated entire oblong base half a foot long and broad, and a lorate obtuse cuspidate minutely serrated horny lamina above two feet long, two to three inches broad at the middle. Scape nearly as long as the leaves. Inflorescence a lax deltoid panicle as long as the scape with many bipinnate branches; tertiary branchlets lax-flowered. Flower-bracts minute. Calyx including ovary half an inch long; sepals shortly cuspidate. Petals bright red, twice as long as the sepals.—Guatemala. I am not aware that this is in cultivation in England; I have seen only a leaf in the herbarium of Dr. Karl Koch.

24. *Æ. CYMOSO-PANICULATA*, Baker, n. sp.—*Æ. paniculigera*, Griseb., Gott. Nacht., 1864, 13, *ex parte*.—Leaves with a dilated oblong base half a foot long, four to five inches broad, and a lorate lamina two feet long, two and a half to three inches broad, with a deltoid cuspidate tip and small close horny brown teeth. Scape sheathed by large lanceolate imbricated bract leaves. Flowers in an ample deltoid tripinnate panicle, the lower branches nearly a foot long, spreading, peduncled; subtended by lanceolate bracts four to five inches long. Secondary branches two to three inches broad; tertiary laxly cymose, each flower with a stiff ascending pedicel one-quarter to five-eighths of an inch long, with a minute

deltoid cuspidate bract at its base and another similar one subtending the ovary. Ovary including the calyx three eighths of an inch long; sepals small, deltoid, with a distinct erecto-patent cusp. Petals violet, one-eighth of an inch longer than the sepals.—Venezuela, near Tovar, *Fendler*, 2453! The true *paniculigera* has a bipinnate panicle, and the flowers are not pedicellate.

25. *Æ. RAMOSA*, *Mart.*; *Schultes fil.*, *Syst. Veg.*, vii., 1272.—Leaves lorate cuspidate, above a foot long, under two inches broad, minutely serrate. Flowers in a tripinnate panicle, the lower branches nine inches long, subtended by large lanceolate bracts, the rachis red, the tertiary branchlets crowded, flexuose, at most an inch long, two- to four-flowered. Flower-bracts round-ovate, one-sixth to one-fifth of an inch long, with a short brown mucro. Calyx including sepals one-third of an inch long; ovary globose; sepals deltoid mucronate, spirally twisted, as long as the ovary. Petals yellow, half an inch long.—Brazil, in the province of Minas Geraes, *Martius*.

26. *Æ. PYRAMIDALIS*, *Benth.*, *Bot. Sulph.*, 173; *Walp. Ann.* i., 838. *Hohenbergia pyramidalis*, *Baker in Ref. Bot.*, sub. t. 284.—Leaves lanceolate, two feet or more long, two inches broad at the middle, narrowed gradually to the point, armed with close curved brown horny spines which towards the base of the leaf are one-quarter to one-third of an inch long. Scape including the panicle four feet long, its lanceolate bracts half a foot long. Flowers in an ample tripinnate panicle, the side branches deflexed, peduncled, the lowest half a foot long, subtended by large lanceolate bracts. Primary branches multifarious, two to three inches diameter, the ultimate branchlets one inch to one inch and a half long, not zigzag, densely many-flowered. Flower-bracts deltoid cuspidate, one-quarter to one-third of an inch long. Calyx including ovary three-eighths of an inch long; sepals lanceolate, rather longer than the ovary, not mucronate. Petals one-eighth of an inch longer than the sepals.—Columbia, *Cuning*, 1178! Guayaquil, *Sinclair*. (*Herb. Kew.*) Woods of Atamacas, *Barclay*, 782! (*Herb. Mus. Brit.*) A plant in the Kew herbarium, gathered by Edmonstone in Columbia, with a much smaller and less compound panicle and thinner leaves with smaller prickles, is probably a distinct species.

27. *Æ. PLATYNEMA*, *Baker*.—*Pironneava platynema*, *Gaudich.*, *Atlas Bonite*, tab. 64.—*Hohenbergia platynema*, *Baker in Ref. Bot.*, sub. t. 284.—Whole plant reaching a height of six to ten feet. Leaves two to three feet long, five to six inches broad above the base, lorate, apex deltoid with a cusp, the close horny teeth one-eighth to one-sixth of an inch long in the lower part of the leaf. Panicle ample, tripinnate, the lower racemes reaching a foot in length, two to three inches broad when expanded, the tertiary branches slender, very flexuose, few-flowered. Flower-bracts coriaceous, round-cordate, with a lamina one-quarter to one-third of an inch long, and a very distinct pungent mucro. Calyx including the ovary half a inch long; sepals lanceolate, as long as

the ovary, distinctly mucronate. Petals white, two to three times as long as the sepals.—South Brazil; Rio Janeiro, *Burchell*, 764. *Glaziou*, 8027! and 5465! (a form with minute leaf prickles); Rio Grande, *Tweedie*! One of the most effective species of the genus, but although growing in a well explored country not yet introduced into cultivation.

28. *Æ. CAPITATA*, *Baker*.—*Hohenbergia capitata*, *Schultes* fil., *Syst. Veg.*, vii., 1252.—Leaves unknown. Scape above a foot long, the lower lanceolate bract-leaves toothed towards the tip. Flowers in a dense tripinnate head two to three inches long, three to four inches diameter, composed of three to five very shortly peduncled primary spikes, subtended by bracts of their own length, each consisting of about three sessile densely congested eight- to twelve-flowered spikelets fifteen to eighteen lines long. Flower-bracts ovate-navicular, rose-red, exceeding the calyx, three-quarters of an inch long. Sepals lanceolate with a mucro, seven to eight lines long. Petals about an inch long, scaled at the base.—Brazil, in the province of Bahia at Almada, *Martius*.

29. *Æ. PARVIFLORA*, *Baker*.—*Billbergia parviflora*, *Mart.*, *Schultes* fil., *Syst. Veg.*, vii., 1270.—*Lamprococcus chlorocarpus*. *Wawra*, *Reise Maxim.*, 162, t. 28.—Leaves about a foot long, with a dilated oblong base, and a lanceolate entire lamina one-half to three-quarters of an inch broad at the middle. Scape about a foot long, with many small lanceolate adpressed bract-leaves. Flowers in a lax rhomboid panicle four to six inches long, with erect-patent nine- to twelve-flowered racemose branches, the lowest sometimes forked. Pedicels spreading, one-eighth to one-quarter of an inch long, with a minute deltoid cuspidate bract at the base. Calyx including ovary about a line long; sepals deltoid, minutely cuspidate. Petals lingulate, blue, one-sixth to one-fifth of an inch long, not scaled at the base.—Brazil, in the province of Bahia at Ilheos and Almada, *Martius*; *Wawra and Maly*, 232. A very distinct species.

30. *Æ. LAXIFLORA*, *Benth.*, *Bot. Sulph.*, 173.—*Hohenbergia laxiflora*, *Baker* in *Ref. Bot.*, sub. t. 284.—*Aloe americana arboribus innascens*, &c., *Rel. Houst.*, edit. *Banks*, t. 16.—*Bromelia bracteata*, *Schultes* fil., *Syst. Veg.*, vii., 1280, *ex parte*.—Leaves above two feet long, ensiform, narrowed to the point, one inch and a half to two inches broad at the middle, very horny in texture, with large distant falcate horny teeth like those of *Bromelia Pinguin* or *Karatas Plumieri*. Scape a foot or more long, with several large red lanceolate bract-leaves. Panicle dense, twelve to eighteen inches long, four to six inches broad, with very numerous spreading or decurved slender branches, the upper ones simply spicate, the lower forked or subpinnate and subtended by large red lanceolate bracts. Flowers moderately close, fifteen to twenty to a simple branch. Flower-bracts deltoid-navicular, striated, acute, but scarcely mucronate, under a quarter of an inch long. Calyx including ovary one-third of an inch long; sepals oblong-lanceolate, not cuspidate, about as long as the ovary. Petals about one-

eighth of an inch longer than the sepals.—Vera Cruz, *Houston!* Mosquito shore, *Capt. Miller!* Merida, Yucatan, *Schott, 891!* (Herb. Mus. Brit.) Acapulco, *Sinclair!* (Herb. Kew.) Houston's specimen was collected in the year 1731, *Capt. Miller's* in 1774. Judging from description alone this appears to be identical with *Æ. Schiedeana*, *Schlecht* in *Linnaea*, xviii., 437, a plant gathered by *Schiede* at the Hacienda de la Laguna.

(To be continued).

POLYGALÆ AMERICANÆ NOVÆ VEL PARUM
COGNITÆ.

By ALFRED W. BENNETT, M.A., B.Sc., F.L.S.

(Continued from p. 143).

SECTIO D.—Carina eximie cristata. Caulis suffruticosus, erectus rigidus, vel procumbens carnosus; folia numerosissima, confertissima, imbricata, rigida vel carnosâ; racemi capitati; sepala exteriora subæqualia; semina hirsuta, strophiolata, biappendiculata.

This section is divided into two sub-sections. The first, with erect rigid stem, rigid linear leaves, and heath-like habit, includes a few species peculiar to Tropical Brazil. The second section, with procumbent stem, fleshy leaves, and large black seed with two long appendages to the arillode, belongs entirely to extra-tropical South America, with an especially western distribution. The species described in the 'Flora Brasiliensis' nearly all extend also into Uruguay, the Argentine Republic, and other neighbouring countries. The following species all belong to this latter subsection:—

12. *P. Neai*, DC., *Prodr.*, i., 319; *Hook. Bot. Misc.*, iii., 146; *Gris. Pl. Lorentz.*, 37. Apparently a widely distributed species over western Temperate South America; distinguished from *P. thesioides*, Willd., *P. aspalatha*, Linn., and their allies, by its sessile capsule; from *P. stricta*, St. Hil., and other allied species, by its hairy habit, persistent calyx and corolla, and other characters. Argentine Republic, *Gillies*; *Lorentz*; Banda Oriental, in collibus aridis; Chile, Pampas, *Tweedie, 1137*; *Cuming, 280*; Patagonia.

β *Pearcii*, MS. Folia plantaque tota glabriora; bracteæ deciduæ; racemi globosi. Chucalezua, *Pearce*.

γ *alpina*, MS. "Chile australis, in aridioribus ad Autaco, rarissima, flores cærulei" in *Herb. Vind.*, is certainly *P. Gayii*, nob. (= *P. stricta*, *Gay*.)

13. *P. GAYII*, nob.—Caulis infra lignosus, circa semipedalis; rami ascendentes, subrigidi, virgati, subsimplices, glabri. Folia pauca, distantia, linearia, $\frac{1}{3}$ poll. longa. Racemi elongati, $\frac{1}{2}$ –1 poll. longi; bracteæ parvæ, ovatæ, marginibus membranaceis, subsistentes. Flores parvi, $1\frac{1}{2}$ lin. longi, subsessiles, distantes. Sepala exteriora subæqualia; alæ obovatæ vel obcuneatæ, corollam æquant. Petala lateralia brevissima, porrecta. Carina ample cristata. Ovarium ovale. Capsula parva, sessilis, suborbicularis,

alis persistentibus dimidio brevior. Semina ovalia, hirsuta; arillobium duabus appendicibus præditum, quam semen subbrevioribus.

Chile and Argentine Republic. In collibus apricis S. Juan, Phil., 374; Prov. Colchagua, Phil.; arid places in Prov. Santiago, and at Antuoco, Gay. *P. stricta*, Gay, Fl. Chil., i., 236 (non St. Hil.). *P. Neai*, var. *alpina*, in Herb. Vind. More erect and rigid in its habit than the rest of the section.

14. *P. gnidioides*, Willd., Sp., iii., 878; DC., Prodr., i., 327; Gay, Fl. Chil., i., 235; Hook., Bot. Misc., iii., 146. *P. fragilis*, Kze. MS. *in parte*.

Chile; between Valparaiso and Valdivia; Cuming, 632; Phil., 414; Bridges, 358; Pöppig, 179. Distinguished from *P. Neai* by its more glabrous habit, shorter leaves, narrower bracts, smaller racemes, and nearly sessile flowers.

β pubescenti-pilosa, Hook., *l. c.*; plant somewhat pubescent; leaves obtuse. Mendoza, Argentine Republic, Dr. Gillies.

15. *P. subandina*, Phil. in Linnæa, xxxiii., 17. Caulis a basi ramosus, tenuis, glaberrimus, 2-6 poll. altus. Folia linearia, subulata, acuta, $\frac{1}{2}$ - $\frac{3}{4}$ poll. longa. Racemi terminales, denique laxi, elongati; flores subsessiles; bracteæ ovatæ, acutæ, floribus dimidio breviores. Sepala exteriora ovata, acuta, subæqualia; alæ ovatæ, acutæ, cæruleæ, corollâ longiores. Carina pulchre cristata, petalum lateralium pars libera linearis, carinâ longior. Capsula sessilis, ovata, emarginata. Semina nigra, pilosa; arillobii appendices parvæ.

Province of Santiago, Chile, Phil.; Cordova, Argentine Republic, in collibus rupestribus, Phil. Grisebach (Pl. Lorentz., 29) makes this a variety of *P. Neai*, from which, however, it differs in several other points besides its glabrous habit. It seems to me nearer *P. gnidioides*, from which it is distinguishable only with difficulty, chiefly by its (ultimately) very lax racemes.

16. *P. salasiana*, Gay, Fl. Chil., i., 237. Caules 2-8 poll. vel etiam breviores, lignosi, a basi ramosi, procumbentes vel ascendentes. Folia sat conferta, patentia vel ascendentia, anguste obcuneata, $\frac{1}{2}$ poll. longa, glabra vel subfarinosa. Racemi terminales, sessiles, pauciflori, corymbosi; bracteæ suborbiculares, pedicellis dimidio breviores, membranaceæ, persistentes. Calyx sub fructu persistens; sepala exteriora subæqualia, superius latius; alæ anguste ovatæ, infra angustatæ, breviter mucronatæ, sepalis exterioribus duplo longiores, corollam excedentes. Carina pulchre cristata; petala lateralibus porrecta. Ovarium obovatum, glabrum. Capsula suborbicularis, emarginata, margine incrassato. Semina nigra, nitida, hispida; arillobii appendices semen æquantés.

Chile, Meyen; Santiago, Phil., 869; Cordilleras de Tolcaregue, 8240 ft., Gay; Volcano of Peteroa, Bridges, 1131; Cordilleras de Santiago, Germain. *P. fragilis*, Kze. MS., *in parte*. A good species, its most obvious characteristic being the mucronate wing-sepals, and leaves narrowing towards the base.

17. *P. pratensis*, Phil. in Linnæa, xxxiii., 18. Caulis infra lignosus, ramosus, 2-6 poll. altus; rami ascendentes vel decumbentes. Folia linearia, obovata vel spatulata, 3-4 poll. longa,

subcoriacea, marginibus revolutis. Racemi terminales, pauciflori, compacti, sessiles; flores 2 lin. longi, læte cærulei, subsessiles; bracteæ mox deciduæ. Sepala exteriora subæqualia, ovata; alæ obovatæ, corollâ breviores. Carina pulchre cristata; petala lateralia elongata, angusta, carinam æquantés et alas superantes, fere usque ad basim discretâ. Capsula calyce persistente subtenta, orbicularis, leviter emarginata, margine angusto crenulato, $1\frac{1}{2}$ lin. longa. Semina nigra, pilosa; arillodium duabus appendicibus longis præditum.

Valdivia, Phil.; Chiloe, Lobb. (?) Most easily distinguished by its spatulate leaves with revolute margin, somewhat large flowers, and crenulated margin to capsule.

18. *P. PERSISTENS*, nob. n. sp. Caulis 2-6 poll. altus, ascendens, a basi ramosus; rami tenues, glabri. Folia obovata, basi angustata, 3 lin. longa, $1\frac{1}{2}$ lin. lata, subconcava; ramorum pars inferior nuda. Racemi terminales, pauciflori, in foliis supernis conditi; bracteæ deciduæ; flores 2-3 lin. longi, pedicellis brevibus glabris suffulti. Sepala exteriora ovata, glabra, superius paullo majus; alæ sepalis exterioribus duplo longiores, obovatæ. Carina pulchre cristata; petala lateralia linearia, ascendentia, carinam æquantia. Capsula ovalis, subinteger, calyce corollâque omnino persistentibus subtenta. Semina oblonga; arillodium biappendiculatum.

Chile; Bridges, 1132. The habit of this plant appears to associate it with the section in which it is here placed, though it has broader and thinner leaves than the other species.

All the above species have a sessile capsule, as also have *P. Cyparissias*, St. Hil., *P. corisoides*, St. Hil., *P. stricta*, St. Hil., and *P. sedoides*, nob., in Mart. Flor. Bras. Polyg., t. x., f. 3, belonging to the Brazilian flora, all well-marked species, though needlessly confused by synonymy. The last, with its small Sedum-like habit and persistent bracts, is remarkably distinct; it occurs also in British Guiana; Appun, 2226. *P. stricta*, St. Hil. (non Gay) has acuminate wing-sepals and elliptic seeds. The two remaining species, with globose seeds, are often confounded with one another, and very needlessly with *P. aspalatha*, Linn. (= *P. polycephala*, St. Hil.); *P. Cyparissias* has very narrow thin patent leaves, while those of *P. corisoides* are more fleshy and deflexed. They are both abundant in Southern Brazil and the adjacent countries.

The remaining four species of the subsection have a stipitate capsule. Of these, *P. thesioides*, Willd.; has larger flowers than the rest of the section, and linear-ovate flat leaves; it belongs to Peru, Chile, and Uruguay. *P. aspalatha*, L., South Brazil, Uruguay, &c., has acicular patent leaves and sessile racemes, and is identical with St. Hilaire's *P. polycephala*, as I have satisfied myself from a comparison of the type-specimens of these two species in the Linnean and Berlin herbarium respectively. It is, however, constantly confounded with St. Hilaire's *P. Cyparissias* and *corisoides*. *P. sabulosa*, nob., Brazil, usually confounded with the last species, is distinguished from it by its long-stalked racemes and other characters. To these must now be added—

19. *P. chloroneura*, Gris., Pl. Lorentz., 30. Tucuman in Rep. Arg., in pascuis alpinis. It is a pretty little species, distinguished by its dense racemes and the bright green centre and membranous margins of its ovate bracts. From *P. aspalatha* it differs in its flatter leaves.

SECTIO E.—Carina cristata. Folia verticillata, superiora tamen sæpius alterna. Semina plerumque strophiolata. Herbæ validæ floribus sat magnis, vel humiles floribus parvis.

Polygalas with verticillate leaves are quite peculiar to America; but the section extends through the whole Continent, and also into the West Indies. In the Northern United States there are about seven species, in Brazil fourteen, and many in the intervening countries. In many of the smaller tropical species, as *P. paniculata*, *adenophora*, *longicaulis*, and *variabilis*, the lowermost leaves only are verticillate, and these are early deciduous; in *P. paniculata* so greatly is this the case that many writers have failed to notice them at all. In several of the species there is a tendency of the verticillate character of the leaves to become more marked as the species advances further north. Peru, Bolivia, and Paraguay afford several species hitherto undescribed.

A small subsection is characterised by being annual herbs, with the lower leaves only verticillate and deciduous; the seed nearly estrophiolate, and densely clothed with long silky hairs directed downwards from the hilum, and extending beyond the apex in a silky crown, giving them a very remarkable appearance. This subsection comprises at present the following species:—*P. longicaulis*, H. B. K. (= *P. Stelleræ*, DC.); *P. adenophora*, DC.; *P. variabilis*, H. B. K.; *P. trichosperma*, Linn.; and *P. gracilis*, H. B. K. It is especially characteristic of the region of the Amazon, extending southward to Bolivia, and northward through Central America and the West Indies. To it must now be added one more species:—

20. *P. BOLIVIENSIS*, nob. n. sp. Caulis erectus teres, haud striatus, sparse hirsutus, infra simplex, tunc corymbose ramosus; ad apicem valde foliosus. Folia linearia, margine incrassata; $\frac{1}{2}$ poll. longa, infima verticillata, superna alterna. Racemi terminales, subdensi, denique elongati; flores rosei, oleum flavum præbentes; pedicelli graciles, floribus dimidio breviores; bracteæ deciduæ. Sepala exteriora minuta, ovata, glabra; alæ hæc triplo excedentes, anguste obovatæ, glabræ, membranaceæ, rosæ. Petala lateralia longa, angusta, carinam sat conspicue cristatam multo excedentia. Capsula anguste ovata, emarginata, glaberrima. Semina anguste obconica, sericea, cristâ pilorum sericeorum coronata.

In graminosis Prov. Larecaja, Andium Bolivienſium, Mandon, 838. Somewhat between *P. variabilis* and *gracilis*, but larger than either and quite distinct. Stem nine inches to one foot high; leaves one inch long; the elongated racemes one to two inches. Stains the paper a bright yellow.

In the largest of the remaining subsections the leaves are all, or very nearly all, verticillate; and to this belong all the following species:—

21. *P. conferta*, nob. in Hemsley, Diagn. nov. Plant. Mex., p. 2. Caulis adscendens, 2-4 poll. altus, tenuis, simplex, striatus. Folia omnia verticillata, infima obovata vel obcuneata, superiora linearia, marginibus revolutis, obsolete glanduloso-punctata. Racemi terminales, longe pedunculati, valde compacti, $\frac{1}{4}$ poll. longi, cylindrica vel conici; bracteae parvae, deciduae. Flores minuti, subsessiles. Sepala exteriora subaequalia, ovata; alae duplo longiores, obovatae, subglandulosae, carinam aequantes. Carina cristata sat magna tenuiter serrata gaudens; petalum lateralium pars libera parva, porrecta. Ovarium ellipticum, glabrum; stylus brevis; stigma 2-lobum, cristatum. Capsula maculis glandulosis inconspicue punctata, alas aequans. Semina nigra, elliptica, hirsuta; arillodium parvum, appendicibus duabus membranaceis praeditum, quam semen $\frac{1}{3}$ brevioribus.

Orizaba, Mexico; F. Müller, 302, in Herb. Mart. Nearest to *P. adenophylla*, St. Hil., but a smaller, slenderer plant with much smaller flowers and narrower leaves, and not nearly so glandular. The head of flowers is remarkably compact and globular.

22. *P. PUNCTATA*, nob. n. sp. Radix crassa, carnosa. Caules numerosi, ramosi vel subsimplices, circa $\frac{1}{2}$ pedales, angulosi, subglabri. Folia fere omnia 4-5 verticillata, $\frac{3}{4}$ poll. longa, glanduloso-punctata; inferiora obovata, apiculata; superiora lanceolata vel linearia, acuta. Racemi capitati, compacti, subglobosi, circa 5-6-lin. longi; bracteae lineares vel subulatae, pedicellos aequantes, usque ad anthesim persistentes. Flores 2 lin. longi, pedicellati; pedicelli graciles, glabri, flores subaequantes. Sepala exteriora ovata, superius paullo majus; alae membranaceae, obovatae, corollam includentes. Carina pulchre cristata; cristae laciniae numerosae, lineares. Ovarium obcordatum; stylus curvatus, medius incrassatus; stigma papillosum. Capsula ovalis. Semina sericeo-hirsuta; arillodium biappendiculatum.

Paraguay. Villa Rica, sur les collines incultes; Bal., 2192. Readily distinguished from its congeners by its nearly spherical racemes, long-stalked flowers, long persistent bracts, and glandular leaves; perhaps nearest to *P. adenophylla*, but the racemes are of quite a different shape, and the flowers have much larger stalks.

23. *P. LEUCANTHA*, nob. n. sp. Radix crassa, descendens. Caules valde numerosi, tenues, graciles, 3-5 poll. longi, glabri, angulati vel etiam subulati. Folia conferta, lineari-lanceolata, acuminata. 4-5 lin. longa, glanduloso-punctata, plerumque 4-5 verticillata. Racemi breves, conici, densiflori, $\frac{1}{4}$ - $\frac{1}{2}$ poll. longi; bracteae subulatae, flores subaequantes, subpersistentes, alabastra excedentes. Flores parvi, 1 lin. longi, subsessiles, albi. Sepala exteriora ovalia, superius paullo majus; alae ovales, corollam includentes. Carina pulchre cristata. Ovarium parvum. Capsula alis persistentibus multo brevior. Semina nigra, sericeo-hirsuta; arillodium haud galeatum, appendices duas gerens, tenues, semini subaequilongas.

Paraguay; Cerro-Perron; Bal., 2190. Well-marked by its crowded whorls of narrow, acuminate, glandular leaves, and short, conical, somewhat comose racemes of small white flowers.

24. *P. NEMORALIS*, nob. n. sp. Caulis circa 2-pedalis, ascendens,

infra simplex, tunc ramosus, teres, minutissime striatus, glaber. Folia cir. $1\frac{1}{2}$ poll. longa, $\frac{1}{3}$ poll. lata, ovata vel lanceolata, obtusa vel acuta, margine incrassato sæpe undulato, brevissime petiolata; subtus albiora, nervo centrali subtus prominente, cæteris obscuris; infima alternantia, superiora 4-verticillata. Racemi terminales, elongati, sublaxi, 2-6 poll. longi; bracteæ lineari-lanceolatæ, deciduæ. Flores circa $1\frac{1}{2}$ lin. longi, rosei, subsessiles. Sepala glabra, minute glanduloso-punctata; exteriora inæqualia, duo inferiora approximata, superius majus, carinatum; alæ ellipticæ, roseæ, sepalis exterioribus duplo longiora, corollâ sublongiores. Carinæ crista valde conspicua, in multas lacinias lineares divisa; petalum lateralium pars libera parva. Capsula alis persistentibus brevior, suborbicularis, glabra. Semina nigra, semiovalia, leviter hirsuta; arillodium haud galeatum, in duabus appendicibus carnosus descendens.

From Bolivia to the borders of Mexico. In sylvis Anacoo Andium Boliviensium, Mandon, 839; Chilaso, Guatemala, Salvin and Godman, 1861; Chiapas, Mexico, Linden, 173. Allied to *P. distans*, St. Hil., and *P. galioides*, Poir.

25. *P. PERUVIANA*, nob. n. sp. Caulis ascendens, teres, pedalis vel major, infra simplex, tunc ramosus, glaber; rami subpubescentes. Folia lineari-lanceolata, glabra, utrinque attenuata, acuta, 1 poll. longa, $2\frac{1}{2}$ lin. lata, nervo medio prominente, infima 4-verticillata, superna alterna. Racemi terminales; $1\frac{1}{2}$ -2 in. longi; bracteæ deciduæ. Flores circa $1\frac{1}{2}$ lin. longi, pedicellis brevibus pubescentibus suffulti. Sepala exteriora lineari-lanceolata, subpubescentia, ciliata, duo inferiora approximata; alæ anguste ellipticæ, sepalis exterioribus duplo excedentes. Carina eximie cristata. Capsula suborbicularis, emarginata, alas æquans. Semina nigra, curvata, pilosa; arillodium duabus appendicibus latis carnosus semen æquantibus præditum.

Peru. Tatamara; inter muscos; Lechler, 2629, in Herb. Kew. Near *P. nemoralis*; but a smaller plant, with much narrower leaves; the lower part of the stem often bare of leaves; the flowers on longer stalks; and the whole plant somewhat more pubescent.

26. *P. PARAGUAYENSIS*, nob. n. sp. Radix lignosa. Caules numerosi, virgati, ascendentes, angulati, levissime puberuli, circa pedales. Folia plerumque 4-verticillata, ad 1 poll. longa, $\frac{1}{4}$ poll. lata, lanceolata vel obovata, apiculata, versus apicem ramorum sparsa, linearia. Racemi terminales, confertiflori; bracteæ lineares, post anthesim persistentes, pedicellis longiores. Flores breviter pedicellati, fusco-albi. Sepala exteriora parva, lineari-lanceolata, marginibus membranaceis; alæ multo majores, lanceolatæ, capsulâ maturâ sublongiores. Carolla ignota. Ovarium pulchre glandulosum. Capsula ovalis. Semina nigra, curvata, sericeo-hirsuta; arillodium subgaleatum, appendicibus duabus minutum, semine dimidio brevioribus.

Paraguay. Itangu, près de Villa-Rica, dans les prairies, Bal., 2193. Nearest to *P. nemoralis*, but readily distinguished by its longer more crowded racemes, larger flowers, persistent bracts, and other characters.

(To be continued).

ON A NEW CHINESE *CARYOTA*.

BY H. F. HANCE, PH.D., F.L.S., &c.

THE climatic conditions of South-eastern China are not favourable to the growth of Palms; and hence the members of this family bear but a small numerical proportion to the other constituents of its rich and varied flora. Comparatively few though they are, however, it is noteworthy that all appear, without exception, to be endemic. *Livistona chinensis*, R. Br., extensively used for roofing, for building huts, and for making fans and rain-coats, is not found anywhere wild out of Southern China; whilst *Rhapis flabelliformis*, Linn., a great favourite in cultivation, though extending, it is stated, to the Loo-choo islands, is not indigenous in Japan. The four *Calami* I have been so fortunate as to add to the flora of Hong-kong* seem well distinguished from any of their previously described congeners; and the *Phœnix* which I had supposed† to be identical with *P. farinifera*, Roxb., and most probably also *P. pusilla*, Lour., has been decided by authorities with better materials for arriving at a just conclusion than are at my command to be a distinct species, which M. Naudin has called *P. Hanceana*. This last-named plant, it may be remarked *en passant*, is likely to become an object of considerable interest to horticulturists in the cooler parts of Europe, owing to its singularly hardy constitution. M. Naudin, who raised it from seeds I sent him, at his property at Collioure, in the Pyrénées orientales, thus wrote me regarding it, in June, 1872, "La perle de mon jardin est toujours mon magnifique *Phœnix Hanceana*, Ndn., qui vient admirablement ici. Il a enduré, sans souffrance, trois hivers consécutifs, tous trois *exceptionnellement rudes* pour le pays. Il y a deux ans, il a été littéralement enseveli sous un mètre de neige, pendant onze jours, puis noyé par l'eau glaciale de cette neige fondue. Il n'en a poussé que plus vigoureusement. L'année dernière il a produit une quinzaine de feuilles (palmes), et cette année il est en train d'en faire autant. Sa tige s'élève déjà notablement au dessus du sol, et je ne désespère pas de le voir fleurir l'année prochaine. Il y a quatre ans ce n'était cependant qu'une petite plante en pot, et qui y languissait faute d'espace."

I have now the pleasure of describing an eighth new palm peculiar to this region. *Caryota*, the genus to which it belongs, was founded by Linnæus, the only species known to him, *C. urens*, being the "*Schunda pana*" of Rheede. Blume made a study of the species of the Indian archipelago, of which he admitted five, † *C. maxima*, Bl., *C. propinqua*, Bl., *C. Rumphiana*, Mart., *C. furfuracea*, Bl., and *C. urens*, Linn. The species are all very much alike, and cannot be said, up to the present time, to be well known or satisfactorily discriminated. Professor Beccari, the latest and

* Trimen, 'Journ. Bot.' xii., 263; xiii., 289.

† Seem., 'Journ. Bot.', vii., 15.

‡ Rumphia, ii., 134, sqq.

evidently the most careful student of the genus, which he examined in Papua, Borneo and Ceylon, has some excellent observations,* which are to be commended to the careful study of Phœnicologists. He admits *C. urens*, Linn., *C. Rumphiana*, Mart. (to which he reduces *C. maxima*, Bl., *C. furfuracea* β . *caulata*, Bl., *C. obtusa*, Griff., *C. No*, Becc., and *C. Alberti*, F. de Muell.), *C. sobolifera*, Wall., *C. Griffithii*, Becc. (= *C. sobolifera*, Griff., *C. furfuracea* α . *plicata*, Bl.), and I suppose also *C. propinqua*, Bl. I leave unnoticed two or three Luzonian species, either wrongly referred to the genus or insufficiently characterised, and also Loureiro's *C. mitis*, which is far too imperfectly described to be recognisable. The Chinese tree I had always supposed to be referable to *C. urens*, Linn., and it was only on its flowering at Canton that I became convinced it was a very well-marked species. It is not uncommon on hill-sides in Kwangtung, especially in the westerly districts, and Kwangsi, but I am not aware that it furnishes either toddy or sago, though I am assured the fibrous leaf-sheaths supply all the coir so extensively used in this part of China for covering trunks, making brooms, mats and sandals, and for other purposes.† Desiring to satisfy myself as to its distinctness, I appealed for aid to Dr. R. Scheffer, who, with the promptitude and great kindness he has ever shown in assisting me in botanical difficulties, sent me a full set of herbarium specimens of all the *Caryota* under cultivation at Buitenzorg. Though these are not in all cases named, I have been enabled to identify *C. furfuracea* α . *plicata*, *C. urens* and *C. Rumphiana*, whilst two others seem distinct. The ability and care displayed by Dr. Scheffer in his revision of the Archipelagic *Arecinæ*‡ must make all botanists feel anxious that he should study in detail the remaining tribes of Palms in the vast establishment which has the advantage of his supervision. It is at once evident, on a comparison with the various forms I have examined, that the Chinese Palm is perfectly distinct. So far as can be judged from Blume's and Griffith's plates of *C. propinqua* and *C. Rumphiana* (*obtusata*), and the little woodcut of *C. urens* in Moore's "Treasury of Botany," it differs widely in aspect from all three, by its much more ample coma of fronds, and their very dense pendulous primary segments, forming in the aggregate thick drooping plumes. The sharp cutting of the leaflets is more like that of *C. urens* than the others, but they are more deeply and distinctly lobed. The fruit is as large as that of *C. Rumphiana* (*maxima*); the divisions of the corolla in the male flowers very much larger and wider than in any of the other species at my disposal; and, finally, whereas *C. urens* has from 18 to 38 stamens, *C. furfuracea* about 15 to 25, *C. sobolifera* 12 to 18, *C. propinqua* about 24 to 27, and the various forms referred to *C. Rumphiana* by Beccari from 10 to 50, the Chinese Palm has from 110 to 155,

* Malesia, i., 69, sqq.

† See a very interesting notice by Mr. Sampson, in "Notes and Queries on China and Japan," iii., 129.

‡ Natuurk. Tijdschr. v. Ned. Indië, tom. xxxii.: Ann. du jard. bot. de Buitenz., i., 103, sqq.

A mere comparison of the male flowers with those of *C. urens* and *C. Rumphiana* is at once sufficient to show how extremely different they are. I supposed at first that the Chinese Palm might be identical with *C. mitis* of Loureiro; but this can scarcely be possible, as that author describes his species* as having a "bacca nigra, globo sclopeti minoris æqualis, non urens," whereas in ours the ripe fruit is red, twice as large, and its juice causes considerable irritation and rubefaction when applied to the skin. He adds, too, "Inter palmas hæc omnium pulcherrima est; quando, stante aura leni, motis petiolis, foliola volitare videntur," which evidently indicates much lighter fronds and differently poised segments, and thus a distinct habit from that of the species now described.

The subjoined character has been carefully drawn up from the living tree:—

CARYOTA OCHLANDRA, *sp. nov.*—Non sobolifera, caudice 40-pedali et ultra pedem crasso leviusculo cinereo-viridi anulis 8 poll. inter se distantibus notato basi fibras numerosas pennæ anserinæ crassitie emittenti; frondibus apice cernuis, pinnis primariis utrinque 18–20 pendulis mediis paulo longioribus rachi tenuiter furfuracea segmentis sessilibus dimidiato-rhombeis antice grossiuscule laceris inæqualiter (et crebrius quam in *C. urenti*) serratis apice acuminatis terminali flabelliformi coriaceis 7–9 poll. longis, spadiceis ramis 8–9 ped. longis viridibus, bracteolis latis margine eroso-crenatis calyce duplo brevioribus, florum masculorum oblongorum subtriquetrorum calycis foliolis arcte imbricatis glaberrimis viridibus rotundatis margine eroso-crenatis 3 lin. longis 4 lin. latis, corollæ laciniis luteis crassis rigidis symptyci valvatis coriaceis 8 lin. longis 4 lin. latis, staminibus 110–155† corollæ acquilongis filamentis anthera 2–3 plo brevioribus connectivo ultra loculos in acumen breve productis, floribus ♀ (masculis jam apertis viridibus trigonis 3 lin. tantum longis, staminodiis 3 subulatis laciniis corollinis triente brevioribus, fructibus depresso-globosis sanguineo-rubris pollicem diametro succo urente mono- vel sæpius di-spermio corolla 4- calyceque 2- lineali suffultis.

In montosis regionum occidentalium prov. Kwangtung, et per totam provinciam Kwangsi sponte occurrit; sæpius etiam circa templa et in hortis Cantonensium colitur. (Herb. propr. n. 20332).

NOTE ON THE MORPHOLOGY OF THE CHARACEÆ.

By S. H. VINES, B.A.

In a recent number of this journal‡ Mr. Bennett expresses himself unable to accept the view held by me of the nature of the "pro-embryo" of the *Characeæ*. It would not be necessary for me to add anything to the account which I have already given§ were

* 'Flora cochinchinensis,' ed. Willd., ii. 698.

† 110, 114, 129, 137, 142, 151, 154 inveni in variis quos examinavi floribus

‡ 'Journal of Botany,' March, 1879, p. 67.

§ *Ib.*, December, 1878, p. 355.

it not that the reasons for which Mr. Bennett rejects my view seem to be based upon a misapprehension of my meaning. I will here endeavour to make clear the obscure points.

Mr. Bennett understands me to say that the "pro-embryo," which is developed from the apical cell of the fertilised oosphere, is the entire embryo of the plant; to say, in fact, that in this case the embryo is developed from a part only of the ovum. The following passages from my paper will suffice to show that this is not my meaning. On page 359 I say, "the 'pro-embryo' and the basal cell *together* are equivalent to the sporogonium (of a Liverwort) with its seta and foot"; and again, "the 'pro-embryo,' or rather the true embryo of *Chara*, must be regarded as the sporophore of the plant." Finally, in summarising the results of the enquiry, I say (page 361) that the sporophore of *Chara* is "represented by the embryo, *i.e.*, the product of the development of the central-cell of the archegonium."

With reference to the accuracy of my statements concerning the apogamy of Ferns, I may say that I never cited *Pteris serrulata* as an example of it, so I cannot be fairly charged with having overlooked the fact that Farlow found "archegonia with embryonal outgrowth" upon prothallia of this species. I have the authority of De Bary* for the statement that, so far as is at present known, the three species mentioned by me are only reproduced apogamously.

I will conclude with a few remarks upon the morphology of the nucule. In the paper alluded to I expressed the opinion that the nucule of the *Characeæ* is probably to be regarded rather as an archegonium than as a carpogonium. Whichever of these two terms may be accepted, it must be applied simply and only to the essential organ (central-cell,—oogonium, Celakovsky) of the nucule, without reference to its investment. It is this organ which is the analogue of the carpogonium of the *Carposporeæ* on the one hand and of the archegonium of the *Muscineæ* on the other. It resembles a carpogonium in that it is multicellular (Oosphere and Wendungszellen), and an archegonium in that the fertilised oosphere gives rise to an embryo. Whether the nucule be regarded as a modified branch† or as a modified leaf,‡ there can be no doubt that the spirally-wound filaments which surround the essential organ (archegonium) are phyllomes. They may be very naturally compared with the perichæatial leaves of Mosses.

* Ueber apogame Farne. Bot. Zeitg., 1878, p. 453.

† Sachs; Lehrbush, 4th ed., 1874, p. 300.

‡ Celakovsky; Flora, 1878, p. 49.

THE CRYPTOGAMIC FLORA OF KENT—*FUNGI*.

By T. HOWSE, F. L. S.

(Continued from p. 153.)

Genus 2.—*COPRINUS*, *Fr.*

- C. COMATUS*, *Fr.* Grev., t. 119.
Crystal Palace Grounds; near Chislehurst; Bromley, *Sparkes*;
between Beckenham and Penge, *Percy Bicknell*.
Edible when young.
- C. ATRAMENTARIUS*, *Fr.* Berk. Out., pl. 12. f. 1.
Sydenham Hill. Common.
- C. EXTINGTORIUS*, *Fr.* Bolt. t. 24.
Rowdow Wood, near Kemsing.
- C. NIVEUS*, *Fr.* Sow., t. 262.
Near Deal; near Bromley, *Sparkes*.
- C. MICACEUS*, *Fr.* Sow., t. 261.
Sydenham Hill. Common.
- C. RADIATUS*, *Fr.* Bolt., t. 39, f. C.
On dung, Sydenham Hill. A minute species.
- C. EPHEMERUS*, *Fr.* Bull., t. 128.
On dung. Sydenham Hill.
- C. PLICATILIS*, *Fr.* Sow., t. 364.
Sydenham Hill. Common.

Genus 3.—*BOLBITIUS*, *Fr.*

- B. TITUBANS*, *Fr.* Sow., t. 128.
Amongst grass. Near Bromley, *Sparkes*.
- B. TENER*, *Berk.* Berk. Out., t. 12, f. 2.
Amongst grass. Sydenham Hill.
- B. APICALIS*, *Smith*.
Staplehurst, *Smith Draw*.

Genus 4.—*CORTINARIUS*, *Fr.*Subgenus 1.—*Phlegmacium*.

- C. CYANOPUS*, *Fr.* Sow., t. 223.
Knowle Park.
- C. GLAUCOPUS*, *Fr.* Grevillea, t. 104, f. 5.
Wickham Common, *Huss.*; near Bromley, *Sparkes*.
- C. FULGENS*, *Fr.* Saund. & Sm., t. 12.
Hillydeal Wood, near Otford; Wrotham, *Holmes*.

Subgenus 2.—*Myxacium*.

- C. COLLINITUS*, *Fr.* Bull., t. 549, 596.
Near Bromley, *Sparkes*; Pembury Woods, T. Wells, *T. Walker*.
- C. ELATIOR*, *Fr.* Sow., t. 9.
Sydenham Hill; Joyden's Wood, Bexley; St. Paul's Cray
Common; Pembury Woods, T. Wells, *T. Walker*.

Subgenus 3.—*Inoloma*.

- C. VIOLACEUS, *Fr.* *Fr. Sv. Svamp.*, t. 58.
Knowle Park, *A. S. Bicknell*; Goudhurst, *A. S. Bicknell*; near
Bromley, *Sparkes*.
- C. BOLARIS, *Fr.* *Grevillea*, t. 79.
Wood near Shoreham.
- C. SUBLANATUS, *Fr.* *Sow.*, t. 224.
Sydenham Hill; Holwood, *Huss.*

Subgenus 4.—*Dermocybe*.

- C. CANINUS, *Fr.* *Bull.*, t. 544, f. 1, h. 1.
St. Paul's Cray Common; Shoreham; Starvecrow Wood, *W.T.T.*
- C. ANOMALUS, *Fr.* *Bull.*, t. 431, f. 2.
Sydenham Hill; Shoreham.
- C. SANGUINEUS, *Fr.* *Kromb.*, t. 2, f. 28–30.
Near Bromley, *Sparkes*; Goudhurst, *A. S. Bicknell*.
- C. CINNAMOMEUS, *Fr.* *Kromb.*, t. 71, f. 12–15.
Bostol Wood; Chiselhurst; Sandwich; Keston, *Huss.*
A very variable species; sometimes the gills are red, then
C. semisanguineus, *Gillet*.

Subgenus 5.—*Telamonia*.

- C. ARMILLATUS, *Fr.* *Bull.*, t. 527, f. 1.
St. Paul's Cray Common; Bromley, *Sparkes*.
Varies much in colour of pileus; *C. hæmatocheilis*, *Fries*, figured
in *Hussey*, has a darker pileus than the typical variety.
- C. GENTILIS, *Fr.* *Grevillea*, t. 84, f. 3.
Canterbury, *Berk. Eng. Fl.*, p. 84; near Bromley, *Sparkes*.
- C. ILIOPODIUS, *Fr.* *Bull.*, t. 586, f. 2, A, B.
Canterbury, *Berk. Eng. Fl.*, p. 88; near Bromley, *Sparkes*.

Subgenus 6.—*Hygrocybe*.

- C. CASTANEUS, *Fr.* *Bull.*, t. 268.
Sydenham Hill; Canterbury, *Berk. Eng. Fl.*, p. 89. The Grove,
T. Wells; *T. Walker*.
- C. REEDII, *Berk.* *Hus.*, ii., t. 45.
Hayes Common, *Huss.*
- C. MILVINUS, *Fr.* *Grevillea*, t. 114, f. 6.
Wrotham, *Berk. & Br. in A. N. H.*

Genus 5.—*Paxillus*, *Fr.*

- P. INVOLUTUS, *Fr.* *Bull.*, t. 240.
Sydenham Hill. Common.
- P. ATRO-TOMENTOSUS, *Fr.* *Batsch.*, f. 32.
On stumps and palings. Sydenham Hill.
- P. LEPTOPUS, *Fr.*
Sydenham Hill, *Max Cornu*.
Very like *involutus*, but stem more slender.

- P. PANUOIDES, *Fr.* Berk. Out., t. 12, f. 6.
Charlton, *Berk. Eng. Fl.*, p. 102.
- P. PARADOXUS, *Kalch.* Icon., t. 16, f. 1.
Amongst decayed furze. Wrotham, *Berk. & Br. in A. N. H.*

Genus 6.—GOMPHIDIUS, *Fr.*

- G. GLUTINOSUS, *Fr.* Sow., t. 7.
In fir woods. Sandwich; Bromley, *Sparkes*; Rosebank, T. Wells, *T. Walker*.
- G. VISCIDUS, *Fr.* Sow., t. 105.
In fir woods. Goudhurst, *A. S. Bicknell*.
- G. GRACILIS, *Berk. & Br.* Berk. Out., t. 12, f. 7.
In fir woods. Pembury Woods, T. Wells, *T. Walker*.

Genus 7.—HYGROPHORUS, *Fr.*

- H. EBURNEUS, *Fr.* Berk. Out., t. 15, f. 1.
Chislehurst; Dunton Green; Shoreham, *Holmes*; Near Bromley, *Sparkes*.
- H. COSSUS, *Fr.* Sow., t. 121.
Starvecrow Wood, Tunbridge, *W. T. T.*; near Bromley, *Sparkes*.
Like the last, but turning yellow when decaying, whilst *eburneus* turns red in parts. *H. cossus* is strong scented.
- H. ARBUSTIVUS, *Fr.*
Shoreham; Wrotham.
- H. HYPOTHEJUS, *Fr.* Sow., t. 8.
Sydenham Hill. Very common under fir trees late in the year.
Some French mycologists are of opinion that it does not appear until after the first frost.
- H. LEPORINUS, *Fr.* Schæff., t. 313.
Kent, *Cooke*.
- H. PRATENSIS, *Fr.* Huss., ii. t. 90.
Rosebank, T. Wells, *T. Walker*. Knowle Park; Starvecrow Wood, *W. T. T.*; Bromley, *Sparkes*.
Edible.
- H. VIRGINEUS, *Fr.* Sow., t. 32.
Sydenham Hill. Common.
Edible.
- H. NIVEUS, *Fr.* Kromb., t. 25, f. 1-3.
Crystal Palace Grounds.
- H. DISCOIDEUS, *Fr.* Gonn & Rab., t. 10, f. 4.
Wood near Shoreham; Rowdow Wood, near Kemsing.
- H. RUSSO-CORIACEUS, *Berk. & Mill.* Saund. & Sm., t. 28, f. 2.
Rusthall Common, *Dr. Deakin, Huss*.
- H. CERACEUS, *Fr.* Sow., t. 20.
Sydenham Hill; Knowle Park.
- H. COCCINEUS, *Fr.* Huss., i. t. 61.
Chislehurst; Cobham Park, *Holmes*; near Bromley, *Sparkes*.

- H. *MINIATUS*, *Fr.* Kromb., t. 1, f. 21.
Sydenham Hill; Chislehurst; Starvecrow Wood, Tunbridge,
W. T. T.
Resembles the last, but is smaller, and the stem is scarlet.
- H. *PUNICEUS*, *Fr.* Sv. Svamp., t. 17.
Knowle Park, Sevenoaks; Rosebank, T. Wells, *T. Walker.*
- H. *CONICUS*, *Fr.* Bull., t. 50.
Sydenham Hill. Common.
- H. *PSITTACINUS*, *Fr.* Bull., t. 545, f. 1.
Crystal Palace Grounds. Common.
- H. *CALYPTRÆFORMIS*, *Berk.* Gillet, t. 44.
Knowle Park, Sevenoaks.
- H. *UNGUINOSUS*, *Fr.*
Sydenham Hill.

Genus 8.—*LACTARIUS*, *Fr.*

- L. *TORMINOSUS*, *Fr.* Sv. Svamp., t. 28.
Sandwich; near Bromley, *Sparkes.*
Milk acrid, white. Very poisonous, sometimes called *A. necator*, Bull.
- L. *TURPIS*, *Fr.* Kromb., t. 69, f. 1–6.
Sydenham Hill. Milk acrid, white. *L. plumbeus*, *Fr.*, is now considered to be identical with *L. turpis*, differing only in the stem, which is equal in *L. plumbeus*, whilst in *turpis* it is attenuated downward.
- L. *BLENNIUS*, *Fr.* Kromb., t. 69, f. 7–9.
Sydenham Hill; Starvecrow Wood, Tunbridge, *W. T. T.*
Milk acrid, white.
- L. *UVIDUS*, *Fr.* Kromb., t. 57, f. 14–16.
Near Hadlow, *Holmes.* Milk white, turning lilac.
- L. *PIPERATUS*, *Fr.* Bull., t. 200.
Poundgate Woods; Southboro', *Holmes*; Bromley, *Sparkes.*
Milk white, very acrid. Resembles the next, but is neater, smaller, and has narrower gills.
- L. *VELLEREUS*, *Fr.* Sow., t. 204.
Common in woods. Joyden's Wood, Bexley, *Holmes.* Milk white, acrid; sometimes juiceless, *A. ersuccus*, *Berk.*
- L. *DELICIOSUS*, *Fr.* Sow., t. 202.
In fir woods. Sydenham Hill; Sandwich; Joyden's Wood and Shoreham, *Holmes*; Pembury Woods, *T. Walker*; Bromley, *Sparkes.* Milk red, turning green. Edible.
- L. *CHRYSORRHEUS*, *Fr.* Bolt., t. 144.
Bostol Wood near Plumstead; Goudhurst, *A. S. Bicknell.*
Milk white, turning golden yellow.
- L. *QUIETUS*, *Fr.* Kromb., t. 40, f. 1–9.
Sydenham Hill; Knowle Park; Bromley, *Sparkes.* Milk mild, white.

- L. *VOLEMUM*, *Fr.* Sv. Svamp., t. 10.
Knowle Park, Sevenoaks; Maidstone, *Smith Draw.* Edible.
Milk mild, white.
- L. *SERIFLUUS*, *Fr.* Berk. Out., p. 13, f. 4.
Sydenham Hill; Bromley, *Sparkes*; Barnett Wood, near
Hayes, *Huss.* Milk watery white, like whey.
- L. *MITISSIMUS*, *Fr.* Sv. Svamp., t. 10.
Greenhill Wood, Otford; Knowle Park. Milk mild, white.
- L. *SUBDULCIS*, *Fr.* Sow., t. 204.
Common. Sydenham Hill. Milk white, rather acrid.
- L. *RUFUS*, *Fr.* Sv. Svamp., t. 11.
Common in fir woods. Sydenham Hill. Milk white, very
acrid.
- L. *GLYCIOSMUS*, *Fr.* Kromb., t. 39, f. 16-18.
Sydenham Hill; Chislehurst. Sweet smelling; milk acrid,
white.
- L. *FULIGINOSUS*, *Fr.* Bull., t. 567, f. 3.
Near Bromley, *Sparkes.* Milk white, turning brownish red.

Genus 9.—*RUSSULA*, *Fr.*

- R. *NIGRICANS*, *Fr.* Sow., t. 30.
St. Paul's Cray Common, Chislehurst; Wrotham.
- R. *ADUSTA*, *Fr.* Kromb., t. 70, f. 7-11.
Chislehurst, *Holmes*; Bromley, *Sparkes*; Goudhurst, *A. S. Bicknell.*
Resembles the last, but has more crowded gills.
- R. *ROSACEA*, *Fr.* Bull., t. 509, f. z.
Chislehurst; Knowle Park.
Distinguished from other red *Russula* by the variegated, spotted
pileus.
- R. *FURCATA*, *Fr.* Kromb., t. 62, f. 1, 2.
Crofton Woods, Orpington, *Holmes.*
Distinguished from *R. heterophylla* by its larger size and thick
distant gills.
- R. *HETEROPHYLLA*, *Fr.* Berk. Out., p. 13, f. 5.
Sydenham Hill; Joyden's Wood; Bostol Wood; Chislehurst;
Wrotham; Knowle Park. Edible.
- R. *VESCA*, *Fr.* Bolt., t. 1.
Knowle Park; Chislehurst, *Holmes*; Kent, *Huss.*
Edible. Known by its flesh-coloured pileus with darker,
cinereous disk.
- R. *LEPIDA*, *Fr.* Sv. Svamp., t. 49.
Stockholm Wood, Dunton Green; Hayes, *Huss.*
Pileus rose-red, pruinose, disk more or less rimose.
- R. *EMETICA*, *Fr.* Sv. Svamp., t. 21.
Chislehurst; Joyden's Wood, *Holmes*; Bromley, *Sparkes.*
Known by its scarlet polished pileus and broad free gills.

- R. FRAGILIS, *Fr.* Bull., t. 509, f. T. U.
Sydenham Hill. Common.
Distinguished from *R. emetica* by the thin bleaching cuticle and duller red of pileus.
- R. ALUTACEA, *Fr.* Kromb., t. 64, f. 1-3.
Sandwich; near Bromley, *Sparkes*; Goudhurst, *A. S. Bicknell*.
Distinguished by its large size and yellow gills. Edible.
- R. INTEGRATA, *Fr.* Vitt. t. 21.
Sydenham Hill.
Allied to *R. alutacea*, but smaller in size and paler in colour.
- R. CYANOXANTHA, *Fr.* Schœff., t. 93.
Sydenham Hill; St. Paul's Cray Common; Knowle Park.
Allied to *R. heterophylla*, but with a variegated purplish pileus.
- R. OCHROLEUCA, *Fr.* Kromb., t. 64, f. 7-9.
In fir woods. Knowle Park; St. Paul's Cray Common.
- R. FŒTENS, *Fr.* Sow., t. 415.
Sydenham Hill; Knowle Park; Wrotham, *Holmes*.
Known by its disagreeable smell, and strongly striated margin of pileus.

(To be continued.)

ON THE FLORA OF NORTH-WESTERN DONEGAL.

BY HENRY CHICHESTER HART, B.A.

ADDENDA.

- † *Chelidonium majus*, L. Very rare; road-side near Drumalla.
- † *Cheiranthus Cheiri*, L. Established on the ruins of Rathmullan Abbey.
- † *Smyrniolum Olusatrum*, L. With the last.
- † *Linaria Cymbalaria*, Mill. With the last.
- Primula vulgaris*, Huds. Common. F.

The following species (accidentally omitted) belong under the head *Filices*, and immediately after *Polypodium vulgare*, on p. 150:—

Polypodium Phegopteris, L. Local and rather rare. I have gathered this fern in the following localities in North-West Donegal, 1878:—Glenalla, by the road side; by the side of a mountain road above Magherawarden, Knockalla; in great profusion throughout a wood, about one mile long, called Carradoan or the Backwood; near the Chapel, Angterlim, towards Croghan-more mountain, and on the east side of that mountain; abundant in Bunlinn and Cratlaugh woods, Milford; woods in Glenveagh; the Poisoned Glen; and reaches to upwards of 2000 feet on Slieve Snacht West. F.

Lastrea Oreopteris, Presl. Very local. Glenveagh, and Bunlinn.

L. Filix-mas, Presl. Common. F.

L. dilatata, Presl. Common. F.

I. amula, Brack. Common about Glenalla, Rathmullan, &c., and at Carrablagh. F.

Polystichum angulare, Newman. Rather local. Dimnacraig; Glenalla, Bunlinn. F.

(*P. Lonchitis*, Roth. This plant is recorded upon the authority of Dr. Moore, in the 'Cybele Hibernica,' from "The Rosses and Fanet"; but having applied to him, I learn that this was a mistake).

Athyrium Filix-femina, Roth. Common. F.

" " var. *Fri-ellia*. I had the pleasure of forwarding to Mr. T. Moore, of Chelsea, a frond of this remarkable form, which I gathered near the Seven Arches, Fanet, in August, 1877. I only observed one plant. Mr. Moore informed me that it was quite a characteristic specimen. I may mention that the above station is far from any garden, and that I have not seen the plant in cultivation in Donegal. F.

SHORT NOTES.

LINNÆA BOREALIS IN YORKSHIRE.—This was found a few years ago on the north-eastern Yorkshire moors, not far from Scarborough. I enclose a specimen, though it is without flowers, in which state alone the plant has hitherto been found. It grows on Silpho Moor, a wild place, miles away, I believe, from any habitation, towards the head of the river Derwent, at a height of about a thousand feet, where, along with the Cranberry, it trails over Sphagnum, under the shade of heather. It was discovered in the autumn of 1863 by the late Mr. John Tissiman, of Scarborough, better known as an archæologist than a botanist, and the specimen sent herewith was gathered in 1877, by his grandson, Peter Tissiman. A few miles southward from the locality of the *Linnaea*, on bushy hill-sides towards the village of Hackness, grows *Smilacina bifolia*, along with *Trientalis europæa*. My friend Mr. J. Hildyard, of Scarborough, has sent me every spring, for several years past, a few fresh specimens of each of these two plants; but this year we have had no spring, so that wild flowers are exceedingly scarce. The *Trientalis*, however, grows abundantly and luxuriantly in woods (about four miles west of where I am writing) beyond the village of Hovingham, towards Coxwold—Laurence Sterne's Coxwold,—where Mr. Hildyard found it a few years ago.—RICHARD SPRUCE.

CAREX ORNITHOPODA.—In looking over the herbarium of the late Mr. Borrer at Kew, I came across two *Carexes*, gummed on the same sheet of paper, labelled "*Carex digitata*"; one from "Mackershaw Wood"; the other from "Roche Abbey Wood, Yorkshire, 1846." The one from Mackershaw I believe to be

C. ornithopoda, an opinion in which Mr. J. G. Baker coincides, although the specimen is not altogether satisfactory for identification from having only immature fruit. This note may induce some botanist to search the locality with the hope of securing satisfactory specimens.—T. R. ARCHER BRIGGS.

HELIANthemum POLIFOLIUM, *Pers.*—Our Floras seem strangely at fault as regards this plant's time of flowering in England. Hooker's 'Student's Flora,' Babington's 'Manual,' and Hooker and Arnott's 'British Flora' all give "July and August"; and yet I found it in full bloom on the cliffs near Torquay on May 9th, in so backward a year as this. In 'Flora Devonienensis,' I see, the time given is "June and July."—W. MOYLE ROGERS.

A SECOND (?) PHYsOSTIGMA.—A plant with ripe fruit, collected in Angola by Dr. Welwitsch in September and October, 1855, and named by him *Mucuna cylindrosperma*, was, in 1871, published under that name by Mr. Baker.* Neither its pods nor its seeds agree with the diagnosis of the genus *Mucuna*, but clearly with that of *Physostigma*, and Dr. Welwitsch subsequently recognised it as agreeing in the characters of its seeds with the latter genus (founded in 1861, to contain the Calabar Bean of commerce), and in the MS. ticket of his herbarium-specimens he suggests that affinity. Indeed, the seeds of the plant differ from ordinary Calabar Beans only in being a little longer and straighter, nearly or quite cylindrical (circular on section) and not laterally compressed, also the hilum does not quite reach the micropylar end, and the colour is lighter and of a redder tinge. As the flowers of the plant were not collected, any claims to specific rank must rest on these characters of the seed alone, since the pods and foliage appear from Welwitsch's specimens to differ in no respect from those of the old species *P. venosum*; the stipules are persistent and ultimately reflexed in both.† In the 'Pharmaceutical Journal'‡ Mr. Holmes has recently made the interesting announcement that seeds identical with those of the Welwitsch collection (to which his attention was drawn by Mr. Carruthers) occur among the Calabar Beans of commerce. He gives figures of the two kinds, but the seed of *P. venosum* is drawn too wide, whilst that of *P. cylindrospermum* is considerably larger than any of Welwitsch's numerous specimens in the British Museum, the largest of which is barely $1\frac{1}{4}$ inch long. The locality in which the plant was collected is so incorrectly quoted in Mr. Holmes' paper, that it will be well to give it precisely; the plant grows in the primæval forest (*mata virgem*) at Quisuncula, near Bango-Aquitamba, in the district of Golungo Alto, Angola. This part of West Tropical Africa lies about 10 degrees S. lat., and is therefore at least 15 degrees south of the previously known localities for *Physostigma* in Old Calabar.

* 'Fl. Trop. Africa,' ii., p. 186.

† See Bentley and Trimen, 'Med. Plants,' t. 80 (Part 6.).

‡ May 10, 1879; p. 913.

As, however, the seeds occur mixed in commerce, it is probable that they are found together in some district. But at present the evidence for the second species, (*P. cylindrospermum*, Holmes), must be considered inconclusive.—HENRY TRIMEN.

FESTUCA AMBIGUA, *LeGall*.—Mr. Fred. Townsend refers to this a grass collected at Mildenhall, Suffolk; and he suggests that botanists should look for the plant elsewhere during the early summer. He thinks the species ranks as a glabrous variety of *F. ciliata*, Link.

Extracts and Notices of Books & Memoirs.

NEW GENERA AND SPECIES OF PHANEROGAMOUS PLANTS PUBLISHED IN PERIODICALS IN GREAT BRITAIN DURING THE YEAR 1878.

(Continued from p. 158).

DASYSTACHYS, *Baker* (Liliaceæ).—Angola. — D. CAMPANULATA, *Baker* (Trans. Linn. Soc., 2, i., p. 256., tab. 35). — D. COLUBRINA, *Baker* (Ib., t. 35).—D. FALCATA, *Baker* (Ib.).—D. PLEIOSTACHYA, (Ib., p. 255.)

DENDROBIUM BURBIDGEI, *Rehb. f.* (Orchideæ).—Indian Archipelago. (Gard. Chron., pt. ii., p. 300.)

D. CHLOROPTERUM, *Rehb. f.*, & *S. Moore*.—Hort. Kew. (Journ. Bot., p. 137., tab. 196.)

D. D'ALBERTISII, *Rehb. f.*—N. Guinea. (Gard. Chron., pt. i., p. 366.)

D. DOMINYANUM, *Rehb. f.*—Hybrid (*nobile* × *Linawianum*). (Gard. Chron., pt. i., p. 202.)

D. GOLDIEI, *Rehb. f.*—(Gard. Chron., pt. i., p. 652.)

D. AMBLYONOIDES, *Rehb. f.*—N. Guinea. (Gard. Chron., pt. i., p. 232.)

D. STRONGYLANTHUM, *Rehb. f.*—India. (Gard. Chron., p. i., p. 462.)

D. WILLIAMSIANUM, *Rehb. f.*—N. Guinea. (Gard. Chron., p. i., p. 652.)

DEVERRA JUNCEA, *Ball* (Umbelliferæ).—Morocco. (Journ. Linn. Soc., xvi., p. 468.)

DIPCADII COMOSUM, *Welw.* (Liliaceæ).—Angola. (Trans. Linn. Soc., 2., i. p. 247., tab. 24.)

D. FILIFOLIUM, *Baker*.—Trop. Africa. (Journ. Bot., p. 322.)

D. LANCEOLATUM, *Baker*.—Trop. Africa. (Journ. Bot., p. 322.)

D. LATERITIMUM, *Welw.*—Angola. (Trans. Linn. Soc., 2., i., p. 247.)

D. OXYLOBUM, *Welw.*—Angola. (Trans. Linn. Soc., 2., i., p. 246.)

*DIPLASIA PYCNOSTACHYA, *Benth.* (Cyperacæ).—Brazil. (Journ. Linn. Soc., xv., p. 512, foot-note.)

* Accidentally omitted from last year's List.

DIPLOCYATHA, *N. E. Br.* (Asclepiadææ). — *Stapelia ciliata*, Thunb. (Journ. Linn. Soc., xvii., p. 168., tab. 12.)

DRACENA ACAULIS, *Baker* (Liliacææ).—Angola. (Trans. Linn. Soc., 2., i., p. 252.)

D. INTERRUPTA, *Baker*.—Angola. (Trans. Linn. Soc., 2., i., p. 252.)

D. MONOSTACHYA, *Baker*.—Angola. (Trans. Linn. Soc., 2., i., p. 252.)

D. NITENS, *Welw.*—Angola. (Trans. Linn. Soc., 2., i., p. 252.)

D. PARVIFLORA, *Baker*.—Angola. (Trans. Linn. Soc., 2., i., p. 252.)

DRIMIOPSIS PERFOLIATA, *Baker* (Liliacææ).—Zanzibar. (Gard. Chron., pt. ii., p. 364.)

EICHLERIA, *Hartog* [see MURIEA.] (Journ. Bot., pp. 72, 145.)

ELÆOSELINUM HUMILE, *Ball* (Umbelliferææ).—Morocco. (Journ. Linn. Soc., xvi., p. 479.)

ENCEPHALARTOS ACANTHA, *Mast.* (Cycadææ).—S. Africa. (Gard. Chron., pt. ii., p. 810.)*

ERIA CORNERI, *Rehb. f.* (Orchidææ).—Formosa. (Gard. Chron., pt. ii., p. 106.)

ERIOSPERMUM ANDONGENSE, *Welw.* (Liliacææ).—Angola. (Trans. Linn. Soc., 2, i., p. 261.)

E. FLEXUOSUM, *Welw.*—Angola. (Trans. Linn. Soc., 2, i., p. 261.)

E. OPHIOGLOSSOIDES, *Welw.*—Angola. (Trans. Linn. Soc., 2, i., p. 262.)

E. PALUDOSUM, *Baker*—Angola. (Trans. Linn. Soc., 2, i., p. 261.)

E. STENOPHYLLUM, *Welw.*—Angola. (Trans. Linn. Soc., 2, i., p. 261.)

EUCOMIS AMARYLLIDIFOLIA, *Baker* (Liliacææ).—S. Africa. (Gard. Chron., pt. ii., p. 492.)

E. BICOLOR, *Baker*—Natal. (Gard. Chron., pt. ii., p. 492.)

EUGENIA BULLOCKII, *Hance* (Myrtacææ).—China. (Journ. Bot., p. 227.)

EUPATORIUM ARECHAVALETÆ, *Baker* (Compositææ).—Monte Video. (Journ. Bot., p. 78.)

EURYGANIA OVATA, *Hook. f.* (Ericacææ).—Peru. (Bot. Mag., t. 6393.)

EXOCHORDA SERRATIFOLIA, *S. Moore* (Rosacææ).—N. China. (Ic. Plant., t. 1255.)

FEVILLEA MOOREI, *Hook. f.* (Cucurbitacææ).—Guiana? (Bot. Mag., t. 6356.)

FLEMINGIA LAMONTII, *Hance* (Leguminosææ).—China. (Journ. Bot., p. 10.)

FRITILLARIA GRAYANA, *Rehb. f. & Baker*.—California. (Journ. Bot., p. 268.)

GARDENIA KALBREYERI, *Hiern.* (Rubiaceææ). — Old Calabar. (Journ. Bot., p. 97, tab. 195.)

* This, according to Mr. Thiselton Dyer, is *E. Friderici-Guilielmi*, Lehmann. (See Gard. Chron., 1879, p. 11).

- GARULEUM ALBUM*, *S. Moore* (Compositæ).—S. Africa. (Journ. Bot., p. 133.)
- GLADIOLUS ANDONGENSIS*, *Welw.* (Irideæ).—Angola. (Trans. Linn. Soc., 2, i., p. 269.)
- G. ANGOLENSIS*, *Welw.*—Angola. (Trans. Linn. Soc., 2, i., p. 269.)
- G. BENGUELLENSIS*, *Baker.*—Angola. (Trans. Linn. Soc., 2, i., p. 268.)
- G. BREVICAULIS*, *Baker.*—Angola. (Trans. Linn. Soc., 2, i., p. 267.)
- G. CÆRULESCENS*, *Baker.*—Angola. (Trans. Linn. Soc., 2, i., p. 267.)
- G. GREGARIUS*, *Welw.*—Angola. (Trans. Linn. Soc., 2, i., p. 268.)
- G. LAXIFLORUS*, *Baker.*—Angola. (Trans. Linn. Soc., 2, i., p. 268.)
- G. LURIDUS*, *Welw.*—Angola. (Trans. Linn. Soc., 2, i., p. 267.)
- G. MULTIFLORUS*, *Baker.*—Angola. (Trans. Linn. Soc., 2, i., p. 269.)
- G. WELWITSCHII*, *Baker.*—Angola. (Trans. Linn. Soc., 2, i., p. 268.)
- GRAMMATOPHYLLUM PANTHERINUM*, *Rehb. f.* (Orchideæ).—New Guinea. (Gard. Chron., pt. i., p. 788.)
- GYMNADENIA PINGUICULA*, *Rehb. f. & S. Moore* (Orchideæ).—China. (Journ. Bot., p. 135.)
- HABENARIA PLECTOMANIACA*, *Rehb. f. & S. Moore* (Orchideæ).—E. Trop. Africa. (Journ. Bot., p. 136.)
- H. STYLITES*, *Rehb. f. & S. Moore.*—E. Trop. Africa. (Journ. Bot., p. 136.)
- HÆMANTHUS ALBOMACULATUS*, *Baker* (Amaryllideæ).—S. Africa. (Gard. Chron., ii., p. 202.)
- H. ANGOLENSIS*, *Welw.*—Angola. (Journ. Bot., p. 194.)
- H. ARNOTII*, *Baker.*—S. Africa. (Gard. Chron., pt. ii., p. 492.)
- H. FILIFLORUS*, *Hiern.*—Angola. (Journ. Bot., p. 194.)
- H. KALBREYERI*, *Baker.*—W. Trop. Africa. (Gard. Chron., pt. ii., p. 202.)
- H. HIRSUTUS*, *Baker.*—Transvaal. (Gard. Chron., pt. i., p. 756.)
- H. MANNII*, *Baker.*—Guinea. (Bot. Mag., t. 6364.)
- HANNOA SCHWEINFURTHII*, *Oliv.* (Simarubææ).—Tropical Central Africa. (Ic. Plant., t. 1256.)
- HARTWEGIA GEMMA*, *Rehb. f.* (Orchideæ). (Gard. Chron., pt. ii., p. 8.)

(To be continued).

Australian Orchids. By R. D. FITZGERALD, F.L.S. Parts III. & IV.

This valuable work still continues on its course, and we will give in brief the most salient points of the two last-published parts. The floral parts of *Orthoceras strictum* are so arranged that the species is evidently fitted for insect-fertilization. The pollinia,

however, do not touch the rostellum; but if the flower be examined sometime after expansion, they are found attached to the back of the thin substellar portion of the stigma, and so self-fertilization is effected, a cross being apparently impossible. All the flowers seen produced seed, whether they were artificially or naturally fertilized. *Prasophyllum* yields an instance of a curious order of expansion of the flowers, those in the middle of the spike opening first. *Calochilus paludosus* and *C. campestris* appear to be invariably self-fertilized, although the flowers are open. We may remark that in this genus the labellum looks rather like an insect's body, and take leave to suggest that its chief function is to deceive bees which might interfere with the autogamic process, by inducing them to suppose that another bee is already in possession of the flower; in fact, that a precisely similar function is fulfilled here as in the case of the bee ophrys. *Lyperanthus nigricans* shows a very curious adaptation to circumstances, since Mr. Fitzgerald believes that it very seldom flowers unless a bush-fire has passed over it; the leafage is frequently seen in unfired localities, but without flowers.

Of great interest to the student of gamotaxy are the four states in which the sexual parts of *Thelymitra* are found. In this genus the anther, which is placed behind the stigma, has a tendency to leave the latter as the column elongates. Sometimes the pollen is friable, and leaving the rostellum is dropt on to the stigmatic surface, while the flower is still in the early bud. Again, the pollen may be flaky and more firmly attached to the rostellum; in this form the upper edges of the stigma are very thin and recurved so as to come in contact with the pollen. Or the edges of the stigma may be revolute, so as to expose its surface to the pollen which, in the fourth case, may remain firmly attached to the rostellum, so that insect-aid is necessary to fertilization.

The taxonomic additions and emendations are rather numerous. Among the latter we may mention the re-establishment of Robert Brown's *Caladenia dilatata*, a species which it is difficult to understand could ever have been confounded with any other. The additions include two new species of *Pterostylis*, two of *Chiloglottis*, and one of *Thelymitra* (*T. circumsepta*), having a curious third (anterior) wing to the column which acts as a guard of the pollen against insects, and occupies the position of the a_3 of the ordinary orchid-diagram, of which organ it is probably a reappearance.

S. M.

Mikro-Photographien nach botanischen Präparaten. Von A. DE BARY.

A collection of ten photographic plates, containing three species of *Peronospora*, two of *Erysiphe*, *Podosphæra myrtillina*, transverse section of *Welwitschia* leaf, leaf of *Psoralea bituminosa*, transverse section of stem of *Euphorbia Lathyris*, and cynenchyma of the root of *Scorzonera hispanica*. We do not think this method of illustration is of great value, except in cases of disputed interpretation from unique preparations.

S. M.

In the 'Bulletin of the Academy of Sciences of St. Petersburg,' vol. x., Bunge gives an enumeration of all Mongolian *Salsolaceæ*, with descriptions of the new species.

OTHER NEW BOOKS.—A. GRISEBACH, 'Symbolæ ad floram Argentinam,' ed. 2. Gottingen (9 mk.)—W. PFEFFER, 'Osmotische Untersuchungen: Studien zur Zellmechanik.' Leipzig, Engelmann.—G. HÄBERLANDT, 'Entwicklungsgeschichte des mechanischen Gevebesystems der Pflanzen.' Leipzig.—S. SCHWEN-DENER, 'Mechanische Theorie der Blattstellungen.' Leipzig.—J. D. HOOKER and others, 'Flora of British India,' Part 6, *Melastomaceæ-Araliaceæ*. L. Reeve (10s. 6d.)

ARTICLES IN JOURNALS.—APRIL.

Bot. Zeitung.—E. Schulze, 'On the decomposition of the albumen in plants.'—J. Boehm, 'On the functions of vessels.'—E. Strasburger, 'New observations on cell-formation and cell-division' (tab. 4).

Flora.—W. J. Behrens, 'On the nectaries of flowers' (contd.)—E. Hackel, 'Agrostological notes.'—O. Böckeler, 'Notes on *Cyperaceæ*. 1, *Acoridium*; 2, Balansa's Paraguay *Cyperaceæ*.'—J. Müller, 'Lichenological notes.'—M. Westermaier, 'On the vascular bundles in the pith of *Begoniaceæ*' (tab. 6, 7).—P. G. Strobl, 'On the flora of the Nèbrodes' (contd.)

Hedwigia.—G. Winter, 'On the rapidity of germination in Fungi-spores, and of the growth of their germ-tubes.'

Oesterr. Bot. Zeitschr.—C. L. Langer, 'Observations on water-pores' (continued).—S. Schulzer, 'Mycological notes.'—C. Haussknecht, '*Epilobia nova*' (contd.)—F. Antoine, 'On the growth of *Pinus leucodermis*, Ant.'—A. Dichtl, 'Botanical notes from the Teplitz.'

Magyar Nov. Lapok.—L. Simkovics, 'Supplement to Flora of Kolosvar and Torda.'

Nuov. Giorn. Bot. Ital. (7 April).—O. Penzig, 'Sketch of the botany of Monte Generoso.'—P. A. Saccardo, '*Viscum laxum*, B. & R., in Italy.'—F. Sestini, 'Action of various vapours on seeds in germination.'—L. Macchiati, 'On the action of the atmosphere on the fruit at various stages.'—A. Mori, 'On the histology of *Crassulaceæ*' (tab. 5-7).—L. Caldasi, 'On a new *Polygala* with yellow flowers (*P. pisaurensis*).—G. Archangeli, 'On a new species of *Taccarum*' (tab. 8).—A. Piccone, 'On the disease *falchetto* in Mulberries.'

Bot. Notiser.—E. V. Ekstrand, 'On bud formation on the leaves of *Hepaticæ*.'—'Notes on Scandinavian Liver-mosses.'—E. Warming, 'Review of Danish Bot. Literature for 1878.'

Scott. Naturalist.—F. B. White, 'Cryptogamic flora of Glen Tilt.'—J. Keith, 'Fungi of the province of Moray' (contd.)

Botanical News.

DR. ISAAC BAYLEY BALFOUR has succeeded Dr. Dickson in the chair of Botany in the University of Glasgow. The appointment is interesting, as being the first in this country of one of the younger generation of botanists to an important position as a teacher: it may be confidently expected that the energy and ability already shown by Dr. B. Balfour will, with this full scope for their exercise, result in much improvement in the methods of scientific study in the University.

A practical botanist who is also a Cardinal must be a very rare combination; if it has ever occurred except in the person of MONSIGNORE HAYNALD, the Hungarian archbishop who has recently been raised to the highest distinction in the Roman church. Botanists who attended the Congress in Florence in 1875 will remember him as one of the Vice-Presidents on that occasion.

DR. W. G. FARLOW, for the past five years Assistant-Professor of Botany at the Bussey Institution, Harvard University, U.S.A., has been appointed Professor of Cryptogamic Botany in the University proper, and the laboratory is now established at Cambridge. This is the first special chair of Cryptogamy established in America (or elsewhere?).

Professor Tuckerman has examined and named the whole of the collection of Lichens of Dr. Thomas Taylor, which now forms part of the herbarium of the Boston Society of Natural History. It contains many of the types of the species described by Taylor.

THE death of HEINRICH RUDOLF AUGUST GRISEBACH occurred on May 9th. He was in his 66th year, having been born at Hanover April 17th, 1814. Grisebach did a great deal of systematic and geographical work in botany; his early publications were on the *Gentianea*, which he finally monographed in 1845 for the 'Prodromus.' In 1841 he was appointed Professor at Göttingen, with which university and garden he was connected till his death. He explored Turkey in 1839 for the Hanoverian Government, and on his return he published his travels, and the 'Spicilegium Floræ Rumelicæ,' in 2 vols., in 1843-45. His attention was afterwards called to the botany of the West Indies; and in the preparation of the 'Flora of the British West India Islands,' 1859-64 (the first of the Colonial Floras), of which he was the author, he paid six excursions to England, but did not visit the Islands themselves. Grisebach's most extensive work was the 'Vegetation der Erde,' published in 1872, which has been translated into French, and is the only comprehensive book on the subject. More recently he has published on the plants of temperate S. America, and he continued to work at Argentine botany till his death. The genus *Grisebachia* was founded by Klotzsch in 1838, and includes some South African *Ericaceæ*. A biography of the late Prof. Reichenbach, from the pen of his

son Prof. H. G. Reichenbach, is given in the 'Gardeners' Chronicle' for May 3rd.

It is intended to organize a Botanical Congress at Brussels next year at the time of the great national *fêtes* which are to take place in 1880, and the Botanical Society of Belgium has already commenced to take the necessary preliminary steps.

We are glad to give publicity to the request of Mr. A. Bennett that any botanists who can contribute information on the botany of Surrey, additional to that already published, will forward their notes to him at 107, High Street, Croydon. It is proposed to issue a Supplement to the existing 'Flora,' and it is probable that the Holmesdale Club at Reigate will undertake it.

DR. EDOUARD BARNET, of Paris, the eminent algologist, and Prof. H. G. REICHENBACH, Director of the Botanic Gardens, Hamburg, especially distinguished for his knowledge of Orchids, have been elected foreign members of the Linnean Society of London.

We see with pleasure that the great services to the Australian Colonies of BARON VON MUELLER have been again publicly recognized by the bestowal of a Knight Commandership of the order of S. Michael and S. George, of which he was already a Companion. Among the numerous claims to the consideration of botanists which Dr. (now Sir) Ferd. von Mueller's publications, in all departments of the science, during the last thirty years, have afforded, his share in the great 'Flora Australiensis,' now completed with the 7th volume, must not be overlooked. Though the whole of the species described in that remarkable book were independently worked out by Mr. Bentham, yet the great assistance he received from Dr. von Mueller is gratefully acknowledged by him in the preface to the last volume, where he also thanks him for the regular transmission, "arranged for each volume, of the vast stores of Australian specimens collected by his own exertions, as well as by the able collectors he has employed, and the numerous residents and other correspondents whom he had inspired with a love for the science." Over 100,000 specimens were thus sent over, mostly previously examined, and many also published in the ten volumes of the 'Fragmenta.' In this serial publication, which still continues, 650 species have since been added to the 'Flora.' During the collection of this immense herbarium, from which about two-thirds of the localities given in the 'Flora' are derived, more than 27,000 miles have been traversed by Baron von Mueller himself during the past thirty years, and thousands of letters written to correspondents in all parts of the Australian colonies.

We also observe that MR. BENTHAM'S valuable services to the British Colonies by the elaboration of the 'Flora Australiensis' and other Colonial Floras, have been acknowledged in a similar way, and that he is gazetted C.M.G.

WILLIAM RICHARDSON of Alnwick, one of the oldest members of the Exchange Club, and the discoverer in England of *Psamma baltica* in 1871 (see 'Journ. Bot.' 1872, 21 & 315, died, in his 80th year, on April 19th.

Original Articles.

NOTES ON THE *COCOS NUCIFERA*.

BY H. O. FORBES.

(TAB. 202.)

ON a late visit to the Cocos Keeling Islands, in the South Indian Ocean, I examined a Cocoa-nut Palm with branches, of which, as it is rather a rare occurrence, I send the accompanying sketches, for which I am indebted to Mr. A. C. Ross. It will be seen that instead of producing flowers in the usual way from the axils of the leaves of the crown, this tree bears plumes of leaves which are persistent. As yet it has produced no fruit; it is, however, not very old. The scars on the stem indicate the position of other plumes, which were likewise persistent, but were cut off by the natives for their sweet "cabbage." As soon, however, as Mr. Ross, the proprietor of the islands, became aware of this peculiar tree, he issued strict orders that it should be left intact. At present there are twenty-five living branches, and the scars of fifty-two. During a destructive cyclone which visited the group in 1876 it suffered considerably, but has begun to recover, and is now looking most healthy. It will be interesting to know how the growth of the branches continues, and if it bear fruit; as to these particulars, Mr. Ross has kindly promised to keep me informed.

The Cocoa Palm grows here with great luxuriance; some reach a height of 120 feet. In numerous instances the three cells of the ovary are developed, forming a nut with three cells separated by leathery walls. These do not often attain a size as large as the cells of the ordinary nut, in which two are suppressed. Very often the three seeds germinate, producing an apparently trifid tree, the trunks coalescing at their bases. I have seen also nuts with cells ranging from four to eight and ten.* I send you a rough outline sketch of a tree which has come up from a nut of fourteen cells, all of which germinated, producing a tree with fourteen stems united at the base; several have been cut off, and there remain now only seven. The tree is three years old.

The trees growing by the margin of the sea, and washed often by the tide, do not reach so great a size as those in the interior of the island, where they have more fresh water and not so much of

* It would be very interesting to have specimens of such remarkable Cocoa-nuts.— [*Ed. Journ. Bot.*]

the scorching rays of the sun; and yet the amount of fruit borne by these differently situated trees, if of about equal age, is the same in quantity and in quality. Mr. Ross, an accurate observer, who has closely studied the Cocoa Palm for many years, believes that the nuts are best and contain most oil which are formed when the sun is north, and ripened when it is south of the Equator.

Prof. Balfour, in his 'Botany,' gives thirteen to sixteen years as the period, after transplanting, which must elapse before the Cocoa Palm will bear fruit. Here transplanting is not practised at all; and I am told that the best nuts are obtained by burying the newly-fallen seed some twelve to eighteen inches in the ground, and from three to ten years after this (the average is about five) fruit is formed, taking from eight to thirteen months to ripen. In these islands ripe nuts have been gathered three years and nine months after the seed fell from the parent tree. Each palm throws out a spathe containing from seven to fourteen nuts every month, and continues in perfect vigour for certainly much over forty years,—the period allotted by Prof. Balfour to its fruit-bearing powers.

Fires are not uncommon on the islands; and when such occurs, or when any considerable space has been burned clear, the ground, if rain follows, immediately brings forth an abundant crop of Cape gooseberry (*Physalis peruviana*) and a species of *Brassica* (*B. juncea?*), though among the cocoa-nut trees there is none of the *Physalis* to be seen, and but very few mustard plants.

[The mode of ramification in Palms above described by Mr. Forbes (now on his way to Celebes) by the production of persistent leaf-bearing branches in place of flower-panicles, must be of very rare occurrence, if previously recorded. Dr. Pulney Andy has described and figured (Trans. Lin. Soc., xxvi., p. 661, fig. 1) a somewhat similar transformation, where numerous branches of the spadix were metamorphosed into small leafy tufts, but he expressly notes that these quickly withered and fell away. The branched Palmyra and Cocoa-nut Palms figured in the plate (t. 51) attached to Dr. Pulney Andy's paper are cases of bifurcation of the terminal bud (analogous to the normal condition in *Hyphane*) and have been more frequently observed.—*Ed. Journ. Bot.*]

DESCRIPTION OF PLATE 202.—Drawn from sketches by Mr. A. C. Ross.—
 1. View of branched Cocoa-nut Palm, northern aspect. 2. The same, seen from the opposite side. 3. A young Cocoa-nut Palm with seven stems (see text).

3



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1

Cocos nucifera.

VULPIA AMBIGUA, LE GALL, AND *V. CILIATA*, LINK.

BY FREDERICK TOWNSEND.

I HAVE had in my herbarium ever since June, 1846, some specimens of a *Vulpia*, which I gathered in Suffolk and labelled at the time *Festuca sciuroides*. When Mr. A. G. More discovered *Vulpia ambigua*, Le Gall, in the Isle of Wight, and described the plant in 1861 in the 'Journal of the Proceedings of the Linnæan Society' (vol. v., pp. 189–192), it struck me that my plants from Suffolk appeared very similar; but not then having time for closer investigation, I did no more than transfer my specimens to the species-sheet devoted to *Vulpia ambigua*.

In 1872 I found, in the neighbourhood of Cannes, several plants which I suspected to be a variety of a well-known and long recognised species—*Vulpia ciliata*, Link; and I named my specimens *V. ciliata* var. *glabra*. On placing these in my herbarium, their similarity to *V. ambigua* so forcibly impressed me that I put them with the latter species, and there they have lain until a few days ago, when I was reminded of their existence by the fact that *V. ambigua* now stands out as the only Phanerogam in the Isle of Wight which is not also found on the mainland; the following species, enumerated by Mr. A. G. More in 1861 (in his Supplement to 'Flora Vectensis'), viz., *Calamintha sylvatica*, *Arum italicum*, *Matthiola incana*, *Callitriche obtusangula*, and *Festuca ambigua*, as peculiar to the Island, having, with the exception of the last, been since discovered on the mainland. I have now carefully examined my Suffolk specimens, and have come to the conclusion that they are identical with the Isle of Wight plant and with my *V. ciliata* var. *glabra* from Cannes.

Mr. J. Lloyd, in his 'Flore de l'Ouest,' places *V. ambigua* as a var. of *V. pseudomyurus*, and alludes to it under this species in the following terms:—"Varie à valve inférieure de la glume tres-courte et sur les bord de la mer à valve supérieure obtuse (*V. ambigua*, Le Gall)." 'Flore de l'Ouest de la France,' ed. iii. p. 371; but Le Gall himself, on the other hand, considered his plant as more nearly allied to *V. ciliata*, and was disposed to refer it to that species as a non-ciliated variety.

I have in my herbarium one specimen, from Cannes, with many culms to all appearance springing from one and the same root; but several of the culms bear panicles with a glabrous rachis and non-ciliated pales, while other culms have a villous rachis and ciliated pales. It is possible, certainly, that there may be two plants the roots of which are intermingled, but I cannot separate them, even after soaking in boiling water; and if there be two plants, I can detect no difference in them except in the presence or absence of villosity and hairs. The amount of villosity certainly varies in the type *V. ciliata*; and I am led to conclude also that the species varies in having the pales ciliated or non-ciliated.

With the view of comparing the four nearly allied species,

V. uniglumis, *V. ciliata*, *V. pseudomyurus*, and *V. sciuroides*, I have appended short characters of each; and I hope that botanists who may have the opportunity will search for *V. ciliata* var. *glabra* in Suffolk.* My specimens were gathered near Mildenhall.

Vulpia uniglumis, Parl.—Uppermost sheath distant from the erect close simple panicle; upper glume setigerous, nearly equalling the first floret on the same side; lower glume wanting, or very minute membranous; stamens three. Middle and South Europe, near the sea.

Vulpia ciliata, Link.—Uppermost sheath reaching to or partly including the erect close panicle; lowermost panicle-branch not nearly equalling half the panicle, usually much shorter; glumes widely membranous, the upper reaching about one-third way up the lowest floret on the same side; lower glume wanting, or very short and membranous; rachis villous, outer pale villous and ciliate; one stamen. North, middle, and South Europe.

Var. *glabra* (*V. ambigua*, Le Gall).—Rachis and florets glabrous. Isle of Wight; Suffolk; N. W. France; Mediterranean.

Vulpia pseudomyurus, Soy. Willm.—Uppermost sheath reaching to or partly including the long narrow interrupted nodding panicle, its lowest branch not one-third the length of the whole panicle; upper glume reaching to about the middle of the lowest floret on the same side; lower glume subsetiform, less than half the length of the upper; one stamen. North, Middle, and South Europe.

Vulpia sciuroides, Gmel.—Uppermost sheath far distant from the erect close panicle, its lowest branch equalling half the panicle; upper glume about equalling the lowest floret on the same side; lower glume subsetiform, about half or more the length of the upper; one stamen. North, Middle, and South Europe, &c.

DECAS PLANTARUM NOVARUM IN HISPANIA COLLECTARIUM.

AUCTORIBUS LERESCHE ET LEVIER.

ANEMONE PAVONIANA, Boissier Herb. (Sect. *Eriocephalus*).—Perennis rhizomate abbreviato fibrillifero, collo fibrilloso, caulibus tenuibus adscendentibus pilis longis sparsis obsitis 2-3-floris rarius unifloris, foliis radicalibus ternatim decompositis segmentis ovatis in lacinias linearis-cuneatas acutas trifidas partitis, petiolo et petiolis secundariis elongatis pilosulis, foliis involucralibus ternis conformibus sed valde diminutis sessilibus a flore longo intervallo remotis, flore mediocri, petalis 7-8 albis oblongo-ellipticis lineatim venosis extus adpresse hirtis, carpellis semiorbiculatis lanatis stylo glabro recurvo longioribus in capitulum globosum dispositis.

* See the notes at p. 212, recording additional localities in Suffolk and Dorset.—[*Ed. Journ. Bot.*]

Habitat in regione alpina jugi “Picos de Europa” provinciæ Santander Hispaniæ borealis loco “las gramas” dicto, alt. circ. 7000. Extant quoque in Herbario Boissierano specimina ex herb. Pavon sub nomine *A. alpina* quorum locus non indicatus sed probabiliter in Alpibus Asturicis lecta.

Planta cum pedunculis $\frac{1}{2}$ –1-pedalis, folia radicalia supra pedunculi divisionem 2–3 pollices longa et lata, lacinia eis *A. alpina* angustiores et acutiores, flores magnitudinis eorum *A. baldensis* cui affinis est sed quæ rhizomate elongato repente, caulibus pumilis semper unifloris, foliis minus divisis, carpellorum spicâ ovato-oblongâ, stylis rectis carpello æquilongis differt.

AQUILEGIA DISCOLOR, *Lever et Leresche*.—Rhizoma crassum, inter lapides latitans folia radicalia numerosa caulesque palmares paucos unicumve alit. Foliis radicalibus biternatis, apice rotundato-lobulatis, glabris, subtus glaucis, caule duplo brevioribus, caulinis paucis, summis ligulæformibus. Caule unifloro vel in media altitudine alterum florem breviter pedunculatum edente, apice pubescente. Flore extus pubescente, ante evolutionem nutante, mediocri magnitudine, sepalis petaloideis cæruleis ovato-lanceolatis, obtuse apiculatis, petala duplo superantibus. Petalis rotundatis, pallide albis, stamina vix æquantibus. Antheris ovatis luteolis. Calcaribus petalorum longitudine, apice obtuso subincurvis. Capsulæ huosque ignotæ.

Ad *Aquilegiam pyrenaicam*, DC., valde accedit formâ foliorum altitudine caulis et plantæ omni indole, at differre videtur floribus fere duplo minoribus, sepalis angustioribus, petalis duplo fere brevioribus discoloribus. Calcaria cæterum similia.

In rupestribus calcareis montium Picos de Europa, supra Potes, Cantabriæ altit. 7000 p. s. m., die 10 Julii, 1878, legimus.

ARABIS CANTABRICA, *Leresche et Lever*.—Perennis, cæspitosa, multicaulis, stellatim pubigera. Caulibus adscendentibus, irregulariter arcuatis flexuosisve, simplicibus vel parce ramosis. Foliis radicalibus rosulatis, oblongis basi attenuatis; caulinis alternis, sessilibus, elongatis; omnibus crenato-dentatis acutiusculis; siliquis laxis, pedicello pubescente semipatente duplo triplove longioribus, glabris, complanatis, torulosis. Calycibus extus pubescentibus, luteolis, basi gibbosis, corollâ duplo fere brevioribus. Petalis albis stamina paululum superantibus, integris, obtusis. Stigmate capitato. Seminibus . . . immaturis.

Adspectu magnitudineque *A. alpinam* inter et *serpyllifoliam* media. Ab *Arabide alpinâ* floribus duplo et ultra minoribus, statura minori, petalis angustioribus, foliis minoribus caulinis exauriculatis differt. Ab *Arabide serpyllifolia*, Villars, foliis crenato-dentatis nec integris, ovato acutis, nec spatulatis. Pedicellis longioribus hirtulis, nec abbreviatis glabrisque: siliquis latioribus,* torulosis, nec angustis lævibus et stylo valde acutatis. *Arabis muralis*, Bertol., longius distat et a nostrâ multum differt caulibus firmioribus strictis, floribus majoribus, siliquis adpressis, brevius pedicellatis, rosulâ foliorum radicalium compactâ.

* $1\frac{1}{2}$ millim. latis, 25–28 millim. longis.

Die 9 Julii, 1878, in lapidosis calcareis Alpiniis 6500–7000 p. s. m. editis montium “Picos de Europa” Cantabriæ, supra vicum Potes, nostram speciem legimus.

PIMPINELLA SIFOLIA, *Leresche*.—Radix perennis caudiculos subterraneos passim nodosos emittens. Caule plerumque erecto, tereti, $\frac{1}{4}$ – $1\frac{1}{2}$ pedali, parce ramoso. Foliis ambitu triangulari-lanceolatis, venulosis, subtus glaucescentibus, margine incisosserratis serraturis acutis mucronulatis, radicalibus inferioribusque longe petiolatis trijugis, lobo impari subtrilobo, lobis inferioribus petiolulatis externe ampliatis; caulinis breviter petiolatis, petiolo vaginato margine scarioso; supremis paucilobis, lobis lobulisque linearibus. Umbellis 5–12 radiatis, involuero monophyllo, rarius diphylo, sæpe nullo, phyllis exiguis anguste linearibus. Umbellulis 8–20-radiatis, involucellis 1–3-phyllis integris, inæqualibus, anguste linearibus. Floribus amœne carneo-rubellis, calyce obsoleto, petalis bicornubus, medio nempe lacinulâ inflexâ orbordato. Stylopodio mammillari luteolo, stylis mox extrorsum arcuatis brevibus. Fructus immaturi ovati, ut tota planta glaberrimi.

Species juxta *Pimpinellæ magnæ* varietatem alpinam *rubrifloram* collocanda, sed hæc altior, durior caule angulato nec lævi, foliis firmioribus grossedentatis, stylis duplo longioribus et radice non radicante.

In nostris speciminibus fructus maturi deficiunt; inde genus adhuc incertum remanet.

Hanc novam elegantemque stirpem in pascuis fruticosis lapidosisque montium “Picos de Europa” supra Potes Cantabriæ legimus. A regione superiori quercuum ad usque pascua alpina crescit.

Obs.—Plerique auctores in genere *Pimpinellâ* involucrum utrumque nullum dicunt. Sic DC. prodr. 4, p. 119, Gaudin fl. helv. 2, p. 438, et alii. Koch vero in Syn. fl. Germ. et Helv. ed. 2, p. 316 præsentiam vel absentiam involucrorum in *Pimpinellis* tacet. Boissier in Fl. Orient. 2, p. 864–874, *Pimpinellas* exinvolucratas et alteras involucris et involucellis munitas enumerat.

CAMPANULA ACUTANGULA, *Leresche et Levier*.—Radix centralis, perennis caudiculos plures in orbem expansos emittit. Caudiculis subangulatis, vage pilosis, brevibus, foliatis, paucifloris. Foliis caulinis numerosis, alternis, petiolatis, inferioribus rotundatis, supremis rhomboideis, basi integris cætero ambitu acute paucidentatis, dente supremo majori. Petiolis limbo brevioribus. Ramulis brevibus ex axillis supremis oriundis, parce foliolatis, florem unicum gerentibus. Flores vel potius alabastri in unico nostro specimine nimis juniores ovarium ut videtur rotundatum laciniis calycinis elongatis subfoliaceis lanceolatis ostendunt. Corolla et fructus hucusque ignoti.

Planta rupestris, ut videtur peculiaris, eam ad sectionem *Campanula Portenschlagiana* pertinere suspicamur.

Rupes calcareas alpinas montium “Picos de Europa” Cantabriæ altitudinis 6000–7000 p. s. mare inhabitat.

CAMPANULA ADSURGENS, *Levier et Leresche* (Sect. *Fucodon*).—Radix centralis perennis fusiformis caules plurimos tenues fragiles ad terram propensam adsurgentes semipedales pedalesve simplices vel breviter ramulosos edit. Foliis radicalibus cæteris majoribus petiolo duplo triplove brevioribus; caulinis a basi ad apicem caulium decrescentibus numerosis subcontiguis magis ac magis breviter petiolatis; omnibus crenatis rotundatis; summis ovatis, inferioribus mediisque basi cordatis, caulinorum limbo petiolum superante. Floribus ad apicem caulium racemosis. Pedicellis calyce duplo longioribus et ultra. Corollis extus puberulis profunde 5-fidis lobis semipatentibus laciniis calycinales superantibus. Calycis laciniis ovarium æquantibus anguste lanceolato-linearibus acutis. Stylo exserto recto. Capsulâ obconicâ decemnervia.* Seminibus oblongis luteolis lucidis. Tota planta in omnibus nostris speciminibus pubescit. Flores pallide cærulei.

Folia radicalia illa *Sibthorpie europæe* forma magnitudineque in memoriam revocant at in nostra planta multo minus tenera sunt.

Campanula Elatines, L., temere in Hispania indicata fuit, forsan confusione cum nostrâ. Vide Willkomm et Lange Fl. Hisp. 2, p. 295, observ. sub *C. specularioides*, Coss. quæ longe aliena est. *Campanula Elatines* a nostrâ differt foliis majoribus longius petiolatis, ovato-cordatis acute multidentatis (dentibus 15–21), nec rotundato-cordatis, obtuse crenatis (cren. 7–9), laciniis calycinis patentibus angustioribus nec demum erectis: capsulâ rotundâ nec obconicâ; caulibus multo copiosius longiusque florigeris, nec plerumque tantum modo ad apicem breviter racemosum floridis. Semina *C. Elatines* paulo minora sunt, &c.

CAMPANULA VAYREDÆ, *Leresche* (Sect. *Medium*).—Radix biennis, unicaulis, vel caule centrali ablato pluricaulis. Caule erecto, rubente, duro strigosissimo, in apice 1–8 flo. Foliis late linearibus, sparsis, subundulatis, sessilibus, supra glabris, margine dorsoque subpidis. Pedunculis solitariis 1–3-foliolosis, flore brevioribus. Floribus laxè spicatis semipatentibus expansis magnis cæruleis. Corollâ ad medium usque quinquefidâ, lobis expansis, late ovatis, secus nervum dorsalem pilosis. Calyce brevi hispida laciniis oblongis obtusis corollâ duplo brevioribus, sinibus deflexis triangularibus laciniis longitudine æquantibus. Staminibus glabris. Stylo recto exserto.

Ad *Campanulam speciosam*, Pourret, accedit. Sed nostra durior multo magis strigosa minus foliosa minusque florida. Differt insuper corolla breviori expansâ, horizontali in speciosâ vero erectâ suberectâve. Laciniæ calycis *speciosa* longiores sunt et sinus reflexos longitudine duplo superant. Illæ vero *C. Vayredæ* breviores sunt et sinus reflexos longitudine æquant. *Campanula Medium*, L., corollam longius campanulatam apice brevissime lobatam, calycis laciniis multo latiores et folia (praesertim inferiora) medio latiora basi attenuata præbet.

Hanc novam pulcherrimamque speciem ad basin septentrio-

* Poris ad medium sitis.

nalem Montis Serrati (Montserrat) supra oppidum Monistrol, die 18 Julii, 1870, legi. Clarus Vayreda botanicus Catalaunicus eam quoque legit Julio, 1872, in rupestribus Talaxa, Baragada (Pyr. Orient.). Et ei merito lubenter dicavi.

LINARIA FILICAULIS, Boisser (Sect. *Linariastrum*).— Perennis? glaucescens glaberrima vel sub lente papillaris, late cæspitosa, radice tenui fibrosâ, caudiculis numerosissimis tenuiter filiformibus inter lapides decumbentibus nudis, caulibus prostratis vel adscendentibus brevibus, foliis minutis carnosulis oblongo linearibus obtusis in petiolum brevissimum attenuatis inferioribus quaternis superioribus alternis, floribus breviter pedunculatis in capitula ovata demum laxiuscula aggregatis, calycis laciniis elliptico-linearibus obtusis, corollæ intense roseæ palato aurantiaco, calcare recto acuto corollæ æquilongo, capsulâ obtusâ laciniis calycinis longiore, seminibus planis alâ orbiculari cinctis disco tuberculis elevatis obsito.

Habitat in glareosis mobilibus alpinis jugi “Picos de Europa” dictis alt. 7000, in monte Pena de Curavacas ejusdem provinciæ. (Boissier).

Affinis *L. alpina*, DC., sed specificè distincta videtur foliis latioribus floribus fere duplo majoribus, corollâ roseâ nec cæruleo violaceâ, calcare longiore, seminibus tuberculato-punctatis.

LINARIA FAUCICOLA, Levier et Leresche (Sect. *Supina*).—Annuæ glaberrima, caulibus pluribus filiformibus diffuso adscendentibus simplicibus vel parce ramosis pumilis, foliis parvis quaternis oblongis obtusis basi attenuatis, superioribus alternis, lineari oblongis, racemo paucifloro sub anthesi brevissimo tandem laxo, floribus brevissime pedicellatis, calycis laciniis linearibus acutis corollæ tubo subbrevioribus, corollâ cæruleo violaceâ concolore palato pallidiore tubo striato, calcare recto acuto corollæ æquilongo, seminibus planis anguste marginatis lævissimis.

Habitat in lapidosis umbrosis faucis lateralis vallis fluvii Deva provinciæ Santander Hispaniæ borealis. Floret Julio. Caules 5–8 pollicares, folia majora 5–6 lineas longa 1–1½ lata, flores cum calcare 9 lineas longi. Ex affinitate *L. polygonifolia*, Poir. = *amethystea*, Hoffmg. et Link, differt ramis magis diffusis, racemo non glanduloso. Calycis laciniis non oblongo linearibus, corollæ non multipunctatæ calcare non incurvo, semine nec tuberculato nec margine incrassato.

STERNBERGIA ÆTENSIS, Guss. fl. Sic. prod. 1, p. 395. Kunth Enum. 5, p. 700. Parlat. fl. Italiana 3, p. 93, hucusque in Hispania nullibi reperta fuerat. Eam in quercetis altioribus jugi *Sierra de la Nieve* supra Junquera provinciæ Malacitanæ in Hispania australiori die 20 Septembris, 1877, Boissier et Leresche florentem legerunt.

ISOETES BORYANA, Dur., var. *Lereschii*, Reichenb. fl.—Rigidiuscula, viridissima, macrosporis parcissime et irregulariter gibberosis, gibberibus acutiusculis.

Humilis, truncus more *Isoetidis Boryana* brevissimus, trans-

sectione irregularis omnino non trilobus dicendus. Folia ad 30; 0,05–0,1 alta tenuia, valde subulata, stomatibus numerosis in superficie externa lacunis aëreis maximis. Fasciculus centralis maximus. Fasciculi tres bene parvi accessorii, unus utrinque in angulo, unus ante septum medianum, omnes in superficie interna. Ligula vulgo obtusiuscula, duplo longior quam lata, sæpissime apice quasi erosa, num omnino reniformis humilis (ita bis reperi). Labium obtusissimum crassum. Vela supra macrosporangia vulgo completa, supra microsporangia valde reducta. Macrosporarum carinæ nunc multo minus evolutæ, quam carinæ marginales, quæ imo denticulatæ. Microsporæ densissime muriculatæ.

Specimina I. *Boryanæ* originalia a Cazau 46 paulo validiora firmiora. Illa autem 4 ex “l'étang de Sanguinet” (Landes) coll. Motelay (Reliq. Mailleanæ) sat bene conveniunt. Cum in illis in nostrâ specimina plura humilia polyphylla, bulbo crasso, pauca longiora paucifolia, bulbo tenui. Rigidam in litteris monuit clarus Levier florentinus.

Varietas insignis, multo altius supra mare detecta, de inventori obedientissime dicata.

(Sign.) Reichenbach, f.

In aquis puris lacunæ inferioris montium Gredos Hispaniæ centrali-occidentalis, die 12 Augusti, 1878, hanc speciem legimus. Altit. circiter 6000 p. s. m.

POLYGALÆ AMERICANÆ NOVÆ VEL PARUM COGNITÆ.

By ALFRED W. BENNETT, M.A., B.Sc., F.L.S.

(Concluded from p. 173).

27. *P. AREGUENSIS*, *nob. n. sp.* Radix fibrosa. Caulis simplex vel ramosus, angulatus, puberulus, 1–1½ pedalis. Folia plerumque 4–6 verticillata, superna sæpe alterna, linearia vel lineari-lanceolata, 1 poll. longa, 1½ lin. lata. Racemi terminales, longe pedunculati, breves, confertiflori, lineares; bracteæ deciduæ, lanceolatæ, marginibus membranaceis. Flores subsessiles. Sepala exteriora lanceolata; alæ multo majores, ovatæ, roseæ. Carina cristata. Capsula obovata, emarginata, alis persistentibus multo brevior. Semina elliptica, molliter hirsuta; arilodium haud galeatum, duabus appendicibus ovatis subcarnosis præditum.

Paraguay. Plaine d'Arégua, Bal., 2187. Near *P. paraguayensis*; but an annual plant, distinguished by its small racemes, at a considerable distance from the uppermost leaves.

28. *P. PEARCII*, *nob. n. sp.* Caulis ascendens, 1½ pedalis, glaber, angulosus. Folia quaterna vel quina in verticillis distantibus posita, ½ poll. longa, 1½–2 lin. lata, crassa, rugosa, lanceolata, marginibus revolutis, superna sparsa. Racemi 1–2 poll. longi,

longe pedunculati. Flores $1\frac{1}{2}$ lin. longi, rosei, pedicellis brevibus gracilibus; bracteæ lanceolatæ, acuminatæ, deciduæ. Sepala exteriora ovata, subæqualia, alæ dimidio longiores, corollam excedentes. Carinæ crista in fimbriis longis gracilibus divisa; petala lateralia fere usque ad basim discreta, porrecta, carinâ sublongiores. Stylus curvatus, medius multo dilatatus vel etiam alatus. Capsula elliptica, emarginata. Semina pilis bruneis sericeis omnino oblecta; arillodii appendices membranaceæ, latæ, quam semen dimidio breviores.

Bolivia; open grassy slopes 7–8000 feet, Muna; Pearce. Well-marked by its distant whorls of thick rugose leaves, as much as $\frac{1}{2}$ to $\frac{3}{4}$ inch apart, the long-stalked raceme, and the length of the lateral petals.

P. leptostachys, Shuttleworth in Gray, Pl. Wright., i., 41. Caulis ascendens, glaber, angulosus, simplex, vel superne ramosus. Folia 4–5-verticillata, linearia, $\frac{1}{2}$ poll. longa. Spicæ terminales, valde compactæ, $\frac{1}{2}$ –1 poll. longæ. Flores sessiles, vix $\frac{1}{2}$ lin. longi. Sepala exteriora ovata, marginibus membranaceis. Capsula elliptica. Semina nigra, glabra, duplo longa quam lata; arillodii appendices dimidio semine breviores.

Aspalaga, Florida, Rugel, 545; Tallahassee, Florida, Shut., 34 b. *P. tenuis*, Torr. MS. (non DC.) Gray (*l. c.*) quotes this in a note as a good species, but without any diagnosis. It bears a considerable resemblance to *P. Hookeri*, T. et Gr., and several other North American forms, but is distinguished by the very minute perfectly sessile flowers, the great intervals between the whorls of leaves, and the less globose seed.

The following United States species belonging to this section are found also further south:—*P. cruciata*, L., in Mexico; *P. verticillata*, L., and *P. Boykinii*, Nutt., in Guatemala. The following Brazilian species occur also in Mexico:—*P. galioides*, Poir, var. *major* (*P. asperuloides*, H. B. K.), juxta Topayam, Hartw., 899; *P. adenophylla*, St. Hil., Gal., 876; *P. glochidata*, H. B. K. (*P. spergulaefolia*, St. Hil.), Liebm., 1, 3; Orizaba, Bott., 820; *P. trichosperma*, L., Liebm., 14, 15; *P. variabilis*, H. B. K., Liebm., 27, 28.

The two remaining native West Indian species, *P. spathulata*, Gris., and *P. saginoides*, Gris., belong also to the section with verticillate leaves.

SECTIO F. Carina cristata; folia alterna, nunquam verticillata, aut linearia, tenuia, patula, aut parva, adpressa; semina strophiolata, biappendiculata.

This section is by no means so well-defined and natural a one as any of the preceding, approximating very closely to the next, from which it differs chiefly in the leaves being much smaller, and often very narrow or adpressed, and distinguished more by a certain difference in habit than anything else. In Martius's 'Flora Brasiliensis' I have included in this section twelve species, nearly all belonging to Tropical and Temperate Brazil, south of 10° S. lat., and several extending into the neighbouring countries, being

characteristically southern in their distribution; one or two are found as far north as Guiana, or even extend into the northern continent.

29. *P. AUSTRALIS*, *nob. n. sp.* Caules a basi ramosi, debiles, procumbentes, cylindrici, subglabri, 1-2 poll. longi. Folia sat conferta, alterna, parva, 3-5 lin. longa, 1-1½ lin. lata, ovata, elliptica vel obovata, acuta, tenuia. Racemi sessiles, terminales, densiflori, pyramidales; bracteæ minutæ, lineares. Flores 1-lin. longi, rosei. Sepala exteriora inæqualia, superius majus; alæ obovatæ, corollam multo excedentes. Carina parva, cristata. Capsula 1-lin. longa, ovata, emarginata. Semina curvata, multoties longa quam lata, hirsuta; arillodii appendices semine dimidio breviores.

Uruguay, Tweedie, Lorentz, 1062; Monte Video, Gibert, 381. Near to *P. pulchella*, St. Hil.; but differing in its broader leaves, more prostrate habit, and larger wing-sepals. Perhaps only a small form of *P. linoides*, Poir., a species widely distributed through temperate South America.

30. *P. DARWINIANA*, *nob. n. sp.* Caulis infra lignosissimus, valde ramosus, 2-6 poll. longus; rami subglabri. Folia 3-lin. longa, angustissime elliptico-obovata, margine levissime glandulosa. Racemi terminales, valde pauciflori; bracteæ ovatæ, ½-lin. longæ, pedicellis glabris dimidio breviores. Flores magni, 3-lin. longi, folia æquant. Sepala exteriora parva, ovata, obtusa, superius multo majus; alæ obovato-cuneatæ, retusæ, sepala exteriora triplo superantes. Carina cristâ pulchre fimbriatâ ornata, quam carinam majore; petala lateralia fere usque ad basim discreta, linearia, porrecta. Ovarium parvum, glabrum, obovatum; stylus brevis; stigma cristatum, anatis rostrum simulans. Capsula ignota.

Patagonia; Cape Fairweather, Capt. King; Port Desire, Darwin.

31. *P. SPRUCEANA*, *nob. n. sp.* Caulis subsimplex, erectus, vix bipollicaris, tenuis, gracilis. Folia sat numerosa, linearia, ¼-¾ poll. longa. Racemi terminales vel rarius axillares, parvi, sat densiflori; bracteæ lineares, post anthesim persistentes, pedicellis gracilibus duplo longiores. Flores minimi, vix 1 lin. longi, albi. Sepala exteriora ovato-lanceolata; alæ obovatæ, corollâ longiores. Corolla parum nota; carina cristata. Ovarium minimum, subrotundum, alis persistentibus dimidio breviores. Semina nigra, glabra, nitida, obsolete foveata; arillodium haud galeatum, breviter bi-appendiculatum.

Venezuela. Prope Maypures, ad flumen Orenoco, Spruce, 3734. A very small annual plant, scarcely two inches high. I only know it under this number of Spruce's; but it occurs in nearly all the collections, and seems constant and distinct.

32. *P. SALVINIANA*, *nob. n. sp.* Caulis 2-3 poll. altus, subsimplex. Folia ¼ poll. longa, linearia, subpubescentia, acuminata, sat conferta. Racemi ½-¾ poll. longi, sessiles, vel etiam in foliis supernis conditi, densiflori. Flores parvi, 1-lin. longi, breviter pedicellati; bracteæ deciduæ. Sepala exteriora ovata, inæqualia, glabra; alæ sepala exteriora corollamque triplo excedentes, ellipticæ, unguiculatæ. Carinæ crista parva. Capsula suborbicularis, subinteger.

Semina nigra, pubescentia ; arillodii appendices semine tertiâ parte breviores.

Guatemala. Val de Fuego, 8300 feet, Salvin ; locis graminosis, Llano de la Laguna de Ayarces, Bern., 695. Often confounded with *P. scoparia*, H. B. K. ; but a smaller and less rigid plant ; and distinguished also by its acuminate leaves and the great length of the wing-sepals.

The two next species, of isolated distribution, would almost seem to form a subsection by themselves, and are doubtfully placed in this section.

33. *P. insularis*, nob. Glaberrima. Caulis basi lignosus, erectus, subrigidus, ramosus, 1-2 pedalis. Folia sparsa vel rarius conferta, sub-adpressa, linearia, lineari-obovata, vel cuneata, 4-5 lin. longa, coriacea, enerva, acuta vel obtusa, glanduloso-punctata. Racemi terminales, breves, sat densi ; bracteæ lineari-ovatæ, deciduæ. Flores 2-lin. longi, pedicellis brevibus glabris gracilibus suffulti. Sepala exteriora ovata, glabra, superius majus ; alæ sepala exteriora duplo excedentes, obovatæ, corollâ longiores, subacutæ. Carina pulchre cristata ; petala lateralia angusta. Ovarium glabrum, ellipticum. Capsula alis persistentibus multo brevior, emarginata. Semina obconica, sericea, arillodii appendices breves.

Galapagos Islands ; Anderson, 181 ; Cuming, 103 ; Chatham Is., Darwin ; Albemarle Is., Macrae ; Charles Is., Edmonston, Hooker. *P. obovata*, Hook. f. in Linn. Trans. xx., 233 ; And., Veg. Gal., 231 (non St. Hil.). Leaves very variable, but always narrow and coriaceous.

34. *P. galapageia*, Hook. f. in Linn. Trans. xx., 233 ; And., Veg. Gal., 232. Glaberrima. Caulis erectus, infra lignosus, gracilis ; parce ramosus, virgatus, 6-10 poll. longus. Folia sparsa, tenuia, $\frac{1}{2}$ -poll. longa, linearia vel obeuneata, acuminata. Racemi spicæ-formes, elongati, 1-3 poll. longi ; bracteæ deciduæ. Flores 3 lin. longi. Sepala exteriora subæqualia, ovata ; alæ triplo longiores, ellipticæ. Carinæ crista conspicua. Capsula (immatura) obovata. Semina obconica, sericea ; arillodium duabus appendicibus minutis præditum.

Galapagos Islands. Charles and Albemarle Islands ; Chatham Island, Anderson. Distinguished from *P. insularis* by its more slender habit, larger flowers, elongated racemes, and the leaves being always thin.

Anderson's *P. chutamensis*, l.c. 232, must probably be identified with *P. insularis* ; and his *P. puberula*, l.c. 232 (non A. Gray) with *P. galapageia*.

In this section must perhaps be included also two North American species which have been greatly confounded with one another, but which have been well distinguished by Gray (Pl. Wright, i., 38).

P. alba, Nutt., Gen., ii., 87 ; D.C., Prodr., i., 330 ; Torr. and Gr., i., 130 ; Hook., Lond. Journ. Bot., vi., 72, has thin leaves, a dense raceme, the flowers nearly sessile and erect. It is *P. bicolor* of H. B. K., v., 394, t. 507 ; *P. scoparia*, Benth., Pl. Hartw., 30 (non

H. B. K.), and *P. Beyrichii*, Torr. and Gr., i., 130. It extends as far north as Missouri (Geyer, 276), and occurs also as follows:—Texas, Wright, 99, Drummond, 4, 17, Lindh, 220; Mexico, Coult., 725, Hartw., 30.

P. scoparia, H. B. K., v., 399; DC., Prodr., i., 329 (non Benth.), has a more rigid and more branched stem, the racemes are laxer, and the lower flowers often pendent after flowering. Only in a few cases can any mistake be made between the two. This species is decidedly more southern than the last, scarcely passing into the United States Territory. It occurs in Mexico, Bott., 823 (Orizaba), and Coult., 726; New Mexico, Wright, 70, 100, and 1348; and Mexican Boundary Survey, 193. The var. *multicaulis* is *P. Wrightii*, Gray, MS.

Seemann (Bot. Her. 269) has introduced further confusion into these species by erroneously identifying *P. bicolor*, H. B. K., with *P. aparinoides*, H. & A., *P. asperuloides*, H. B. K., *P. distans*, St. Hil., and *P. molluginifolia*, St. Hil., all of which have verticillate leaves, while this is never the case with *P. alba* or *P. scoparia*.

SECTIO G. Carina cristata; folia alterna, nunquam verticillata, elliptica vel latiora; semina strophilolata, biappendiculata. Herbæ.

The least satisfactory of all the six divisions, made up of those which cannot be included in any of the previous five. It will probably be broken up or altogether abandoned when all the American Polygalas come to be properly monographed. In the 'Flora Brasiliensis' I have included eleven species in this section; and with them must probably be associated nearly all the North American species, except *P. grandiflora* and those with verticillate leaves or leafless stems.

The following species of Polygala, recorded as inhabitants of America and the West Indies, are not included in the foregoing enumeration. I have not had access to type-specimens, and the descriptions are in most cases too incomplete to admit of their identification, or otherwise, with known species.

- P. Berteriana*, DC., Prodr., i., 328. St. Domingo. (*P. hygrophila*, H. B. K., fide Müller).
- P. calvipes*, Schlecht. in Linn., xiv., 160. Mexico. Probably *P. americana*, Mill.
- P. cestrifolia*, St. Hil., Flor. Bras. Mer., ii., 51. Prope Sebastianopolim.
- P. coridifolia*, Presl, Reliq. Haenk., v., 99. Peru.
- P. corifolia*, Tr. et Pl., Prodr. Fl. Nov. Gr., 129. Bogota.
- P. crucianelloides*, DC., Prodr., i., 328. St. Domingo.
- P. mexicana*, DC., Prodr., i., 333. Mexico.
- P. minutiflora*, Presl, Reliq. Haenk., v., 100. Mexico.
- P. myrtilloides*, Willd., Sp., iii., 889. America australis.
- P. pulchella*, Schlecht. in Linn., v., 230. Mexico. Probably *P. hebantha*, Benth.
- P. pulchella*, Scheele in Linn., xvii., 335. Brazil. Probably *P. glochidata*, H. B. K.

- P. quadrangula*, Presl, Reliq. Haenk., v., 100. Mexico.
P. solieria, Gay., Fl. Chil., i., 238. Chile.
P. strigulosa, Schlecht. in Linn., xiv., 160. Mexico.
P. tenella, Willd., Sp., iii., 878. Panama.
P. velutina, Presl, Reliq. Haenk., v., 100. Mexico. Probably
P. americana, Mill.

BALANSA, 'PLANTES DU PARAGUAY,' 1874.—1877.

- No.
 1494. *Bredemeyera floribunda*, Willd.
 2174. *Acanthocladus albicans*, A. W. Benn.
 2175. *Monnina Richardiana*, St. Hil.
 2176. „ *exalata*, A. W. Benn.
 2177. *Polygala hygrophila*, H. B. K.
 2178. „ *longicaulis*, H. B. K.
 2179. „ *violacea*, Vahl, aff.
 2181. } „ *gracilis*, H. B. K.
 2181 a. }
 2183. „ *sulphurea*, A. W. Benn.
 2184. } „ *glochidata*, H. B. K. (*P. spergulaefolia*, St. Hil.)
 2184 a. }
 2185. „ *paniculata*, Linn.
 2186. „ *galioides*, Poir., var. *molluginifolia*. (*P. mol-*
luginifolia, St. Hil.)
 2187. „ *areguensis*, A. W. Benn.
 2188. „ *tenuis*, DC., (*P. paludosa*, St. Hil.)
 2189. „ *galioides*, Poir., var. *molluginifolia*.
 2190. „ *leucantha*, A. W. Benn.
 2191. „ *aphylla*, A. W. Benn.
 2191 a. „ *remota*, A. W. Benn. aff.
 2192. „ *punctata*, A. W. Benn.
 2193. „ *paraguayensis*, A. W. Benn.
 2195. „ *obovata*, St. Hil.

ADDENDA ET CORRIGENDA.

P. Nutkana. For the paragraph in text (p. 140) substitute the following:—

†4. *P. Nutkana*, DC., Prodr., i., 330; Torr., Bot. Mex. Bound., 49, t. 12; *P. cucullata*, Benth., Pl. Hartw., 299; Wats., Bot. Cal., 59. California, Lobb., 277. This and the three following species are distinguished by the beak or boss with which the corolla is furnished, and should probably form a distinct subsection.

Insert after *P. Nutkana* (p. 140) the following:—

†4a. (No. 35). *P. californica*, Nutt. in Torr. et Gr., Fl., i., 671; Wats., Bot. Cal., 59. Caules $\frac{1}{2}$ –1 ped. vel altiores, fruticosi. Flores viridi-albi. Sepala omnia tomentosa; alæ oblongæ, basi vix angustatæ. Petala lateralia carinam modo æquantia, rostrum angustum strictum gerentem. Capsula ovata, 4 lin. longa, emar-

ginata vel apice retuse bidentata, anguste alata. Semina 3 lin. longa, dense hirsuta; arillodium validum, teres, alam tenuem gerens, usque ad basim seminis attingentem. Sierra Nevada, ab El Dorado Co. usque ad Oregon, in pinetis. Much resembling *P. Nutkana*; but stems more shrubby, stouter and more branched. *P. Nutkana*, Torr. et Gr., l. c.; not DC. (fide S. Watson); *P. cucullata*, Newberry, Pac. R. Rep., vi., 70, not Benth.; *P. cornuta*, Kellogg in Proc. Calif. Acad., i., 61.

Under *P. subspinosa* (p. 140) insert:—Wats., Bot. Cal., 59; Parry, Am. Nat., ix., 269. Erase “Central Mexico, Parr. et Palm (1878), No. 42 (?),” which is certainly *P. puberula*, Gray. Instead of “it is the only spiny Polygala of the Northern Continent,” read “this and the following are the only spiny Polygalas of the Northern Continent.”

After *P. subspinosa* (p. 140) insert:—

†5a. (No. 36). *P. acanthoclada*, Gray, Proc. Am. Acad., xi., 73. “Fruticulosa, bipedalis, ramosissima, subcinereo-pubescentis, spinis gracilibus armata; foliis lineari-spathulatis, rigidulis (lin. 3–4 longis); floribus subaxillaribus sparsis albidis lin. 2 longis, pedicello basi bibracteato parum brevioribus; alis obovatis, sepalis cæteris duplo majoribus, corollam adæquantibus; carina breviter cymbiformi, nuda, dorso umbonata; capsula ignota. Sides of bluffs on the San Juan river, in the south-eastern border of Utah, T. S. Brandegee in Hayden’s Exploration. Resembles *P. subspinosa* of Watson, but woody, the flowers scattered, pale, and less than half the size; the free portion of the corolla of 5 short obtuse lobes nearly equal in length and little longer than the united portion, emarginate; the keel much larger, a conical boss on the upper part of the back; no crest; spines of the branchlets often compound.”

This raises the number of species not included in Watson’s ‘Bibliographical Index’ or Martius’s ‘Flora Brasiliensis’ to 36; and the total number of American species of Polygala to 156. *P. Nutkana* (*cucullata*), *californica*, and *acanthoclada* are, however, all named in the addenda to Watson’s Index.

THE CRYPTOGAMIC FLORA OF KENT—FUNGI.

BY T. HOWSE, F.L.S.

(Continued from p. 153.)

Genus 10.—CANTHARELLUS, Fr.

C. CIBARIUS, Fr. Grev., t. 258.

Boston Wood, Holmes. Common. Edible.

C. AURANTIACUS, Fr. Berk. Out., pl. 14, f. 1.

Sydenham Hill; Boston Wood, Holmes; Keston Common, Sparkes.

Genus 11.—NYCTALIS, *Fr.*

- N. ASTEROPHORA, *Fr.* Bull., t. 516, f. 1.
Parasitic on *Russula nigricans*. Chislehurst.
- N. PARASITICA, *Fr.* Berk. Out., pl. 19, f. 2.
Parasitic on *Russula adusta*. Chislehurst; Tunbridge Wells,
Dr. Deakin.

Genus 12.—MARASMIUS, *Fr.*

- M. URENS, *Fr.* Bull., t. 528, f. 1.
Sydenham Hill.
Nearly related to the next, but smaller, darker, and with less crowded gills.
- M. PERONATUS, *Fr.* Sow., t. 37.
Common in woods amongst leaves. Wrotham; Shoreham;
Dunton Green; Knowle Park; Bromley, *Sparkes*.
- M. PORREUS, *Fr.* Sow., t. 81.
On middle of leaves. Wood near Shoreham.
- M. OREADES, *Fr.* Bull., t. 144.
In pastures and by roadsides. Sydenham Hill. Very common.
Edible.
- M. TERGINUS, *Fr.*
On leaves. Goudhurst, *Smith Draw*.
- M. ERYTHROPUS, *Fr.*
On and near stumps. Sydenham Hill; Bell's Ewe Green,
T. Wells, *T. Walker*; Joyden's Wood, Hadlow, and
Cobham Park, *Holmes*.
Resembles *A. dryophilus*, but with broader gills.
- M. FETIDUS, *Fr.* Sow., t. 21.
On sticks and stumps. Hillydeal Wood, Otford; Rowdown
Wood, near Kemsing, *Holmes*.
- M. RAMEALIS, *Fr.* Bull., t. 336.
On dead branches. Wood near Halstead, and Crofton Woods,
Orpington, *Holmes*. Sydenham Hill; near Bromley,
Sparkes.
- M. ANDROSACEUS, *Fr.* Sow., t. 94.
On leaves. Sydenham Hill; St. Paul's Cray Common;
Lewisham; near Bromley, *Sparkes*.
- M. ROTULA, *Fr.* Berk. Out., pl. 14, f. 7.
On fallen twigs, &c. Bostol Wood; Knowle Park; near
Bromley, *Sparkes*.
- M. INSITITUS, *Fr.* Berk. Out., pl. 14, f. 6.
On leaves. Near Deal.
- M. EPIPHYLLUS, *Fr.* Sow., t. 93.
On fallen leaves. Sydenham Hill; Chislehurst; Bromley,
Sparkes.
- M. SACCHARINUS, *Fr.* Batsch, f. 83.
East Farleigh, *Berk. & Br. in A. N. H.*

Genus 13.—LENTINUS, *Fr.*

- L. TIGRINUS, *Fr.* Sow., t. 68.
On old stumps. Southboro', *Holmes.*
- L. VULPINUS, *Fr.* Sow., t. 351.
On stumps. Margate, *Berk. Eng. Fl.*, p. 72.
- L. LEPIDEUS, *Fr.* Sow., t. 382.
On rotten railway-sleepers, Dartford, *M. C. Cooke.*

Genus 14.—PANUS, *Fr.*

- P. TORULOSUS, *Fr.* Bolt., t. 146.
On old stumps. Stockholme Wood, near Dunton Green ;
Knowle Park, Sevenoaks.
- P. CONCHATUS, *Fr.* Bull., t. 298, 517, O. P.
On old stumps. Knowle Park ; Margate, *Berk. Eng. Fl.*, p. 70.
- P. STYPTICUS, *Fr.* Sow., t. 109.
Very common on stumps. Sydenham Hill ; Shooter's Hill.

Genus 15.—LENZITES, *Fr.*

- L. BETULINA, *Fr.* Berk. Out., pl. 15, f. 3.
Common on stumps and rails. Shooter's Hill.
- L. FLACCIDA, *Fr.* Bull., t. 394.
Sydenham Hill. Resembling the last, but pileus thin, coriaceous,
whilst that of *L. betulina* is corky.

Genus 16.—SCHIZOPHYLLUM, *Fr.*

- S. COMMUNE, *Fr.* Sow., t. 183.
Undoubtedly indigenous specimens have occurred in Kent in
1878, *Berk. & Br. in A. N. H.*

Order 2.—POLYPOREI.

Genus 17.—BOLETUS, *Fr.*

- B. LUTEUS, *L.* Kromb., t. 33.
Sydenham Hill ; Wrotham ; Shoreham ; Otford ; Kemsing,
Holmes.
- B. ELEGANS, *Schum.* Grev., t. 183.
Goudhurst, *A. S. Bicknell.*
- B. FLAVUS, *With.* Sow., t. 265.
Crystal Palace Grounds ; Joyden's Wood, *Holmes* ; Pembury
Wood, T. Wells, *T. Walker.* Distinguished from the last
by the larger, more angular tubes.
- B. LARICINUS, *B.* Huss., 1, t. 25.
Under larch trees. In a larch wood between Shoreham and
Dunton Green ; Keston, *Huss.*
- B. GRANULATUS, *L.* Sow., t. 420.
Under fir trees. Rosebank, T. Wells, *T. Walker* ; Goudhurst,
A. S. Bicknell ; Keston, *Huss.*
- B. BOVINUS, *L.* Kromb., t. 75, f. 1-6.
In fir woods. Goudhurst, *A. S. Bicknell* ; Sandwich. Some-
what like *B. luteus*, but has no ring.

- B. *BADIUS*, *Fr.* Kromb., t. 36, f. 15.
In fir woods. Bostol Wood; Chislehurst; Knowle Park.
- B. *PIPERATUS*, *Bull.* Sow., t. 34.
Sydenham Hill; St. Paul's Cray Common, Chislehurst.
- B. *RUBINUS*, *Smith.* Seem. Journ., 1868, t. 75, f. 1-4.
Joyden's Wood, *Holmes.*
- B. *PURPUREUS*, *Fr.* Sv. Svamp., t. 41.
Under oaks. Staplehurst, *James Ward, Smith Draw.*
- B. *VARIEGATUS*, *Fr.* Kromb., t. 34, f. 15-18.
In pine woods. Goudhurst, *A. S. Bicknell*; T. Wells, *Forst. Fl. Tunb.*
- B. *CHRYSENTERON*, *Fr.* Bull., t. 490, f. 3.
Sydenham Hill. Common.
- B. *SUBTOMENTOSUS*, *L.* Kromb., t. 37, f. 8-11.
Joyden's Wood; Chislehurst; Goudhurst, *A. S. Bicknell.*
Similar in appearance to the last; it is distinguished from it by the flesh being yellow immediately under the cuticle, not red as in *B. chrysenteron.*
Var. *radicans.* Kromb., t. 48, f. 1-6.
Staplehurst, *Smith Draw.* Whole plant light ochre or stone colour.
- B. *CALOPUS*, *Fr.* Sv. Svamp., t. 69.
Knowle Park, Sevenoaks. Stem scarlet, reticulated, tubes adnate.
- B. *PACHYPUS*, *Fr.* Sv. Svamp., t. 68.
Knowle Park; Wood near Dunton Green, Goudhurst; *A. S. Bicknell.* Nearly allied to last, but stem yellow and scarlet, tubes nearly free.
Var. *amarus*, *Fr.* Saund. & Sm., t. 17.
Pileus nearly white. Barnet Wood, Bromley Common, *Huss.*
This is figured by Mrs. Hussey, 2, t. 2, and named *B. elephantinus*, *With.*
- B. *LURIDUS*, *Fr.* Sv. Svamp., t. 12.
Sydenham Hill; Langton Green, *Jenner, Fl. Tonb.*; Goudhurst, *A. S. Bicknell*; Pickhurst, *Percy Bicknell.*
- B. *SATANAS*, *Lenz.* Huss., 1, t. 7.
Goudhurst, *A. S. Bicknell.*
Resembles the last, but the pileus is whitish.
- B. *SCABER*, *Fr.* Huss., 1, t. 57.
Sydenham Hill. Common.
- B. *VERSIPELLIS*, *Fr.* Sow., t. 110.
St. Mary Cray; Goudhurst, *A S Bicknell.*
Nearly allied to last, but pileus orange.
- B. *SANGUINEUS*, *With.* Sow., t. 225.
Roadsides about Staplehurst, *Smith Draw.*
- B. *VISCIDUS*, *Linn.*
Roadsides about Staplehurst, *Smith Draw.*

- B. *ÆSTIVALIS*, *Fr.* Sv. Svamp., t. 43.
Roadsides about Staplehurst, *Smith Draw.* Kent, *Mrs. Hussey*,
Berk. Out.
Resembles the pale form of *B. edulis*, but the stem is even.
- B. *ALUTARIUS*, *Fr.* Kromb., t. 74, f. 8, 9.
Kent, *Mrs. Hussey*, *Berk. Out.*
- B. *CYANESCENS*, *Bull.* Saund. & Sm., t. 47.
Staplehurst, *Gard. Chronicle*, 1869, p. 1061.
- B. *EDULIS*, *Bull.* Bull., t. 60, 494.
Sydenham Hill; Knowle Park; Woods between Shoreham and
Dunton Green; Joyden's Wood, Bexley, *Holmes*; Goud-
hurst, *A. S. Bicknell.* Edible.
Known by the whitish network on the stem.
- B. *FELLEUS*, *Bull.* Bull., t. 379.
St. Paul's Cray Common, Chislehurst, *Madame Bommer.*
- B. *CASTANEUS*, *Bull.* Bull., t. 328.
Hayes Rectory, *Huss.*

(To be continued).

SHORT NOTES.

CROCUS NUDIFLORUS IN SHREWSBURY.—In the public grounds known as the "Quarry," in Shrewsbury, there has been noticed to grow for many years a *Crocus*, which, as far as I am aware, has never been observed to flower. My curiosity having been awakened by its appearing this spring, I gathered some specimens in the hope of being able to make out the species. It appeared to answer to *C. nudiflorus*, chiefly on account of the stoloniferous corm, no other species described in 'English Botany' presenting this character. I forwarded the specimens to Dr. Trimen, that I might have the advantage of his opinion on them, and it resulted in my obtaining not only his opinion but that of the Rev. Harpur Crewe and Mr. G. Maw, both great authorities on the *Croci*, which confirmed my own impression. The question naturally arises, can it be considered indigenous? I must leave the answer to this to more experienced botanists, contenting myself by giving as clear a description of the nature of the habitat as possible, to enable your readers to form their own opinion. Shrewsbury is surrounded on all sides by the river Severn, except a narrow neck of land on the north side, on part of which the old Norman Castle stands. The town walls form an inner boundary, leaving a considerable space between it and the river, a part of which space on the south-west side of the town is laid out as a public walk possessing a most beautiful avenue of lime trees, perhaps unsurpassed by any in the kingdom, planted by Wright in 1719, a nurseryman whose name is still associated with an apple known as "Wright's Codling." The name "Quarry" is derived from the fact that there is an abandoned stone quarry in it known now as the "Dingle," which

was worked in the middle of the thirteenth century for sandstone. The place has been used from time immemorial as recreation ground by the inhabitants of the town, and the portions on which the Crocus grows were let off as pasture-land, but are now mown. They grow under the lime trees on the margin of the public walk.
—WILLIAM PHILLIPS.

FESTUCA AMBIGUA IN SUFFOLK.—I enclose a specimen which I think must be referred to *F. ambigua*. I gathered it on Lakenheath High Warren, near Wangford, Suffolk, June 10th, 1878, and had placed the plant on one side for future examination. The note in the 'Journal of Botany' last month (p. 186) recalled the specimens to my mind. Another specimen from Guernsey will, I believe, also prove to be same plant.—A. BENNETT. [I have no doubt that the Suffolk specimen sent is *F. ambigua*. It is a more tufted and smaller plant with more spreading habit than the Isle of Wight specimens. Mr. Townsend has also seen and passed the plant as *F. ambigua*.—Ed. JOURN. BOT.]

FESTUCA AMBIGUA IN DORSET.—Attention being just now specially called to this grass by Mr. Townsend's paper, I was led to search for it in the very suitable locality of Studland Bay, Dorset, where, on June 17th of this year, I had the pleasure of the company and guidance of Mr. Mansel-Pleydell, the botanographer of the county. It proved to be very abundant, especially at South Haven close to the mouth of Poole Harbour, and on the sandhills below the ascent to the village of Studland, at the southern end of the bay. Many of the specimens were very much depauperated—reduced in some cases to merely one or two spikelets, and none were so fine as those from the Isle of Wight: the characteristics of the species were, however, in all cases well preserved, and presented no variation whatever. Both *F. Myurus* and *F. bromoides*, both usually very dwarf, grow along with *F. ambigua*; but we did not see *F. uniglumis*, which is given in the 'Flora of Dorset' for the locality.—HENRY TRIMEN.

THE CHINESE FONTANESIA.—Under the name of *Fontanesia chinensis*, Dr. Hance describes in the current volume (p. 136) the Oleaceous shrub mentioned by me in vol. v., n. s., 1876, p. 208. I was wrong in assuming, even then, that it was an undescribed plant. It appears to have been first described by Carrière, 'Revue Horticole,' 1859, p. 43, fig. 9, under the name of *Fontanesia Fortunei*. In 1875 Dr. M. O. Debeaux published a *Fontanesia phillyraoides*, var. *sinensis*, in the 'Actes de la Société Linnéenne de Bordeaux,' vol. xxx., reprinted under the title of 'Florule de Shang-Hai.' This is taken up by Maximowicz in his recent 'Ad floræ Asiæ orientalis cognitionem meliorem Fragmenta.' Debeaux is of opinion that his plant differs from Carrière's *F. Fortunei*, but the only difference he has been able to discover

is the period of flowering. Fortune's specimens are from Shanghai, and Carrière's species was introduced from the same locality, where also Maingay, Forbes, and others have collected what is certainly the same species as Fortune's. I think there is no doubt that all the authors quoted have had one species under consideration, but whether the eastern and western forms should be regarded as varieties of the same species, or as distinct ones, I will not offer an opinion.—W. B. HEMSLEY.

Extracts and Notices of Books & Memoirs.

NEW GENERA AND SPECIES OF PHANEROGAMOUS PLANTS PUBLISHED IN PERIODICALS IN GREAT BRITAIN DURING THE YEAR 1878.

(Concluded from p. 188).

HAWORTHIA ANGOLENSIS, Baker (Liliaceæ).—Angola. (Trans. Linn. Soc., 2, i., p. 263.)

HERACLEUM MOELLENDORFFII, Hance (Umbelliferae).—China. (Journ. Bot., p. 12.)

HIPPEASTRUM FRANCISCANUM, Baker (Amaryllidaceæ).—Brazil. (Journ. Bot., p. 82.)

H. JAMESONI, Baker.—Argentine Republic. (Journ. Bot., p. 83.)

HOODIA BAINII, Dyer (Asclepiadaceæ)—S. Africa. (Bot. Mag., t. 6348.)

HOPEA PHILIPPINENSIS, Dyer (Dipterocarpeæ).—Philippine Islands. (Journ. Bot., p. 100.)

HUERNIOPSIS, *N. E. Br.* (Asclepiadaceæ), *H. DECIPIENS*, *N. E. Br.*—S. Africa. (Journ. Linn. Soc., xvii., p. 171, tab. 12.)

HYPOXIS ANDREWSII, Baker (Hypoxideæ).—Cape Colony. (Journ. Linn. Soc., xvii., p. 104.)

H. ANGOLENSIS, Baker.—Angola. (Trans. Linn. Soc., 2, i., p. 266.)

H. ARGENTEA, Harv.—Cape Colony. (Journ. Linn. Soc., xvii., p. 110.)

H. CANALICULATA, Baker.—Angola. (Trans. Linn. Soc., 2, i., p. 265.)

H. COSTATA, Baker.—S. Africa. (Journ. Linn. Soc., xvii., p. 119.)

H. CUANZENSIS, Welw.—Angola. (Trans. Linn. Soc., 2, i., p. 265.)

H. FILIFORMIS, Baker.—S. Africa. (Journ. Linn. Soc., xvii., p. 109.)

H. GERRARDI, Baker.—Natal. (Journ. Linn. Soc., xvii., p. 110.)

H. IRIDIFOLIA, Baker.—Trop. S. Africa. (Journ. Linn. Soc., xvii., p. 117.)

H. JACQUINI, Baker.—Cape Colony. (Journ. Linn. Soc., xvii., p. 112.)

H. MEMBRANACEA, Baker.—Natal. (Journ. Linn. Soc., xvii., p. 106.)

H. MILLOIDES, Baker.—S. Africa. (Journ. Linn. Soc., xvii., p. 105.)

H. MONANTHOS, Baker.—Angola. (Trans. Linn. Soc., 2, i., p. 266.)

H. PARVULA, Baker.—Natal. (Journ. Linn. Soc., xvii., p. 113.)

- H. PLATYPETALA*, *Baker*.—Natal. (Journ. Linn. Soc. xvii., p. 105.)
- H. POLYSTACHYA*, *Welw.*—Angola. (Trans. Linn. Soc., 2., i., p. 266.)
- H. RIGIDULA*, *Baker*.—Cape Colony. (Journ. Linn. Soc., xvii., p. 116.)
- H. SCHIMPERI*, *Baker*.—Abyssinia. (Journ. Linn. Soc., xvii., p. 110.)
- H. SERICEA*, *Baker*.—Cape Colony. (Journ. Linn. Soc., xvii., p. 111.)
- H. SETOSA*, *Baker*.—Cape Colony. (Journ. Linn. Soc., xvii., p. 133.)
- H. ZEYHERI*, *Baker*.—Cape Colony. (Journ. Linn. Soc., xvii., p. 112.)
- INDIGOFERA WYNBERGENSIS*, *S. Moore* (Leguminosæ).—S. Africa. (Journ. Bot., p. 131.)
- ISCHARUM ANGUSTATUM*, *Hook. f.* (Aroideæ).—Syria. (Bot. Mag., t. 6355.)
- ISMENE TENUIFOLIA*, *Baker* (Amaryllidaceæ).—Ecuador. Bot. Mag., t. 6397.)
- JUNCUS HANCOCKII*, *Hance* (Juncaceæ).—China. (Journ. Bot., p. 111.)
- JUSTICIA FITTONIODES*, *S. Moore* (Acanthaceæ).—E. Trop. Africa. (Journ. Bot., p. 134.)
- KNIPHOFIA ANDONGENSIS*, *Baker* (Liliaceæ).—Angola. (Trans. Linn. Soc., 2, i., p. 246.)
- K. BENGUELLENSIS*, *Welw.*—Angola. (Trans. Linn. Soc., 2, i., p. 246.)
- LACHENALIA WRIGHTII*, *Baker* (Liliaceæ).—Cape Colony. (Journ. Bot., p. 322.)
- LÆLIA DOMINYANA*, *Rehb. f.* (Orchideæ).—Hybrid (*Cattleya Dowiana* × *L. elegans*?) (Gard. Chron., pt. ii., p. 332.)
- LAPEYROUSIA CYANESCENS*, *Baker* (Irideæ).—Angola. (Trans. Linn. Soc., 2, i., p. 270.)
- L. FRAGRANS*, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 270.)
- L. LITTORALIS*, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 272.)
- L. ODORATISSIMA*, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 273., tab. 36.)
- LAPIEDRA GRACILIS*, *Baker* (Amaryllideæ).—Morocco. (Journ. Linn. Soc., xvi., p. 678.)
- LAVANDULA TENUISECTA*, *Coss.* (Labiatae).—Morocco. (Journ. Linn. Soc., xvi., p. 609.)
- LEONTODON HELMINTHOIDES*, *Coss. & Dur.* (Compositæ).—Morocco. (Journ. Linn. Soc., xvi., p. 544.)
- LEPERIZA EUCROSIODES*, *Baker* (Amaryllideæ)—Ecuador. (Gard. Chron., pt. ii., p. 170.)
- LEPISTEMON AFRICANUM*, *Oliv.* (Convolvulaceæ).—E. Trop. Africa. (Ic. Plant., t. 1270.)
- LETTSONIA CHALMERSII*, *Hance* (Convolvulaceæ).—China. (Journ. Bot., p. 230.)
- LEUCOIUM TINGITANUM*, *Baker* (Amaryllideæ).—Morocco. (Journ. Linn. Soc., xvi., p. 678.)
- LISSOCHILUS WAKEFIELDI*, *Rehb. f. & S. Moore* (Orchideæ).—E. Trop. Africa. (Journ. Bot., p. 136.)

- LISTROSTACHYS REPENS, *Rchb. f.* (Orchideæ).—Cameroon Mts. (Gard. Chron., pt. ii., p. 266.)
- L. SEDENI, *Rchb. f.*—E. Africa. (Gard. Chron., pt. i., p. 138.)
- LYCASTE WITTIGII, *Rchb. f.* (Orchideæ).—Brazil. (Gard. Chron., pt. ii., p. 654.)
- LYSIMACHIA KLATTIANA, *Hance* (Primulaceæ).—China. (Journ. Bot., p. 236.)
- MASDEVALLIA ABBREVIATA, *Rchb. f.* (Orchideæ).—S. Amer. (Gard. Chron., pt. ii., p. 106.)
- M. BELLA, *Rchb. f.*—N. Grenada. (Gard. Chron., pt. i., p. 725.)
- M. CAMPYLOGLOSSA, *Rchb. f.*—Trop. Amer. (Gard. Chron., pt. ii., p. 588.)
- M. CORNICULATA, *Rchb. f.*—N. Grenada. (Gard. Chron., pt. i., p. 72.)
- M. HYPODISCUS, *Rchb. f.*—Trop. Amer. (Gard. Chron., pt. ii., p. 234.)
- M. SPLENDIDA, *Rchb. f.*—Trop. Amer. (Gard. Chron., pt. i., p. 492.)
- M. TUBEANA, *Rchb. f.*—Trop. Amer. (Gard. Chron., pt. i., p. 234.)
- MASSONIA CALVATA, *Baker* (Liliaceæ).—Cape Colony. (Journ. Bot., p. 321.)
- M. ORIENTALIS, *Baker*.—Cape Colony. (Journ. Bot., p. 321.)
- MAXILLARIA NEOPHYLLA, *Rchb. f.* (Orchideæ).—N. Grenada. (Gard. Chron., pt. ii., p. 588.)
- M. CALOGLOSSA, *Rchb. f.*—Trop. Amer. (Gard. Chron., pt. ii., p. 654.)
- MESEMBRYANTHEMUM HIRTUM, *N. E. Br.* (Ficoideæ).—S. Africa. (Gard. Chron., pt. ii., p. 138.)
- MOLINERIA CRASSIFOLIA, *Baker* (Hypoxideæ).—Sikkim. (Journ. Linn. Soc., xvii., p. 121.)
- MORÆA ANDONGENSIS, *Baker* (Irideæ).—Angola. (Trans. Linn. Soc., 2, i., p. 271.)
- M. CANDELABRUM, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 271.)
- M. GLUTINOSA, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 271.)
- M. GRACILIS, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 272.)
- M. SPITHAMÆA, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 271.)
- M. TEXTILIS, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 270.)
- M. WELWITSCHII, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 270.)
- MYRISTICA MANNII, *Benth.* (Myristiceæ).—Old Calabar. (Ic. Plant., t. 1262.)
- M. MICROCEPHALA, *Benth.*—Fernando Po. (Ic. Plant., t. 1261.)
- M. SAGOTIANA, *Benth.*—French Guiana. (Ic. Plant., t. 1260.)
- MYRRHIS? CHEROPHYLLOIDES, *Hance* (Umbellifereæ).—China. (Journ. Bot., p. 108.)
- NEPETA EVERARDI, *S. Moore* (Labiatae).—China. (Journ. Bot., p. 135.)
- ODONTOGLOSSUM JENNINGSIANUM, *Rchb. f.* (Orchideæ).—(Gard. Chron., pt. i., p. 366.)
- O. EDWARDI, *Rchb. f.*—Ecuador. (Gard. Chron., pt. ii., p. 74.)
- ONCIDIUM CRUCIATUM, *Rchb. f.* (Orchideæ).—Brazil. (Gard. Chron., pt. i., p. 138.) *O. pubes* var. *flavescens*, *Hook.*—(B. Mag., t. 3926.)

- O. KIENASTIANUM, *Rchb. f.*—(Gard. Chron., pt. i., p. 558.)
- O. MILLIANUM, *Rchb. f.*—Trop. Amer. (Gard. Chron., pt. ii., p. 364.)
- OREOPANAX THIBAUTII, *Hook. f.* (Araliaceæ).—Mexico. (Bot. Mag., t. 6340.)
- ORNITHOGALUM AURANTIACUM, *Baker* (Liliaceæ).—S. Africa. (Gard. Chron., pt. ii., p. 748.)
- O. ALBOVIRENS, *Baker.*—S. Africa. (Gard. Chron., pt. ii., p. 369.)
- O. BENGUELLENSE, *Baker.*—Angola. (Trans. Linn. Soc., 2, i., p. 248.)
- O. CEPÆFOLIUM, *Baker.*—Angola. (Trans. Linn. Soc., 2, i., p. 248.)
- O. HAWORTHIOIDES, *Baker.*—Cape Colony. (Journ. Bot., p. 322.)
- OROBANCHE HOOKERIANA, *Ball* (Orobanchaceæ).—Morocco. (Journ. Linn. Soc. xvi., p. 605.)
- O. TETUANENSIS, *Ball.*—Morocco. (Journ. Linn. Soc. xvi., p. 606.)
- ORTHOSIPHON LINEARIS, *Benth.* (Labiatae).—S. Africa. (Ic. Plant., t. 1274.)
- PANDANUS UNGUIFER, *Hook. f.* (Pandanaceæ).—Bengal. (Bot. Mag., t. 6347.)
- PARNASSIA OREOPHILA, *Hance* (Saxifragaceæ).—China. (Journ. Bot., p. 106.)
- PASSIFLORA HAINAUENSIS, *Hance* (Passifloraceæ).—China. (Journ. Bot., p. 227.)
- PESCATOREA BELLA, *Rchb. f.* (Orchideæ).—(Gard. Chron., pt. ii., p. 492.)
- P. RUSSELLIANA, *Rchb. f.*—S. Amer. (Gard. Chron., pt. ii., p. 524.)
- PHILODENDRON SERPENS, *Hook. f.* (Aroideæ).—New Grenada. (Bot. Mag., t. 6375.)
- POLYGONUM TENUICAULE, *Biss., and S. Moore* (Polygonaceæ).—Japan. (Journ. Bot., p. 134.)
- PRIMULA MODESTA, *Biss., and S. Moore* (Primulaceæ).—Japan. (Journ. Bot., p. 134.)
- QUERCUS KURZII, *Hance* (Cupuliferæ).—Assam. (Journ. Bot., p. 328.)
- Q. RAJAH, *Hance.*—Malay Archipelago. (Journ. Bot., p. 198.)
- Q. RHIGENSIS, *Hance.*—Malay Archipelago. (Journ. Bot., p. 198.)
- Q. SCYPHIGERA, *Hance.*—Bangka. (Journ. Bot., p. 199.)
- RENANTHERA HISTRIONICA, *Rchb. f.* (Orchideæ).—E. Indies. (Gard. Chron., pt. ii., p. 74.)
- RHYNCHOSIA CLIVORUM, *S. Moore* (Leguminosæ).—South Africa. (Journ. Bot., p. 131.)
- RUBUS PARADOXUS, *S. Moore* (Rosaceæ).—China. (Journ. Bot., p. 132.)
- RUELLIA ARUENSIS, *S. Moore* (Acanthaceæ).—Aru Islands. (Journ. Bot., p. 135.)
- SABIA BULLOCKII, *Hance* (Sabiaceæ).—China. (Journ. Bot., p. 9.)
- SACCOLABIUM MIMUS, *Rchb. f.* (Orchideæ).—Pacific Is. (Gard. Chron., pt. i., p. 266.)

- SAGERETIA RUGOSA, *Hance* (Rhamnaceæ).—China. (Journ. Bot., p. 9.)
- SANDERSONIA LITTONIOIDES, *Welw.* (Liliaceæ).—Angola. (Trans. Linn. Soc., 2, i., p. 262.)
- SANICULA LAMELLIGERA, *Hance* (Umbelliferæ).—China. (Journ. Bot., p. 11.)
- SANSEVIERA BRACTEATA, *Thunb.* (Liliaceæ).—Angola. (Trans. Linn. Soc., 2, i., p. 253.)
- SARCANTHUS HINCKSIANUS, *Rehb. f.* (Orchideæ).—Brazil. (Gard. Chron., pt. i., p. 73.)
- S. MIRABILIS, *Rehb. f.*—E. Indies. (Gard. Chron., pt. ii., p. 300.)
- SARCOCODON, *N. F. Br.*, (Asclepiadeæ).—S. SPECIOSUS, *N. E. Br.*,—Somali Land. (Journ. Linn. Soc., xvii., p. 170., tab. 12.)
- SAUSSUREA IODOSTEGIA, *Hance* (Compositæ).—China. (Journ. Bot., p. 108.)
- SAXIFRAGA ROSSII, *Oliv.* (Saxifragaceæ).—N. China. (Ic. Plant., t. 1258.)
- SCÆVOLA HAINANENSIS, *Hance*.—China. (Journ. Bot., p. 229.)
- SCHIZOBASIS ANGOLENSIS, *Baker* (Liliaceæ).—Angola. (Trans. Linn. Soc., 2, i., p. 255.)
- SCHÆFFIOPSIS, *Miers* (Styraceæ) = *Schæffia*, *Auct.*, sp. 4 Asiaticæ. (Journ. Linn. Soc., xvii., p. 75.)
- SCILLA ARENARIA, *Baker* (Liliaceæ).—Angola. (Trans. Linn. Soc., 2, i., p. 249.)
- S. BENGUELLENSIS, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 249.)
- S. CONGESTA, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 250.)
- S. FLACCIDULA, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 249.)
- S. HISPIDULA, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 248.)
- S. LAXIFLORA, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 250.)
- S. PLATYPHYLLA, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 250.)
- S. POLYPHYLLA, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 249.)
- S. SIMIARUM, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 249.)
- S. SPICATA, *Baker*.—Trop. Africa. (Journ. Bot., p. 323.)
- SHEARERIA POLII, *Franchet* (Compositæ).—China. (Journ. Bot., p. 257., tab. 198.)
- SHOREA PIERREI, *Hance* (Dipterocarpeæ).—Cambodia. (Journ. Bot., p. 302.)
- S. SCHEFFERIANA, *Hance*.—Borneo. (Journ. Bot., p. 303.)
- SIDERITIS COSSONIANA, *Ball* (Labiatae),—Morocco. (Journ. Linn. Soc., xvi., p. 622.)
- SOPHRONITIS PURPUREA, *Rehb. f.* (Orchideæ).—Brazil. (Gard. Chron., pt. i., p. 462.)
- STACHYS MAWEANA, *Ball* (Labiatae).—Morocco. (Journ. Linn. Soc., xvi., p. 626.)
- STATICE ORNATA, *Ball* (Plumbagineæ).—Morocco. (Journ. Linn. Soc., xvi., p. 559.)
- STENACHENIUM CAMPESTRE, *Baker* (Compositæ).—Monte Video. (Journ. Bot., p. 79.)

- S. RIEDELI, *Baker* (Compositæ).—Monte Video. (Journ. Bot., p. 78.)
- SWARTZIA AMAZONICA, *S. Moore* (Leguminosæ).—Brazil. (Journ. Bot., p. 132.)
- THALICTRUM FORTUNEI, *S. Moore* (Ranunculacæ).—China. (Journ. Bot., p. 130.)
- THERMOPSIS CHINENSIS, *Benth.* (Leguminosæ).—China. (Journ. Bot., p. 131.)
- TILLANDSIA ANDICOLA, *Gillies* (Bromeliacæ).—Andes. (Journ. Bot., p. 239.)
- T. BRYOIDES, *Griseb.*—Temp. S. America. (Journ. Bot., p. 236.)
- T. ERECTA, *Gillies.*—Argentine Republic. (Journ. Bot., p. 239.)
- T. FUSCA, *Baker.*—Obragillo. (Journ. Bot., p. 240.)
- T. GILLIESII, *Baker.*—Argentine Republic. (Journ. Bot., p. 240.)
- T. MYOSURA, *Griseb.*—Andes, &c. (Journ. Bot., p. 240.)
- T. PAUCIFOLIA, *Baker.*—(Gard. Chron., pt. ii., p. 748.)
- T. PUSILLA, *Gillies.*—Argentine Republic. (Journ. Bot., p. 237.)
- T. RECTANGULA, *Baker.*—Argentine Republic. (Journ. Bot., p. 238.)
- T. RETORTA, *Griseb.*—Argentine Republic. (Journ. Bot., p. 238.)
- T. TRICHOLEPIS, *Baker.*—Bolivia. (Journ. Bot., p. 237.)
- T. UNDULATA, *Baker.*—Paraguay. (Journ. Bot., p. 240.)
- TORENIA SCHWEINFURTHII, *Oliv.* (Scrophulariacæ).—Bongo-land, Nupe. (Ic. Plant., t. 1251.)
- TRICHOCAULON, *N. E. Br.* (Asclepiadæ).—T. FLAVUM, *N. E. Br.* S. Africa. (Journ. Linn. Soc., xvii., p. 165.)
- TULBAGHIA ÆQUINOCTIALIS, *Welw.* (Liliacæ).—Angola. (Trans. Linn. Soc., 2, i., p. 246.)
- T. CAMERONI, *Baker* (Liliacæ).—Trop. Africa. (Journ. Bot., p. 321.)
- UNCIFERA HETEROGLOSSA, *Rchb. f.* (Orchidæ).—(Gard. Chron., pt. ii., p. 234.)
- URGINEA CHLORANTHA, *Welw.* (Liliacæ).—Angola. (Trans. Linn. Soc., 2, i., p. 248.)
- U. COMOSA, *Welw.*—Angola. (Trans. Linn. Soc., 2, i., p. 247.)
- U. PSILOSTACHYA, *Welw.*—Angola. (Trans. Linn. Soc., 2, i., p. 247.)
- U. RIGIDIFOLIA, *Baker.*—Cape Colony. (Journ. Bot., p. 323.)
- VATICA PAPUANA, *Dyer* (Dipterocarpeæ).—New Guinea. (Journ. Bot., p. 100.)
- VERNONIA PTEROCAULON, *Baker* (Compositæ).—Monte Video. (Journ. Bot., p. 77.)
- VERBASCUM COSSONIANUM, *Ball* (Scrophulariacæ).—Morocco. (Journ. Linn. Soc., xvi., p. 583.)
- V. HOOKERIANUM, *Ball.*—Morocco. (Journ. Linn. Soc., xvi., p. 584.)
- VITIS PAPILLATA, *Hance* (Ampelidæ).—China. (Journ. Bot., p. 226.)
- V. SARCOCEPHALA, *Schweinf.*—Trop. Africa. (Ic. Plant., t. 1253.)
- WIKSTRÆMIA MONNULA, *Hance.*—China. (Journ. Bot., p. 13.)
- XEROPHYTA CAPILLARIS, *Baker* (Hæmadoracæ).—Angola. (Trans. Linn. Soc., 2, i., p. 264, t. 36.)

X. SQUARROSA, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 264.)

X. STENOPHYLLA, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 265.)

X. VELUTINA, *Baker*.—Angola. (Trans. Linn. Soc., 2, i., p. 265.)

ZAMIA ? AMPLIFOLIA, *Hort. Bull* (Cycadææ).—(Gard. Chron., pt. ii., p. 810.)

ZYGOPETALUM OBTUSATUM, *Rehb. f.* (Orchidææ)—(Gard. Chron., pt. ii., p. 300.)

THE Royal Society has issued a thick extra volume of the 'Philosophical Transactions' (vol. 168), containing a full account of the collections, petiological, botanical and zoological, made during the Transit of Venus expedition of 1874-75, in Kerguelen Island and Rodriguez. We have already alluded (p. 122) to the portion devoted to the Botany of the latter island. The plants of Kerguelen, though few in number, are of great interest. This large area, eighty miles long by seventy wide, is probably the most barren tract on the face of the globe, and possesses the poorest flora. Sir J. D. Hooker gives a complete list of the Phanerogams, Ferns, &c., now known in the island. Altogether there are only 21 of the former and 7 of the latter; the only new species is *Ranunculus Moseleyi*, Hk. f. This more complete knowledge of the Kerguelen Phanerogamic Flora has strengthened its previously-recognised affinity with that of Fuegia. Its constituents may be thus classified:—one endemic genus (*Pringlea*) with no near ally, one endemic genus allied to *Pycnophyllum*, an Andean one (*Lyallia*), six endemic species allied to American congeners (*Ranunculus crassipes* and *Moseleyi*, *Colobanthus kerguelensis*, *Acena affinis*, *Poa Cookii*, *Festuca kerguelensis*), five species common to Fuegia but not found elsewhere (*Ranunculus tenuifolius*, *Azorella Selago*, *Galium antarcticum*, *Festuca erecta*, *Deschampsia antarctica*), six species common to America and also to New Zealand and the islands south of it, many very widely dispersed (*Tillæa moschata*, *Montia fontana*, *Callitriche obtusangula*, *Limosella aquatica*, *Juncus scheuzerioides*, *Agrostis magellanica*), two species found elsewhere but not in Fuegia (*Cotula plumosa*, Lord Auckland's Group and Campbell's Island south of New Zealand; *Uncinia compacta*, Tasmania and New Zealand). There are 74 Mosses, 25 Hepaticæ, 61 Lichens, 71 marine and 106 fresh-water Algæ, and 10 Fungi enumerated; these also strongly support the American affinity. Five plates illustrate the Memoir, two devoted to Phanerogams and three to Cryptogams. The flowers of the curious *Lyallia* are figured, and corroborate its position in the Caryophyllææ;* there are also figures of the different forms of flower (apetalous, uni- and tri-petalous) of *Pringlea*.

* From the similarity of habit and foliage, and in the absence of flowers, Anderson, the surgeon to Cook's third voyage, who first collected this plant, placed it in the same genus as *Azorella Selago*, both being species of his *Cookia*, an unpublished genus dedicated to the illustrious navigator.

Mr. Fred. Townsend has printed and sent out to botanists some 'Notes on the flora of Hampshire,' in the hope that he may thus obtain additional information and the correction of errors, before he publishes his Flora of the county. Two lists are given; first, of species found in mainland Hants, but absent from the Isle of Wight, or from one or more of the adjoining counties of Wilts, Dorset, Sussex, Surrey, or Berks; second, of species absent on the mainland of Hants, but found in one or more of the same counties, including Wight. The first list contains 316 species; or, excluding 74 maritime species, 242; the second, 110. From these lists it appears that Surrey and Sussex most nearly approach Hants in possessing with it 176 and 174 respectively, of the 242 plants of the first list; whilst, contrary to what would be expected, the same two counties most differ from Hants in possessing most species of the second list, viz., 62 and 44 respectively, out of the 110 absent from Hants. The author adds, "The explanation of this apparent contradiction lies, I believe, in the fact that the newer or Germanic flora, spreading from the east, is naturally more developed in the counties of Surrey and Sussex than in Hants mainland (to which, nevertheless, the latter owes the main features of its flora, if we except Mr. Watson's 'English' species), or in the counties still further westward; whilst the Isle of Wight was, in all probability, very early cut off from the mainland, before the eastern flora had time to become more fully developed. Of the 19 species found on the island, but not on the mainland, only 3 are of the Germanic type, whilst 7 are of the Atlantic type, and 4 of the English type. Of the 153 species in the mainland which are not in the island, 65 are of the English type, 22 of the Germanic, and only 7 of the Atlantic type." Mr. Townsend intends to divide his Flora into districts founded on river-basins, and devotes the conclusion of his useful paper to his reasons for preferring this natural division to an artificial one.

NEW BOOKS.—'The Botanical Text Book,' Edition 6. Part I., Structural Botany, by ASA GRAY, LL.D. (Iverson & Co., New York), 1879.—'Floral Dissections illustrative of typical genera of the British Natural Orders.' Lithographed by the Rev. G. HENSLOW, M.A., &c. (Stanford, London), 1879.—F. M. BAILEY and K. T. STAIGER, 'An illustrated Monograph of the Grasses of Queensland,' vol. i., 1878 (42 plates). (Brisbane, lithographed by Warwick & Sapsford.)

ARTICLES IN JOURNALS.—MAY.

Bot. Zeitung.—E. Strasburger, 'New observations on cell-formation and cell-division' (contd., tab. 4).—A. Tomaschek, 'On vegetative reproduction of a young plant of *Equisetum palustre*.'—G. Becker, 'Diagnostic notes on *Ranunculus*.'—F. von Höhnelt, 'On the cause of the rapid decrease of capacity for passage of

water in branches.'—C. Kraus, 'Causes of formation of etiolated plants.'—F. Musculus, 'On the modification in physical respects which starch undergoes.'

Flora.—F. Westermaier, 'On the vascular bundles in *Begoniaceæ*' (contd.)—W. Nylander, 'Addenda nova ad lichenographiam Europæam.'—H. Bauke, 'On the prothallium of *Salvinia natans*' (tab. 8).—K. A. Henniger, 'On hybridization in plants.'—W. J. Behrens, 'On the nectaries of flowers' (contd., t. 4).

Hedwigia.—P. Richter, 'New *Bacillariaceæ*.'

Magyar Nov. Lapok.—L. Walz, 'Plants collected in mountains of Gorgeny, shore of Maros and district of Buszek.'

Oesterr. Bot. Zeitschr.—F. R. v. Höhnel, 'Anatomical remarks on the proportions of intercellular space to the vascular system.'—J. Wiesbaur, 'Botanical notes.'—C. Haussknecht, '*Epilobia nova*' (contd.)—F. Hauck, 'On Adriatic *Algæ*' (contd.)—E. Hackel, 'Botanical notes.'—S. Schulzer, 'Mycological notes.'—F. Antoine, 'The Sundew and the rain-makers of N. Australia.'

Ann. Sc. Nat. (ser. 6, vii., pt. 4).—P. von Tieghem, 'On *Leuconostoc mesenteroides*' (contd., tab. 17).—M. G. Capus, 'Anatomy of conductive tissue' (tab. 18).

Bull. Soc. Bot. France (xxv., pt. 2).—P. Petit, 'Observations on the life of Diatoms.'—E. Mer, 'Effects of submersion on aerial leaves.'—Id., 'Effects of water on aquatic leaves.'—De Seynes, 'On a new genus of *Spheriaceæ* (*Eurythea*).'
—Id., 'Notes on cells "en boucle"'—M. Bainier, 'On *Chenocarpus hypotrichoïdes*.'—E. Prillieux, 'Action of vapour of sulphide of carbon on seeds.'—G. Chastaingt, 'Addition to plants of environs of Aubin.'—E. Mer, 'Absorption of water by leaf-blades.'—P. Sagot, 'Test for poisonous plants by their action on Batrachians.'—J. de Seynes, 'On *Peziza phlebophora*, Berk., and *Ptychogaster alba*, Cord.'—M. Cornu, '*Podisoma Juniperi-Sabina* on *J. virginiana* and other Junipers.'—Id., 'On some spring Fungi (*Morchella*, *Verpa*, *Gyrometra*).'
—Id., 'Fungi of environs of Paris.'—X. Gillot, 'Cryptogams in Corsica, 1877.'—E. Malinvaud, 'Some Mints in herb. of Bot. Garden, Brussels.'—G. Genevier, 'On *Morchella elata*.'—M. Pihier, 'Spiral cells in roots of *Nuphar advenum*.'—M. de Villepoix, 'Secretory canals of *Umbellifera*.'—Id., 'Structure of fruit of *Conium*.'—E. Bornet, 'On separation of sexes in *Euonymus europæus*.'—M. Cornu, 'New or rare Fungi in environs of Paris.'

Id. (xxv., pt. 3).—A. Posada-Arango, 'On some Palms of Columbia (*Acrocomia*, *Martinezia*).'
—D. Arbaumout, 'Lenticels of *Cissus quinquefolius*' (tab. 2).—E. Bonnet, 'Notes on some plants of S. of France.'—M. Cornu, 'Notes on French Fungi.'—E. Malinvaud, 'On Bryology of Haute Vienne and Mont-Dore.'—G. Rouy, '*Heliotropium curassavicum* and *Paronychia echinata* in isle of Sidrière de Fiton (Aude).'
—M. Cornu, 'Notes and remarks on the *Uredinea* (*Ræstelia*).'
—Id., 'Anatomy of lesions caused in the Vine by anthracnose.'—Cheboisseau, 'Report on Society's Library.'—P. Duchartre, 'Note on two monstrosities of *Crocus*.'—Rodriguez,

'Additions to flora of Minorca.'—M. Cornu, 'On *Rhizopogon luteolus* and *Lenzites sepiaria*.'—Bainier, 'Note on two vars. of *Arthrotricha*.'—D. Clos, 'Plants of S. Jean de-Luz.'—M. Patrouillard, 'On endocarpic proliferation in flowers of *Gentiana lutea*.'—J. Poisson, 'On disengagement of heat accompanying withering of flowers in *Dioon edule*.'—X. Gillot, 'On *Viola Cryana*.'

Bull. Soc. Bot. Belgique (xvii., pt. 2, 3).—O. Hecking, 'Report of the herborization of the Society, 1878.'—A. Cogniaux, 'Remarks on Brazilian *Cucurbitacea*.'—A. Déséglise and T. Durand, 'Descriptions of new Mints' [twenty-four forms of *Mentha sylvestris*.]

Bot. Tidskrift (ser. 3, ii., pt. 4.—J. Lange and H. Mortensen, 'Review of new and rare Danish species, 1872-78' (concluded).

Journ. Linn. Soc. Lond. (No. 101).—A. W. Bennett, 'Notes on cleistogamic flowers, chiefly of *Viola*, *Ovalis*, and *Impatiens*.'—G. Dickie, 'Notes on *Algae* from Lake Nyassa.'—J. Miers, 'On the *Symplocaceæ*.'—R. J. Lynch, 'On branch-tubers and tendrils of *Vitis gongylodes*' (tab. 15).—C. B. Clarke, 'Note on *Gardenia turgida*.'—W. Mansell Weale, 'Note on S. African Orchids.'—Rev. G. Henslow, 'On absorption of rain and dew by green parts of plants.'—H. Trimen, 'On the genus *Oudnaga*, Br.'—W. T. Thiselton-Dyer, 'Note on fruiting of *Wistaria sinensis* in Europe.'

Proceedings of Societies.

LINNEAN SOCIETY OF LONDON.

April 3, 1879.—William Carruthers, F.R.S., Vice-President, in the chair.—Ferdinand Coles, Esq.; W. A. Forbes, Esq.; and Dr. N. S. Whitney were elected Fellows of the Society.—Mr. W. T. Thiselton Dyer exhibited the inflorescence of *Gynerium saccharoideum*, grown at Kew; originally obtained through Dr. Cappenemar, of Buenos Ayres.—Dr. Henry Trimen exhibited the unique specimen of *Balsamodendrum Myrrha*, Nees, collected by Hildebrandt in Somali Land, and kindly lent by the authorities of the Royal Berlin Herbarium to be figured in 'Medicinal Plants.' It was gathered in 1873, and possesses but few leaves and a single fruit. The traveller saw the myrrh exuding on the tree. For comparison with this specimen there were also exhibited the original type specimens of *B. Myrrha*, Nees (also from the Berlin Herbarium), collected by Ehrenberg in Arabia; and Dr. Trimen observed that, so far as the scanty material enabled a judgment to be formed, the statement of Hildebrandt that the two plants are identical (*Sitzungsber. Gesellsch. Naturf. Freunde zu Berlin*, Nov. 1878, p. 196) is sustained.* The specimens of Ehrenberg's other myrrh plant, *B. Ehrenbergianum*, Berg, with his notes attached (which it is stated in Hanbury's 'Pharmacographia' could not be found at Berlin in 1872), were also shown, as well as

* For further particulars see a paper in 'Pharm. Journ.' May 3, 1879, p. 393.

(from the Hanbury herbarium) *B. Playfairii*, Hook. fil., from Somali Land, with its gum called "Hotai," and examples of the several varieties of Myrrh, Beesabol, and Bdellium.—An account of a remarkable Peatflood in the Falkland Islands, by Mr. Arthur Bailey, was communicated by Mr. W. T. Thiselton Dyer. Just after midnight, 29th November, 1878, it was discovered that a black moving mass of peat several feet high was moving towards the settlement at the rate of between four and five miles an hour. The next morning (30th) it was found that the town of Stanley was cut in two, communication between east and west end only being possible by boats. Fortunately no lives were lost.—The Secretary read in abstract a paper 'Notes on *Moquilea*, with description of a new species,' by Mr. John Miers. The author marks the difference between *Moquilea* and *Licania*, genera often confounded. In *Licania* the tubular five-toothed calyx always enlarges considerably, and finally encloses and conceals the fruit. In *Moquilea* the small five-toothed calyx scarcely enlarges, but remains persistent, supporting the larger fruit. In *Licania* half of its stamens are fertile and unilateral, the rest without anthers follow consecutively, all placed on an elevated membranous ring. In *Moquilea* the stamens vary in number in the several species from five to forty, all free and distinct to the base and seated in the mouth of the small calyx. In *Licania* the fruit is concealed within the augmented calyx: it consists of a hard pericarp containing a single seed, with a slender embryo embedded in a fleshy albumen. In *Moquilea* the fruit is larger, supported by the unchanged calyx, and contains a single erect seed: its testa is membranaceous and bilamellar, exhibiting a branching raphe or network of numerous vessels; the albumen is solid and as hard as ivory, containing an embryo of fleshy or corneous cotyledons partially conferruminated and hollow in the centre. A new species, *Moquilea organensis*, is then described.

Botanical News.

At the anniversary meeting of the Linnean Society, held May 24th, an unanimous vote of thanks was passed to Mr. Kippist, who for the long period of forty years has held the post of Librarian, and whose failing health has compelled him to give up some of its duties.

ELISABETHA, CONTESSA FIORINI-MAZZANTI, died at Rome on April 23rd, at the great age of eighty-nine. She was the author of many papers on Cryptogamic Botany, especially Algæ; and her name is commemorated in the genus of Grasses *Fiorinia*, Parl., and also in *Mazzantia*, Mart. (Fungi).

THE death is recorded at Sondershausen, on April 28th, of THILO IRMISCH, ætat. sixty-four, well-known for his numerous valuable memoirs on the morphology of Phanerogams, especially

of the underground portions of the axis in Monocotyledons; and on critical European botany. *Thiloua*, Eichl. (*Combretaceæ*), and *Irmischia*, Schlecht. (*Asclepiadeæ*), preserve his name, but neither are maintained in the 'Genera Plantarum.'

EDOUARD SPACH was a native of Strassburg, where he was born in 1801. He is best known as the author of the 'Phanérogames,' which occupy fourteen volumes of the work called 'Suites a Buffon,' and were published at Paris, 1834-48. In conjunction with the late Count Jaubert he issued a magnificent work on the plants of Asia Minor, with 500 plates, 'Illustrationes Plantarum Orientalium,' in five volumes, from 1842 to 1857. For many years he has held the position of keeper of the herbarium at the Paris Museum, and is the author of very numerous systematic papers, revisions of genera, &c. He died on May 17th. *Spachea*, A. Juss., is a genus of *Malpighiaceæ*.

WE have also to record the death, on May 25th, of KARL KOCH, at Berlin, where he was till lately Professor of Botany. Born at Weimar in 1809, he was early influenced by Goethe; studied at Jena and Würzburg, and then explored the Caucasus and Asia Minor. An account of his travels is published in the 'Linnæa' for 1848. Koch was especially known as a horticultural botanist, and his great work was the 'Dendrologie,' the first part of which appeared in 1869. He was the author of many monographs of the cultivated genera of Arads, Bromeliads, &c., and was well known to the horticulturists of all countries as the leading authority on garden botany.

WE much regret to have to include in our obituary another great horticultural botanist in DAVID MOORE, the well-known director of the Glasnevin Botanic Gardens, Dublin. His death occurred on June 9th, after three days' severe illness, at the age of seventy-two. He was born at Dundee, and went to Ireland in 1828, as assistant to Dr. Mackay, then Director of the Dublin University Garden. In 1838 he was appointed to Glasnevin Gardens, and for the long period of forty years has had the charge of them, to the great advantage of horticultural science. As a botanist, Dr. Moore paid especial attention to the flora of Ireland, and particularly to the Mosses and Hepaticæ. The 'Cybele Hibernica,' which was prepared in conjunction with Mr. A. G. More, appeared in 1866, and is a standard work on the Irish Flora. The 'Synopsis of Irish Mosses' was printed in 'Proceedings of the Royal Irish Academy' for 1873, where also, in 1876, appeared the valuable 'Report on Irish Hepaticæ.' One of Dr. Moore's last contributions to science was the description of the new Irish *Isoetes* in this Journal (1878, p. 353), dedicated to his friend Mr. A. G. More.

TILBURY FOX, M.D., who died very suddenly of heart disease at Paris, on June 7th, æt. forty-three, had paid considerable attention to the part played by minute Fungi in the production of diseases of the skin and hair; and in our volume for 1867 will be found a letter from him on the subject of the so called "Chignon-Fungus."

Original Articles.

MELLERA: A NEW GENUS OF TROPICAL AFRICAN ACANTHACEÆ.

By S. LE M. MOORE, F.L.S.

(TAB. 203.)

INCLUDED with doubt by Mr. Bentham* amongst the species of Hochstetter's unsatisfactory genus, *Paulo-Wilhelmia*, is a somewhat remarkable plant gathered by the late Dr. Meller among the Manganja Hills, and more recently sent home from Moramballa by Mr. Horace Waller. I venture to think that it will constitute the type of a new genus of which a diagnosis follows.

MELLERA (*Acanthacearum* [*Hygrophilearum*]), gen. nov. :—Calyx 5-partitus laciniis linearibus obtusis subæqualibus erectis. Corollæ tubus angustus superne ampliatus leviter incurvus limbus 2-labiatus æstivatione contortus labii antici 3-lobi lobis lateralibus æqualibus lobo medio iis latiore ac pilis setosis appresse decurvis munito labii postici 2-lobi lobis æqualibus omnibus obtusis. Stamina 4 exserta sub fauce affixa, filamentis subæquilongis basi per paria lateralia connatis, antherarum loculis arcu contiguis subæqualibus oblongo-linearibus basi calcaratis. Stigmatis lobus alter fere omnino obsoletus. Ovarium 8-ovulatum. Capsula oblongo-linearis fere a basi seminifera; seminum retinacula basi dilatata apice angusta. Suffrutex? foliis magnis longe petiolatis lobulatis; inflorescentia hirsuta, floribus magnis in axillis superioribus fasciculatis 2-bracteolatis.

M. LOBULATA, *sp. unica*. Caule tetragono cinereo glabrato. Foliis ovato-oblongis obtusiusculis utrinque pluries-lobulatis vel argute dentatis minoribus acuminatis undulatis omnibus puberulis, petioli laminam subæquantibus vel eâ brevioribus foliorum minorum villosis majorum glabris vel fere glabris, bracteolis longe spathulatis calycis segmentis hirsutulis subæquilongis. Corollæ tubo plus quam 1-cm. longitudine glabro labii antici lobo medio nervoso. Connectivo dorso levissime puberulo. Stylo pilosiusculo. Capsula 8- (vel abortu pauciori-) sperma obscure papillosa. Seminibus suborbicularibus compressis.

Hab. In collibus Manganja dictis (Meller) necnon ad Moramballa (Waller).

The plant is thus referred to by Mr. Bentham (*l. c.*), after enumerating the other species of *Paulo-Wilhelmia* :—“ His forte addenda est planta Zambesiana, plerisque characteribus imprimis calyce et inflorescentia iis accedens, sed corollæ lobi angustiores vix

* Gen. Pl. ii., p. 1080.

contorti, antico intus setis reflexis barbato, et antherarum loculi ut in *Echinacantho* basi mucronati-aristati."

Perhaps the most striking point about *Mellera* is the curious mid-lobe of the lower lip with its recurved setæ. The presence of these as well as the larger size of the mid-lobe plainly show a well-developed differentiation of the limb into two lips, a character which, differing as it does from the occasional slight tendencies to the bilabiate condition seen in *Calophanes*, *Ruellia*, &c., indicates that *Mellera* has closer affinity with the tribe *Hygrophilæ* than with *Eruellicæ*. From *Brillantaisia* it differs in the absence of staminodes, fewer ovules, shape of the corolla, as well as in the totally-different inflorescence; from *Nomaphila*, its inflorescence, spurred antlers, &c., afford good characters for separation; while *Hygrophila*, with its scattered axillary fascicles of flowers, and its usually muticous but at most merely mucronate anthers, &c., stands towards it in but distant relationship. When I first examined the plant some years ago I thought that it might possibly be placed with *Calophanes*, but in addition to the bilabiate corolla, the 8-celled ovary and habit render the affinity less close than I before suspected to be the case.

DESCRIPTION OF TAB. 203.—*Mellera lobulata*, S. Moore (Nat. size).—*a*, corolla opened; *b*, calyx with bracteoles; *c*, an anther opened out, showing the cells unequal at the base; *d*, ovary style and stigma; *e*, ovary opened (all more or less magnified).

A SYNOPSIS OF THE GENUS ÆCHMEA, R. & P.

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

(Concluded from p. 168).

31. Æ. ODORA, Baker.—*Billbergia odora*, Miquel in Linnæa, xviii. 377.—*Hohenbergia odora*, Baker in Ref. Bot., sub. t. 284.—Leaves lorate, moderately horny in texture, obtuse with a prominent cusp, reaching a length of two to three feet and a breadth of one inch and a half to three inches at the middle, closely minutely serrated up to the top. Scape a foot long, sheathed by many large lanceolate adpressed bract-leaves. Panicle lax, rhomboid, bipinnate, a foot or more long, with few or many distant ascending or spreading spicate branches, the lowest of which are nearly a foot long and subtended by lanceolate bracts two to three inches long. Flower-bracts minute, deltoid, with a pungent cusp as long as the lamina. Calyx including ovary three-eighths of an inch long; sepals deltoid, half as long as the ovary, with a large erecto-patent pungent cusp. Petals yellowish, one quarter of an inch longer than the sepals.—Surinam, *Focke*, 809! Cayenne, *Poitreau*! Trinidad, *Prestoe*! Martinique, *Hahn*, 577! St. Lucia, *Herb. Mus. Brit.*!—We have this in cultivation at Kew, but it has not yet been figured.





32. *Æ. PATENTISSIMA*, Baker.—*Billbergia ? patentissima*, Mart. ; Schultes fil., Syst. Veg., vii. 1270.—Leaves linear-lorate, three to four feet long, one inch to one inch and a quarter broad, minutely serrated. Scape sheathed by lanceolate toothed or subentire adpressed bract-leaves two inches to two and a half inches long. Panicle one foot to three feet long, with short spreading densely spicate branches, the lower four to five inches long, subtended by small lanceolate bracts. Flowers spreading, each subtended by an ovate flower-bract with a pungent mucro, which is one-eighth to one-fifth of an inch long, and shorter than the ovary. Sepals deltoid, one-eighth of an inch long, with a large pungent mucro. Petals above a quarter of an inch long, pale lilac or reddish, not scaled at the base.—Brazil, *Martius*.

33. *Æ. CÆRULESCENS*, Hort.—*Æ. carulea*, E. Morren, Cat., 1871, 1.—*Lamprococcus carulescens*, Regel Gartenfl., 1871, 225, t. 694.—*Hoplophytum carulescens*, E. Morren, Cat., 1873, 9.—Leaves with a dilated oblong entire base and a lorate lamina fifteen to eighteen inches long, one inch and a half to two inches broad, obtuse with a cusp, with close minute deltoid prickles. Scape nearly as long as the leaves, sheathed by several pale lanceolate bract-leaves. Flowers in a dense oblong-deltoid bipinnate panicle four to five inches long, two inches in diameter, with crowded flexuose few-flowered branches, the flowers each with a pedicel one-sixth to one-third of an inch long, with a minute subulate bract at the base. Flower-bracts none or minute and caducous. Ovary with calyx one-third of an inch long ; sepals deltoid-cuspidate, a third as long as the ovary. Petals lingulate, bluish-red, one-third of an inch long.—South America ; the precise country not known. Introduced into cultivation about 1870. Well-marked from all the other species with small crowded bipinnate panicles by its pedicellate flowers and obsolete flower-bracts.

34. *Æ. MELINONII*, Hook. in Bot. Mag., t. 5235.—*Hohenbergia Melinonii*, Baker in Ref. Bot., sub. t. 284.—Leaves with a dilated oblong utricular base about three inches broad, and a lorate lamina one foot and a half to two feet long, two inches broad at the middle, with minute distant deltoid prickles. Scape about a foot long, brownish. Flowers in a dense bipinnate thyrsoid panicle five six inches long, three to four inches broad, the lower branches sometimes binate, bearing twelve to fifteen sessile erecto-patent flowers ; the branch with a bract as long as itself. Flower-bracts minute, caducous. Calyx including ovary five-eighths to three-fourths of an inch long, bright red ; sepals oblong, obtuse, minutely mucronate, half as long as the ovary. Petals bright red, a quarter to one-third of an inch longer than the sepals.—French Guiana. Introduced into cultivation in 1857.

35. *Æ. CUMINGII*, Baker, n. sp.—Leaves unknown. Scape sheathed with lanceolate red bract-leaves with a few small hooked teeth. Flowers in a dense bipinnate panicle six to eight inches long, three to four inches broad, the lower branches spreading, about two inches long, bearing ten to twelve erecto-patent sessile

flowers and subtended by red lanceolate bract-leaves longer than themselves; flower-bracts coriaceous, navicular, lanceolate-deltoid, a quarter of an inch long, with a distinct mucro. Calyx including ovary half an inch long; sepals lanceolate, as long as the ovary, distinctly mucronate. Petals twice as long as the sepals.—Columbia, *Cuming*, 1178, *ex parte!* (Herb. Kew.)

36. *Æ. SUBINERMIS*, *Baker*, n. sp.—Leaves about twenty in a rosette, with a dilated oblong base two inches broad, and a lanceolate lamina narrowed gradually to the point, three-quarters to one inch broad at the middle, thin in texture for the genus, the edge furnished with only a few minute deltoid prickles near the base. Scape about a foot long, with several red ascending lanceolate bract-leaves about two inches long. Flowers in a dense oblong-thyrsoid bipinnate panicle about three inches long, the lower branches subtended by red lanceolate bracts one to two inches long: central branches one inch to one inch and a half long, five- to six-flowered; their rachises zigzag and glabrous; flowers sessile, subtended by an orbicular flower-bract one-sixth to one fifth of an inch long and broad, without a cusp. Calyx including ovary half an inch long; sepals deltoid, one-eighth of an inch long, not mucronate. Petals not seen.—Rio Janeiro, *Glaziou*, 9326! (Herb. Kew.)

37. *Æ. CÆLESTIS*, *Baker*.—*Hohenbergia caelestis*, *Baker* in Ref. Bot., t. 284.—*Hoplophytum caeleste*, *K. Koch*; *E. Morren*, Cat., 1873, 9.—Leaves ten to twelve in a rosette, with a dilated entire oblong base three inches broad, and a horny lorate lamina one foot to one foot and a half long, one inch and a half to two inches broad at the middle, the tip deltoid-cuspidate, the edge furnished with close minute deltoid horny teeth. Scape a foot long, with many erect lanceolate bract-leaves, the upper ones tinted red. Flowers in a dense deltoid bipinnate panicle three to five inches long, two to three inches broad, with stout floccose rachises, the lower branches four- to six-flowered, ascending or subpatent, subtended by red lanceolate branch-bracts an inch long. Flower-bracts deltoid-cuspidate, half as long as the ovary. Calyx with ovary white-floccose, about half an inch long. Sepals deltoid, with a distinct mucro. Petals lingulate, blue, three-eighths of an inch to half an inch long.—South America, the precise country not known. Well known in cultivation for many years. I suspect it will prove to be identical with *Billbergia paniculata*, *Mart.*; *Schultes fil.*, Syst. Veg., vii., 1268. A native of the upper Amazon.

38. *Æ. SUAVEOLENS*, *Knowles & West.*, Floral Cab., iii., 177, t. 134.—*Billbergia purpureo-rosea*, *Hook.* in Bot. Mag., t. 3304.—*Hoplophytum suaveolens* and *purpureo-roseum*, *Beer*, Brom., 135.—*Bromelia albo-rosea*, *Lemaire*, Ill. Hort., 1855, misc. 64.—Leaves with a dilated ovate entire utricular base four to five inches long, and a lorate horny lamina one foot and a half to two feet long, two inches broad at the middle, with a deltoid-cuspidate tip and close moderately large pungent deltoid horny teeth up to the top. Scape one foot and a half to two feet long, with many small

lanceolate acuminate bract-leaves. Flowers in an oblong bipinnate panicle six to ten inches long, three to four inches broad, dense in the upper half, lax in the lower half, with very zigzag ascending spicate branches, the lower six- to eight-flowered, and subtended by small lanceolate bracts. Flower-bracts ovate, about a quarter of an inch long, with a conspicuous pungent mucro. Ovary with calyx three-eighths of an inch to half an inch long; sepals lanceolate-deltoid, one-sixth of an inch long, minutely mucronate. Petals half an inch long, red-purple.—Rio Janeiro, *Bowie and Cunningham!* (Herb. Mus. Brit.). Minas Geraes, *Libon*. Discovered by Bowie and Cunningham in 1815. Introduced into cultivation in 1831.

39. *Æ. FLORIBUNDA*, *Mart.*; Schultes fl., Syst. Veg., vii. 1271.—Leaves with a dilated entire base and a lorate lamina one foot and a half to two feet long, two inches to two inches and a half broad, abruptly rounded at the tip with a small cusp, the teeth of the edge irregular and very minute. Scape a foot or more long, with several lanceolate bract-leaves. Flowers in a dense oblong bipinnate panicle eight to sixteen inches long, two inches and a half to three inches in diameter, the spicate branches very zigzag, spreading or ascending, the lower ones four- to six-flowered, subtended at the base by small lanceolate branch-bracts. Flower-bracts lanceolate, a quarter to one-third of an inch long, exclusive of the long subulate cusp. Calyx including ovary three-quarters of an inch long. Sepals deltoid, with a cusp as long as the lamina. Petals yellow, three-quarters of an inch long.—Rio Janeiro, *Martius!* St. Paulo, near Santos, *Burchell*, 3291! A close ally of *Æ. suaveolens*, from which it differs by its minutely-toothed leaves with a rounded tip, yellow petals, and long-pointed sepals and flower-bracts.

40. *Æ. REGULARIS*, *Baker*, n. sp.—Leaves with a dilated utricular oblong base three inches broad and a horny lorate cuspidate lamina one foot and a half to two feet long, one inch and a half to two inches broad at the middle, with copious spreading lanceolate horny prickles one-eighth to one-sixth of an inch long. Scape above a foot long, with several large lanceolate bract-leaves, the upper ones red. Flowers in a dense oblong bipinnate panicle six to eight inches long, three inches broad, with spreading nearly straight square spicate branches, the lower ones six- to eight-flowered, and subtended by red lanceolate bracts above an inch long. Flower-bracts deltoid-navicular, a quarter of an inch long inclusive of a short cusp. Calyx including ovary one-third of an inch long; ovary globose; sepals deltoid, as long as the ovary, not mucronate. Petals cream-white, twice as long as the sepals.—South Brazil, *Weir!* I have only seen this in a living state in the collection of Mr. Wilson Saunders. A drawing of it was made for the 'Refugium,' but it has not yet appeared.

41. *Æ. SPICATA*, *Mart.*; Schultes fl., Syst. Veg., vii., 1275.—*Æ. angustifolia*, *Popp. and Endl.*, Nov. Gen., t. 159.—*Hoplophytum spicatum* and *angustifolium*, *Beer, Brom.*, 132, 4.—*Hohenbergia angustifolia* and *Martii*, *Baker* in Ref. Bot., sub. t. 284.—Leaves

with a dilated entire oblong-deltoid utricular base three to four inches long and broad, and an ensiform lamina about a foot long, three-quarters of an inch to one inch broad at the middle, armed with spreading horny black prickles, those of the base a line long, the upper ones smaller and more distant. Scape about a foot long, the upper bract-leaves spreading, crowded, bright red, lanceolate, two to three inches long, spine-ciliated. Flowers in a dense cylindrical panicle three to six inches long, one inch to one inch and a half broad, with short ascending or spreading dense-flowered secund spicate branches. Flower-bracts coriaceous, roundish, wrapped quite round the flower, a quarter of an inch to one-third of an inch long, minutely cuspidate. Calyx with ovary three-eighths to five-eighths of an inch long; sepals lanceolate, with a spreading horny brown cusp. Petals yellow, twice as long as the sepals.—French Guiana, *Sagot*, 560! British Guiana, *Appon*, 249! Dutch Guiana, *Herb. Cliffort*. Maynas, *Poppig*. Barra do Rio Negro, *Spruce*, 1204! Woods of the Yapura, *Martius*; and a more robust variety, with broader, more horny leaves and larger prickles, at Para, *Burchell*, 9725! *Sir Everard Home*! The specimen at the British Museum, from the herbarium of Cliffort, was gathered in Surinam in 1736.

42. Æ. MERTENSII, *Schultes fil.*, *Syst. Veg.*, vii., 1274; Hook. Bot. Mag., t. 3186.—*Bromelia Mertensii*, Meyer Esseq., 144.—*Billbergia Mertensii*, Miquel in *Linnæa*, xviii., 376.—*Hoplophytum Mertensii*, Beer, *Brom.*, 134.—*Hohenbergia Mertensii*, Baker in *Ref. Bot.*, sub. t. 284.—Leaves with an entire dilated base three to four inches broad, and an ensiform lamina above two feet long, one inch and a half to two inches broad at the middle, narrowed to the point, armed with close spreading horny spines one-twelfth of an inch to one twenty-fourth of an inch long. Scape shorter than the leaves, the upper bract-leaves crowded, spreading, lanceolate, entire, red, two to four inches long. Flowers in a dense cylindrical bipinnate panicle six to twelve inches long, one inch and a quarter to one inch and a half broad, with dense-flowered short ascending erecto-patent spicate branches, the largest six- to eight-flowered. Flower-bracts a quarter of an inch long, roundish, with a minute cusp. Calyx with ovary under half an inch long; sepals lanceolate, a quarter of an inch long, obtuse, with a distinct mucro. Petals rose-red, twice as long as the sepals.—Guiana, *Parker*! Introduced into cultivation in 1832.

43. Æ. PANICULIFERA, *Griseb.*, *Flor. Brit. West Ind.*, 592.—*Bromelia paniculifera*, Swartz, *Prodr.* 56.—*Hohenbergia paniculifera*, Baker in *Ref. Bot.*, sub. t. 284, excl. syn.—*B. thyrsoides*, Willd.; *Schultes fil.*, *Syst. Veg.*, vii., 1282.—Leaves with a dilated entire base four to six inches long and broad, and a lorate lamina reaching a couple of feet long, two to three inches broad at the middle, obtuse with a cusp, margined by close horny hooked teeth one-eighth of an inch to one-sixth of an inch long. Scape one foot to one foot and a half long, the lower bract-leaves adpressed, the upper spreading, tinted red, three to four inches long and distinctly

serrated. Flowers in a dense cylindrical bipinnate panicle six to fifteen inches long, two to three inches broad, with very numerous spreading, very flexuose, slender few-flowered branches, the lower often binate. Flower-bracts minute, deltoid-cuspidate. Calyx including ovary half to three-quarters of an inch long. Sepals lanceolate, as long as the ovary, with a large mucro. Petals red-purple, twice as long as the sepals.—Jamaica, *Dr. Wright!* *Purdie!* Venezuela, *Fendler, 2454!* *Moritz, 299!* Para, *Count Hoffmannsegg, Spruce!*—Although this is a fine plant, with a wide range of locality, yet I am not aware that it has been introduced into cultivation.

44. Æ. SETIGERA, *Mart.*; *Schultes* fil., *Syst. Veg.*, vii., 1274.—Leaves with a dilated base four to five inches long, and a lorate cuspidate lamina one foot and a half to three feet long, fifteen to eighteen lines broad, the spines near the base a quarter of an inch long, the upper ones growing gradually smaller till the uppermost are one-third of a line. Scape long, sheathed with lanceolate-acuminate bract-leaves reaching a length of six to eight inches, purple-tinted and spine-bordered. Panicle three to four feet long, with a tomentose axis and spreading two- to three-fid, two- to three-flowered spicate branches, subtended at the base with a bract with a very long pungent point. Flower-bracts coriaceous, wrapped round the flower so as to form a tube three-eighths of an inch to half an inch long, terminated with a black spine an inch long; the uppermost flowerless and reduced to acicular spines. Calyx pale yellowish green, white-floccose. Petals pale rose-red.—Rio Negro, *Martius*.

45. Æ. FASCIATA, *Baker.*—*Billbergia fasciata*, *Lindl.* in *Bot. Reg.*, t. 1130.—*Hoplophytum fasciatum*, *Beer, Brom.*, 129.—*Hohenbergia fasciata*, *Schultes* fil., *Syst. Veg.*, vii., 1253.—*Æchmea Leopoldii*, *Hort.*—*Billbergia rhodocyanea*, *Lemaire* in *Flore des Serres*, t. 207; *Hook.* in *Bot. Mag.*, t. 4883.—Leaves about twenty in a rosette, with an oblong entire clasping base three to four inches broad, and a lorate lamina one foot and a half to two feet long, two inches to two inches and a half broad at the middle, the tip rounded with a mucro, the face plain-green, the back marked with white cross-bands, especially in the lower half, the edge-teeth minute, brown, deltoid. Scape erect, floccose, about a foot long, mottled purple and white, with several pale red erect lanceolate bract-leaves. Flowers in a very dense simple or forked head three to four inches long and broad. Flower-bracts very large and flat, not navicular, coriaceous, acuminate and sharply serrate, bright pink, the lower two to three inches long, the upper not much longer than the flowers. Ovary with calyx half an inch to five-eighths of an inch long. Sepals lanceolate, as long as the ovary, not mucronate. Petals pink, lingulate, three-quarters of an inch long.—Rio Janeiro. Introduced into cultivation in 1826.

46. Æ. BURCHELLII, *Baker*, n. sp. — *Bromelia aurantiaca*, *Burchell* MSS.—Leaves twelve to eighteen inches long, with a dilated entire utricular base two inches to two inches and a half

broad, and a lanceolate minutely-toothed lamina one inch and a half to two inches broad, of moderately firm texture, with a deltoid-cuspidate tip. Scape three inches long, quite hidden by its lanceolate bract-leaves. Flowers in a dense globose head one inch and a half to two inches long and broad, its base-bracts not overtopping it. Flower-bracts lanceolate or deltoid, membranous, toothed at the margin, six to nine lines long, the lower reaching to the top of the sepals, the upper shorter. Calyx including ovary above half an inch long. Sepals yellow, lanceolate, longer than the ovary, minutely cuspidate. Petals not seen.—South Brazil in the province of St. Paulo near Cubatao, *Burchell*, 3487! and near Santos, *Burchell*, 3323! (*Herb. Kew.*)

47. *Æ. CALYCVLATA*, *Baker*.—*Hohenbergia calyculata*, *Baker* in *Ref. Bot.*, t. 286.—*Hoplophytum calyculatum*, *E. Morren* in *Belg. Hort.*, 1865., 162, t. 11.—*Macrochordium luteum*, *Regel* *Gartenfl.*, 1867, 161, t. 544.—*M. nudiusculum*, *K. Koch*, *Wochen.* 1864, 176.—Leaves ten to twelve in a rosette, with a dilated oblong base three to four inches long, two and a half to three inches broad, and a lorate lamina about a foot long, moderately firm in texture, rounded at the tip to a small cusp, minutely toothed all down the edge. Scape shorter than the leaves, floccose, with several deciduous lanceolate bract-leaves. Flowers forty to sixty in a dense globose head an inch and a half long and above an inch in diameter, its base-bracts small and linear. Flower-bracts small, entire, reddish, lanceolate-acuminate, shorter than the calyx. Calyx including ovary one-third of an inch to half an inch long; sepals deltoid, with a cusp as long as the lamina. Petals lingulate, bright yellow, under half an inch long.—South America, the exact country not known. Introduced into cultivation about 1862.

48. *Æ. PINELIANA*, *Baker*.—*Echinostachys Pineliana*, *A. Brong.*; *Planch. Hort. Donat.*, 25; *Hook. in Bot. Mag.*, t. 5321; *Beer, Brom.*, 148.—*E. rosea*, *Beer, Brom.*, 149.—*Macrochordium Pinelianum*, *Lemaire, Ill. Hort.*, ix., *Misc.* 62.—Leaves twelve to fifteen in a rosette, with a dilated clasping base three to four inches broad and an ensiform lamina about a foot long, one inch and a quarter to one inch and a half broad at the middle, of moderately firm texture, narrowed to the point, the crowded spreading horny lower edge-prickles one-quarter of an inch long, those of the middle of the leaf one-eighth of an inch, the face slightly lepidote and the back more so. Scape about as long as the leaves, with numerous large lanceolate adpressed bract-leaves, the upper ones tinged red. Flowers in a dense oblong spicate head two to three inches long, about an inch in diameter. Flower-bracts with a coriaceous deltoid lamina one-eighth of an inch long, and a pungent stramineous cusp as long as the lamina. Calyx including ovary three-eighths to half an inch long; sepals deltoid, with a cusp as long as the lamina. Ovules three to four in a cell, horizontal, arising from the top of the axile placenta. Petals lingulate, bright yellow, half an inch long.—Rio Janeiro. Well known in cultivation; introduced about 1855.

49. *Æ. PECTINATA*, *Baker*, n. sp.—Leaves large, not seen their full length, two and a half to three inches broad above the dilated base, with hooked black horny prickles one-eighth of an inch long. Scape one foot and a half long, quite hidden by its numerous large imbricated coriaceous bract-leaves, of which the lower reach a foot in length, but the upper only one inch and a half to two inches, all of them furnished with close brown-black horny teeth down the edge. Flowers in a dense oblong head three inches long, two inches in diameter. Flower-bracts deltoid-cuspidate, with close large black horny teeth down the edge, the uppermost as long as the calyx, the lower quite an inch long. Calyx with ovary three-quarters of an inch long. Sepals lanceolate, minutely cuspidate, longer than the ovary. Petals not seen.—South Brazil, in the province of St. Paulo on the Serra de Cubatao, *Burchell*, 3594! (Herb. Kew.)

50. *Æ. MUCRONIFLORA*, *Hook.* in *Bot. Mag.*, t. 4832.—*Hoplophytum mucroniflorum*, *Beer*, *Brom.*, 131. *Hohenbergia mucroniflora*, *Baker* in *Ref. Bot.*, sub. t. 284.—Leaves horny in texture, above a foot long, with a dilated entire deltoid base two to three inches broad, and a lorate lamina one inch and a half broad, rounded at the tip to a small cusp, the lower teeth horny, one-eighth to one-sixth of an inch long, the upper ones minute. Scape half a foot long, with many lanceolate toothed bract-leaves one inch and a half to two inches long, the upper ones tinted red. Flowers in a dense oblong spike three to four inches long, one inch and a half in diameter, which is simple or slightly compound at the base. Flower-bract half as long as the calyx, roundish, very obtuse, with a distinct cusp. Ovary including calyx three-eighths of an inch to half an inch long; sepals lanceolate, with a large brown cusp. Petals bright yellow, cuspidate, half an inch long.—Demerara, at Kaieteur Falls, *Appun!* Introduced into English gardens in 1855, by Sir Henry Barkly, when Governor of the colony.

51. *Æ. LINDENI*, *K. Koch*, *Wochen.* 1865, 398.—*Hoplophytum Lindeni*, *E. Morren*, *Belg. Hort.*, 1873, 81, t. 5.—Leaves about twenty in a rosette, with a dilated utricular entire oblong base three inches broad and a lorate horny lamina two to three feet long, one inch and a half to two inches broad, channelled all down the face, minutely toothed, rounded at the tip to a small cusp. Scape one foot to one and a half foot long, with many small adpressed lanceolate bract-leaves. Flowers in a dense oblong head two to three inches long, one inch and a quarter to one inch and a half in diameter. Flower-bracts membranous, reddish, the lower lanceolate, acute, as long as the calyx, the upper shorter, oblong, obtuse, with a cusp. Ovary including calyx half an inch long; sepals round-deltoid, obtuse, with an oblique cusp. Petals lemon-yellow, twice as long as the sepals.—Sant Catherina, South Brazil; discovered by *M. Libon*, to whom we are indebted for the introduction of many Brazilian species. Introduced into cultivation in 1864; drawn for the 'Botanical Magazine' from a specimen that flowered at Kew this winter, presented by *Mr. J. T. Peacock*, but

not yet published.—*Tillandsia tetrastachia*, Vell. Fl. Flum., iii. t. 137 (*Hoplophytum tetrastachyum*, Beer, Brom., 137), may be a rude drawing of this species with an accidentally compound spike.

52. *Æ. COMATA*, Baker.—*Pothuava comata*, Gaudich., Atl. Bonite, t. 116.—*Hoplophytum comatum*, Beer, Brom., 140.—Leaves lanceolate, about two feet long, narrowed to the point, minutely toothed. Scape above a foot long, with many adpressed lanceolate bract-leaves. Flowers in a dense oblong spike about three inches long, two inches in diameter. Flower-bracts lanceolate, acute, as long as the calyx. Calyx with ovary half an inch long; ovary oblong-trigonal, furfuraceous; sepals lanceolate, cuspidate.—South America. Known only from Gaudichaud's figure.

53. *Æ. CONTRACTA*, Baker.—*Billbergia contracta*, Mart.; Schultes fil., Syst. Veg., vii., 1263.—Leaves with a dilated utricular base and a lanceolate lamina one foot and a half to two feet long, nine to fifteen lines broad, the lower edge-spines one-twelfth to one-sixth of an inch long, the upper smaller. Scape one foot and a half to two feet long, purplish, its bract-leaves tinted red-purple, the upper ones toothed, two and a half to three and a half inches long. Flowers in an oblong spike three to four inches long, with a flexuose tomentose rachis. Flower-bracts ovate-acuminate, entire, one-third of an inch to half an inch long. Sepals lanceolate, one-third of an inch long, obtuse or sub-acute. Petals orange-yellow, twice as long as the sepals.—Brazil in the Amazon province, at Arara-coara and Porto das Miranhas, *Martius*.

54. *Æ. NUDICAULIS*, Griseb., Flor. Brit. West. Ind, 593.—*Bromelia nudicaulis*, Linn. Sp., 409; Hook. Exot. Flora, t. 143.—*Billbergia nudicaulis*, Lindl. Bot. Reg., sub. t. 1068.—*Hohenbergia nudicaulis*, Baker in Ref. Bot., sub. t. 284.—*Bromelia lutea*, Meyer Esseq., 145.—*Billbergia lutea*, Schultes fil., Syst. Veg., vii., 1258.—*B. pyramidata*, Beer, Brom., 123.—*Hoplophytum nudicaule*, K. Koch; E. Morren, Cat., 1873, 9.—*H. lanuginosum*, Beer, Brom., 138.—Leaves with a dilated entire base three to four inches broad and a lorate lamina one to two feet long, two to three inches broad at the middle, rounded at the tip to a small cusp, the close horny dark coloured edge-teeth one-twelfth to one-eighth of an inch long. Scape a foot or more long, with several large lanceolate red bract-leaves. Flowers in a dense simple cylindrical spike two to six inches long, one inch to one inch and a half in diameter. Flower-bracts very minute. Calyx including ovary half an inch to five-eighths of an inch long; sepals as long as the ovary, oblong-lanceolate, minutely mucronate. Petals pale yellow, one-sixth of an inch longer than the sepals.—Cuba, *C. Wright*, 673! 1524! Trinidad, *Schacht*! Columbia, *Cuming*! Guiana, *Meyer*, *Parker*! Appun! Rio Janeiro, *Glaziov*, 7501! Introduced into cultivation about 1825. Var. *β. cuspidata*, Baker.—*Pothuava spicata*, Gaudich. Atl. Bonite, t. 117.—*Hoplophytum spicatum*, Beer, Brom., 140.—*Hohenbergia spicata*, Baker in Ref. Bot., sub. t. 284. Teeth of leaves large and horny. Flower-bracts minute; sepals furnished with a distinct pungent cusp.—South Brazil in the province of St.

Paulo, near Santos, *Burchell*, 3150! 3288! Doubtless this is *Tillandsia unispicata*, Vell. Fl. Flum., iii. t. 134. (*Hoplophytum unispicatum*, Beer, Brom., 138.) Var. γ . *microdon*, Baker.—Teeth leaves minute. Flower-bracts firmer in texture, lanceolate-cuspidate, a quarter of an inch to one-third of an inch long. Sepals furnished with a distinct cusp one-twelfth of an inch long, as in the last variety.—South Brazil at Rio das Pedras, *Burchell*, 3617!

55. *Æ. AURANTIACA*, Baker.—*Canistrum aurantiacum*, E. Morren in Belg. Hort., 1873, t. 15.—Leaves ten to twelve to a rosette, with a dilated base three inches broad and a lorate lamina one foot to one foot and a half long, two inches broad at the middle, rounded to a cusp at the tip, the teeth close and very minute. Scape nearly as long as the leaves, hidden by its sheathing adpressed scariose bract-leaves, the upper of which are crowded, erect and bright red, and surround and overtop the head of the flowers. Flowers thirty to one hundred in a dense head. Flower-bracts lanceolate-acuminate, longer than the ovary. Flower an inch and three-quarters to two inches long. Sepals as long as the ovary, oblong, obtuse, with a distinct cusp. Petals lingulate, orange-yellow, half an inch longer than the sepals.—South America; the exact country not known. Flowered with Prof. Morren at Liege for the first time in 1867.

56. *Æ. VIRIDIS*, Baker.—*Canistrum viride*, E. Morren in Belg. Hort., 1874, 376, t. 16.—Leaves twelve to fifteen in a rosette, reaching a length of two to three feet, one inch to one inch and a half broad at the middle, the bright green lorate obtuse cuspidate lamina mottled with deeper green on both surfaces, the margin closely minutely toothed. Scape about a foot long, its bract-leaves large and lanceolate. Head globose, sixty- to eighty-flowered, surrounded and overtopped by a whorl of large greenish deltoid acute toothed bracts three to four inches long. Flower bracts lanceolate, shorter than the calyx. Calyx with ovary one inch and a half long. Sepals lanceolate, about as long as the ovary. Petals oblong-spathulate, greenish.—South Brazil, in the province of Santa Catherina in an island of the bay of Paránagua, *Platzman*. Introduced into cultivation about 1870.

[Besides *aurantiaca* and *viridis*, there are in the Kew Herbarium specimens of two species of the section *Canistrum*, gathered by *Burchell* near Sao Bento in the province of St. Paulo in South Brazil, neither of which is complete enough to characterise fully.

3360. *Tillandsia citrina*, *Burchell* MSS., may not unlikely be identical with *T. cyathiformis*, Vell., Fl. Flum., iii., t. 144 (*Hohenbergia cyathiformis*, Beer, Brom., 74).—Leaves above a foot long, chartaceous, not horny in texture, with a dilated entire deltoid base one inch and a half to two inches broad, and an ensiform lamina an inch broad, minutely toothed, narrowed to the point. Scape slender, nearly as long as the leaves, its clasping bract-leaves large and lanceolate. Head surrounded by a whorl of scariose minutely-toothed deltoid-acuminate bracts about two inches long.

3314. Leaves longer and narrower than in the last, similar in texture, linear, minutely toothed, narrowed to the point, half an inch to five-eighths of an inch broad at the middle, narrowed to a quarter of an inch above the dilated base. Scape half a foot long, quite hidden by its large lanceolate imbricated bract-leaves. Head overtopped by a whorl of lanceolate toothed red-tinted acuminate chartaceous bract-leaves three to four inches long.]

57. *Æ. LEGRELLIANA*, Baker. *Hohenbergia Legrelliana*, Baker in Ref. Bot., t. 285. *Ortyesia palliolata*, E. Morren, Cat., 1871, 2.—Leaves about twenty in a rosette, horny in texture, about a foot long, narrowed gradually from a utricular base one inch and a half to two inches broad to an acuminate point, lanceolate, about an inch broad at the middle, the teeth half a line to one line long. Scape central, half a foot long, quite hidden by its crowded lanceolate-acuminate horny leaves. Flowers twelve to twenty in a dense oblong spike about three inches long and above an inch in diameter. Flower-bracts lanceolate-acuminate, bright red, minutely tooth, as long as the ovary. Calyx with ovary an inch long; sepals lanceolate, distinctly cuspidate, united in a tube above the ovary. Petals lingulate, red-purple, obtuse, a quarter of an inch longer than the sepals.—South America, the exact country not known. Introduced into cultivation about 1865.

58. *Æ. ORTGIESII*, Baker. *Ortyesia tillandsioides*, Regel. Gartenfl., xvi., 193, t. 547.—Leaves twenty to thirty to a rosette, horny in texture, lanceolate, seven to eight inches long, narrowed gradually from an entire utricular deltoid base one inch and a half broad to an acuminate point, eight to nine lines broad two-thirds of the way down, the edge furnished with minute rather curved horny lanceolate teeth. Scape central, very short. Flowers in a dense oblong head. Flower-bracts lanceolate-acuminate, toothed, one inch and a half to one inch and three-quarters long. Calyx including ovary fifteen to eighteen lines long. Sepals oblong, with a large mucro, united in a tube above the top of the ovary. Petals lingulate, red-purple, scarcely exerted beyond the sepals.—South America, the precise country not known. Introduced into cultivation about 1860. Var. *suberserta*, Regel, loc. cit., is a form with a longer peduncle than in the type.

THE CRYPTOGAMIC FLORA OF KENT—FUNGI.

By T. HOWSE, F.L.S.

(Continued from p. 211.)

Genus 18.—STROBILOMYCES, B.

- S. STROBILACEUS, B. Kromb., t. 74, f. 12, 13.
Knowle Park, Sevenoaks, C. E. Broome.

Genus 19.—POLYPORUS, Fr.

- P. SCHWEINITZII, Fr. Sv. Bot., t. 720.
Amongst the roots of pines. Goudhurst, A. S. Bicknell.

- P. RUFESCENS, *Fr.* Sow., t. 190.
On a gate-post, Lawrie Park, Upper Sydenham.
- P. PERENNIS, *Fr.* Sow., t. 192.
Joyden's Wood, *Holmes*; Kildown Woods, *Dr. Deakin*.
- P. SQUAMOSUS, *Fr.* Grev., t. 207.
Sydenham Hill. Common.
- P. QUERCINUS, *Fr.* Huss. i., t. 52.
On old oaks. Kent, *Cooke*; Hayes, *Huss*.
- P. INTYBACEUS, *Fr.* Huss. i., t. 6.
In Mr. Wollaston's garden, Chislehurst; Knowle Park; The Grove, Tunbridge Wells, *T. Walker*; Kent, *Mrs. Hussey*, *Berk. Out.*; Beckenham Place, *Percy Bicknell*.
- P. GIGANTEUS, *Fr.* Huss., t. 82.
Rowdow Wood, near Kemsing, *Holmes*.
- P. SULPHUREUS, *Fr.* Huss. i., t. 46.
Knowle Park; wood near Kemsing, *Holmes*; Hayes Place, *Huss*.
- P. CHIONEUS, *Fr.* Pers. M. E. ii., t. 15, f. 2.
Sandwich; Stockholme Wood, Dunton Green.
- P. DESTRUCTOR, *Fr.* Kromb., t. 5, f. 8.
On larch and Scotch fir. In a wood near Otford.
- P. FUMOSUS, *Fr.* Rost., t. 42.
Sydenham Hill; Otford; Knowle Park.
- P. ADUSTUS, *Fr.* Sow., t. 231.
Knowle Park.
- P. CRISPUS, *Fr.* Batsch, f. 227.
Sydenham Hill.
- P. SPUMEUS, *Fr.* Sow., t. 211.
Shortlands.
- P. DRYADEUS, *Fr.* Huss. i., t. 21.
On old oaks. Lullingstone Park and Cobham Park, *Holmes*; Hayes, *Huss*.
- P. BETULINUS, *Fr.* Grev., t. 246.
On birch trees. St. Paul's Cray Common; Knowle Park; Somerhill, *Jenner*, *Fl. Tonb.*
- P. IGNIARIUS, *Fr.* Sow., t. 132.
Beckenham; Farningham.
- P. RIBIS, *Fr.* Rost., t. 83.
At the base of currant and gooseberry trees. Sydenham Hill.
- P. CONCHATUS, *Fr.*
On willows. Shortlands, near Broml y.
- P. SALICINUS, *Fr.* Huss. i., t. 64.
On willows. Shortlands.
- P. ULMARIUS, *Fr.* Berk. Out., t. 16, f. 5.
On elms. Chislehurst; Lewisham; Kent, *Huss*.

- P. ANNOSUS, *Fr.* Rost., t. 29.
Stockholme Wood, Dunton Green; Bostol Wood; Sydenham Hill.
- P. HIRSUTUS, *Fr.*
Goudhurst, *Smith Draw.*
- P. VELUTINUS, *Fr.*
On felled stumps, Tunbridge Wells, *Dr. Deakin.*
- P. VERSICOLOR, *Fr.* Huss. i., t. 24.
Sydenham Hill. Common.
- P. ABIETINUS, *Fr.* Grev., t. 221.
On *Coniferæ.* Rowdow Wood, near Kemsing.
- P. FERRUGINOSUS, *Fr.* Grev., t. 155.
On gate-posts and sticks. In Mr. Wollaston's garden, Chislehurst.
- P. MOLLUSCUS, *Fr.* Sow., t. 387, f. 9.
St. Paul's Cray Common; Otford; Sydenham Hill.
- P. VAPORARIUS, *Fr.*
On fallen branches. St. Paul's Cray Common; Knowle Park.
- P. HYBRIDUS, *Berk. & Br.*
On decaying trees, Tunbridge Wells, *Forst. Fl. Tunb.*
- P. VULGARIS, *Fr.* Berk. Out., t. 16. f. 6.
Sydenham Hill.

Genus 20.—TRAMETES, *Fr.*

- T. GIBBOSA, *Fr.* Huss. ii., t. 4.
Rowdow Wood, near Kemsing; Hayes Common, *Huss.*

Genus 21.—DÆDALEA, *P.*

- D. QUERCINA, *P.* Berk. Out., t. 19, f. 5.
On oak stumps and rails. Sydenham Hill. Common.
- D. UNICOLOR, *Fr.* Sow., t. 325.
Sydenham Hill; Igtham; Dunton Green and rocks opposite High Rocks, Tunbridge Wells, *Holmes.*

Genus 22.—MERULIUS, *Fr.*

- M. TREMELLOSUS, *Schrad.* Huss. i., t. 10.
Rowdow Wood, near Kemsing, *Holmes*; Hayes Common, *Huss.*
- M. CORIUM, *Fr.* Grev., t. 147.
Sibertswold, near Dover, *Holmes.*
- M. SERPENS, *Fr.*
Sydenham Hill.

Genus 23.—FISTULINA, *Bull.*

- F. HEPATICA, *Fr.* Huss. i., t. 65.
St. Paul's Cray Common; Knowle Park; Barming, *Holmes*; near the Wells, *Jenner Fl. Tonb.*; Coney Hall Farm, West Wickham, *Percy Bicknell.*
Edible.

Order 3.—HYDNEI.

Genus 24.—HYDNUM, *L.*

- H. IMBRICATUM*, *L.* Grev., t. 71.
On the ground in pine woods. Near Maidstone, *Woodward*,
Berk. Eng. Fl., p. 155.
- H. REPANDUM*, *L.* Huss. i., t. 16.
Sydenham Hill. Common.
Edible.
- H. NIGRUM*, *Fr.* *Fr. Icon.*, t. 5, f. 2.
On the ground in pine woods. Hillydeal Wood, near Otford;
wood near railway, Shoreham, *Holmes*.
- H. GRAVEOLENS*, *Del.* *Fr. Icon.*, t. 6, f. 1.
Southboro', *Fawcett*. Resembles *H. nigrum*, but stem slender;
that of *H. nigrum* is stout.
- H. AURISCALPIUM*, *L.* Grev., t. 196.
Sydenham Hill; Shoreham; Ightham Common, *Ohkubo*.
- H. UDUM*, *Fr.* *Berk. Out.*, pl. 17, f. 3.
On fallen branches. Margate, *Berk. Eng. Fl.*, p. 160.
- H. FARINACEUM*, *P.*
On decayed wood. Sydenham Hill.

Genus 25.—SISTOTREMA, *P.*

- S. CONFLUENS*, *P.* Grev., t. 248.
Amongst grass in Mr. Field's plantation near Rusthall Common,
Tunbridge Wells, *Dr. Deakin*.

Genus 26.—PHLEBIA, *Fr.*

- P. MERISMOIDES*, *Fr.* Grev., t. 280.
Hayes Rectory, *Huss*.

Order 4.—AURICULARINI.

Genus 27.—CRATERELLUS, *Fr.*

- C. CORNUCOPIOIDES*, *Fr.* *Berk. Out.*, t. 19, f. 6.
Joyden's Wood, and wood near Halstead, *Holmes*.
- C. SINUOSUS*, *Fr.* *Vaillant. Par.*, t. 11, f. 11-13.
Joyden's Wood, *Holmes*.

Genus 28.—THELEPHORA, *Fr.*

- T. CARYOPHYLLEA*, *Fr.* *Saund. & Smith*, t. 41, f. 2.
Southboro', *Fawcett*.
- T. FASTIDIOSA*, *Fr.* *Saund. & Smith*, t. 41, f. 1.
Darenth Wood, *Huss*.
- T. LACINIATA*, *P.* *Sow.*, t. 213.
Ightham Common; Chislehurst; Thornden Wood, near Canter-
bury, *Holmes*.
- T. SEBACEA*, *Fr.* *Berk. Out.*, Pl. 17, f. 6.
Joyden's Wood; Bostol Wood; Tunbridge Wells, *Dr. Deakin*.

Genus 29.—STEREUM, *Fr.*

- S. PURPUREUM, *Fr.* Huss. i., t. 20.
Sydenham Hill. Common.
- S. HIRSUTUM, *Fr.* Berk. Out., pl. 17, f. 7.
Sydenham Hill. Very common.
- S. SPADICEUM, *Fr.* Bull., t. 483, f. 5.
Dunton Green, *Holmes.*
- S. SANGUINOLENTUM, *Fr.* Grev., t. 225.
On trunks of conifers. Ightham Common; Toy's Hill and
Dunton Green, *Holmes.*
- S. RUGOSUM, *Fr.*
Sydenham Hill; Brastead Chart, and lane from Rusthall
Common to High Rocks, *Holmes.*

Genus 30.—HYMENOCHETE, *Lev.*

- H. RUBIGINOSUM, *Lev.* Sow., t. 26.
Common at base of palings; Sydenham Hill.

Genus 31.—AURICULARIA, *Fr.*

- A. MESENTERICA, *Bull.* Sow., t. 290.
Near Farningham; Seal, Allington Road, Maidstone, Dover,
and Erith, *Holmes.*

Genus 32.—CYPHELLA, *Fr.*

- C. CAPULA, *Fr.* Holms., t. 22.
Darenth Wood, *M. C. Cooke*; Sydenham Hill.

Genus 33.—CORTICIUM, *Fr.*

- C. GIGANTEUM, *Fr.*
Sydenham Hill.
- C. ARACHNOIDEUM, *Berk.*
Petts Wood, near St. Mary Cray.
- C. LÆVE, *Fr.*
Sydenham Hill; Petts Wood; Maidstone and Erith, *Holmes.*
- C. CÆRULEUM, *Fr.* Huss. 1., t. 20.
On old rails, Speldhurst, *Holmes.*
- C. QUERCINUM, *P.* Grev., t. 182.
Petts Wood; Erith and Southboro', *Holmes.*
- C. CINEREUM, *Fr.*
Sydenham Hill.
- C. INCARNATUM, *Fr.*
Wood near St. Paul's Cray Common.
- C. NUDUM, *Fr.*
Sydenham Hill. On dry sticks, Margate, *Berk. Eng. Fl.*, p. 179.
- C. COMEDENS, *Fr.*
Petts Wood, St. Mary Cray.

- C. *SAMBUCI*, *P.* Grev., t. 242.
Petts Wood; Lane from Rusthall Common to High Rocks,
Holmes.
- C. *NIGRESCENS*, *Fr.*
Sydenham Hill.
- C. *PUBERUM*, *Fr.*
Petts Wood, St. Mary Cray.

Order 5.—CLAVARIEI.

Genus 34.—CLAVARIA, *L.*

- C. *FASTIGIATA*, *DC.* Bull., t. 358, f. D. E.
Field near Shoreham; Rusthall Common, *Dr. Deakin*; South-
boro', *Fawcett.*
- C. *CORALLOIDES*, *L.* Sow., t. 278.
Kent, *Mrs. Hussey, Berk. Out.*
- C. *UMBRINA*, *Berk.* Berk. Out., pl. 18, f. 4.
Rusthall Common, Tunbridge Wells, *Dr. Deakin.*
- C. *CINEREA*, *Bull.* Grev., t. 64.
Stockholme Wood, Dunton Green, *Holmes.*
- C. *CRISTATA*, *Holmsk.* Grev., t. 190.
Sydenham Hill; near Hythe; near Halstead, and Crofton
Woods, *Holmes.*
- C. *RUGOSA*, *Bull.* Grev., t. 328.
Sydenham Hill; Tunbridge Wells, *Dr. Deakin.*
- C. *AUREA*, *Schæff.* Schæff., t. 285, 287.
Hurst Wood, Tunbridge Wells, *Dr. Deakin.*
- C. *FUSIFORMIS*, *Sow.* Sow., t. 234.
Sydenham Hill; Rusthall Common, Tunbridge Wells, *Dr. Deakin.*
- C. *CERANOIDES*, *P.* Sow., t. 235.
Tunbridge Wells, *Dr. Deakin.*
- C. *INÆQUALIS*, *Mull.* Huss., 1, t. 18.
Sydenham Hill; North Frith Woods, Tunbridge, *Holmes*;
Rusthall Common, *Dr. Deakin.*
- C. *VERMICULATA*, *Scop.* Fl. Dan., t. 1966, f. 1.
Sydenham Hill; Southboro', *Fawcett.*
- C. *PISTILLARIS*, *L.* Sow., t. 277.
Kent, *Mrs. Hussey, Berk. Out.*
- C. *CONDENSATA*, *Fr.*
On the ground under trees, W. Farleigh, *Berk. & Br. A. N. H.*,
p. 138.

Genus 35.—CALOCERA, *Fr.*

- C. *VISCOsa*, *Fr.* Schæff., t. 174.
Near Wrotham; Shoreham and North Frith Woods, *Holmes.*

Genus 36.—SPARASSIS, *Fr.*

- S. CRISPA, *Fr.* *Fr. Sver. Svamp.*, t. 17.
Goudhurst, *A. S. Bicknell*; Hurst Wood, Tunbridge Wells,
T. Walker.

Genus 37.—PISTILLARIA, *Fr.*

- P. QUISQUILIARIS, *Fr.* *Sow.*, t. 324, f. 1.
Darenth Wood, *M. C. Cooke.*

Order 6.—TREMELLINI.

Genus 38.—TREMELLA, *Fr.*

- T. FOLIACEA, *P.* *Bull.*, t. 406, f. A.
Sydenham Hill; Halstead; North Frith Woods, *Holmes*;
Starvecrow Wood, *W. T. T.*
- T. LUTESCENS, *Fr.* *Bull.*, t. 406, f. C, D.
Southboro', *Fawcett.*
- T. MESENTERICA, *Retz.* *Huss.*, 1., t. 27.
Near Rochester; Otford Junction; Postling, *Holmes*; South-
boro', *Fawcett.*
- T. ALBIDA, *Huds.* *Eng. Bot.*, t. 2117.
Rowdow Wood, near Kemsing, *Holmes.*
- T. TORTA, *Willd.*
Petts Wood, St. Mary Cray.
- T. VISCOSA, *P.* *Ann. Nat. Hist.*, xiii., t. 15, f. 4.
Sydenham Hill.

Genus 39.—EXIDIA, *Fr.*

- E. GLANDULOSA, *Fr.* *Huss.*, 1., t. 42.
Erith, *Holmes*; Southboro', *Fawcett.*

Genus 40.—HIRNEOLA, *Fr.*

- H. AURICULA-JUDÆ, *Berk.* *Berk. Out.*, pl. 18, f. 7.
On elder trees, Folkestone and Dover, *Holmes.*

Genus 41.—NÆMATELIA, *Fr.*

- N. NUCLEATA, *Fr.*
On furze, Sydenham Hill.

Genus 42.—DACRYMYCES, *Nees.*

- D. STILLATUS, *Nees.* *Grev.*, t. 159.
Sydenham Hill. Common.
- D. DELIQUESCENS, *Duby.* *Bull.*, t. 455, f. 3.
Rowdow Wood, near Kemsing.
- D. CHRYSOCOMUS, *Tul.* *Bull.*, t. 376, f. 2.
Tunbridge Wells, *Herb. Deakin.*

(To be continued).

SHORT NOTES.

Polygonatum multiflorum, L., in NORTHAMPTONSHIRE.—A friend of mine, Mr. Norman, of Towcester, who is competing for the Herbarium Prize offered by the Pharmaceutical Society, found in a spinney near Towcester some specimens of the above plant; since then I have visited the locality, and believe them to be truly wild, as there is no trace of non-indigenous plants, and several specimens of the Solomon's Seal occur mixed with *Listera ovata*, *Orchis maculata*, &c. This is an interesting addition to our county flora and also to 'Topographical Botany,' as it considerably extends the eastern range of the species.—G. C. DRUCE.

Festuca ambigua.—The notes on this plant in the last number of the 'Journal of Botany' induces me to send freshly-gathered specimens from Tweedside, to which it has been introduced with wool, from the woollen manufactories at Galashiels, Hawick, &c. I first noticed it on the sides of the Gala in July, 1873, where it was growing along with *H. pseudo-myurus*. Like many other wool-plants it is irregular in its appearance, in some seasons occurring in considerable numbers, in others not seen at all. Possibly the floods frequently destroy the plants, as it grows on gravelly spots liable to be flooded.—ANDREW BROTHERSTON.

Physostigma cylindropermum.—In reference to the note at p. 185 on this plant, Mr. E. M. Holmes wishes to say that he does not consider the occurrence of both kinds of Calabar Bean mixed in commerce to be any proof that they were so imported. He also desires to point out that there is an additional distinction between them in their reaction with liquor potassæ; Welwitsch's specimens giving the orange colour, ultimately turning to dirty green, just as do the cylindrical beans of commerce: these have been found to contain more eserine than the ordinary or true Calabar Bean, the reaction of which is a pale yellow not turning green.

Extracts and Notices of Books & Memoirs.

EXTRACTS FROM THE REPORT OF THE BOTANICAL EXCHANGE CLUB FOR 1877-8.

NOTES ON THE PLANTS GATHERED IN 1877.

EDITED BY T. R. A. BRIGGS.

Fumaria pallidiflora, Jord., b. *Boræi*. Old quarry, near Richmond, Yorkshire, 1877.—DR. ST. BRODY. I incline to think this true *Boræi*.—C. C. BABINGTON.

Sisymbrium Irio, L. Berwick-on-Tweed, June and October, 1877. Recorded from the same station by Ray. Confined to

a small space both on the walls and on the ground, but there in profusion.—ANDREW BROTHERSTON.

Viola tricolor, var. Sandy ground, St. Martin's, Scilly Islands, July 3, 1877.—J. RALFS. It is certainly, as Mr. Baker thought, very like *V. parvula*, Tin., but seems to be too much branched. My Sicilian specimens of *V. parvula* are nearly simple, as described by Gussone; ours are all much branched. But other specimens from Sicily, named and distributed by Huet de Pavillon, are exceedingly like ours and branched.—C. C. BABINGTON.

V. Curtisii, Forst. Lytham sandhills, Lancashire, June, 1877. A hitherto (so far as I can find out) unrecorded locality, but, as the various examples will show, represented here most abundantly in well nigh every variety of form, and likewise gradation of colour. The most frequent are the wholly purple, or wholly yellow—the latter much resembling *V. lutea*, Huds., but smaller. The species is far more abundant at Lytham than at Southport or New Brighton sandhills; indeed, though the latter place is mentioned in all the floras as a habitat of *V. Curtisii*, a diligent though fruitless search in the summers of 1868 and 1869 causes me to believe it to be now extinct in this locality.—J. C. MELVILL.

Tilia grandifolia, Ehrh. Very abundant in the woods, clothing the gorge of the Teme at Downton Castle, Herefordshire. It has all the appearance of being native here, growing mixed with oak and other native timber. The valley of the Teme at Downton bears great resemblance to that of the Wye, at Symond's Yat, where this lime is also abundant.—AUGUSTIN LEY.

Rubus hirtifolius, Wirtg.? Hedge, Derriford, Egg Buckland, S. Devon, July 17, 1877. Apparently identical with a bramble labelled *hirtifolius*, Wirtg., in Mr. Baker's collection of Continental *Rubi*.—T. R. A. BRIGGS. I have a specimen of *hirtifolius* (Wirtg. Herb. Rub., ed. 1, No. 173), which is very much like this. But Focke thinks that published specimen doubtful. He thinks that it may possibly be a form of the *R. pyramidalis*, Kalténb., but I can hardly agree with him, with his own specimen of the latter (Rub. Select., 65) before me. That has, as he describes it, a truly pyramidal panicle with patent branches; not like the Derriford plant and the above No. 173. By "*folia subtus subvelutina*" Focke appears to mean what I should describe as "hairy only on the veins." The Derriford plant seems to be very near to *R. amplificatus*, Lees = *R. stereocanthus*, Müll.; neither of which are, I think, noticed by Focke. I was probably wrong in identifying *R. umbraticus*, Müll., with *R. amplificatus*, as Focke is probably correct in joining that to *R. pyramidalis*, Kalténb. My specimens of *R. umbraticus* are from Wirtgen (H. R., ed. i. iv., 82), and Boulay (No. 9), both apparently authenticated by Müller. I need hardly add that my *R. pyramidalis* is a totally different plant, which Focke considers as near to his *R. myrica*, but can hardly be correct in doing so. But I have not seen any specimen of *R. myrica*.—C. C. BABINGTON.

R. Bloxamii, Lees. Roadside between Marsh Mill and Plympton St. Mary Church, S. Devon. A plant with quite a

restricted distribution, yet abundant in some spots. A specimen from Crabtree was labelled *Bloxamii* by the late Rev. A. Bloxam. July 9, 1877.—T. R. A. BRIGGS. Of course this plant from Marsh Mill is not typical. A specimen of the same from Crabtree collected in July, 1865, is marked in my herb. as authentic *R. rhenanus*, Müll., on the authority of Genevier. I cannot find any description of *R. rhenanus*, and have no foreign specimen of it. It differs in several respects from true *R. Bloxamii*, of which I have a good series before me from Lees and Bloxam, by its much more hairy stem,—indeed, hairiness throughout,—but especially by its beautiful pyramidal, open, nearly naked panicle, with long corymbose few-flowered branches which are quite simple in their lower part. It should not go out as *R. Bloxamii* without note or comment, as it would convey a wrong idea of that plant.—C. C. BABINGTON.

“*R. tuberculatus*, Bab.” Kew, Surrey, July, 1877.—J. G. BAKER. Not my plant, nor much like it. It is very like *R. Balfourianus*, especially resembling a plant so named by me in the Herb. Borrer from Eridge Wood, near Tonbridge Wells; indeed almost the only difference is found in the more furrowed stem of the Kew plant now issued. The lower part of the stem of typical *R. Balfourianus* is not furrowed, although its upper part often is so. I have never seen it with so furrowed a stem as in this from Kew.—C. C. BABINGTON.

R. systyla, Bast. Hedge near Shirley, S. Hants, August, 1877.—J. GROVES. Similar to the Devon *systyla*, considered by Déséglise to be rightly so named.—T. R. A. BRIGGS.

R. leucochroa, Desv. Near River Teign, Trusham, 1877.—W. MOYLE ROGERS. A well-marked rose that abounds in Devon and Cornwall.—T. R. A. BRIGGS.

Saxifraga hypnoides, L., var. Dry limestone rocks, Black Head, Co. Clare, Ireland, May 13, 1876. A variety mentioned in Cyb. Hib., having the leaves clustered in a singularly dense manner, nearly glabrous, the leaves and sepals broader and blunter than in *hypnoides* of the north of Ireland. The fls. small, but the stamens larger and rounder. In some quantity on bare dry limestone rocks.—S. A. STEWART.

Valerianella carinata, Lois. Helston, Cornwall, July, 1877.—J. CUNNACK. Stone-dyke, Penzance, June 4, 1877.—W. B. WATERFALL. Several places near Plymouth.—T. R. A. BRIGGS. Hedge-bank, near Bovey Tracey, Devon, May 26, 1877.—W. MOYLE ROGERS. Hedge-bank, Dundonald, Co. Down, Ireland, June 19, 1877.—S. A. STEWART. Beeston Tor, near Wetton, N. Staffordshire, June 14, 1877. Riversdale, Derbyshire, June 12, 1877. I am convinced that this is as native as *V. olitoria*, Mœnch., in the limestone dales of Derbyshire and N. Staffordshire. This year I found it in two spots in Ravensdale, Derbyshire, growing on the limestone crags in company with *V. olitoria*, amid such purely native vegetation as *Potentilla verna*, &c. Similarly, and again mixed with *V. olitoria*, in the limestone dales near Wetton, N. Staffordshire; and I used to find it in precisely similar situations

near Buxton in 1868-70. In all these cases the two allied species seemed to be inseparable companions. The occurrence of the common one was a sure sign that the rarer was somewhere near.—AUGUSTIN LEY. I quite endorse the Rev. A. Ley's remarks as to this being as much a native as *V. olitoria*. In the neighbourhood of Plymouth it is not restricted to a limestone soil.—T. R. A. BRIGGS.

Cardus tenuiflorus, Curt., form of; *C. pycnocephalus*, Jacq. (verus). On limestone rocks above the coast, Hoe, Plymouth, June, 17, 1877. On receiving a specimen from me of this peculiar form of *C. tenuiflorus*, Mr. H. C. Watson remarked, in a letter:—"By the tomentose pericline this should go to *C. albidus*, Bieb., fide DC. Prodr., which so distinguishes *C. albidus* from *C. pycnocephalus*. Both are there placed as vars. under *C. tenuiflorus*. But, setting aside the tomentose involucre, your specimen is nearer *pycnocephalus*."

Senecio palustris, DC. Fen, with *Cladium Mariscus*, *Rhynchospora alba*, *Ranunculus Lingua*, *Nephrodium Thelypteris*, &c., East Norfolk, July, 1877. About twenty plants were seen, some having only radical leaves, others in flower and fruit.—A. BENNETT.

Hieracium Dewari, Boswell in Trans. Bot. Soc. Edin., 1878. (See B. E. C. Rep., 1876, pp. 26, 27). I suppose I have the Loch Long plant ticketed as found by myself at Arroquhar, Dumfriesshire, August 23, 1842, marked as *H. inuloides* by me, but corrected *H. strictum* by Backhouse. I find no trace of ever having called it *H. Lapeyrousii*. I have also a specimen from Killin (August 1, 1844), formerly called *H. denticulatum* and *H. strictum*; and one from Inverarnan, Loch Lomond, similarly named; which I believe are *H. Dewari*. Also one from Glen Maliene, Antrim, gathered by I. Carroll, and called *H. strictum* by Backhouse, which I suppose may be *H. Dewari*. One named *H. strictum*, by Mr. T. Drummond, from Aberdona, Clackmannan (August 12, 1875), is apparently correct.—C. C. BABINGTON.

Mentha pubescens, Willd. Brookside, near Mitcheldean, West Gloucester, September 13, 1877.—AUGUSTIN LEY. *Mentha pubescens* I call *M. hirsuta*, L., and do not separate the forms given in the 'Students' Flora,' even if they are distinguishable from *M. aquatica*.—C. C. BABINGTON. Is *hirsuta* a slip of the pen for *aquatica*?

Stachys annua, L. Downs near Sevenoaks, Kent, August 4, 1873. Coll. by Jas. Fletcher; com. by W. H. Beeby. The enclosed specimen was collected by my friend, Mr. John Fletcher, who is now in Canada. He writes me that it was growing abundantly on the open downs.—W. H. BEEBY.

Salix Russelliana, Sm., fide Leefe. Tweedside, below Trows Craggs, Roxburgh, May 29 and September 13, 1876; June 12, 1877. Mr. Leefe, after seeing a specimen, replied:—"S. *Russelliana* in my opinion, though the axis of the aments is more woolly and the leaves broader than usual." *S. Russelliana*, Sm., male and female; Peating Bog, Roxburgh, May, 1876, and September, 1877. Banks of Teviot, near Kelso, Roxburgh, May and September, 1877. This without the catkins would pass for *alba*. I send a series of *Russelliana* that have all been seen and examined by the Rev. J. E. Leefe, who, as will be seen, includes a wide range of forms

under that name—from very near *fragilis* on one hand to *alba* on the other.—ANDREW BROTHERSTON.

Salix (sp. ?) Peating Bog, Roxburgh, April, 1876. I send this without a name. It seems to have touches of *stipularis*, *Smithiana*, and *ferruginea*, but in some important points does not agree with any of them. The following are some remarks by Mr. Leefe on it:—"This is a peculiar form, leaves resembling *ferruginea*, except as to stipules, and there is a broad leaf which looks suspicious of something else. The catkins resemble *stipularis*, but the germen is manifestly stalked. Pedicel sometimes as long as style. Worthy of further observation. I do not venture to call it *stipularis*." After sending fresh specimens of catkins I had the following reply:—"I see I felt some doubt about this when you first sent it to me. On the whole I should refer it to *stipularis*." As I wished to get his further opinion before sending specimens to B. E. Club, I sent more specimens, and he replied:—"The stipules are not those of *stipularis*, Sm., and the ovarium does not appear to be sessile: I should name it doubtfully *Smithiana*, Willd."—ANDREW BROTHERSTON. I should call this *ferruginea*.—J. T. BOSWELL.

"*Salix* near *rugosa*." Bowmont Forest, Roxburgh, May, 1877; October, 1876. Mr. Leefe says of this:—"I think *S. rugosa*. I have leaves like this from Yorkshire. It varies much in the form and length of the leaves."—ANDREW BROTHERSTON. I am quite puzzled with this. The very long styles—longer than even those of *S. ferruginea*, on the one hand; and the leaves most like those of *cinerea* in texture, also in the venation and condition of the lower surfaces, on the other hand, make up a plant unlike anything I have seen.—J. T. BOSWELL.

Potamogeton salicifolius, Wolfg., teste Prof. Babington. In the Wye, Sellack, Herefordshire, July 15, 1877. The name of this is given on the authority of Prof. Babington. I have had it in my herbarium ever since 1866, without knowing what to name it. In the last and the present year I found it again, and sent it up to him. He tells me he feels satisfied that it is the *P. salicifolius* of his 'Manual.' It grows in the Wye in shallow, moderately swift water, and though flowering freely, I have been unable to find any fruit perfected.—AUGUSTIN LEY.

Anthoxanthum Puelii, Lec. & Lam. Whittington, Staffordshire, August, 1877. In abundance in a field, probably introduced with grass seeds. Mr. W. Matthews, of Birmingham, and the Rev. J. H. Thompson found it in another grass field near Churchill, Worcestershire, about two miles from this locality.—J. FRASER.

Chara fetida, Braun. The Lizard, W. Cornwall, Sept., 1877. Coll. by Mr. Curnow for Mrs. E. A. Lomax. *C. fetida* from the Lizard is curious, and worth more attention. It may be different, but I cannot now settle that point. It is apparently the plant from near Kynance Cove, which I named *C. fetida*, var. *densa* of Cosson last year. It is more like Cosson's figure (Atl. Fl. de Paris, p. 37, f. 8) than the Kynance Cove plant.—C. C. BABINGTON.

"*C. hispida*." Shallow pool on downs, Lizard, W. Cornwall; August 25, 1877.—W. B. WATERFALL. *C. polyacantha*, I believe.

I so named what is apparently the same plant for Mr. Ralfs from "rivulet on Lizard Downs" last year.—C. C. BABINGTON.

REPORT ON THE PLANTS GATHERED IN 1878.

EDITED BY J. G. BAKER.

Ranunculus fluitans. River Eamont, Cumberland, Rev. W. WOOD; gathered by W. HODGSON. New to subprovince 25.—A form with floating leaves from the Teviot, near Roxburgh Castle; gathered by Mr. A. BROTHERSTON.

Polygala vulgaris var. *grandiflora*. Specimens so named were sent from Cwm Idwal, Carnarvon, Rev. A. LEY; and chalk *débris* near Dover, A. BENNETT. These I asked Mr. A. W. Bennett to examine, and he reports:—"The specimens marked *Polygala vulgaris* var. *grandiflora* from Cwm Idwal, collected by Mr. A. Ley, are nothing but rather large-flowered specimens of the ordinary form. Those with the same name, gathered by Mr. A. Bennett near Dover, more resemble the Ben Bulben variety, both in the smaller lower leaves and fleshy habit, and in the apiculate wiry sepals. Still, no one who saw them together would say that the Kentish plant exhibited more than an approach towards the remarkable Irish variety."

Malva borealis, Wallm. (*M. Henningii*, Goldb.) This species is now becoming one of the common mallows of the neighbourhood of London. From what we in England call *M. rotundifolia* of Linnæus, which is the *M. vulgaris* of Fries and many other continental authors, it differs by its much smaller flowers and fruit-carpels marked on the back by distinct transverse ridges. It comes much nearer to the common South European *M. parviflora* of Linnæus, but in this latter the calyx is more markedly accrescent in the fruiting stage, and the dorsal ridges of the fruit-carpels are more strongly pronounced and produced into marginal teeth. I have not seen any British specimens of the true *parviflora*. This year Mr. Nicholson has contributed specimens of three varieties of *borealis*, all gathered in the neighbourhood of Kew, with characters as follows:—

1. The type, as issued by Fries in his 'Herbarium Normale' under the name of *M. rotundifolia*, and figured by Reichenbach under the same name in his 'Icones,' tab. 4835, with slightly hairy fruit, a quarter of an inch in diameter, and a relatively small calyx with sepals hardly at all incurved at the tip.

2. A form with a smaller fruit (one-sixth to one-fifth of an inch in diameter) not particularly hairy, with a calyx as large as in the type, which wraps over it so as nearly to hide it. This is probably *M. microcarpa*, Reich. Ic., tab. 4833, but not the plant so called by Desfontaines, which is a *parviflora* form.

3. A form with densely hispid fruit as large as in the type, but with the sepals incurved and wrapped over it as in the second variety.

Trifolium supinum and *spumosum*. Waste ground on the Surrey side of the Thames, near Kew.—G. NICHOLSON.

Potentilla norvegica. A good supply sent by Dr. Arnold Lees

with the following note:—"This occurs in two West Yorkshire localities, some twelve miles apart, in both of which it has been known for over a dozen years. It continues to spread along certain lines of waterway. Along the banks of the canal, and River Aire, from Lake Loch Stanley towards Castleford, in the vice-county of S. W. York, it is found for miles; and also grows in profusion in the stonework of the canal between Armley Mills and Kirkstall in the vice-county of Mid-west York. It was first recorded in print in 1866 ('Naturalist,' O.S., vol. ii., p. 80), by the late T. W. Gissing—a Wakefield botanist—under the name of *Aremonia agrimonioides*, as 'pretty abundant by the canal running from Stanley to the Calder.' Now, in 1878, this humble alien weed offers an example of perfectly successful colonisation only paralleled by *Anacharis* or *Impatiens fulva*. It was probably originally introduced with baulks or props of Norway pine used about the canal locks or in adjoining coal-pits, but it has now become as ineradicable as the indigenous weeds to be found with it by the towing-paths where it occurs, and in future editions of our descriptive manuals deserves a place much more than many other species of less recent introduction. It is a most prolific seeder, and the seeds germinate wherever they fall, apparently whether fully ripened on the parent plant or not."

Rosa sepium. One of the most valuable contributions this year is a good supply of this species from a hedge near Puttenham, in Surrey, from Messrs. H. & J. Groves. This for the first time settles it down firmly as an English plant. I got it near Hind Head many years ago, but saw only a couple of bushes. So far as I know it has never been seen in Warwickshire since Mr. Bree gathered it a generation ago.

Rubus mucronulatus. Mr. G. Nicholson sends, from the neighbourhood of Kew, specimens of a London bramble which is regarded by Babington as a variety of *mucronulatus*, a stronger-growing plant than the type, with many setæ on the barren stem, end-leaflets round (not obovate) with a decided cusp, panicle with more numerous and stronger prickles, and denser, more numerous flowers with shorter pedicels. I know of no special name for this, but it is a well-marked form that comes in between *mucronulatus*, *villicaulis*, and *fuscoater*. The true *mucronulatus*, which Dr. Boswell sends this year from the neighbourhood of Aberdour, in Fife, we do not get anywhere in the neighbourhood of London.

R. villicaulis. Mr. Bagnall sends a plant from New Park, Middleton, Warwickshire, which Bloxam named *R. heteroclitus*, Wirtgen. This seems to me a slight variety of *R. villicaulis*, and another plant from Mr. Bagnall from the same locality named *adscitus* by Bloxam to be typical *villicaulis*, as we understand it in England.

R. ramosus, Blox. Minworth, Warwick, J. Bagnall; and Bircham, Egg Buckland, South Devon, T. R. A. Briggs. This seems to me a well-marked bramble, allied to *rhannifolius*. I have never met with it about London, or in the north of England.

R. corylifolius var. *R. degener*, Muller. Under this name, for which I am indebted to Genevier, I have distributed a few specimens, from

hedges at Kew, of a bramble that comes in between *Balfourianus* and *corylifolius* var. *intermedius*. It has angular barren stems, copious large prickles on the rachis of its panicle, and ascending fruit-sepals.

Lythrum hyssopifolium. This I gathered last year in small quantity on the Surrey side of the Thames above Kew Bridge.

Hélosciadium nodiflorum var. *ochreatum*, DC. (*Sium hybridum*, Mérat.) Barnes Common, Surrey, G. NICHOLSON. This is a dwarf form of *nodiflorum* with small obtuse leaflets, one to three lanceolate bracts, and flower-umbels on peduncles one-quarter to one-half of an inch long. From *H. repens*, which is very rare in Britain, with which it is sometimes confounded, it differs by its assurgent flowering stems and shorter peduncles.

Mentha pubescens. Pengersick Castle, J. CUNNACK; and stream on Pra Sands, near Helston, Cornwall, J. RALFS. This is the first time we have had a supply of this interesting mint, which was gathered a generation ago in the neighbourhood of Penzance by Mr. Borrer, but has been long sought for in vain by the resident botanists.

Acanthus mollis. Thoroughly established on a hedge-bank at Treath Manaccan, Cornwall, growing with *Allium Ampeloprasum*, W. B. WATERFALL.

Orobanche elatior. It seems quite clear now that the Epsom *Orobanche*, which has been called *lucorum*, is only *elatior* pure and simple. Mr. A. Bennett sends it this year from "fields between the town and downs, proceeding from the back of the grand stand towards the town of Epsom."

Solanum nigrum. A form with the fruit bright green when ripe (*S. luteo-virescens* of Gmelin), from rubbish-heaps at Mortlake, Surrey, G. NICHOLSON.

Veronica Buxbaumii. A variety with very hairy stems, flowers smaller than usual, and fruit-carpels not ribbed till the plant is dried, from waste ground at Kew, G. NICHOLSON.

Symphytum asperrimum. The introduced British plant which has been so called by Babington in 'Flora Bathonensis,' and Dr. Boswell in 'English Botany,' of which Mr. Flower sends us a good supply this year from the long-known station in the neighbourhood of Bath, and Rev. W. H. Purchas from Grange Mill, near Wirksworth, Derbyshire, is evidently not the true wild *S. asperrimum*, M. B., of the Caucasus, but a garden hybrid between that species and *S. officinale*, which is often planted for forage, and which is most likely *S. peregrinum*, Ledeb., Fl. Ross., vol. iii., p. 114. *S. asperrimum* is a plant that grows five or six feet high, with stems densely clothed with very short, rigid, bristly pubescence, many of the bristles springing from white calcareous tubercles, leaves rough over the face with bristle-pointed white tubercles, like *Anchusa italica*, lower leaves of the flowering branches ovate and contracted suddenly at the base, and a flower-calyx not more than one-eighth of an inch long, with linear-oblong obtuse teeth not longer than the tube. The naturalised hybrid has much less bristly stems, leaves without white tubercles on the face, lower leaves of the flowering branches both absolutely narrower and narrowed more gradually at the base, and a flower-calyx like that of *officinale*, with acute linear teeth twice as long as the tube. Mr.

Flower tells me that the Bath plant grows sometimes to the height of a man, so that it is not inferior to the true *asperrimum* in stature, although in its leaves and flowers it seems much nearer to *officinale*. We have the true *asperrimum* in the Kew herbarium from the neighbourhood of Stirling, gathered by G. Thomson.

Ckenopodium opulifolium. Mud-heaps at Mortlake, Surrey, G. NICHOLSON.

Urtica pilulifera. The lower branches of several vigorous plants growing on rubbish-heaps at Kew had the deeply serrated leaves of typical *pilulifera*, whilst the upper part of the plant showed the entire or subentire leaves of var. *Dodartii*, G. NICHOLSON.

Polygonum alpestre, C. A. Meyer. On the Surrey side of the Thames, near Kew Bridge, where it was first gathered by Mr. Naylor in 1872, G. NICHOLSON. It is identical with *P. cognatum*, Meisn., and is common through Western Asia.

Rumex. Dr. Trimen has kindly examined the critical forms of *Rumex* received this year, and reports on them as follows:—"An interesting series of specimens is sent by Rev. Augustin Ley from the banks of the tidal river Wye at Tintern, collected at the end of July, 1878. This Dock-vegetation in Monmouthshire is apparently much the same as that of the tidal Thames.

'*Rumex*, form of *conglomeratus*, Murr.' This is a rather slender form with ascending branches, but scarcely var. *Borreri*.

'*Rumex*, hybrid. Tidal banks, Tintern.' These are various forms of *R. pratensis* (*crispus* × *obtusifolius*).

'*Rumex elongatus*, Gussone? Muddy tidal banks, Tintern, 30th July, 1878.' A fine series of large specimens of this; quite the same as the Thames plant. Whatever may be its proper name, it cannot be separated as a species from *R. crispus*. In some of Mr. Ley's specimens the petals are denticulate, as in *R. crispus*, and one has the lower leaves slightly crisped. There is a suggestion of *R. Hydrolapathum* about this river-side Dock, but I do not think it is a hybrid between that species and *R. crispus*.

'*Rumex* hybrid, *pulcher* × *obtusifolius*. Waste ground, West Head, East Cornwall, near the sea, 12th July, 1878.' Portions of a large plant. I agree in the naming, but have not seen English specimens of this intermediate before. *R. obtusifolius* predominates.

'*Rumex* hybrids. Waste ground by the sea, West Head,' and 'Hedgerow near Millbrook, East Cornwall, 12th July.' These are *R. pratensis* more or less typical. 'Field near Cawsand, E. Cornwall.' The same; a curious form, close to *R. crispus*; and with the tubercles almost entirely suppressed.

There are now on record a number of intermediate and probably hybrid forms of *Rumex* in England. The species which seem most prone to cross are *R. pulcher*, *R. crispus*, and *R. conglomeratus*. I have seen English specimens of apparently the following hybrids:

<i>Rumex pulcher</i>	×	<i>rupestris</i> .	
"	"	×	<i>obtusifolius</i> .
"	"	×	<i>conglomeratus</i> .
"	"	×	<i>nemorosus</i> ?
"	"	×	<i>crispus</i> .

- Rumex crispus* × *obtusifolius* (*R. pratensis*, M. & K.)
 „ „ × *nemorosus*.
 „ „ × *domesticus* (*R. conspersus*, Hartm.)
 „ *conglomeratus* × *maritimus* (forma *Warrenii*).
 „ „ × *sylvestris*.

Of these *R. pratensis* (*crispo-obtusifolius*) is by far the most common. This is an exceedingly variable plant, showing a series of forms completely connecting its two supposed parents. Probably the plants are often again crossed by either *crispus* or *obtusifolius*, and secondary hybrids result; it is convenient for further distinguishing these forms to call them *crispo-pratensis* or *obtusifolio-pratensis*.—H. TRIMEN, 28th February, 1879.

Wolffia arhiza. A good supply this year from a new station, a pond near the canal between Hanwell and Brentford, Middlesex, G. NICHOLSON.

Potamogeton Zizii, C. & S. A plant sent by Mr. Brotherston from Cauldshiels Loch, near Melrose, Roxburghshire, matches German specimens so labelled in the Kew herbarium by Dr. A. Braun. *P. Zizii* appears to be a large deep-water form of *heterophyllus*, simulating *P. lucens* in general habit, and destitute of floating leaves. The same plant is in Borrer's herbarium from Llyn Maclog, in Anglesea, gathered by Wilson.

Zannichellia polycarpa. Brackish ditch in the Peoples' Park at Belfast, S. A. STEWART. An interesting addition to the Irish flora.

Zostera angustifolia. Dr. Trimen points out that a plant gathered by Mr. Waterfall at Plymouth, and labelled *Z. nana*, is properly *angustifolia*, and that the true *nana*, of which Mr. Ralfs has sent a good supply from Cornwall, may be readily distinguished in the absence of flowers by its strictly 1-nerved leaves.

“*Iris Pseudo-Acorus*, Boreau, Flore du Centre de la France. (*I. Pseudacorus*, Linn., var. *genuina*, Syme Eng. Bot.) Banks of Thames, Kew, Surrey, and fish-pond, Sion House, Isleworth, Middlesex. This is a very distinct *Iris*, and easily distinguished from the prevailing form (*I. acoriformis*, Boreau, with which it is probably frequently confounded) by the following characters:—*I. Pseudacorus*, Boreau. Outer perianth-segments of a uniform clear yellow colour: blade broadly obovate; claw rather short; stigmas long and narrow.—*I. acoriformis*, Boreau. Blade of outer perianth-segments nearly orbicular, a deeper blotch at base; claw long, greenish yellow marked with prominent violet-purple veins; stigma shorter and broader than in last-named, and the yellow of the flower almost a shade less deep.”—G. NICHOLSON.

Carex punctata. Dr. Trimen points out that a plant so labelled, gathered by Mr. Stewart on rocky shore at Dingle, Kerry, is properly a small form of *distans*.

Bromus Benekeni. “Garden grown; root from Eaton Bishop, Herefordshire, July, 1878, A. LEY. This appears to be correctly referred to *B. Benekeni*, Lange, differing from that plant mainly in its greater luxuriance and more ample panicle, the result probably of garden cultivation. Specimens of the original wild plant, with notes on its locality and distribution, would be of great interest.”—H. TRIMEN.

Ophioglossum vulgatum, L., β *ambiguum*, C. & G. "Pasture at the west end of the Calf of Flotta, Orkney, August 2, 1878. Discovered on the above date by Mr. Wm. A. Irvine Fortescue. I have seen two specimens of this plant from near the Black Crag, Stromness, where Miss Patricia Deuchar first found it in 1877. These two stations and Dr. Boswell's one at Veness, and that at Swanbister, in Orphir, are all at the seashore."—H. HALCRO JOHNSTON, December 31, 1878.

The Botanical Text-Book. Sixth Edition. Part I. *Structural Botany, or Organography on the basis of Morphology*; to which is added the principles of Taxonomy and Phytography, and a Glossary of Botanical Terms. By ASA GRAY, LL.D., &c. 1879. (Iverson and Co., New York.)

THIS is rather a long title, but it quite accurately gives the scope and contents of the volume. Those who are familiar with the last previous edition of the American 'Text-Book'—and its excellence made it widely known and much used in England—will see that Prof. Gray has much restricted the range of subjects in his new volume. The date of that edition is 1866, and during the long interval the relative importance of the various departments of Botany has greatly altered. Then it was thought necessary merely to give a brief outline of histological and physiological structures and processes; the Cryptogamia were still more imperfectly treated; and the whole book extended but to 556 pages. Now all these subjects are entirely omitted, as well as the short sketches of the Natural Orders, which occupied 140 pages of the old edition; and the volume (pp. 442) is strictly devoted to the morphological anatomy of Phanerogams, with sections on the principles regulating their classification, description, and nomenclature. It was, indeed, the masterly and philosophical treatment of these sections of the science which always gave to the Text-Book its special value; they have been particularly the branches to which the author's long and laborious life has been devoted, and it is with great satisfaction that botanists will receive this fuller treatment of them at his hands.

The whole has been entirely re-written, and it is scarcely necessary to say, well written. Dr. Gray is able to convey strictly technical instruction in the attractive and easy style only reached by a few masters. Much has been added, especially under the sections of Phyllotaxy and Anthotaxy, the structure of the flower, and the adaptations in flowers for insect-fertilization. References to other authors are also greatly increased, and a wide acquaintance with researches, ancient and modern, is evidenced everywhere, the results being stated in the briefest and simplest manner. Indeed, students of this branch of botany will never find themselves puzzled and mystified by the presentation of conflicting views and contradictions so often found in text-books.

The only fault to be found is the quite unnecessary number of foot-notes, which interfere seriously with consecutive reading on nearly every page. Foot-notes are necessary evils, and they

should be reduced to the smallest proportions; nothing which will well go in the orderly sequence of the text should be put in them. Here some of the most interesting and important researches are only to be found in long foot-notes, often extending from one page to another. The descriptions of the figures, which should have been placed beneath them, are also in foot-notes in a slightly different type to the others; the whole resulting in a very confused arrangement.

The remarks on nomenclature and synonymy are admirable, and fully in accord with the principles which have been advocated here by Mr. Bentham and others. We have also a very full glossary of fifty pages, which forms an index to the volume.

The whole work is contemplated to occupy four volumes, of which Prof. Goodale has undertaken that on Histology and Physiology, and Prof. Farlow an introduction to Cryptogamous Botany, whilst Prof. Gray himself "may rather hope than expect" to draw up the fourth on the Natural Orders of Phanerogamous Plants. May the hope be fulfilled!

H. T.

Floral Dissections. Illustrative of Typical Genera of the British Natural Orders. Lithographed by the Rev. G. HENSLOW, M.A., F.L.S., &c. 1879. (London, E. Stanford.)

THIS is intended for students beginning to work at the Natural Orders, and its object is to assist them to arrive at an accurate comprehension of structural Botany. With this view very numerous figures of the parts of the flower of several leading genera of 77 Natural Families have been closely arranged in eight long quarto plates, accompanied by twenty pages of short descriptions. There is, no doubt, a great deal of information compressed into a small compass here; but the plan adopted does not appear to be a good one. The figures are too small generally (they are drawn to no scale), too closely crowded, and in many cases not very clearly expressed. The Umbelliferæ and Grasses, for example, cannot be considered to be satisfactorily treated: a few large clear figures would be of more use to the student. A good and full series of figures of the genera of British plants, somewhat on the plan, or even more extended, of Gray's 'Genera of the United States' or Nees' 'Genera Floræ Germanicæ' (from which latter many of the figures in the present book are copied),—both, unfortunately, unfinished works,—is still a real desideratum.

H. T.

THE 'Report of the Botanical Locality Record Club' for 1878 contains the usual list of "new" county records (*i.e.*, new in the sense of not having been previously printed in Mr. Watson's books or these Reports), and various notes on British species. To a considerable extent these refer to the same specimens as the Exchange Club Report, of which we reprint extracts in the present number. The Rev. A. Ley reports of *Bromus Benekeni*—which he finds in three counties, Monmouth, Hereford, and York north-west—that it flowers about a week before *B. serotinus*, keeps its

characters well under cultivation, and that at Monmouth the two grew together without any intermediates being seen. Mr. Brotherston has a note on *Potamogeton Zizii*,* from which it appears that the same plant is recorded as *P. decipiens* (from an imperfect example sent by Mr. Borthwick in 1869) by Prof. Babington, in the 7th edition of his 'Manual,' and was named *P. heterophyllus* by Dr. Boswell (Syme) in 1875, but now considered by him "typical *nitens*." Prof. Babington now names it *Zizii*, and, as will be seen from the Exchange Club Report, Mr. Baker agrees with him in so calling it. We have lately had the opportunity of examining Mr. Brotherston's specimens and comparing them with numerous continental examples, and can fully confirm this nomenclature. We hope soon to give a figure and description of this interesting critical Pondweed. A novel feature in the Report are the Bryological Lists, three of which are here given as a first instalment—West Cornwall, East Cornwall, and North Lincolnshire. The Editor insists absolutely on the rule that every species-name recorded must be represented by a sufficient specimen.

MR. HEMSLEY has issued a second part of his 'Diagnoses' of new Mexican and Central American plants, dated July, 1879. There are about 80 new species described; and a new genus of *Bignoniaceæ* from Panama, *Godmania* (founded on *Cybistax macrocarpa*, Benth.) is dedicated to the liberal naturalist and traveller, Mr. F. D. Godman. There is also a revision of the Central American species of *Rondeletia*.

IN 'Contribuciones a la Flora de Paraguay,' Fasc. 4, Senor Parodi describes systematically the species of *Psidium*, *Eugenia*, *Myrcia*, and *Myrtus*. Nearly all, *i.e.* 70, are apparently new, and are described in Latin, but the author has scarcely in any case affixed a specific name, refraining, it would appear, lest he should add to the existing confusion of nomenclature.

WE note with satisfaction the continuation, after an interval, of Baillon's fine 'Dictionnaire de Botanique,' by the issue of the first part of vol. 2. It maintains its excellence fully, but it may be a question whether such long articles as Dr. Lanessan's on Chlorophyll (pp. 17), and Circulation (pp. 23), are not rather out of place in a dictionary.

THE plates and descriptions of species of chief botanical interest in Bentley & Trimen's 'Medicinal Plants' (Parts 33-40) are—*Gossypium barbadense*, *Dorema Ammoniacum*, *Hibiscus esculentus*, *Dichopsis Gutta*, *Metroxylon Sagu*, *Smilax officinalis*, *S. medica*, *Cinnamomum Cassia*, *Cichona officinalis*, *C. succirubra*, *C. Calisaya*, *Aloe succotrina*, *A. spicata*, *Balsamodendrum Myrrha*, *Gracilaria lichenoides*. Two more parts will complete the work.

* This species is referred to "Boreau" in the Report; but Boreau treats it as a variety of *P. heterophyllus*, Schreb. The authors of *P. Zizii* as a species are Mertens and Koch; the latter afterwards considered it as merely a variety, but Reichenbach and Lange have restored it to specific rank. In the Exchange Club Report "C. & S." are credited with the species, but Chamisso and Schlechtendal also made it only a variety of their *P. Proteus*, which included *P. heterophyllus* and *P. lucens*.

OTHER NEW BOOKS. — E. BOISSIER, 'Flora Orientalis,' vol. iv., pt. 2 (*Corollifloræ* concluded, and *Monochlamydeæ*), 1879 (Georg, Geneva and Basel, 16 mk). — 'Cryptogamen-Flora von Schlesien,' Bd. ii., hft. 2. Flechten, von B. STEIN, 1879 (Breslau, Kern's Verlag). — A. & C. RUVIERE, 'Les Bambous' (Martinet, Paris). — 'Royal Society Catalogue of Scientific Papers,' vol. viii. (1864-1873, concluded), 1879 (20s.) — L. JUST, 'Botanischer Jahresbericht,' 1877. Part 2, 1879 (Borntraeger, Berlin, 12 mk.)

ARTICLES IN JOURNALS.—JUNE.

Oesterr. Bot. Zeitschr.—L. Menyharth, '*Roripa Borbasii*, n. sp.' — A. Kerner, 'On the history of plant-distribution.'—V. v. Borbas, 'On some *Epilobiums*.'—L. v. Vukotinovic, 'Novæ *Quercuum* Croaticarum formæ.'—H. Zukal, 'The common life of Moss and Lichen.'—S. Schulzer, 'Mycological notes.'—R. F. Solla, 'Notes from Carinthia.'

Hedwigia.—J. Schroeter, '*Protomyces graminicola*, Sacc.'

Flora.—W. J. Behrens, 'Nectaries of flowers' (contd., t. 5).—K. A. Henniger, 'Hybridization in plants' (contd.)—L. Celakovsky, 'On the gymnospermy of *Coniferæ*.'—P. G. Strobl, 'Flora of the Nebrodes' (contd.)

Bot. Zeitung.—P. F. Reinsch, 'A new genus of *Chroolepideæ*' (t. 3 a).—P. Ascherson, 'The observations on *Ranunculus* of G. Becker.'—B. Frank, 'On parasites in the root-swellings of *Papilionaceæ*' (t. 5).—A. Prazmowski, 'On development and fermentative power of some *Bacteria*.'

Magyar Nov. Lapok.—L. Menyharth, 'Addenda to Flora of Kalocsa.'—L. Simkovics, 'Botanical notes,' I.

American Journal (Silliman's).—C. S. Sargent, 'The forests of Central Nevada.'

Botanical News.

MR. F. MOORE has been appointed Curator of the Glasnevin Botanical Gardens in succession to his father, the late Dr. D. Moore. He is succeeded at the College Botanical Gardens, Dublin, by Mr. F. W. Burbidge.

It is understood that the India Museum is to be given up, and its contents distributed to various other institutions where it is considered they will be of more public utility.

THE Swedish Government intends to purchase the house and estate of Hammarby, near Upsala, which was the residence of Linnæus during the latter part of his life, and has appropriated for the purpose the sum of 80,000 crowns. The house was built under the direction of Linnæus himself, and has remained unoccupied since his death.

Original Articles.

SECOND SUPPLEMENT TO THE JAMAICA FERNS RECORDED IN GRISEBACH'S 'FLORA OF THE BRITISH WEST INDIES.'

BY G. S. JENMAN.

IN vol. vi. of the 'Journal of Botany' (new series), page 263, I gave a supplement to the Jamaica Ferns recorded in Grisebach's 'Flora of the British West Indies.' Since then I have made two hasty trips collecting—one to the Manchester hills, the other to Blue Mountain Peak, by which, with the discoveries of Mr. Nock, of the Government Cinchona Plantation, the following plants have been added to the list of species and varieties then enumerated and described.

I am again indebted to Mr. Baker for the important and indispensable service of comparing my collections with the very comprehensive fern herbaria at Kew; for references to figures, and numerous notes as to his idea of the affinity of several of the more notable plants. Though agreeing mainly with Mr. Baker's views regarding the limits of species, my acquaintance with the living plants in their habitats has, in a few instances, led me to depart from his conclusions. With one or two exceptions, the new species accepted by Mr. Baker in this paper have his name attached to them.

Gleichenia dichotoma, Willd.

3.* *CYATHEA* NOCKII, *Jenman*, n. sp.—Caudex less than two inches thick, only a few inches long, procumbent and rooting from the under side, corrugated with the raised and densely-crowded bases of the past stipites; stipites caespitose, few or many, erect, the gradually-dwindling pinnae reaching to their very base, unarmed, rusty tomentose beneath, above clothed with lanceolate dark-brown scales; fronds erecto-spreading, plumelike, lanceolate-acuminate, from 2 to nearly 4 feet long, 6 to 9 inches wide in the middle; pinnae erecto-spreading, 1 to 2 inches apart, truncate and sessile, with a gland at the base beneath, fully pinnate, $3\frac{1}{2}$ to 6 inches long, $\frac{3}{4}$ to $1\frac{1}{4}$ inch wide, acuminate with the point serrate; pinnules $\frac{1}{2}$ to $\frac{3}{4}$ inch long, 2 lines wide, obliquely acute, sub-mucronate, dentate, or the inferior ones crenato-lobulate and rounded at the base, the lowest pair largest and lobed or pinnatifid; texture coriaceous; upper surface dark green, glossy, under glaucescent, both naked; costules rusty above, ribs beneath clothed with pale deciduous bullate scales; rachis angular,

* The numbers preceding the new species indicate their position in the sequence followed in the 'Synopsis Filicum.'

puberulous and greyish with scattered lanate scales; veins once forked at the base; sori in a double line close along the midrib, not reaching the apex, inserted at the forking of the veins; involucre membranous, cup-shaped, its margin usually entire. No. 107, Herb. Kew, 1877.—Rare; a singular and beautiful species, well marked by its habit, especially in the absence of a real trunk.

Cyathea elegans, Hew. This and *C. Serra*, Willd., are the only low-land species, all the rest occurring above 4000 feet altitude.

Cyathea Schanschin, Mart. This is confined to a higher elevation than any other species attains, and is found clustering on and around the apex of Blue Mountain Peak.

12.* *ALSOPHILA PARVULA*, Jenman, n. sp.—Trunk 10 to 30 feet high, hardly thicker than a broomstick, the scars of the fallen fronds small and crowded; stipites numerous, 12 to 15 inches long, slender, channelled, curved, straw-coloured or brown, armed beneath with short blunt prickles, and clothed at the base with linear-lanceolate acuminate chaff-coloured scales $\frac{1}{2}$ inch long; fronds 3 to $3\frac{1}{2}$ feet long, 18 to 24 inches wide, bipinnate; pinnæ 9 to 12 inches long, 3 to 4 inches wide, the apices acuminate and pinnatifid, not sessile; costæ slender, pubescent above, beneath naked; pinnules oblong-ligulate, the obtusely serrate apices shortly acuminate, sessile, 2 inches long, $\frac{3}{8}$ to $\frac{1}{2}$ inch wide, deeply pinnatifid; segments blunt, $\frac{3}{8}$ inch long, 1 to $1\frac{1}{2}$ line wide, sub-falcate, the margins slightly crenulato-dentate; surfaces naked, but the flexuose costulæ pubescent above, beneath having a few small deciduous, obovate, pale scales in the axils formed with the mid-vein of the segments; colour above light green, beneath greyish; texture sub-coriaceous; veins pellucid, forked in the outer half or third, reaching the edge; sori pale, copious, ascending half to two-thirds up the segments, inserted just below the forking of the veins; rachis sparsely prickly below, quite naked. No. 97, Herb. Kew, 1878.—This has the cutting of *A. aspera*, but contrasts with that species by its small, slender habit, many fronds, and pale colour in all its parts. Mr. Baker looks upon it as a form of *aspera*, judging from pinnæ, but the best distinguishing characters are shown by the trunk and stipes. These parts of the species of this and allied genera are so cumbersome to collectors from their bulk and prickliness, that they rarely reach European herbaria; and yet as good distinguishing characters are afforded by them as by the fronds. Indeed, the Jamaican tree ferns are as well individualized, and can be as readily identified, by the characters which the trunk alone exhibits as by those shown by the fronds alone.

Dicksonia cicutarioides, Fée.

Hymenophyllum L'Herminieri, Mett.?

H. sphaerocarpum, V. D. B.

H. hirsutum, Sw., var. *H. lanatum*, Fée.

H. ciliatum, Sw., var. *H. gratum*, Fée.

H. elegantissimum, Fée.

H. lineare, Sw., var. *antillense*, Jenman: fronds uniform, long

attenuated, $\frac{1}{4}$ to $\frac{1}{2}$ inch wide at the base; rachis narrowly winged above the free base. No. 85, Herb. Kew, 1878.

Adiantum macrophyllum, Sw., var. *bipinnatum*, Baker, MSS.: stipes long; pinnæ more numerous than in the type and smaller, base of the frond bipinnate; pinnules oblong. No. 76, Herb. Kew, 1878.

Adiantum cubense, Hk., var. *nanum*, Jenman: small, delicate, 3 to 6 inches high; lamina 3 inches long; segments 4 to 10, with a larger deltoid terminal one, casually bipinnate on the left side at the base. No. 75, Herb. Kew, 1878.—The type proves, in its ultimate state, to be a large, amply-developed, tripinnate plant; and very fragrant in drying.

Adiantum obtusum, Desv.

A. hispidulum, Sw. The discovery of this plant in Jamaica tends to confirm the doubted Peruvian habitat, referred to in Hk. Sp. Fil., vol. ii., p. 31.

Cheilanthes paupercula, Mett. Previously known only from Cuba.

Nothochlæna trichomanoides, R. Br., var. *subnuda*, Jenman: similar to the type, but without the coating of rusty tomentum beneath.

Blechnum longifolium, H. B. K.

B. serrulatum, Rich.

Lomaria Plumieri, Desv.

L. Boryana, Willd.

Asplenium rutaceum, Mett.

A. auriculatum, Sw.

A. hastatum, Kl.

A. auritum, Sw., var. *macilentum*, Kze.

A. caudatum, Forst.?

A. Wilsoni, Baker.

258.* *ASPENIUM ALTISSIMUM*, Jenman, n. sp.—Caudex stout, erect or decumbent, beset with the persistent bases of the past stipites; stipites cæspitose, few, suberect, 18 to 24 inches long, dark coloured, not channelled, puberulous and warty with dense raised points, dotted below with largish, membranous scales; fronds spreading, ovate, 2 to 4 feet long, 16 to 24 inches wide; lowest pinnæ little or not reduced, bipinnate; pinnæ spreading, 12 to 18 inches long, 5 to 8 inches wide, often bearing bulbils in the axils of the upper ones; pinnules subpetiolate, 3 to 4 inches long, acuminate, deeply pinnatifid, the lowest pair reduced; segments $\frac{1}{2}$ to $\frac{3}{4}$ inch long, 2 to 3 lines wide, oblong, the apices rounded, entire, toothed, or lobed half-way to the midrib; texture firm; under surface puberulous; the costæ and costulæ slightly scaly; upper glabrous, the costulæ channelled, with accessory sharp-edged margins; veins pinnate, simple or forked, reaching the edge; sori short, close to the midrib, the inferior occasionally double; involucre tumid, membranous, naked; colour above dull dark green, beneath pale, lurid. No. 64, Herb. Kew, 1878. *Asplenium hians*, var., Baker MSS.—Intermediate between *radicans* and *hians*, with the cutting of the former and the sori and involucre of the latter.

Aspidium triangulum, Sw., var. *latipinnum*, Jenman: pinnæ in opposite pairs, large, $1\frac{1}{4}$ inch long, $\frac{3}{4}$ inch wide, ovate-rhomboid; teeth of the margins very shallow, appressed, spinulose, acute point mucronate; complete row of sori medial, 1 to 2 incomplete outer rows; apex of frond lobed or pinnatifid, rooting at the point. No. 105, Herb. Kew. 1878.

8.* *ASPIDIUM CAUDATUM*, Jenman, n. sp.—Stipites 5 to 8 inches long, scaly at the base, cæspitose, spreading from a decumbent rootstock, which is $\frac{3}{8}$ to $\frac{1}{2}$ inch thick; fronds prostrate, simply pinnate, 10 to 15 inches long, 2 to $3\frac{1}{2}$ inches wide, oblong-lanceolate or lanceolate, the base not reduced, tapering gradually upwards and attenuated, terminating in a 1 to 2 inches long, stiffish, tail with a scaly bud at its point, apparently fully pinnate throughout, but the upper third narrowly margined; pinnæ numerous, spreading horizontally, apart, but not distant, 1 to $1\frac{1}{2}$ inch long, $\frac{3}{8}$ to $\frac{1}{2}$ inch wide, lower petiolulate, the inferior edge within obliquely cut away, curved outwards to the acute point, the upper side usually with a short rounded auricle at the base, inner edge parallel with the rachis; margin inciso-serrate or sometimes cut into shallow, roundish lobes, teeth obtuse, not spinulose, and the point not mucronate; texture coriaceous; surfaces naked, glabrous; veins close, 1 to 3 times forked (above the basal auricle); sori terminal on the anterior inferior veinlet, near to, or remote from, the edge; involucre deciduous; rachis stiffish, channelled, slightly scaly; colour on both sides greyish or pale green. No. 51, Herb. Kew, 1878.—“Matches Wright, Cuba, 828,” Baker, MSS. Approaching *triangulum* by the var. *P. ilicifolium*, Fée., but differing in habit, with flat spreading pinnæ, and without the rigidity and spinulosity of that species. Looked at in a broad view this, *tridens*, *viviparum* and some other allied plants, can only be regarded as sub-species; linking together by gradual transitions typical *triangulum* and *aculeatum*. However, for practical purposes, it seems better to keep them separate.

49.* *NEPHRODIUM FIRMUM*, Baker MSS., n. sp.—Rhizomè freely creeping, hardly thicker than a quill, but beset with the persistent bases of the old stipes, the advancing point clothed with narrow acuminate brown scales; stipites slender, erect, scattered, 8 to 12 inches long, glabrous, subpolished, brown or nearly straw-coloured, channelled, having a few deciduous scales at the base; fronds 9 to 12 inches long, 4 to 6 inches wide, larger ones ovate-lanceolate; pinnæ spreading, oblong-lanceolate, acuminate, sessile, pinnatifid, or fully pinnate at the base, lowest 1 to 2 pairs little reduced and reflexed, central $2\frac{1}{2}$ to $3\frac{1}{2}$ inches long, $\frac{1}{2}$ to $\frac{3}{4}$ inch wide; pinnules slightly connected by their decurrent bases, but the basal pair not adnate and nearly free, all entire or subentire, the crenulate edge slightly reflexed, $\frac{1}{4}$ to $\frac{1}{2}$ inch long, $\frac{1}{2}$ to 2 lines wide, apices bluntish or acute, basal pair not (or only that on the inferior side) enlarged; texture firm, subcoriaceous; surfaces naked; under side pale, upper dark green and shining; rachis and costæ slender, glabrous beneath, puberulous above, the latter slightly wavy; veins oblique, simple or forked, pellucid, raised and

conspicuous above, obsolete or obscure beneath; sori small, close to the margin; involucre small, fugacious; capsules ciliate. No. 36, Herb. Kew, 1878. "Near *N. rigidulum*, Baker, from Cuba," Baker, MSS. Though the fronds are not strictly dimorphous, the majority are barren; and to this feature and their resemblance otherwise to the fronds of seedling tree-ferns, as the plants are seen growing in the forest among the trailing bamboo and other undergrowth, is due the circumstance that nearly all the Jamaican collectors appear to have tramped over the species on the only track-way approaching Blue Mountain Peak, where it is found, without having gathered it.

Nepherodium Sprengelii, Hook., var. *persicinum*, Jenman: growth coarser than in the type, the nascent fronds thickly coated with mucous, viscid throughout when mature, strongly peach-scented; margins inflexed, nearly enclosing the sori. No. 37, Herb. Kew, 1878. Though nearly identical in cutting with *conterminum* and *Sprengelii*, probably entitled to specific distinction.

75.* *NEPHRODIUM SHERRINGII*, Jenman, n. sp.—Caudex erect; stipites cæspitose, very short, scaly; fronds erect, lanceolate or ovate-lanceolate, acuminate, fully pinnate to the very apex, 2 to 3 feet long, 10 to 14 inches wide; pinnæ copious, spreading, dwindling down gradually to mere segments at the base, quite sessile, largest 6 to 8 inches long, $1\frac{1}{2}$ to 2 inches wide, acuminate, cut down to the narrowly-winged costæ into ligulate, bluntish or acute, subentire, toothed or deeply-lobed pinnules, which are $\frac{1}{2}$ to $1\frac{1}{4}$ inch long, 2 to 3 lines wide, with a rounded open sinus between them, the inferior one on the lower side producing a small auricle which overlaps the rachis; texture chartaceous; colour light green; both surfaces, with the rachis, puberulous-glandulose; cortex finely ciliate above, the edge of the margins obscurely cartilaginous-toothed; veins pellucid, about 16 to a side, simple, forked, or pinnate; sori small, one to each branch, medial, or nearer the edge; involucre persistent, glandulose. No. 1, Herb. Kew, 1879.

63.* *Nepherodium Jenmani*, Baker, var. *sitiorum*, Jenman: stipes and rachis slender; pinnæ in opposite, patent pairs, narrow, and diminishing gradually from the base outwards, the acuminate attenuated apices usually entire; basal pinnules enlarged and increasing in size as the pinnæ dwindle to mere auricles at the base of the stipes; veins evident on the upper side; sori hardly medial. No. 38, Herb. Kew, 1878. "Near *A. polyphyllum*, Kaulf." Baker MSS.

Nepherodium subfuscum, Baker? : a large robust species, marked by its stout, erect, caudex, nearly as thick as one's wrist, and the enlarged, often again pinnatifid, basal pinnules. No. 40, Herb. Kew, 1878. "*N. patens*, var. approaching *subfuscum*." Baker MSS. *N. patens* has a creeping hypogæous rhizome, and is a much smaller plant.

Nepherodium Fendleri, H. K.

N. brachyodon, H. K.

161.* *NEPHRODIUM USITATUM*, Jenman, n. sp.—Caudex stout,

erect, often a span or more high; stipites cæspitose, strong, numerous, 9 to 16 inches long, clothed at the base (and a few scattered upwards) with deciduous, dark, dull brown scales; fronds pinnate, 18 inches to 2½ feet long, 9 to 12 inches wide, apex acuminate, pinnatifid and passing through mere lobes into the serrate attenuated point; pinnæ numerous, but distant, spreading horizontally, 4 to 6 inches long (variable in width) $\frac{3}{8}$ to 1 inch wide, the lowest one to two pairs little or hardly reduced, and sometimes narrowed at the base, upper ones sessile, truncate; point finely acuminate, serrato-entire, within cut a third or rather more to the costæ into broadish, rounded, or subappressed, thin cartilaginous-edged, crenato-entire lobes, which are 2 to 3 lines wide; texture thinly papyraceous; pellucid; colour dark green above and glossy, pale beneath from minute microscopic greyish scales; rachis puberulous; veins pellucid, simple, 4 to 8 to a side, lowest pair uniting and sending a vein to the sinus, where the next pair meet; sori medial or nearer the midrib, reaching to the lowest vein; involucre minute, soon obliterated. No. 42, Herb. Kew, 1878. Hitherto probably confounded with *Polypodium tetragonum*, Sw., from which Mr. Baker hesitates to separate it. With a full knowledge of the two plants, there can be no question as to their being most thoroughly distinct.

Nephrodium hastatum, Jenman. *Goniopteris*, Fée 'Foug. Antilles,' p. 65, plate 18, fig. 1? (No. 28, Herb. Kew, 1878). Just like Fée's plant in habit and pinnæ, but with a dark purple involucre clearly observable on the undeveloped fronds.

N. amboinense, Presl?

Polypodium tetragonum, Sw., var. *P. megalodus*, Schk.

P. ctenoides, Fée.

P. punctatum, Thumb.

136.* *POLYPODIUM HETEROTRICHUM*, Baker MSS. n. sp.—Stipites many, short, less than one inch long, very slender and wiry, tufted, but not strictly cæspitose, clothed with long, soft spreading hairs; fronds pendent, ligulate, 3 to 8 inches long, $\frac{1}{2}$ to $\frac{3}{4}$ inch wide, deeply pinnatifid; segments numerous, close, spreading obliquely, adnate and barely confluent by the shortly decurrent base, about 1 line wide, $\frac{1}{4}$ to $\frac{1}{2}$ inch long, acute, entire, subentire, or occasionally remotely toothed; texture thin, flaccid; rachis black, thread-like, and with both surfaces puberulous-glandulose, and rusty ciliate with soft spreading hairs; veins pinnate, oblique, short, reaching half-way or more to the margin, simple; sori copious, dorsal, or terminal, contiguous, in two approximate rows along the midrib, 4 to 7 to a side. No. 24, Herb. Kew, 1878. "Midway between *subtile* and *pendulum*." Baker in litt.

Polypodium elasticum, Rich.

P. lavigatum, Cav.

P. costale, Kze.

Meniscium serratum, Cav.

Gymnogramme consimilis, Fée.

G. diplazioides, Desv.

Polypodium elongatum, Mett., of Grisebach's Flora (*Gymnogramme*

Hook., *Grammitis*, Sw.), is evidently a true species of the genus *Taenitis*; the sori, though generally interrupted, being often confluent and continuous. I propose that it shall be known as *Taenitis Swartzii*.

4.* *ACROSTICHUM GRAMNEUM*, Jenman, n. sp.—Rhizome slender, $\frac{1}{8}$ inch thick, creeping, naked, dark-coloured; fronds scattered but copious, forming spreading grass-like patches, 5 to 8 inches high, linear acuminate, decurrent into the long (2 to 3 inches) slender petiole, $\frac{3}{8}$ inch wide; surfaces naked throughout, glossy, viscid, pale green; veins immersed, close, simple or forked, terminating within the edge in clavate apices; texture firm; fertile fronds smaller, on longer petioles, but similar in shape. No. 27, Herb. Kew, 1876. "*A. simplex*, Sw., var." Baker MSS. A much smaller and more delicate plant than *simplex*, with a very different habit.

Acrostichum viscosum, Sw., var. *obtusum*, Jenman: fronds long, narrow, obtuse; rachis very prominent; stipites long, cæspitose. No. 11, Herb. Kew, 1878. From the rapid elongation of the caudex, the long, slender stipes appressed thereto, splint-like, give specimens of this plant a peculiar appearance.

Acrostichum Sartorii, Liebm.

16.* *ACROSTICHUM PALLIDUM*, Baker MSS., n. sp.—Caudex stout, woody, 1 inch thick, densely clothed with long attenuated, loose, fibrillose, undulate, black scales, which are $\frac{1}{2}$ inch long, $\frac{1}{4}$ line wide; stipites numerous, cæspitose, 5 to 10 inches long, slenderish, flattened on the upper side and channelled; fronds pendent, 6 to 14 inches long, $1\frac{1}{2}$ to 2 inches wide, apex acuminate, base rounded (in large specimens subcordate); texture coriaceous; margins repand, edge cartilaginous; veins once or twice forked, about 1 line apart, the dark-coloured bases curved; surfaces naked; colour throughout pale green; fertile fronds similar in shape, but smaller and on longer stipes. No. 8, Herb. Kew, 1878.

Acrostichum nicotianafolium, Sw., var. *saxicolum*, Jenman: rhizome epigæous, clothed with scales, creeping on rocks; stipes and rachis fibrillose scaly; pinnæ oblong-oval, fertile, larger and more in number than in the type; texture thinner. No. 7, Herb. Kew, 1878.

Lygodium venustum, Sw.

Ophioglossum vulgatum, L.

THE PLANTS OF TORY ISLAND, COUNTY DONEGAL.

By R. M. BARRINGTON, B.A., LL.B.

ON the 2nd July, 1877, I landed on the remote Island of Tory, which lies about nine miles off the north-west coast of Donegal. I spent nearly a week there in company with a friend, Mr. A. Webb, and examined its flora each day carefully. Notes which I then made have been lying by ever since, but the publication of his interesting paper on the Flora of North-Western Donegal by my

friend, Mr. H. C. Hart, induces me to forward them to the 'Journal of Botany' as a supplement thereto.

No botanist seems ever to have examined the flora of Tory with care. A list of forty-two flowering plants and ferns found on Tory is given in an appendix to a paper by Mr. Edmund Getty, M.R.I.A., published in the first volume of the Ulster 'Journal of Archaeology,' January, 1853. The paper is entitled, "The Island of Tory; its History and Antiquities," and the Appendix is written by Mr. G. C. Hyndman, who paid a visit to the island in August, 1845. Mr. Hyndman's list is very incomplete, and the idea it gives of the vegetation of this distant island is not accurate. It is, however, the only information I could obtain in reference thereto prior to my visit in 1877.

Tory is nearly three miles long, and about half a mile broad; it contains 785 statute acres; and its population in 1871 numbered 343. Its highest point is the Doon, or Stronghold of Balor—a remarkable peninsula which rises 282 feet above the sea level; the cliffs are, therefore, not high, but are strangely indented on the north and east sides of the island, thus forming the curious peninsula just referred to, and giving the island a towery outline from the mainland of Donegal, whence some derive the name Tory—pronounced Torry. From the edge of the cliffs on the north and east the ground slopes gradually to the south and west shores, which are rocky, the vegetation being swept away three or four hundred yards inland in some places by the violence of the westerly gales.

Tory is one of the few fragments of Ireland of which there is no geological map, and except the small scale-map, published by Sir Richard Griffith in 1839, no information could be obtained at the Geological Survey Office. Its general formation, however, appeared to be granitic or quartzose.

There are two small loughs on the island, Lough Ahooley and Lough Ayes. The rarest of Tory plants are to be found in a curious natural depression close to the cliffs north-east of a little village called West Town; this depression is called, in Mr. Hyndman's list, the Rams Hollow, and appears to be formed by the subsidence or falling in of the roof of a large marine cave, for on one side is a natural arch communicating with the sea.

The fuel used by the islanders was at one time altogether peat, but this has become scarce of late years, and the grassy sods of the slopes have been extensively cut away and used as a substitute. Thus the island is not so fertile as it used to be, and many plants have been diminished in numbers, or perhaps extirpated altogether.

The cultivation is mainly confined to oats and potatoes, and no doubt some of the "colonists" have been introduced with imported seed, yet the intercourse with the mainland is slight, and the majority of the islanders cannot speak English. There are no trees on Tory, and it is said that those natives who visit the mainland occasionally pull twigs and branches of trees to show as curiosities on their return.

Mr. Hyndman's list contained 42 species, but I have enlarged the number to 145 in the following catalogue. This list I have compared with Mr. H. C. Hart's 'List of plants found on the islands of Aran, Galway Bay,'* and also with my friend, Mr. A. G. More's 'Report on the Flora of Innish Bofin, County Mayo,' † whither I accompanied him in 1875.

There are 372 species in the Aran list, which embraces three islands containing an aggregate of 10,781 statute acres; in the Bofin list we find 303 species from an area of 2312 acres; Tory Island produces 145 species, and contains 785 acres. There are 36 species found on Tory not in the Aran list, and 14 not in the Bofin list, but it has been thought sufficient to mention the eight species which occur on Tory and are absent from *both* Aran and Bofin, namely:—

Haloscias scoticum.	Lamium intermedium.
Carduus pratensis.	Lamium incisum.
Linaria vulgaris.	Beta maritima.
Lamium amplexicaule.	Carex vulgaris.

These are characteristic of the Tory flora.

There are 11 species I noticed on Tory which do not appear to be mentioned in Mr. Hart's list of the plants of North-Western Donegal.

Ranunculus Baudotii.	Beta maritima.
Brassica Napus.	Juncus acutiflorus.
Callitriche platycarpa.	Juncus compressus.
Linaria vulgaris.	Carex Oederi.
Lamium incisum.	Festuca duriusecula.
Myosotis cæspitosa.	

Three of these are new to district 11 of the 'Cybele Hibernica,' namely, *Ranunculus Baudotii*, *Linaria vulgaris*, and *Lamium incisum*.

In Mr. Hyndman's list before referred to there are four species which I did not notice, *Crambe maritima*, *Erica Tetralix*, *Gentiana campestris*, and *Juniperus communis*.

Crambe is one of the rarest Irish plants, and a careful search was made for it unsuccessfully. *Erica Tetralix* and *Gentiana campestris* were perhaps extirpated by the islanders cutting sods for fuel, or may have been overlooked; *Juniperus communis* was probably recorded for *Empetrum nigrum* (see following list).

It is hardly necessary to analyse and classify the scanty flora of Tory into Mr. H. C. Watson's "types." The following list is perhaps more valuable for the negative evidence it affords than for any positive information it supplies. A comparison of the flora of remote islands will not improbably be useful in elucidating the geographical distribution of species; the plants found on such insulated areas are certainly less liable to be influenced by artificial means of transport than those which grow in districts and counties whose inhabitants are in daily and frequent intercourse.

* Dublin: Hodges, Foster & Co., 1875. [See 'Journ. Bot.' 1875, p. 111.]

† Proceedings Royal Irish Academy, 2nd Series, vol. ii. (Science), p. 553. [See 'Journ. Bot.' 1876, p. 373.]

As Mr. H. C. Hart has just concluded his paper on the flora of that portion of the mainland of Donegal opposite to Tory Island, a comparison between the insular flora of 145 species and the mainland flora of 530* species can be readily instituted.

Plants certainly not native are marked thus *, those possibly introduced †, and those probably introduced ‡.

Ranunculus Baudotii, Godron. In one place only east of Lough Ayes.

R. hederaceus, Linn. Only in a spring between Portnathralla and East Town.

R. Flammula, Linn. Common and variable. Var. *pseudoreptans*, Syme, not unfrequent.

†*R. repens*, Linn. Common.

‡*Sinapis arvensis*, Linn. }

‡*Brassica Napus*, Linn. }

} In cultivated ground only—colonists.

Cochlearia officinalis, Linn. Variable; some specimens very dwarf, and almost var. *alpina* of Lond. Cat.

†*Capsella Bursa-pastoris*, DC. Common.

(*Crambe maritima*, Linn. Is in Mr. Hyndman's list of Tory plants, but not a trace of it could be found, though I searched for it most carefully).

Viola sylvatica, Fries. In the Rams Hollow, a curious shady depression near the cliffs in which a few plants, very rare on Tory, may be found.

Polygala depressa, Wender. On the elevated portions of the island, but not common. "*P. vulgaris*" of Mr. Hyndman's list is probably the same.

Silene maritima, With. Frequent.

Cerastium tetrandrum, Curt. Not uncommon among rocks north of the lighthouse.

C. triviale, Link. Not uncommon.

‡*Stellaria media*, With. Common.

Sagina maritima, Don. Very common about the lighthouse.

S. procumbens, Linn. Abundant.

‡*Spergularia arvensis*, Linn. Very abundant in the cultivated fields. Specimens examined belonged to the var. *S. arvensis* (Reich.), i.e., without papillæ on the seeds.

Spergularia salina, Presl. Common about the lighthouse on damp ground. Probably "*Arenaria rubra*" of Hyndman's list.

S. rupicola, Lebel. Common on the rocks about the lighthouse.

Radiola Millegrana, Sm. Around Lough Ahoocy, and in several other places. Specimens diminutive.

‡*Trifolium pratense*, Linn.

T. repens, Linn. Common, and as it occurred on the wildest parts of the island, even on the summit of Tor-more, I am disposed to consider it native.

Lotus corniculatus, Linn. Sparingly over the whole island.

* Stated to be 420 ('Journ. Bot.', n. s., vol. viii., p. 77), but on counting up Mr. Hart's list carefully this appears to be an error.

- Vicia Cracca*, Linn. In pasture-fields, but rare.
- Potentilla Tormentilla*, Schenk. Sparingly over the island.
- † *P. anserina*, Linn. Very common, especially about the light-house.
- Rosa spinosissima*, Linn. Only in the Rams Hollow; about half a dozen specimens.
- Lythrum Salicaria*, Linn. Rare; in a field between the light-house and West Town.
- Peplis Portula*, Linn. Not uncommon.
- Montia fontana*, Linn. Common.
- Myriophyllum alterniflorum*, DC. Only near Lough Ayes in one spot.
- Callitriche platycarpa*, Kutz. On mud in several places.
- (*C. verna*, Linn. Thought to have been noticed, but no specimen having been gathered it must remain doubtful).
- Sedum anglicum*, Linn. Common on the highest portions of the island.
- Hydrocotyle vulgaris*, Linn. Abundant.
- Helosciadium nodiflorum*, Koch. Frequent.
- Haloscias scoticum*, Fries. On Tor-more, growing luxuriantly in three or four spots.
- Crithmum maritimum*, Linn. On the cliffs between Portnaglass and the Rams Hollow; sparingly.
- Angelica sylvestris*, Linn. Grows plentifully on the grassy ledges of the cliffs. I never saw more luxuriant specimens in damp sheltered meadows inland than may be seen on the wild cliffs of Tory, and on Inish Turk, County Mayo, fully exposed to the Atlantic gales.
- ‡ *Heracleum Sphondylium*, Linn. Noticed in the neighbourhood of houses only.
- Daucus Carota*, Linn. Frequent in the fields about East Town.
- Hedera Helix*, Linn. Three or four plants on one side of Rams Hollow.
- Lonicera Periclymenum*, Linn. A single specimen only noticed growing close to the ivy on the Rams Hollow.
- Galium palustre*, Linn., var. *Witheringii*. In one or two places.
- Scabiosa succisa*, Linn. Common.
- Carduus lanceolatus*, Linn. Common.
- C. pratensis*. Huds., var. In a field south of East Town. Two or three specimens only were in flower. One was forwarded to Dr. Boswell and kindly examined by him. He writes that it is "evidently a hybrid," and suggests "between *lanceolatus* and *pratensis* ?!" There were about fifty other specimens, all presenting an unusual look, and none of the ordinary form of *C. pratensis* was observed on the island.
- † *C. arvensis*, Curt. In fields about West Town.
- Arctium*, probably *intermedium*, Lange. Not uncommon, but too young to determine accurately.
- Centaurea nigra*, Linn. Rare and only in a few fields near West Town.

- **Chrysanthemum segetum*, Linn. Abundant in some fields.
Matricaria inodora, Linn., in the fields. Var. *maritima*, with large flowers and fleshy leaves; common on the cliffs.
- ‡*Artemisia vulgaris*, Linn. In a waste field near West Town.
Gnaphalium uliginosum, Linn. Damp waysides; not uncommon.
- ‡*Senecio vulgaris*, Linn. Scarce; introduced by cultivation.
S. sylvaticus, Linn. Dry ditch-banks about East Town.
S. Jacobæa, Linn. Frequent; the rayless form not observed.
S. aquaticus, Huds. Frequent.
Bellis perennis, Linn. Very common and looks indigenous.
Solidago Virga-aurea, Linn. Only in the Rams Hollow.
Hypochaeris radicata, Linn. Common and variable in size.
Leontodon autumnalis, Linn., var. *pratensis*. One of the commonest Composites on Tory.
- ‡*Taraxacum officinale*, Wigg. In suspicious places, not common, and a doubtful native.
- †*Sonchus oleraceus*, Linn. Rare; on an old stone fence at West Town.
- †*S. asper*, Hoffm. Frequent.
Jasione montana, Linn. Very common. Specimens dwarf in some situations and flowers large, forming beautiful blue tufts.
Erica cinerea, Linn. Very common. It is curious that Mr. Hyndman should only have seen it at the Rams Hollow.
(*E. Tetralix*, Linn. Not seen, but mentioned by Mr. Hyndman in his list).
Calluna vulgaris, Salisb. Frequent.
Erythraea Centaurium, Pers. Sparingly on the grassy slopes north of East Town.
(*Gentiana campestris*, Linn. Not seen, but mentioned by Mr. Hyndman as a Tory plant. May have been overlooked or extirpated by the islanders cutting sods for fuel).
- †*Linaria vulgaris*, Mill. Rare; sparingly in a field between the lighthouse and West Town.
Euphrasia officinalis, Linn. Common. The maritime form, with leaves thick and fleshy, stunted growth, and bracts close together, was only observed. This variety I have also noticed on the islands of Achill and Inish Boffin, County Mayo.
Bartsia Odontites, Huds. Sparingly in a few fields.
Rhinanthus Crista-galli, Linn. Rather rare.
Thymus Serpyllum, Linn. Common.
Prunella vulgaris, Linn. Frequent.
Stachys palustris, Linn. Rare; in one field only near West Town.
- †*S. arvensis*, Linn. Sparingly in a dry waste field near West Town.
- †*Lamium amplexicaule*, Linn. Rare; roadside near West Town.
- †*L. intermedium*, Fries. } Common in cultivated ground, all
†*L. incisum*, Willd. } three species growing together, *inter-*
†*L. purpureum*, Linn. } *medium* perhaps the most plentiful.

- Myosotis cæspitosa*, Schultz. Frequent.
- † *M. arvensis*, Hoffm. Rare; in two fields between the lighthouse and West Town.
- Anagallis tenella*, Linn. Very common.
- Glaux maritima*, Linn. Common, especially near the lighthouse.
- Armeria maritima*, Willd. Abundant; covering a large extent of the island, in some places to the exclusion of all other plants except *Plantago maritima* and *P. coronopus*.
- † *Plantago major*, Linn. Not common.
- P. lanceolata*, Linn. Plentiful.
- P. maritima*, Linn. Abundant. Leaves very variable in width, in sheltered clefts of the rocks near the lighthouse half an inch across, but in exposed situations very narrow, and the whole habit changed, the plant being very diminutive.
- P. Coronopus*, Linn. Abundant; more so than any other plant. In many spots it forms more than half the vegetation.
- Littorella lacustris*, Linn. Plentiful around Lough Ahooley and Lough Ayes.
- Beta maritima*, Linn. A single specimen near the landing-place at Portdellig.
- † *Chenopodium album*, Linn. Frequent as a weed of cultivation.
- † *Atriplex angustifolia*, Smith. Frequent in cultivated ground.
- A. Babingtonii*, Woods. Not uncommon among the shingle on the shore.
- † *Rumex obtusifolius*, Linn. } Common.
- † *R. crispus*, Linn. }
- R. Acetosa*, Linn. Frequent; luxuriant in the Rams Hollow.
- R. Acetosella*, Linn. Common.
- Polygonum aviculare*, Linn. Common.
- P. amphibium*, Linn., var. *terrestre*. One of the commonest weeds among the crops.
- Empetrum nigrum*, Linn. Around the Rams Hollow and on Tor-more.
- † *Urtica dioica*, Linn. Common.
- † *U. urens*, Linn. Near some houses at Portdellig.
- Salix repens*, Linn. Sparingly on the hilly portions of the island. Probably *Salix fusca*, var. *argentea*, of Hyndman's list.
- (*Juniperus communis*, Linn. Recorded by Mr. Hyndman from the Rams Hollow, but no trace of it could be found. *Empetrum nigrum* grows round the Rams Hollow, but is not mentioned by Mr. Hyndman).
- Sperganium affine*, Schn. In Lough Ahooley.
- Potamogeton polygonifolius*, Pourr. In Lough Ahooley.
- Triglochin palustre*, Linn. By Lough Ahooley and Lough Ayes.
- Orchis maculata*, Linn. In one spot only; in a field near East Town.
- Iris Pseudacorus*, Linn. Around Lough Ahooley and Lough Ayes.

- Luzula multiflora*, Lej. Hilly ground between East and West Town; sparingly.
- Juncus conglomeratus*, Linn. Edges of drains; scarce.
- J. acutiflorus*, Ehrh. Very common.
- J. supinus*, Mœnch. Very common; the floating form in Lough Ahooy.
- J. bufonius*, L. Common; var. *fasciculatus*, Koch, also observed.
- J. compressus*, Jacq., var. *Gerardi*, Lois. In one place near the cliffs, north-east of West Town.
- Schenus nigricans*, Linn. Not common.
- Scirpus palustris*, Linn. Common; around Lough Ahooy.
- S. multicaulis*, Sm. Plentiful over the whole island.
- S. Savii*, S. et M. Frequent.
- Carex vulgaris*, Fries. Very common.
- C. glauca*, Scop. Scarce.
- C. extensa*, Good. Rare; north of lighthouse.
- C. Oederi*, Ehrh. Common; often not more than an inch high.
- Anthoxanthum odoratum*, Linn. Rare; in the same field as *Orchis maculata*.
- Alopecurus geniculatus*, Linn. Scarce; in a field between the lighthouse and West Town.
- Agrostis alba*, Linn. Abundant.
- A. canina*, Linn. Not common.
- Phragmites communis*, Trim. In a field between the lighthouse and West Town.
- Aira præcox*, Linn.
- Holcus lanatus*, Linn.
- Triodia decumbens*, Beauv.
- Glyceria fluitans*, Br.
- Sclerochloa loliacea*, Woods. Rare; by the rocks near Lough Ayes.
- Poa pratensis*, Linn.
- P. trivialis*, Linn.
- Festuca rubra*, Linn., var. *duriuscula*.
- Bromus mollis*, Linn.
- † *Triticum repens*, Linn. Not common.
- Lolium perenne*, Linn.
- Nardus stricta*, Linn.
- Pteris aquilina*, Linn. Sparingly in a few spots. From the description given of a fern by one of the islanders, which, he said, once thickly covered portions of Tory and grew three or four feet high, I am led to think it must have been *Pteris aquilina*. The turf has been cut away off a great part of Tory for fuel, and *Pteris* and many other plants have thus probably become very rare, or been extirpated altogether.
- Blechnum boreale*, Sw. A single plant gathered in a deserted rabbit-hole on the Doon by Mr. A. Webb.
- Asplenium marinum*, Linn. Common.
- Athyrium Filix-femina*, Roth. Only in the Rams Hollow.
- Lastrea dilatata*, Presl. Very sparingly in deserted rabbit-holes on the Doon.

MIMICRY OF SEEDS AND FRUITS, AND THE FUNCTIONS OF SEMINAL APPENDAGES.

By S. LE M. MOORE.

(PRELIMINARY NOTICE.)

THE fierce contest for existence everywhere proceeding around us, and modifying and differentiating in such extraordinary diversity both animals and plants, is, I venture to think, exhibited by seeds in no dubious or ill-defined outline. Indeed, one has but to consider the tenacity shown by seminal characters, which renders the seed one of the most, if not the most, valuable of aids to the systematist, and the amazing difference in size, shape, colour, marking, &c., of seeds, to have a strong suspicion that Natural Selection has had some influence in moulding their history. The enemies of seeds are legion; if, therefore, they possess no means of escaping from them, and are not produced (as is indeed rarely the case) in countless multitudes, spermology is the only department of nature showing structures unadapted to their environment. The *success* of vegetation belies this conclusion. How then are seeds enabled to carry out with such unflinching punctuality the duties entrusted to them?

Putting aside consideration of the means of protection against purely physical agencies, for which the testa seems all-sufficient, it is evident that seeds may be protected by their smallness, which enables them to keep out of notice of their larger would-be enemies; when, too, we remember that, other things equal, the smaller the seeds the more numerous they are, and that by reduction in size they are liable to become the prey of insignificant creatures with but feeble powers of injury, we must, I think, recognise in this the *vera causa* of the so-general smallness of seeds, such reduction being in each case governed by the habit of the plant, by the chemical constitution of the matters stored up for the nourishment of the seedling, and by other circumstances. Acridity has long since been recognised as a selection-induced condition whereby seeds are enabled to render themselves obnoxious to insects; the secretion of volatile oils by the testa, &c., may also effect the same purpose; this is certainly the function of the vitæ of the umbelliferous mericarp, which leads to the mention of adnation in many cases of the ovary to the calyx, indehiscence of the fruit, and the various ways of thickening, &c., of the latter, methods directly subservient to protection of the seed. Then again a thick testa is of great service in protecting the seed (or fruit) during its passage, through, say, a bird's alimentary canal; the sculpturings, too, such frequent and constant seminal marks seem to be especially valuable against small insects, which are thereby hindered in their ravages. Often, too, quick germination is a very great advantage—this holding, of course, almost exclusively in the tropics—and soil-like colouration, as well as to a certain extent germination under water; to these may be added a

hairy coat and other epidermal appendages, and apical, bilateral, unilateral, circumferential, dorsal, or basal winging; and, lastly, mimicry of animals or parts of plants. I shall here speak especially of this last method, and run over a few of the more noteworthy instances of its occurrence.

In Polygalaceæ, besides the large genus *Polygala*, with beautifully strophiolate and coleopteroid, though small, seeds, I may refer to *Brelemeyera*, from the reduced strophiole of the seed of which are given off a number of long coarse hairs with a tendency to bilateral disposition. The narrow seed flanked by these curious hairs presents in a remarkable degree the appearance of a dipterous insect.* The order Leguminosæ contains many species with insect-mimicking seeds and fruits; of these it will be sufficient to refer to *Abrus precatorius*, many species of *Lupinus* which have seeds resembling spiders' bodies, legumes of *Medicago*, one or two resembling, to a certain extent, the larva-case of the Mantis and others shells, &c., and of *Scorpiurus* (notably *S. vermiculatus*), shaped like caterpillars, as well as other *Hippocrepideæ*. Thus in Cucurbitaceæ, *Dimorphochlamys* has curious twig-like seeds, and in Turneraceæ and Passifloreæ they are transversely ridged, so as to resemble to some extent articulated creatures; in Umbellifereæ, too, the fruits of *Magydaris tomentosa* have, unless I am deceived, an insect-mimicking function, and other umbelliferous fruits, with their persistent antenna-like styles, have probably similar functions. Then the characteristic seeds of Sapotaceæ resemble to some extent shells, and that of *Martynia diandra*, a beetle, though the two large hooks undoubtedly act as graspers of a passing animal's hide, and have been actually seen attached to a tiger. What, too, shall we say of the remarkable capsules of *Antirrhinum*, which look so much like an insect, the pores of dehiscence resembling eyes and the persistent style a head-appendage? or of the seeds of the Cannaceous *Ischnosiphon*, with their beautifully-crenated axil, or of the coleopteroid fruits of many species of *Scleria* and of *Rutaceæ*?

There is, however, an Order which is to be regarded as *par excellence* containing insect-like seeds—*Euphorbiaceæ*. In this Order the appendage of the seed has a unique name (carunculus), and, since it is an outgrowth from the placenta, an unique history. Many of the genera of this Order are indeed not carunculate, in which case they may, as in *Tragia* and *Argyrothamnia*, resemble spiders. Many of the carunculate seeds are beautifully coleopteroid, the carunculus representing the head, and the raphal line the line between the closed elytra, in addition to which the seed is often spotted or symmetrically striped on a paler ground. It will suffice here to mention *Ricinus*, *Jatropha*, *Croton*, *Baliospermum*, and *Stipellaria*, and especially *Manihot*. In order to show the seminal diversity exhibited by species of this genus, some of the

* The strophiole of the Violet has, at least partly, an entirely different function from that of insect-mimicry, as might be presumed to be the case, seeing that it not uncommonly separates spontaneously from the ripe seed.

seeds of which greatly resemble beetles of the tribe Calligraphidæ, I will here write my notes respecting them.

M. hemitrichandra, Müll. Arg. Ground colour pale olive-green. Raphal line strongly marked, and on each side of it are a very few pale brown or reddish streaks extending with more or less interruption to the edge of the seed. Carunculus very prominent.

M. palmata, Müll. Arg. Ground colour straw-yellow. Raphal line not very prominent; on each side of it three or four dark brown striæ. Carunculus well lobed.

M. triphylla, Pohl. Ground colour pale olive-green, dappled with rather large reddish brown spots. Raphal line scarcely distinguishable. Carunculus large, extending outwards on each side farther than usual.

M. cecropiaefolia, Hb. Kew (Burchell, 7015.) Ground colour pale grey, very scantily darker-striped. Raphal line and carunculus both very prominent.

M. Glaziovii, Müll. Arg. Seed large and carunculus relatively small. Ground colour black with pale brown mottling. Raphal line broad, black.

M. sp. (Burchell, 8850.) Ground colour pale brown with occasional darker short stipes and frequent very fine darker mottling. Carunculus but slightly prominent.

M. anomala, Hb. Kew (Burchell, 8094.) Ground colour pale brown, striation of darker brown lines with obscure mottling. Carunculus prominent.

M. sp. (Balansa, 1713.) Seeds broad with sharp edges. Ground colour pale brown, with darker striations and mottling. Raphal line concave. Carunculus not very prominent, surmounted by the apex of the seed.

M. angustiloba, Müll. Arg. Seeds broad with sharp edges. Ground colour brown, with broad rather obscure black lines and faint mottling.

M. sp. (Spruce, 3604.) Ground colour brownish grey, diversified with irregular lines of darker hue and mottling. Raphal line concave. Carunculus very small, but prominent.

But it will be asked, may it not be rather that the insects mimic the seeds instead of the seeds the insects? and if the latter be the case, how can the resemblance benefit the seeds? Geological evidence nullifies the supposition, although, owing to the enormously greater amount of differentiating force possessed by the animal as compared with the vegetable organism,—force depending primarily on the continuity of its protoplasm,—it is *à priori* far more likely that the animal would mimic the plant. But we should be careful not to carry this too far, because in the case of seeds, only a slight modification being involved, a comparatively small amount of force is required to produce it, besides which the appendage is, as will be shown below, in most, if not in all cases, subservient also to some other function, or to other functions. There can be no doubt that the seminal appendage, often highly coloured to attract the attention of seminivorous creatures, is their reward for work performed in diffusion of the seed. But nobody will say that this

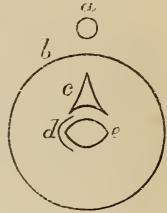
can account for mimicry. The only other possible hypothesis is that the appendage is a reservoir of nutriment for the embryo; but some experiments with *Ricinus communis*, made recently for me by Mr. Nicholson, of Kew, experiments which we hope to renew next spring, seem to show that the carunculus exercises no appreciable effect during germination—a conclusion which is borne out by the diverse chemical constitution of the contents of endosperm and carunculus-cells, in proof of which it must suffice to mention that the peptone reaction, though easily obtained from an aqueous solution of the macerated endosperm, cannot be obtained from a similar carunculus-solution, even after eight hours' exposure in a water-bath to a temperature of 100 F.

The insect-mimicking fruit or seed may escape from its semi-nivorous enemies by being passed over as an insect; moreover, insectivorous ones seizing it and finding out their mistake would be almost certain to fling it some distance away, by which means the species would stand a better chance of dispersion. Seeing, then, the cycle of offices performed by these structures, it will, I think, be admitted that they are among the most wonderful to be found in the whole vegetable world.

SHORT NOTES.

ON A TWO-FLOWERED PERIGYNIUM OF *CAREX INTUMESCENS*, Rudge, AND THE DIFFERENCES BETWEEN THIS SPECIES AND *C. GRAYI*, Carey. —In consequence of seeing a communication in the 'Gardeners' Chronicle' of the 12th ult., respecting *Carex Grayi* and *C. folliculata*, I examined the specimens in Kew herbarium in order to be able to reply to the question raised. *C. intumescens*, Rudge, (*C. folliculata*, Michaux, Schkuhr, Kunth, and many other botanists, but not of Linnæus), and *C. Grayi*, Carey, the latter being a more vigorous plant and flowering a month later than the former, of which Dr. Asa Gray at first regarded it as a variety. In Boott's herbarium at Kew is the following note from Carey:—"You have never told me what you think of this [*Carex Grayi*, Carey] as a species. There are specimens from the Cambridge garden where it retains such characters as it has. It appears distinct, but wants (or at least I cannot detect) strong contrasting characters." Having found what I believed to be a very good distinctive character not mentioned in Gray's definition of the species in his 'Manual' or in Boott's 'Illustrations of Carex,' I requested Mr. N. E. Brown to examine the achenes of the two species in question with care, and, in so doing, he accidentally discovered a perigynium of *C. intumescens* containing two achenes. I have not been able to find any record of a similar occurrence, therefore I think a brief description may be sufficiently interesting to find a place in the 'Journal of Botany.' Within the utricle or perigynium is the normal triquetrous achene, fully developed and apparently ripe; and in front of it and occupying the place of the

seta or rhacheole of some species is a second achene, which is tetragonous from compression. This achene is scarcely two-thirds the size of the other, by which it is closely seated. On one side of it, and partially encircling its base, is a rudimentary perigynium, easily recognised by its bifid tip. Mr. Dyer found an analogous case in *Carex acuta*, but his was a quite rudimentary flower. He states ('Journal of the Linnean Society,' xiv., p. 154): "One flower, which I examined with great care, possessed an abnormal arrangement of great interest (fig. 8, t. 12). Within the perigynium, the upper margin of which was much depressed in front, there was, besides the normal ovary, a rudimentary second flower consisting of a nuclear body subtended by a bract which was clearly deficient posteriorly, or with its edges connate low down and out of sight." Our condition of things appears to differ only in the degree of development attained. The accompanying diagram represents the position of the parts as they appear in a nearly or quite ripe state. It may be added that several botanists, as Wesmael, Wigand, and Eichler, record instances of the seta or rhacheole growing out at the top of the perigynium and bearing spikelets of flowers. The differential character which I observed, and which appears to be constant, is in the achenes; those of *C. Grayi* being nearly globular, with a slender style, and indistinctly three-ribbed, whilst those of *C. intumescens* are elongated and sharply triangular, with concave facets.—
W. B. HEMSLEY.



a axis, b primary perigynium, c primary achene, d secondary perigynium, e secondary achene.

MOÇINO AND SESSE'S COLLECTION OF MEXICAN DRIED PLANTS.—The writer of this note would be glad to know what has become of a collection of Mexican plants made by Moçino and Sessé, and formerly in Lambert's herbarium. According to a memorandum in a catalogue of the sale of Lambert's collections in the library at Kew, this collection, as well as many other lots of American plants, was purchased by a person named Rich, probably an agent.*

* From a priced catalogue of the sale in the Botanical Department of the British Museum, it is seen that the collection fetched £1 8s. It was therefore probably small—less than a hundred species. Mr. Pamplin, now of Llandudfel, N. Wales, has kindly given us the following information concerning Mr. Rich:—"He and his father before him were the accredited agents in London for the eminent botanist and banker of Paris, M. Benj. De Lessert; and although Mr. Rich was most probably entrusted with commissions from others, yet I have very little doubt that the principal purchases in his name at A. B. Lambert's sale were for Baron De Lessert." This is fully borne out by a consultation of Laségue's valuable book on the De Lessert Herbarium, where (at p. 205) we find the plants of Moçino, Sessé, and Cervantes "autrefois la propriété de M. Lambert de Londres," mentioned as forming part of the collection. The same work states (p. 348) that the herbarium of Moçino and Sessé is at the Royal Gardens, Madrid, and also (p. 322) that the great number of Mexican plants in the herbarium of Ruiz and Pavon (now in the British Museum), appear to have formed part of Moçino and Sessé's collections.—(ED. 'JOURN. BOT.')

Several hundred species of Moçino and Sessé's Mexican plants were published in the early volumes of DeCandolle's 'Prodromus,' but the descriptions were made from drawings, and, although the original drawings were excellent, the descriptions are usually insufficient for the determination of the intended species. M. Alphonse DeCandolle, recognising this difficulty, generously offered a few years ago to supply the principal botanical institutions with sets of tracings of the drawings upon which these species had been founded, at the cost of production; these tracings have proved exceedingly useful in naming a collection of Mexican plants made by Drs. Parry and Palmer, chiefly in the State of San Luis Potosi, at an elevation of 6000 to 8000 feet, and presented to Kew herbarium on the condition that they should be included in the Botany of Messrs. Godman and Salvin's 'Biologia Centrali Americana.' Drs. Parry and Palmer appear to have traversed the same country as Moçino and Sessé, for they have collected many of the same species of which, at Kew, there were previously only the tracings mentioned. Mr. N. E. Brown is assisting me, and we have been able to identify a number of our species by means of the tracings. Other species represented in the set of tracings we have been able to refer to their proper genera. Thus, for example, *Margaris barbigera*, DC., is *Symphoricarpus microphyllus*, H. B. K., and *Geum? cercocarpoides*, DC., is *Fallugia paradoxa*, Endl., Syn. *Sierersia paradoxa*, Don. Now the fact that Don described and figured two plants, *Cowania mexicana* and the one just mentioned, from dried specimens "collected by Moçino and Sessé," which are identical with two drawn by them, seems to point to the probability of the collection in question containing specimens of others which they figured. I think M. DeCandolle informed me, when I was inspecting his collection of drawings, that he was not aware of the existence of any dried plants collected by Moçino and Sessé, therefore the discovery of evidence of a collection having existed is worth putting on record, and may perhaps, if the collection still exists, give the owner an idea of its real value in connection with the drawings. With regard to genera, *Cardionema*, DC., is the same as *Pentacæna*: another interesting determination (suggested by Dr. Parry) is the genus *Cordia*. On examining our material we detected two very distinct species of this curious, usually monandrous, genus, neither of which we could identify with the two previously published, though there is not the slightest doubt respecting the genus. Possibly, however, one of them may be the same as one of the published species, but from the tracings it appears quite different.—W. B. HEMSLEY.

ORCHIS HIRCINA NOT EXTINCT IN KENT.—It may be interesting to some of the readers of your Journal to know that the Lizard Orchis, *Orchis hircina*, was found by me near Greenlith last year. The plant, which was growing in a chalk quarry, was about two feet in height. Being extremely rare, and in such a situation

likely to be destroyed, it was removed to the garden of one of the members of the Greenhithe Naturalists' Society, and thus preserved; it is in flower at the present time, but not quite so fine as last year. I have again, this year, found a specimen of the same plant on the ridge of the quarry, about one hundred feet above the site of the other and about twenty yards distant.—E. J. Cox.

THE SPARTINAS OF SOUTHAMPTON WATER.—There grows, on the mud-flats about Hythe, South Hants, in company with *S. alterniflora*, a *Spartina*, which, by the majority of characters given in British works, would be rather *S. alterniflora* than *S. stricta*, yet which we now consider to be the latter. Mr. Townsend first pointed this out from a specimen which we sent him as a voucher for the occurrence of *S. alterniflora* on the western shores of Southampton Water. This form of *S. stricta* is from two to four feet high, and has four to six *spreading* spikes sometimes six inches in length, with the rachis protruded three-eighths to five-eighths of an inch; the spikelets are twenty to thirty, and the leaves do not narrow to the sheath. Prof. Babington gives for *S. stricta* "one to two feet high," "spikes two to three," "*rachis scarcely extending beyond the last spikelet*;" and Dr. Boswell (Syme) says, "spikes two, rarely three or four," "spikelets six to ten," "flowering-stems six inches to one foot, though I have seen specimens two feet high." We think, with Mr. Townsend, that the comparative importance usually given to the characters separating the two species is very misleading. The production of the rachis, number of the spikes, and size of the plant, as distinctive characters, are apparently quite overthrown by the Hythe plant; and it would appear that the leaves being jointed to the sheaths or continuous with them, and the comparative length of the upper leaf to the spike, afford the most reliable characters for separating the two species. We have circulated during the last five years, through the Botanical Exchange Club and otherwise, a number of specimens named "*S. alterniflora*," of which many probably should have been labelled *S. stricta*. We do not find, in the herbaria at the British Museum, Kew, or Cambridge, any form of *S. stricta* so extreme as the Hythe plant, the nearest being Billot, No. 1089, from Rochelle.—H. & J. GROVES.

REDISCOVERY OF CEPHALANTHERA RUBRA.—I was fortunate enough, after many unsuccessful searches in the neighbourhood, to discover *Cephalanthera rubra* last year. It occurs in a beech wood on the side of a steep hill about two miles from Stroud, the locality being restricted to one narrow strip of ground, perhaps of fifty yards in extent, down the side of the hill, and is not easily found. I noticed this summer some thirty or forty specimens; few of these, however, bear flowers. It is an exceedingly beautiful species, and

although I have frequently met with it on the Continent, I have never seen it grow there to such perfection as it does in the locality I refer to. I have had the pleasure of pointing it out to two or three botanists upon whose trustworthiness I believe I can rely, otherwise I am rather jealous of divulging its habitat. Many of the beech woods about here have been cut down of late years, and this has had the effect of destroying many orchids. I have good reason to believe that a former habitat of *C. rubra* has been destroyed in this way.—H. C. READER.

FESTUCA AMBIGUA AT THETFORD.—I was down in Suffolk on July 19th, and in the neighbourhood of Thetford found *Festuca ambigua* in abundance; it was growing on sandy banks on Thetford Heath with *Agrostis (Apera) interrupta*, *Medicago minima*, and *Veronica verna*, the last four inches or several five inches high. I have never seen it before more than three inches and a half high on Ickligham Heath; doubtless the excessively wet spring and summer have been the cause. Near it (showing the curious season) was *Draba verna* in flower and fruit. I will later on send you a series of the *Festuca*, but I was at least a fortnight too late to gather it in good condition.—A. BENNETT.

JUNCUS DIFFUSUS IN WORCESTERSHIRE.—I have met with *Juncus diffusus* growing in considerable quantity upon Newland Common, near Malvern. Its existence there may be of interest, as it has not hitherto been recorded as a Worcestershire plant.—R. F. TOWNDROW.

Notices of Books and Memoirs.

Ueber Befruchtung und Zelltheilung. Von Dr. EDOUARD STRASBURGER. Jena, 1877.

ALTHOUGH more than a quarter of a century ago Reichenbach studied the division of the pollen-cell in Orchids and compared this process with that exhibited by Coniferæ, and although Hartig saw division of the nuclei in *Tradescantia*, *Campanula*, and a few other cases, their observations appear to have passed out of view, and it was entirely as a new subject that the author took up the systematic study of this phenomenon. His method consists in cultivating the pollen in 3 per cent. or 5 per cent. solution of sugar, then treating with 1 per cent. osmic acid, and staining with carmine. The pollen-cell of *Narcissus poeticus* thus prepared is seen to have a spherical nucleus provided with a nucleolus and a spindle-shaped enucleolate one with granular plasma collected at the two poles. In a bud of *Allium fistulosum*, 4–5 mm. long, some of the grains have two nuclei near their flat side separated by a wall shaped like a

watch-glass, and attached to the wall of the grain. This wall is, however, not formed of cellulose, and it soon disappears, the two nuclei being then found free in the fovilla. After a time each nucleus loses its nucleolus. In Orchids division takes place in flowers at the top of a spike while those below are in bloom.

It is usually difficult to see the nuclei in unprepared grains of Dicotyledons, but they may always be seen in the crushed fovilla; sometimes, indeed, as in *Monotropa* and *Rheum*, they may be found without the use of reagents. In this last genus (*R. hybridum*), owing to the absence of starch, the process of division can be followed in a most satisfactory way. The nucleus lies before division in the plasma lining the wall which a few days before pollination becomes massed round it. In segmentation a cell-plate is laid down in the ordinary way, and thus the small "vegetative" cell is separated from its large sister-cell. The free nucleus now wanders away to the other side of the grain, which becomes filled with starch; finally the plasmatic wall is absorbed, and the two nuclei float freely in the fovilla. The process is seen less clearly in *Gloxinia* (*G. hybrida*) on account of the abundance of starch masking it somewhat; in this plant it occurs in buds 22 mm. long. The author has also studied it in *Pyrola*, and not having met with a single case in which division did not hold, he comes to the reasonable conclusion that it is of universal occurrence among Metasperms.

Fired with the desire to ascertain what becomes of these nuclei, the pollen was cultivated in a drop of syrup, of various concentration according to the species, suspended over a moist chamber, and put in a dark place, as light retards the germination of pollen.* The nuclei were seen to pass into the tube, becoming narrower and longer as they advanced. The hinder one in *Orchis* disappears after a time, and in *Allium* they sometimes both remain for a while at the mouth of the cell before passing into the tube.† There is no regular order of entrance into the tube, sometimes the nucleus of the pollen-cell being first, sometimes that of the vegetative-cell.

We will now leave the male element after again calling attention to the similarity of the phenomena which occurs inside the pollen-cells of Metasperms and those of Conifers and Cycads, as well as the microspores of some higher Cryptogams, to give an account of Strasburger's discoveries *à propos* of the embryo-sac of Phanerogams. As types of Monocotyledons, Orchids were made use of, and especially *Orchis pallens*. The young ovules were placed in 3 per cent. solution of sugar, and in addition, when division was expected, in a drop of 1 per cent. osmic acid. The following series of developments was then observed:—The great cell of the central row of the nucleus divides into a lower‡ larger and an upper small cell,

* This fact probably accounts for styles being so often more or less terete and not flat, as the tubes growing down a flat style would be more exposed to light.

† In a species of *Minulus* we have seen one nucleus at the mouth and one a long way in the tube.

‡ That end of the sac nearest the micropyle we refer to as the upper.

which latter immediately itself undergoes division. The large cell, which is the young embryo sac, expands and presses against the two crowning cells, and while doing so its nucleus divides. The new nuclei immediately separate, one going to the top and the other to the bottom of the sac, each accompanied, in its progress, by plasma, and separated at first by an incompletely-formed cell-plate, the disappearance of which is followed by the formation of a large vacuole in the centre of the sac. By this time the two crowning cells have become so compressed that they are visible no more than as a cap. The innermost sac-neighbouring row of nuclear cells now shows signs of disorganisation, after which the two nuclei of the sac divide; but the cell-plate not being completed, there are now two free nuclei at each pole, round which almost the whole of the plasma is collected. These pairs of nuclei next divide each in a plane more or less inclined to that in which its fellows division occurs; this time, however, a complete wall separates the sister nuclei, and one sees three cells at each pole of the sac. Two of these cells, viz., those formed from the nucleus whose cell-plate was laid down parallel to the longitudinal axis of the sac, remain in position, and are accompanied by the deeper-lying uppermost result of the laying down of a horizontal cell-plate in the other nucleus. The fourth nucleus at each pole remains free, and, moving towards the centre, the two soon become united, the separate nucleoli being often observable some time afterwards. The two first-mentioned cells not being true germ-cells, although they have hitherto been called "germinal vesicles," are what we shall call "auxiliary vesicles," or shortly "auxiliaries" (*gehülffinnen*), since, as we shall afterwards see, they assist the germ in its development. The deeper-lying third cell is the real reproductive unit—the "germinal vesicle" or "germ" (*ei*). The three cells at the other end of the sac which, by-the-bye, are in the same horizontal plane, are of course the "antipodal vesicles." We thus see that everything takes place in a beautifully simple and consecutive manner, and that we are released from the necessity of calling in the aid of "free-cell formation," a process which has so often been brought on the *tapis* to explain phenomena difficult of observation.

The auxiliaries differ from the germ in being more pointed, and their nucleus is situated at the upper part, the lower being vacuolate, positions which are reversed in the germ.

For Dicotyledons the author chose *Monotropa Hypopitys*, which he found especially suitable for study. The series of changes is essentially the same as in *Orchis*. Among others *Pyrola*, *Gloxinia hybrida*, *Sinningia Lindleyana*, and especially *Torenia asiatica*, are commended to the notice of those who wish to see the process for themselves.

One would naturally expect to find exceptions to the above-sketches series of phenomena, even did one not know that such have been before noticed. The principal ones recorded by Strasburger are—occasional abortion of the germ in *Monotropa*, multiplication of antipodal vesicles in *Ornithogalum*, large cellulose-

surrounded antipodal vesicles in *Delphinium*, *Gladiolus*, and *Crocus*, two germs in *Santalum* and *Sinningia*, binucleolate germ in *Nothoscordium fragrans*, occasional abortion to a greater or less degree of one (very rarely of both) of the auxiliaries, and protrusion of the embryo-sac into the micropyle in *Torenia asiatica*. Attentive consideration was also given to the development and structure of the apical "filamentary prolongations" in *Gladiolus*, *Crocus*, *Bartonia*, &c., and the thickening of the upper part of the auxiliaries, which in other cases foreshadow them.

For studying the act of impregnation and its immediate results, the author recommends *Torenia asiatica*. The ovules were stripped off the placenta thirty-six hours after pollination, and put in a 3 per cent. solution of sugar. Directly the pollen-tube comes in contact with the top of the auxiliaries, it cleaves to them and rebounds as though it would separate from them. At this stage its contents are strongly refractive and uniformly finely granular. The contents of one of the auxiliaries now appear cloudy, and its nucleus and nucleolus disappear; it then contracts itself a little, and is uniformly filled with a finely granular substance, the second auxiliary either following the example of its fellow or not, according as it participates or not in the fertilizing process. The apex of the pollen-tube either remains at the top of the auxiliaries or is prolonged between them, often directly reaching the germinal vesicle. The now irregularly-contoured auxiliaries are next seen clinging as a formless tenaciously fluid mass to the germ, round which a cellulose membrane can be detected. The auxiliaries are ultimately entirely absorbed, their contents serving, as the author supposes, to nourish the young embryo, unless, as is sometimes the case, the aid of one is dispensed with.

Gloxinia hybrida and *Sinningia Lindleyana* are also good types for study, but especially Orchids (*Orchis pallens*, *Gymnadenia conopsea*) *Monotropa* and *Pyrola*, on account of the germ not being in those plants covered by the auxiliaries, as is the case with *Torenia*. In these the author saw that after the clouded plasma has spread itself on the germ two close-lying nuclei are seen in the latter. The second nucleus cannot be the last remaining nucleus of the pollen-tube introduced as such into the germ, because that always dissolves immediately the tip of the tube touches the embryo-sac. What then is it? Most probably a new nucleus formed by the re-collection of the particles of the nucleus of the pollen-tube. Both nuclei soon unite, and in one case there were three nuclei in the germ of a *Monotropa* ovule. Strasburger's opinion is, therefore, that the union of sperm and germ does not take place by osmosis, but by direct passage of the contents of the pollen-tube, first through their own membrane and then through that of the embryo-sac. For this position he finds strong support from Cornu's observation of the development of macrogonidia in *Nectria*, and the processes of impregnation in *Ascomycetes*, *Florideæ*, and *Lichens*.

As for the pollen-tube, it finds itself compressed after impregnation by the narrowing of the micropyle, a phenomenon essentially

similar morphologically and functionally to that presented by archegonia. The succession of compression being here, as always, towards the *locus* of fertilization, it follows that any contents remaining in the tube will be squeezed into the embryo-sac. Its ultimate fate is probably absorption.

The chief exceptions are the following :—When two germs are present in the embryo-sac,* as may sometimes be the case, they may both occasionally be fertilized and surround themselves with a cellulose wall, but one always predominates over the other, which finally disappears.† In *Gladiolus communis* and *Crocus vernus* the pollen-tube forces its way between the young upper part (filamentary prolongation) of the auxiliaries, and frequently reaches the germ, on the surface of which it expands, or else it remains at a varying height between the auxiliaries. The prolongation remains for some time after the absorption of the latter, and is found clinging to the pollen-tube, which is much swollen after fertilization.‡ In *Ornithogalum nutans* one of the auxiliaries surrounds itself with a cellulose-wall, but never grows further. In *Enothera Drummondii* the tip of the pollen-tube is attached solely to the outer wall of the embryo-sac, a method of union which is even more remote in the case of *Ricinus*, which shows two intervening layers of cells.§

The author's observations on the formation of adventitious embryos are of the greatest importance, and possess most vital interest. In *Funkia orata*, after fertilization, single cells of the one-layered nucleus near the germ and auxiliaries begin to grow into the embryo-sac, dividing and forming a several-celled knob. In *Nothoscordium fragrans* the germ is almost always suppressed in favour of the adventitious growths, while in *Citrus* it usually grows along with them. The same method of embryo-formation is presented by *Calebogyne*, and in all probability its existence has given rise to the supposition of parthenogenesis in this plant. Parthenogenesis, being a method of growth from the unfertilised germ, is altogether distinct from the process of adventitious formation of the embryo. With these observations before us, therefore, it is plain that in future, for the proof of parthenogenesis in any given case, a necessary factor will be disproof of the existence of

* The *raison d'être* of this second germ is easy to understand. Its nucleus is, of course, that one which, under usual circumstances, comes from the upper part of the embryo-sac to unite with one from the lower part into the special sac-nucleus, but which is retained in position by being surrounded with a membrane.

† *Orchis latifolia* is mentioned further on in the book as having two embryos formed from two germs.

‡ Strasburger supposes that this swelling of the wall of the pollen-tube favours the passage of its fertilizing matter. We venture to think that a somewhat similar instance is furnished by those seeds which swell up in water—moistening being necessary to the passage of gases through the testa. (See Dehérain and Landzin in *Ann. Sc. Nat.*, 5me Serie, t. 20, p. 367). The most remarkable occurrence in this connection is the differentiation of the inner layers into a spiral coil, which is liberated as such on applying moisture.

§ In view of the function of the thickened upper part of the auxiliaries, which is to render pervious the top of the embryo-sac, this would appear to be either the relic of, or a reversion to, an ancestral condition.

adventitious embryo formation. So important and beautifully original is this result, that were it the only goal reached by the author, he would have been entitled to our sincerest gratitude.

The nucleus of the fertilized germ does not disappear, as has been supposed, but divides in the usual way preparatory to the formation of the second embryonal cell.

Endosperm is formed in one of two ways; either, as in *Monotropa*, from division of the nucleus of the embryo-sac and continued subdivision from the new nuclei; or, as is generally supposed to be universally the case, the nucleus of the embryo-sac is absorbed, and new nuclei make their appearance in the plasma lining its wall.

The most remarkable upshot of all these observations is that they have led Strasburger to the conclusion that no comparison is possible between the phenomena inside the embryo-sac of *Metasperms* (*Angiosperms*), and that of *Archisperms* (*Gymnosperms*), and that his phylogenetic scheme of the evolution of the former from *Gnetaceæ* is "more than doubtful." The antipodal vesicles cannot represent a prothallus, the entire germ-apparatus (germinal and auxiliary vesicles) has not elsewhere any similar representative; the auxiliaries are not to be compared with "canal-cells," since, irrespective of function, they are not developed from the germ, neither can the filamentary prolongations be regarded as the germinal spot; moreover, if it be held that the auxiliaries are metamorphosed germs, then there is nothing for it but to consider the filamentary prolongations as representing the germinal spot, from which they differ entirely in structure, function, and chemical relations. This is a subject which demands the attentive consideration of every thoughtful evolutionist, and we cannot but think that our author, who has so greatly distinguished himself among the micro-arcana of Nature, will have something further to say about it.

S. M.

MR. SERENO WATSON'S Contributions to American Botany, ix. (Proc. Amer. Acad., vol. xiv., July, 1879), contains a revision of the *Liliaceæ* of North America, using the name in the large signification now given to it. As many as 235 species are described under fifty genera. *Mulla* (an inversion of *Allium*) is a new genus found for a plant (*Hesperoscordium? maritima*, Torr.) usually placed with the *Alliæ*, but which has the characters of the *Milleæ*. Another new genus is separated from *Schenolirion* for *S. album*, Durand, and named *Hastingsia* after Mr. S. C. Hastings, of San Francisco, a liberal promoter of the fine volume on the Botany of California.

A PAPER 'On British Elms,' by Mr. G. S. Boulger, is printed in the Scottish Arboricultural Society's Transactions. The author has carefully worked up the botanical literature of the subject, and has endeavoured to see authentic specimens, living or dried, of the numerous described forms. His results do not disturb to any extent the classification of our English varieties, of which he

enumerates twenty-four; all falling under the two species *U. campestris*, With., and *U. montana*, Sm.

OTHER NEW BOOKS.—F. v. MUELLER, 'The native Plants of Victoria succinctly defined,' part i. (Melbourne, 1879).—F. KURTZ, 'Aufzählung der von Waldburg-Zeil im Jahre 1876 in West Siberien gesammelter Pflanzen' (Berlin, 1879).—Rev. G. HENSLow, 'The Students' Catalogue of British Plants, arranged according to Dr. Hooker's Students' Flora' (Bateman, High Street, Portland Town, London, 1879).—H. H. HIGGINS, 'Biographical Sketches in Botany' (Annual Address for 1879 to Liverpool Nat. Field Club).—J. DECAISNE, 'Monographie des genres *Ligustrum* and *Syringa*' (in 'Nouvelles Archives du Muséum d'Hist. Nat.', ser. 2, vol i., Paris, 1878).—CHRIST, 'Pflanzen-leben in der Schweiz' (Zurich, 1879).—J. BALL, 'On the origin of the Flora of the European Alps' (from 'Proc. R. Geograph. Soc.', 1879).—H. BAILLON, 'Errorum Decaisneorum Centuria ii.' (Paris, 1879).—WHEELER'S 'Report upon U. S. Geographical Surveys west of 100th meridian,' vol. vi., Botany, by J. T. ROTHROCK (1878-9).—J. BRITTEN, 'European Ferns,' part i. (Cassell & Co., London, 1879).

ARTICLES IN JOURNALS.—JULY.

Scottish Naturalist.—J. Cameron, 'Gaelic names of plants.'—J. Fergusson, 'Recent advances in British Bryology.'

Amer. Naturalist.—R. C. Stearns, 'Form of seeds as a factor in Nat. Selection in plants.'—W. Trelease, 'On fertilization of several species of *Lobelia*.'

Bot. Zeitung.—K. Prantl, 'On development of prothallium of *Salvinia natans*.'—V. W. P. Rauwhenhoff, 'On the first appearances in germination of cryptogamous spores.'—J. Reinke, 'Two parasitic Algæ' (t. 6).

Flora.—J. Muller, 'Lichenological notes.'—K. A. Henniger, 'Hybridization in plants' (contd.)—W. Nylander, 'Circa Lichenes vitricolos notula.'—W. J. Behrens, 'On nectaries of flowers' (contd.)—H. Leitgeb, 'On the bilateralness of prothallia.'—F. Arnold, 'Lichenological fragments.'

Oesterr. Bot. Zeitschr.—E. Hackel, 'On the Grasses of Austria-Hungary.'—A. Kerner, 'On history of plant distribution' (contd.)—H. Wawra, 'Diagnoses plant. nov. Brasiliensium coll. in exped. "Novara."'—Halacsy, 'On the flora of Lower Austria.'—F. Körnicke, '*Neovossia*, gen. nov. *Ustilagin*.'—W. Vatke, 'Plantæ in itin. Africano a Hildebrandt coll.' (*Leguminosæ* contd.; *Hoepfneria* gen. nov.)—R. F. Solla, 'Excursion to Rovigno.'—R. v. Uechtriz, '*Arabis muralis*, Bert., and *A. sudetica*, Tausch.'

Hedwigia.—P. Richter, 'Algarum species novæ.'

Ann. des Sc. Nat. (ser. 6, vii., pt. 5 & 6).—G. Capus, 'Anatomy of conducting tissue of style' (cont. t. 18-24).—H. Moissan, 'On the volume of oxygen absorbed, and carbon dioxide expired,

in vegetable respiration.'—C. Barthélémy, 'Note on the water-reservoirs of *Dipsacus*.'

Nuov. Giorn. Bot. Ital. (July 7).—F. von Mueller, 'On the position of the genus *Donatia*.'—L. Macchiati, 'Experiments on the exhalation of carbon dioxide by roots.'—L. Nicotra, 'Further observations on flora of Messina.'—T. Caruel & A. Mori, 'On the "variolutura" of oranges.'—T. Caruel, 'A new *Cartonema* (*C. tenue*).'
—G. Archangeli, '*Amorphophallus Titanum*, Becc.'—Id., 'Further on *Taccarum cylindricum*.'—P. Porta, 'Botanical expedition of Huter, Porta and Rigo in Calabria in 1877.'—T. Caruel, 'The Tulips of Florence.'—Id., 'Phenological observations on plants at Florence, 1848-64.'

Magyar Nov. Lapok.—A. Kanitz, 'Priscorum botanicorum epistolæ ineditæ,' ii. & iii.—V. Janka, 'Bot. excursion in Turkey' (contd.; Kalofer, &c.)—J. Holuby, 'Mycological notes,' iv.

Proceedings of Societies.

LINNEAN SOCIETY OF LONDON.

May 1, 1879.—Lieut.-Col. Grant, C.B., F.R.S., Vice-President, in the chair.—The following gentlemen were elected Fellows of the Society:—T. E. Brown, Inspector of Forests, of South Australia, Adelaide; Richard Rimmer, of Sydenham; and P. O'Shanesy, Cometville, Queensland. Two foreign members, viz., Dr. Edward Bornet, of Paris, and Prof. H. G. Reichenbach, fil., of Hamburg, were also elected.—Mr. Edward J. Morris exhibited a quantity of the berries, whole and ground, of the *Coffea liberica*, grown by him in the vicinity of Monrovia, the Liberian capital.—A living example of *Welwitschia mirabilis*, from Kew Gardens, was shown and commented on by Mr. W. T. Thiselton Dyer.—The Chairman drew attention to a series of teaching diagrams forming the 'Anatomisch-Physiologischer Atlas der Botanik,' now being issued in parts by Dr. Arnold and Carolina Dodel-Port, of Zurich.—The following papers were read:—'On Nutrition in its relations to the Fertilization of Flowers,' by Thomas Meehan. His observations chiefly refer to *Wistaria sinensis*, *W. frutescens*, *Catalpa syringifolia* and *Linum perenne*, from which he deduces that the struggle for power between the growth or vegetative and the reproductive forces decides fertility. He further suggests that the perfection of the polleniferous organs, and consequent potency of pollen, is dependent on phases of nutrition involved in this struggle. Thus, in the above-mentioned plants it is seen that potency in pollen—the main element in the reproductive force—operates only when there has been some check given to the force of vegetative growth.—Some remarks on Mr. Meehan's contribution, and partly in reply to Mr. Dyer's previous strictures on the subject of *Wistaria*, were read by the Rev. G. Henslow; these in the main supporting Mr. Meehan's views by quoting other

instances to the point at issue. He recognizes five degrees in the effects of the reproductive force—(1) Entire abeyance when no flowers are produced; (2) Flowers may be abundant, but pollen remain a mass of tissue, as in *Ranunculus Ficaria*; (3) Flowers produced with good pollen but no seed set, as in *Escholtzia*; (4) Fruit produced only at definite places, as extremity of raceme, or at definite periods, as late in summer; (5) Flowers and fruit occur in abundance as in the “tree” *Wistaria*, or freely growing branches of ivy.—A note was read by Dr. Maxwell Masters on the occurrence of a Restiaceae plant in Cochin China. This new species, *Leptocarpus disjunctus* (collected by M. Godefroy Lebœuf), he technically describes, and notices that hitherto *Restiaceae* have only been recorded from the Cape, Australia, Tasmania, New Zealand, and a single species in Chili. The solitary *L. Schulzii*, of North Australia, seems allied to that from Cochin China, suggesting the possibility that further researches may bring to light other Restiaceae forms in the intermediate area between the Asiatic and Australian localities.

May 24th.—Anniversary Meeting. — Prof. Allman, F.R.S., President, in the chair. The report on publications was read by the Secretary. The Treasurer’s statement of accounts for the past year showed a balance of £220 8s. 9d. on hand, being a slight reduction as compared with that of the previous year, but readily accounted for by the general depression of trade, which indirectly had affected the whole of the Learned Societies. During the session forty-one new Fellows had been elected, against which thirteen had died and three withdrawn. Among the foreign members three had died and one associate. The demise of such well-known workers in Botany and Zoology as Prof. Grisebach of Gottingen, W. C. Hewitson, G. Dawson Rowley, and the Marquis of Tweeddale, is a great loss to science. The following gentlemen were elected members of Council in lieu of five retiring by rotation, viz., F. Crisp, Rev. J. M. Crombie, W. S. Dallas, A. Grote, and R. McLachlan. The President and Officers were re-elected. Afterwards the President delivered his annual address, the subject being “Recent Progress in our knowledge of the Polyzœ.”

June 5.—Prof. Allman, F.R.S., President, in the chair.—Mr. Carruthers, Mr. Ball, Mr. Grote, and Dr. Jeffreys were nominated Vice-Presidents for the ensuing year.—Mr. A. D. Michael was elected a Fellow of the Society.—Attention was called to an article on *Cinchona* in India, by Mr. J. E. Howard; *Calisaya Ledgeriana* is shown to yield excellent results, as much as 10 per cent. of quinine, and of excellent quality, being obtained.—A paper, by Prof. T. Fries, of Upsala, on the Lichens collected during the English Polar Expedition of 1875–76, was communicated by Sir J. D. Hooker. In Dr. Hayes’s Arctic journey lichens probably were not brought away from a more northerly position than 78° N. lat., but Julius Payer, in the German Expedition, with certainty obtained specimens at Cape Fligely, 82° 5′ N. lat. With the exception of these last, but three species of lichens hitherto have been published as found beyond 81° N. lat. Thus considerable

interest is attached to those got under Capt. Sir G. Nares by Capt. Feilden of the 'Alert' and Mr. Hart of the 'Discovery.' As these vessels wintered in different quarters, the localities where the lichens were obtained are more numerous, thus adding to their value as indicative of vegetable life in the frozen regions. Mr. Hart got his at thirteen stations, Discovery Harbour, $81^{\circ} 42'$ N. lat., being the most northern; Capt. Feilden records twelve stations, Westward Ho Valley, $82^{\circ} 41'$ N. lat. being the limit. But Lieut. Aldrich gathered *Gyrophora cylindrica* on the shore of the "palæocrystic sea," the northernmost spot trodden by man, viz., Cape Columbia, $83^{\circ} 6' 30''$ N. lat. Prof. Fries notes that the so-called "fruticolous" and "foliaceous" species are feebly represented, doubtless in consequence of the severe climate, and seemingly at variance with the presence of musk oxen; added to which the reindeer moss is absent. This anomalous circumstance of the presence of large ruminants and deficiency of their usual food Capt. Feilden explains by stating that the musk ox in Grinnel Land does not feed on lichens, but on mosses and grasses. The same officer has also pointed out that the lichens curiously enough increased in size with increase of altitude. Prof. Fries concludes that, without the least credit being given to an open Polar sea (existing, no doubt, only in fancy), lichen vegetation may exist at the very Pole, if only land be there occasionally free from snow or ice. All the forms of lichens—over 100—obtained by the Expedition, save a very few, are already known.—The Secretary read a communication on a new form of *Helvella*, described by Mr. W. Phillips. It was gathered in 1876 on the Sierra Nevada Mountains, in California, by Dr. Harkness. Its nearest ally is *Helvella crispa*, Fr., and for the new species the name *H. californica* is proposed.—The gist of a long memoir, 'A Review of the Ferns of Northern India,' by Charles B. Clarke, was orally communicated by the author. India proper, that is exclusive of the Malayan or Trans-Gangetic Peninsula, was divided by Kurz into three main regions, viz.:—1. The Himalaya extending from Kashmir to Bhotan and Chittagong; 2. The Peninsula, with Ceylon, extending as far north as the table-land extends; and 3. The great plain between, the home of the Hindoos—Hindustan. The area included in this paper comprises the first and third of these divisions. It is intended to form a copious appendix to Hooker and Baker's 'Synopsis Filicum,' and as Col. Beddome has so nearly exhausted the Ferns of India the plates now designed merely bring out the minor differences so as to assist specific determination. Col. Beddome counts of species and varieties in India, 631 species; in Southern India, 320; in the Trans-Gangetic Peninsula, 330; and in Northern India, 405 species. The present paper admits 366 species in Northern India, exclusive of 12 Lycopods and four Equisetums, which have been added so as to include all the monosporous Acrogens. By far the largest genera in N. India are *Polypodium* (67 species), *Asplenium* (56 species), and *Nephrodium* (54 species). Seventeen new species have been described. There has been appended a complete reduction of the

N. Indian Ferns in Wallich's Herbarium; some of the localities given by Wallich, and doubtfully received by botanists, are doubtless correct, though it is shown that in many cases much weight cannot be attached to the herbarium-numbers on the sheets.

June 19.—Prof. Allman, F.R.S., President, in the chair.—Charles Holme, Esq., of Bradford, was elected a Fellow.—The following papers were read:—‘Remarks on *Carpesium cernuum* as indigenous to Australia,’ by F. M. Bailey, of Brisbane. The author gave reasons for supporting Mr. L. A. Bernays's views (Jour. Linn. Soc., vol. xvii., p. 267), of this plant not being introduced, but undoubtedly native to Australia. Mr. Ball noted the peculiar local distribution of the plant in Europe and N. Africa, and seemed inclined to think that *Carpesium* in Australia might be a remnant of an ancient wider distribution of the genus.—‘An Enumeration of the Lichens in the Herbarium of Robert Brown, in the British Museum,’ by the Rev. J. M. Crombie. These were collected between 1802–5, during the notable voyage of Capt. Flinders to New Holland and Tasmania. No complete catalogue of these lichens was published by Brown, though many bear his MS. names, and only the more common species were indicated in the ‘Appendix’ to the above voyage. The author now remarks that the paucity of “saxicole” species, both in this as in more recent collections of exotic lichens, is a matter to be regretted, and should engage the attention of those now collecting lichens abroad.—‘A Contribution to the Flora of Northern China,’ by J. G. Baker and S. Le Marchant Moore. Some 600 specimens, now deposited in the Kew Herbarium, and collected by Mr. John Ross in the province of Selim King, 40° to 42° N. lat. of the Celestial Empire, furnish the basis of this paper. Though many species among these are already known, yet the discovery of such forms as *Exochorda serratifolia*—an addition to a genus that has for years remained monotypic—*Saxifraga Rossii*, *Brachylitis paridiformis*, and *Betula exaltata*, along with several altogether new species, render the collection valuable.

Botanical News.

COUNT SOLMS-LAUBACH has been appointed to succeed the late Prof. Grisebach at Göttingen.

DR. O. DRUDE is appointed Professor of Botany and Director of the Garden at Dresden; and DR. E. ZACHARIAS Privat-Docent in Strassburg.

WE regret to have to record the death, on August 17th, of DR. MARTIUS M. BULL, of Jersey, an accomplished scholar and excellent botanist, who has contributed several papers to this Journal.

THE fifth Annual Conference of the Cryptogamic Society of Scotland will be held at Forres on September 17th–19th. Those who wish to be present are requested to communicate with the Secretary, Dr. Buchanan White, Perth.

Original Articles.

POTAMOGETON ZIZII, M. & K., AS A BRITISH PLANT.

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

(TAB. 204).

Two critical pond-weeds allied to *P. lucens* have been already described and figured in this Journal—*P. nitens*, Web.,* and *P. decipiens*, Nolte,† the description of the former having been contributed by the lamented Dr. D. Moore. Attention is now called to a third of these puzzling forms, *P. Zizii*, M. & K., which occupies a position in some respects intermediate between *P. lucens* and *P. heterophyllus*, to both of which, as will be seen by the synonymy given below, it has been referred by competent authorities.

It is only within the last few years that this variety has been distinguished in England, and its name has not been determined with certainty till the present season. We are chiefly indebted to Mr. A. Brotherston for its discovery, and to his note in the Report for 1878 of the Botanical Locality Record Club, p. 18,‡ we may refer for some particulars. Mr. Brotherston's locality is Caulshiels Loch, near Melrose, Roxburghshire, where the plant grows in shallow water (less than a foot deep in 1878, about two feet in the present very wet year); and he sent out through the Exchange Club, in 1878, specimens labelled "*P. Zizii?*" from this station. Mr. Baker, in the Exchange Club Report,§ adds another locality from Borrer's herbarium—Llyn Maclog, Anglesea, *Wilson*; and two more may be now recorded from the British Museum herbarium—the Teviot near Roxburgh Castle, *W. McRitchie* (where Mr. Brotherston assures me the plant is not now to be found ||); and Balgarves Loch, near Forfar, 1837, *J. H. Balfour* (under the name "*P. rufescens?*")

P. Zizii is one of those species of the genus which possess both a form with floating leaves and one without them; hence it sometimes bears a resemblance to *P. heterophyllus*, which usually has them, and at others is like *P. lucens*, where they are very rarely present. The British specimens of *P. Zizii* that I have seen are all without any floating leaves, properly so called, but the upper ones are yet very different from those lower down the stem. The former are opposite and conspicuously stalked, the

* 'Journ. Bot.', 1864, p. 325, t. 23.

† 'Journ. Bot.', 1867, p. 71, t. 61.

‡ See p. 255 of this volume.

§ See p. 252 of this volume.

|| A plant from this locality which has been distributed by Mr. Brotherston, through the Exchange Club, under the name of *P. nitens*, does not appear to me to be that species, but a large form of *P. decipiens* approaching *P. praelongus*; probably *P. salicifolius*, *Wolfg.*

petiole in large leaves reaching an inch long, while the blade is 2-3½ inches long; usually, however, the whole leaf, including the petiole, does not exceed this length; their form is narrow lanceolate-oblong, tapering at the base and acute or mucronate at the apex; the margin is really entire, but considerably undulated, and so finely puckered as to appear irregularly crenate (exaggerated in the plate); with a lens a few minute spinous denticulations may be detected on the margin near the end of the leaf. The lower leaves are considerably smaller (except in a few luxuriant and barren shoots), alternate, sessile or nearly so, with tapering bases; all are stiff, yellowish-olive green, and usually, especially the lower alternate ones, strongly curved backwards. The stipules are about 1½-2 inches long, broad, acute and doubly keeled (not winged) down the back. The peduncles are numerous, and rather clustered at the top of the branches; they are thicker than the stems and become incrassated upwards, reaching nine inches or even a foot in length, thus greatly exceeding the leaves; the flower-spike is about an inch long. I cannot detect any distinctive characters in the flowers; the perianth-leaves are broadly triangular in outline with rounded angles, and very thick and concave; the fruit is smaller than that of *P. lucens*, but similar in form.

It is thus clear that the plant chiefly differs from *P. lucens* in its much smaller size, narrower and longer-stalked leaves with entire margins, keeled instead of winged stipules, and more crowded and proportionately longer peduncles. In some of these points it approaches *P. decipiens*, which however has larger, more oblong leaves, which are sessile and rounded at the base, and much shorter peduncles. *P. heterophyllus* is distinguished by its much smaller and more numerous submerged leaves, which are scarcely crisped, quite sessile, and narrowly oblong; its stipules are not winged, and when true floating leaves are produced they closely resemble those of *P. oblongus*. *P. nitens*, though its leaves (submersed) are rather larger than those of *P. heterophyllus*, has them rounded and semiamplexicaul; the peduncles, too, in this species are much shorter.

The different views with regard to the relationship of *P. Zizii* will be best seen by tracing its history. The name was first published in 1823 by Mertens and Koch,* who state that they had given it to a plant long familiar to them, in commemoration of the discoverer, Dr. Ziz, and had used it in MS. tickets to friends, but that they now only consider and call it var. *latifolius* of *P. heterophyllus*, Schreb. (*P. gramineus*, Linn.) Koch continues to refer it to that species in his more recent Flora,† and he is followed by Kunth in his general monograph,‡ and by Boreau.§ Apparently the first author to publish "*P. Zizii*, Koch in litt." as a full species was Roth in 1827||; and Reichenbach¶ and Lange** also

* In Röbling, 'Deutschl. Flora,' i. p. 845.

† Koch, 'Syn. Fl. Germ.' ed. 2, pp. 778 & 1628.

‡ Kunth, 'Enum. Plant.' iii. p. 131.

§ Boreau, 'Fl. du Centre de France,' ed. 3, ii. p. 600.

|| Roth, 'Enum. Plant. Germ.' i. p. 531.

¶ Reich., 'Jc. Fl. Germ.' vii. p. 23.

** Lange, 'Haandb. d. Danske Fl.' ed. 3, p. 133.

accord it a similar rank. Curiously enough, the plant is not mentioned at all in Nyman's 'Sylloge.'

If the German authors for the most part are thus inclined to place this pond-weed with *P. heterophyllus* (unless they keep it as a species), on the other hand the Scandinavian botanists with greater propriety place it under *P. lucens*. Thus Nolte* calls it *P. lucens* var. *minor*, Fries† *P. lucens* var. *heterophyllus*, and Hartman‡ and A. Blyth§ *P. lucens* var. *Zizii*. Ascherson also, in his excellent Flora, is in accord with these, and places it as a variety of *P. lucens*. ¶ Probably the arrangement most in accordance with nature, however, is that followed by Chamisso and Schlechtendal in their monograph of the genus published in 1827, ¶ where *P. Zizii* is accorded equal rank with *P. lucens* and *P. heterophyllus*, all being regarded as sub-species of one super-species, *P. Proteus*, C. & S.

These various synonyms and some others are shown in the following list :—

- P. Zizii*, *Mert. & Koch* (Roth, Fieber, Lange, Reichenbach).
- P. angustifolius*, *Presl* (fide Fieber).**
- P. lanceolatus*, *Wolfgang* (non Smith nec Reichenbach).
- P. gramineus* var. *platyphyllus*, *Meyer*.
- " var. *Zizii*, *Koch* (Kunth).
- ? " var. *spathæformis*, *Tuckerman*.
- P. heterophyllus*, var. *latifolius*, *Mert. & Koch*.
- " var. *Zizii*, *Boreau*.
- P. lucens* var. *minor*, *Nolte*.
- " var. *heterophyllus*, *Fries*.
- " var. *Zizii*, *Ascherson*, *Blyth*.
- ? " var. *coriaceus*, *Nolte*.
- P. Proteus*, sub-sp. *Zizii*, *Cham. & Schlecht*.
- P. serratus*, *Linn. Sp. Pl.*, *Nolte* in Hansen, *Herb. Slesv.-Holst.*
n. 1114 (*Herb. Mus. Brit.*)

FIGURES.—*P. Zizii* is well figured in Reichenbach's 'Icones Fl. Germ.' vii. t. 39 (var. *elongatus*) and t. 38 (var. *validus*); but Koch considers the latter to represent at all events partly *P. lucens*. The fruit is also figured in the 'Linnæa,' ii. (1827), t. v. fig. 16 *b, c*, and in Fieber, 'Die Potamog. Böhmens' (1838), t. ii. fig. 11. I hesitate to quote the large new plate of *P. Zizii* in 'Flora Danica,' fasc. 49 (1877), t. 2886, which differs in several particulars, especially in the form of the perianth-leaves.

DISTRIBUTION.—The plant has been observed in many parts of the north and centre of Europe. In the herbarium of the British Museum we have examples from the Palatinate (where it was first noticed), and from Erlangen, Bavaria; from Slesvig-Holstein, Saxony, Silesia, Bohemia, and the island of Bornholm in the

* In Hansen. *Herb. Slesv.-Holst.*, no. 521 (*Herb. Mus. Brit.*)

† Fries, 'Novitiæ Fl. Suec.,' p. 36.

‡ Hartm., 'Skandin. Fl.' ed. 10, p. 226.

§ Blyth, 'Norges Flora,' Suppl., p. 1277.

¶ Asch., 'Fl. Prov. Brandenburg,' p. 659 (1864).

¶ In 'Linnæa,' ii. p. 201.

** This is not improbably an earlier name, but I have been unable to trace it.

Baltic. It is also recorded from Sweden, Norway and Denmark, Lithuania, and the Loire in France. It appears to extend into North America. *P. lucens* var. *minor*, Nolte, is given by A. Gray* in the States, and to judge from specimens in the British Museum labelled '*P. spathis*, Tuckerm. herb.', the *P. gramineus*, var. *spathaformis* is also referable to *P. Zizii*.

Among the synonyms given above is *P. lucens*, var. *coriaceus*, Nolte, which is referred to *P. Zizii* by Koch and by Ascherson. It was first recorded in 1826† by Nolte, who sent specimens to Mertens, and it was duly inserted in Rohling's 'Deutschlands Flora.'‡ Reichenbach has given an excellent figure in the 'Icones,' t. 37, drawn from an authentic specimen, and well agreeing with one in the Museum herbarium, gathered by Nolte in 1821, at Schalisch, in Lauenburg. This is the *P. lucens*, var. *lacustre* of Thore,§ and is a very remarkable plant with thick ovate floating leaves, and the lower submerged ones frequently reduced to the spine-like midrib. It is, I think, rightly referred to *lucens* in a wide sense, but is not quite *Zizii*; nor does it agree completely with the *lucens* with floating leaves from Kinghorn Loch, Fife, collected by Mr. Boswell (Syme). Some British botanists would certainly call it *heterophyllus*.

P. Zizii, then, must be considered as more closely allied to *P. lucens* than to *P. heterophyllus*, and may be placed, like *P. decipiens*, as a variety or subspecies under the former species.

DESCRIPTION OF TAB. 204.—Representing *Potamogeton Zizii*, M & K., from specimens sent by Mr. Brotherston. 1. Upper part of a plant in flower. 2. Portion of a lower branch. 3. Extremity of a branch of the larger form. 4. A perianth-leaf. 5. Fruit.

* ON A COLLECTION OF FERNS GATHERED IN THE FIJI ISLANDS BY MR. JOHN HORNE, F.L.S.

By J. G. BAKER, F.R.S.

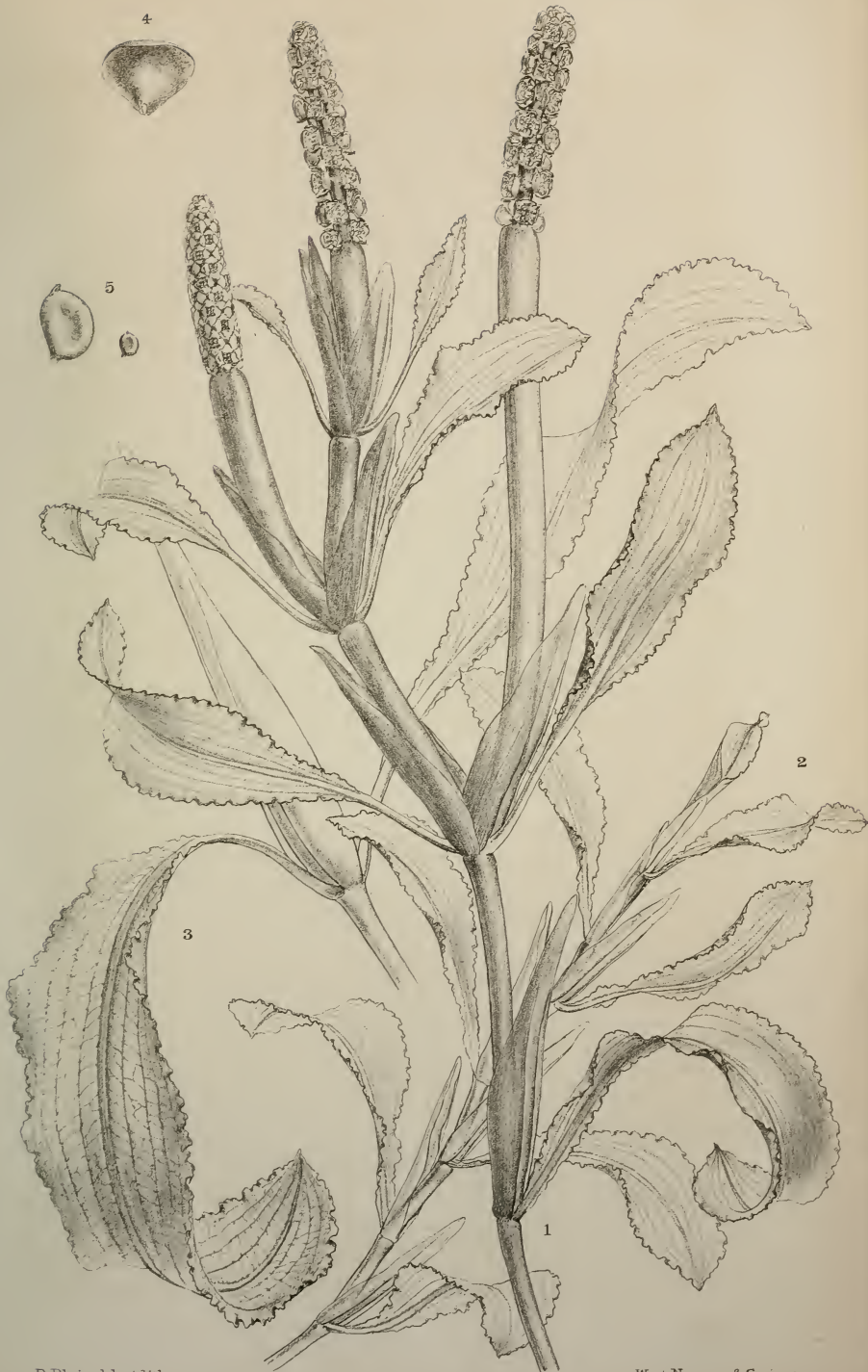
MR. HORNE, F.L.S., the director of the Botanic Garden at Mauritius, who has already done such good service to botany in his exploration of the Seychelles, has recently, whilst on an expedition in search of new varieties of sugar-cane, on the invitation of the governor, Sir Arthur Gordon, spent nearly a year in the Fiji Islands, engaged in the investigation of their flora. He has now returned to England, bringing with him his specimens, which run up to 1146 numbers. Of these about 300 numbers, illustrating nearly 200 species or well-marked varieties, are ferns and fern-allies. It is now practicable to explore in safety all the islands of the Fiji group, so that Mr. Horne has been able to visit many

* A. Gray, 'Man. Bot. N. U. States,' p. 288.

† Nolte, 'Novit. Fl. Holsat,' p. 21, footnote.

‡ *Loc. cit.*, p. 850.

§ Thore, 'Chloris des Landes,' p. 46.



D Blair del. et lith.

West Newman & Co. imp.

Potamogeton Zizii, M. & K.

districts of the interior that were not reached by Seemann, Milne, Macgillivray, Brackenridge, and the other collectors whose gatherings were described in Seemann's great work. He has added to the fern-flora of the group between thirty and forty species, of which about fifteen appear to be new to science. In the present paper I propose to notice these novelties, only describing the species that are new, and simply to mention those not known in the group before or on which his gatherings have in some way thrown new light. He paid a visit of four weeks to Samoa, but whilst there seems to have met with only a single fern not previously found by Messrs. Powell and Whitnce. The numbers prefixed to the names indicate where the species fall in the sequence of our 'Synopsis Filicum.'

47*. *ALSOPHILA HORNEI*, Baker, n. sp.—Trunk 12–16 feet high. Stipe a foot long, nearly black, conspicuously grooved down the frond, unarmed, as are also the black nearly scaleless rachises, clothed towards the base with firm lanceolate paleæ with a brown-black centre and a pale brown edge, and furnished with small decomposed abnormal pinnæ like those of *Hemitelia guianensis* and *H. setosa*. Frond ample, rhomboid, tripinnate, moderately firm in texture, green on both sides, naked above, furnished with copious brown minute bullate membranous scales beneath, the lower pinnæ fertile, the upper sterile. Pinnæ oblong-lanceolate, the central ones 12–18 in. long, 5–6 in. broad; pinnules lanceolate, $\frac{3}{4}$ –1 in. broad, cut down in the lower part to the rachis into crenate linear-oblong tertiary contiguous segments, of which all but the very lowest are adnate by their whole base. Veins 8–10-jugate, distinct, all except the uppermost forked in the tertiary segments of the sterile pinnæ. Tertiary segments of the fertile pinnæ under $\frac{1}{2}$ in. broad, not contiguous, distinctly crenate, their whole under surface filled up with sori, one to each lobe, leaving only a narrow space between the sorus and margin. Sori small (about $\frac{1}{8}$ lin. diam.), 16–18 to a fully-developed tertiary segment. Tops of mountain ranges, 2000 feet above sea-level, between Waiwai and Lomaloma, Vanua Levu, common; and also seen in the mountains of Viti Levu, *Horne*, 620! Easily distinguished from all the other Polynesian species by its black rachises, dimorphic pinnæ of the main frond, and accessory trichomanoid pinnæ at the base of the stipe.

Hymenophyllum javanicum, Spreng.—New to Polynesia.

10*. *TRICHOMANES CULTRATUM*, Baker, n. sp.—Rhizome filiform, wide-creeping. Stipe very short. Lamina suborbicular, entire, $\frac{1}{2}$ in. diam., glabrous, firm in texture for the tribe, the margin entire and naked, the base cuneate or rounded, the midrib distinct above the middle in the sterile fronds, in the deeply emarginate fertile fronds reaching to the deep apical sinus, and bearing a single free funnel-shaped involucre, with a large spreading two-lobed mouth. Receptacle not protruded. Veins radiating flabel-lately from the sides and tip of the midrib. Sori never more than one to a frond. On trunks of trees in shady woods of Bua, Vanua Levu, *Horne*, 1078! Closely allied to *V. Motleyi*, V. D. B.

Trichomanes maximum, Blume.—Two varieties, one with tufted stipites, the other with a creeping rhizome, with dwarfed dimorphic fronds attached.

Dicksonia moluccana, Blume, var. *inermis*, Baker.—Differs from the type, which is only known in Java, by the absence of prickles on the rachises. Mountains of Namosi, Viti Levu, at 1500 feet above sea-level, *Horne*, 841! “Stipe 6 feet long and an inch in diameter; frond triangular in outline, 12 feet long, 10 feet broad at the base.”—*Horne*.

19*. *DICKSONIA INCURVATA*, Baker, n. sp.—Frond 6–10 feet long, including the stout castaneous naked stipe, deltoid, tripinnate, quite glabrous and scaleless, moderately firm in texture, the rachises of all grades bright brown below, pale brown on the upper side of the frond, the main one with a few small prickles. Pinnæ oblong-lanceolate, the lower ones $1\frac{1}{2}$ –2 feet long. Pinnules lanceolate, the fullest-developed ones 1–1 $\frac{1}{4}$ in. broad, cut down to the rachis into oblong-rhomboid deeply pinnatifid free sessile tertiary segments, which are produced and parallel with the rachis on the upper side at the base, cut away cuneately on the lower side. Veins fine, copiously pinnate in the tertiary segments, with ascending forked veinlets. Sori placed at the base of the ultimate sinuses, incurved, with a deep persistent cup-shaped glabrous indusium. Forests near the source of the Vaseri river, in the southern part of Viti Levu, at an elevation of 1000 feet above sea-level, *Horne*, 971! The stipe and rachises are two distinct colours, dark chestnut-brown on the back, pale brown on the face, and the two colours do not blend into one another, but are bounded by a sharp line. Allied to the common American *D. cicutaria*.

Davallia hymenophylloides, Baker.—“This very pretty *Davallia* I found in two places in Fiji, in densely wooded mountains in Vanua Levu, between Waiwai, Savusavu Bay, and Lomaloma, and Viti Levu on the loamy banks of streams, near Navasi saw-mills. In the latter station it was associated with *D. Blumeana*, Hook.”—*Horne*, 636! *D. hymenophylloides* has not been found previously nearer Fiji than New Caledonia. *D. Blumeana* has been gathered several times in Samoa, and once in Fiji, by Mr. Cairns.

Davallia stolonifera, var. *acutifolia*, Baker.—A curious new variety, with narrow deeply pinnatifid pinnæ, nearly an inch long, narrowed gradually from the base to an acute point. On trees on the tops of the mountains near Namosi, Viti Levu, and other stations in the same island, in a region where the rainfall reaches 150 inches in a year, *Horne*, 815!

16.* *ADIANTUM HORNEI*, Baker, n. sp.—Stipites tufted, 6–8 in. long, glossy, nearly black, with a coating of small dark linear palææ near the base, glabrous, as are the rachises. Lamina deltoid, about half a foot long and broad, the lower pinnæ with 1–2 branches, the other three or four simply pinnate, the texture firm, both surfaces glabrous, the lower slightly glaucous. Segments contiguous, oblong-rhomboid, about $\frac{3}{8}$ in. broad from top to bottom, $\frac{1}{2}$ – $\frac{5}{8}$ in. diameter opposite the rachis, the lower shortly petioled, the upper ones sessile, the inner margin parallel with the rachis,

the lower at right angles with it or somewhat ascending, the outer obtusely rounded and minutely crenate, as is the upper margin, which is nearly parallel with the lower one. Sori round, 1-4 to each segment, inserted in deep narrow sinuses of the upper margin; involucre round-reniform, persistent, glabrous. In damp places amongst rocks under the shade of stunted trees at Waiwai, Savu-savu Bay, Vanua Levu, at about 1500 feet, *Horne*, 560! Allied to *affine* and *flabellulatum*. "When growing the fronds have a shining metallic lustre that catches the eye."—*Horne*.

Cheilanthes farinosa, Kaulf.—A single tuft in the province of Navosi, Viti Levu, amongst *débris* on dry cliffs between Beila and Nadrau, *Horne*, 952! A species widely spread in Asia, Africa, and America, but not known before in Polynesia.

3.* PTERIS (EUPTERIS) VITIENSIS, *Baker*, n. sp.—Stipites tufted, pale brown, naked, 6-24 in. long, with small brown linear membranous scales at the base and clothing the caudex. Lamina oblong, $\frac{1}{2}$ -1 foot long, simply pinnate, green and glabrous on both sides, moderately firm in texture. Pinnæ 5-17, lanceolate, all simple, the lower ones shortly petioled, the upper ones sessile, but not at all decurrent, the fully-developed barren ones about half a foot long and an inch broad, acuminate, entire, unequal at the base, but broadly rounded on both sides, the fertile ones narrower and not more than half as broad. Veins close, distinct, ascending, simple or once forked. Sori continuous from the base to within a short distance of the top of the fertile pinnæ; involucre narrow, glabrous. Not uncommon in rich loamy soil between the Waimanu and Rewa rivers, Viti Levu, at about 200 feet above sea-level *Horne*, 718! Most like *P. pellucida*, from which it differs by the pinnæ being all simple and the upper ones not at all decurrent on the main rachis.

Lomaria Patersoni, Spreng.—Steep rocky banks of streams in the mountains between Naquave and Nukasevi, on the Navua river, Viti Levu, *Horne*, 951! New to Polynesia. Mr. *Horne*'s specimens match Cuming 200 from Luzon, figured 'Hook. Sp. Fil.,' vol. iii., tab. 143, the original of *L. Cuningiana*, Hook.

Lomaria (Plagiogyria) adnata, Blume.—Common amongst rocks on a branch of the Navua river, Viti Levu, at 1000 feet, *Horne*, 812! and near the sources of the Waini Malu, in the same island, *Horne*, 939! It seems more and more evident, as fresh specimens arrive, that this is not distinct specifically from *L. euphlebia*, Kunze. The plant was discovered lately in Australia, but this is the first time we have received it from Polynesia.

Asplenium amboinense, Willd., var. *Hillii*, *Horne* MSS.—Differs from typical *amboinense*, as represented by Seemann's No. 813, by its much closer veins, spreading from the costa almost at a right angle. Island of Rabi, *Horne*, 493! "Named after the kind and hospitable proprietor of the island on which it was found."—*Horne*. The relations to one another of *A. vittiforme*, Cav., *A. sundense*, Blume, *A. amboinense*, Willd., and *A. fijiense*, Brack., want carefully working out in the field before we can know how many species

the four names really cover. Mr. Horne has altogether five numbers that fall within these limits.

Asplenium (Diplazium) maximum, Don.—Common in woods, Vanua Levu, *Horne*, 1099! This exactly matches the common Indian plant so-called, which is not distinctly known before as Polynesian.

Allantodia Brunoniana, Wall.—In one place, Vieunga, in the interior of Viti Levu, *Horne*, 799! New to Fiji, but discovered lately by the Rev. S. J. Whitmee in Samoa.

Asplenium aculeatum, Sw.—Tops of mountains, at about 1800 feet, between Waiwai and Naduri, Vanua Levu, common, frequently attaining a height of six feet, *Horne*, 602! It is interesting to get this characteristically temperate fern in this group for the first time. Messrs. Powell and Whitmee have met with three well-marked varieties in Samoa.

213.* *NEPHRODIUM (SAGENIA) TRIPARTITUM*, *Baker*, n. sp.—Stipites tufted, nearly black, glossy, 6–10 in. long, with a few lanceolate brown scales near the base. Frond deltoid, 6–9 in. long and broad, green and glabrous on both sides, moderately firm in texture, cut down within about an inch of the base into three segments, the central one oblong-lanceolate, acuminate, repand, 2–3 in. broad, the side ones shorter and unequal-sided, simple or shortly forked at the base. Main veins ascending, rather wavy, $\frac{1}{3}$ – $\frac{1}{2}$ in. apart, distinct nearly to the margin; areolæ small, irregular, with abundant free included veinlets. Sori large (nearly a line broad), forming two distinct rows (6–8 sori in the central pinnæ) between the main veins; involucre large, reniform, glabrous, persistent. Damp shady places amongst the mountains near Waiwai, Vanua Levu, *Horne*, 562! Allied to *N. Pica*, of Mauritius.

219.* *NEPHRODIUM (SAGENIA) HEPTAPHYLLUM*, *Baker*, n. sp.—Stipites about a foot long, pale brown, naked. Frond deltoid, above a foot long and broad, moderately firm in texture, green and glabrous on both sides, simply pinnate, with 3–4 pairs of pinnæ and an end one. Pinnæ oblong, acute, 2–3 in. broad, the upper confluent at the base or broadly adnate to the rachis, the lowest pair shortly stalked and forked at the base. Main veins erectopate, distinct to the edge, $\frac{1}{4}$ – $\frac{1}{3}$ in. apart, with very copious distinct small intervening areolæ, with free included veinlets. Sori middle-sized, forming two distinct rows between the main veins, 6–8 to a row; involucre glabrous, persistent. Upulo, Samoa, on mountains at 1500 feet elevation, on the slopes of an extinct crater 15 miles from Apia, *Horne*, 20! Allied to the West African *N. Barteri*.

219.* *NEPHRODIUM (SAGENIA) JUGLANDIFOLIUM*, *Baker*, n. sp.—Rhizome woody, wide-creeping, $\frac{1}{8}$ in. diam., clothed densely with dull dark brown lanceolate paleæ. Stipites contiguous, brown, 9–18 in. long, with a few paleæ towards the base. Frond oblong-rhomboid, about a foot long, simply pinnate, moderately firm in texture, green and glabrous on both sides. Pinnæ generally 5, the end one like the others, lanceolate, 6–9 in. long, 15–21 lines broad,

acuminate, cuneate at the base, all simple, the side ones erecto-patent, the upper rather decurrent on the rachis, the lowest pair shortly stalked. Main veins ascending, distinct to the edge, $\frac{1}{4}$ – $\frac{1}{3}$ in. apart, enclosing copious small areolæ with a few included free veinlets. Sori small, irregularly biserial; involucre small, glabrous. Special station not quite certain, probably on the Rewa river, Viti Levu, *Horne!* Allied to *N. Barteri*, *pachyphyllum*, and the last species.

43.* POLYPODIUM (PHEGOPTERIS) ALSOPHILOIDES, *Baker*, n. sp.—Stipe dull brown, naked, above half a foot long. Frond deltoid, tripinnatifid, $1\frac{1}{2}$ –2 feet long, moderately firm in texture, green on both sides, pubescent on both sides on the rachises and principal veins. Pinnæ oblong-lanceolate, the lowest the largest, 6–9 in. long, cut down throughout to a very narrowly-winged rachis into lanceolate pinnules $\frac{1}{2}$ in. broad, with regular oblong contiguous tertiary segments, which are confluent at the base only. Veins pinnate in the tertiary segments, with simple erecto-patent 3–4-jugate veinlets. Sori small, medial on the ultimate veinlets. Densely wooded ravine in the mountains between Waiwai and Lomaloma, Vanua Levu, *Horne*, 645! Cutting of an *Alsophila*, like *latebrosa* or *lunulata*, with a smaller frond and fewer veins to a segment.

43.* POLYPODIUM (PHEGOPTERIS) GORDONI, *Baker*, n. sp.—Stipites tufted, about a foot long, dull brown, thinly paleaceous up to the top. Frond lanceolate-deltoid, tripinnatifid, $1\frac{1}{2}$ –2 feet long, membranous, dark green and glabrous on both surfaces, minutely scaly on the main ribs and rachises. Pinnæ lanceolate, those two-thirds of the way down the largest, half a foot long, cut down throughout to a distinct narrow wing to the rachis into equal-sided lanceolate pinnules $\frac{1}{3}$ in. broad, with numerous deep linear-oblong obtuse contiguous tertiary segments. Veins pinnate in the tertiary segments, with 2–3-jugate erecto-patent simple veinlets. Sori small, medial on the veinlets, usually one only to each tertiary segment. Damp, shaded forests in the mountains round Namosi, Viti Levu, *Horne*, 785! Resembles in general habit the small less compound forms of *Nephrodium Boryanum*.

Polypodium rugulosum, Lab.—Clefts of rocks on the side of an old Fijian fighting-village called Koro Levu, in Walau, at 1500–1800 feet, *Horne*, 206! Just the ordinary Australian form of the plant.

Polypodium ornatum, Wall.—Fiji; the special locality not quite certain.

90.* POLYPODIUM (DICTYOPTERIS) DEPARIOIDES, *Baker*, n. sp.—Stipites tufted, a foot long, nearly black, very glossy, quite free from hairs or scales. Frond deltoid, 3–4-pinnatifid, 3–4 feet long, moderately firm, green and glabrous on both surfaces, all the rachises dark brown-black and glossy. Pinnæ deltoid, upper sessile, the lowest the largest, distinctly stalked, 1– $1\frac{1}{2}$ feet long, with stalked deeply pinnatifid lower pinnules, with the lowest tertiary segments again deeply lobed; ultimate divisions confluent in a broad wing to the rachis, with toothed acute lanceolate lobes.

Veins fine, one main vein central in each ultimate segment, with copious intervening irregular areolæ with free included veinlets. Sori small, globose, superficial, placed on distinct projecting teeth, several to each ultimate segment (6-12 to a segment $\frac{1}{4}$ - $\frac{1}{2}$ in. long). Common in the forests between Naquave and Nukusari, Viti Levu, *Horne!* A scrap of this gathered by Milne has laid for many years amongst the doubtful ferns of the Kew herbarium. It is a most curious and anomalous plant with a close affinity with the New Caledonian *Deparia* (*Cionidium*) *Moorei*, but I cannot find any vestige of an involucre.

Polypodium cucullatum, Blume.—Damp shaded forests in the district of Navosi, Viti Levu; not uncommon, *Horne*, 1026! New to Fiji, but known already in Samoa, where Mr. *Horne* also found it.

169.* POLYPODIUM (EUPOLYPODIUM) HORNEI, *Baker*, n. sp.—Rhizome short-creeping; scales small, dense, dull brown, lanceolate, ciliated. Stipites contiguous, very short, densely pubescent. Frond lanceolate, simply pinnate, 6-8 in. long, 1-1 $\frac{1}{4}$ in. broad at the middle, narrowed gradually to both ends, firm in texture, soon curling up when gathered, green and nearly glabrous on both surfaces, slightly hairy and furnished with a few black linear-subulate scales on the midrib beneath, cut down to the rachis into crowded adnate pinnæ. Pinnæ 40-50 on a side, linear, entire, $\frac{1}{2}$ - $\frac{3}{8}$ in. broad, narrowed gradually from the base to an obtuse point, the lower ones gradually dwindling down to mere auricles. Veins obscure, simple, erecto-patent, 15-16-jugate in the central pinnæ. Sori small, round, superficial, medial. Forests between Nadrau and Babuca, Viti Levu, and also in the mountains of Ovalau, in both cases at about 1000 feet elevation, *Horne*, 369! Allied to *blechnoides* and *decorum*.

Polypodium lingueforme, Mett.—Common on Voma peak and other mountains near Namosi, Viti Levu, *Horne*, 768!

361.* POLYPODIUM (PHYMATODES) VITIENSE, *Baker*, n. sp.—Rhizome woody, flexuose, $\frac{1}{8}$ in. diam., clothed when young with round small imbricated peltate brown scales. Stipites 4-6 in. long, distant, naked, stramineous. Frond rhomboid, 6-12 in. long, 3-6 in. broad, simply pinnatifid, cut down within $\frac{1}{8}$ - $\frac{1}{4}$ in. of the rachis into 6-8 pairs of ascending entire acute lanceolate pinnæ, $\frac{1}{2}$ in. broad at the base, narrowed gradually to the tip, membranous in texture, green and glabrous on both surfaces. Veins fine, the main ones not distinct more than half way from the midrib to the margin, the ultimate areolæ small, copious, with free included veinlets. Sori small, superficial, forming a single row $\frac{1}{4}$ - $\frac{1}{3}$ in. apart, nearer the midrib than the margin of the segments. Rocks on the banks of the river at Nadrau, in Viti Levu, in a gorge about 500 feet deep, *Horne*, 950! Near the Samoan *P. Powellii*, and New Zealand *P. Billardieri*.

1.* MENISCIUM BECCARIANUM, *Cesati*, *Fil. Beccar. Polyn.*, p. 8.—Rhizome slender, woody, short-creeping. Stipites contiguous, dull brown, 3-4 in. long, clothed with minute squarrose linear-subulate scales. Lamina lanceolate, simple or with a pair of detached auricles at the base, 9-12 in. long, 1-2 in. broad at the

middle, acute, narrowed gradually from the middle to the base, firm in texture, green on both sides, glabrous or slightly pilose on the main ribs on the under surface. Main veins distinct to the edge, $\frac{1}{8}$ – $\frac{1}{6}$ in. apart, with 5–8 areolæ between the midrib and margin. Sori deltoid, occupying nearly the whole length of the cross-veins. Voma peak and other mountains near Namosi, Viti Levu, at about 1800 feet, *Horne*, 745! 795! This is one of the many interesting species discovered by Professor Beccari in his recent exploration of the mountains of New Guinea.

Vittaria scolopendrina, Thwaites.—Trees in damp, shady forests near Namosi, Viti Levu, *Horne*, 780! This is not published as a Fiji species, but we received it not long ago from Mr. Edgar Layard.

Antrophyum reticulatum, Kaulf.—On trees in low, damp, shady forests, both in Walau and Viti Levu, *Horne*, 15! 106!

Gymnogramme borneensis, Hook., var. *major*, Baker.—Woods near Nadrau, Viti Levu, at 1500 feet, *Horne*, 926! The type is a rare Bornean plant, discovered by T. Lobb, and regathered lately by Burbidge. The Fiji plant coincides with it in texture, veining, and sori, but the lamina is twice as long and as broad, and furnished with a distinct stipe. ✓

60.* GYMNORAMME (SYNGRAMME) SCOLOPENDRIOIDES, *Baker*, n. sp.—Rhizome woody, wide-creeping, clothed with copious spreading lanceolate crisped brown scales. Stipe very short, scaly. Frond lanceolate, entire, 10–12 in. long, $\frac{3}{4}$ –1 in. broad above the middle, narrowed very gradually to the base, acute, coriaceous, green and glabrous on both surfaces, a few scales similar to those of the stipe extending to the midrib on the under surface. Veins distinct, erecto-patent, simple or forked, $\frac{1}{2}$ – $\frac{3}{4}$ lin. apart, united at the apex by an obscure intramarginal vein, like that of *Thamnopteris*. Sori shorter than in any of its allies, confined to the upper part of the frond, irregular, the largest nearly touching both midrib and margin. On trees near Navesi saw-mills, Suva, Viti Levu, *Horne*! ✓

Gymnogramme Wallichii, Hook.—At Koroivono, and also at Waiwai, Vanua Levu, in open parts of the forests, at about 1000 feet, *Horne*, 522! 621! New to Polynesia.

Gymnogramme pinnata, Hook.—Of this there seem to be three well-marked varieties; the type, as figured by Brackenridge under the name of *Hemionitis elongata* (Atlas, tab. 8), with copiously confluent linear sori; a var. *brachysora* (Milne, 321! *Horne*, 737!) with the sori mostly oblong, $\frac{1}{8}$ – $\frac{1}{6}$ in. long, rarely round or linear; and a var. *polypodioides*, gathered for the first time by Mr. Horne, in which the sori are more numerous, smaller, and mostly round. The three forms all correspond in veining and in the texture and cutting of the frond.

Acrostichum conforme, Sw.—A plant gathered by Mr. Horne on trees on the mountains near Namosi, Viti Levu, agrees well with the Himalayan *A. marginatum*, Wall.

Acrostichum sorbifolium, L.—A specimen gathered by Mr. Horne shows conclusively that *Gymnogramme?* *subtrifoliata*, Hook. Sp.

Fil., vol. v., p. 152, tab. 298, a plant known only in a barren state, is an abnormal form of this species.

Acrostichum Blumeanum, Hook.—The type and also a fully bipinnate variety in damp shady forests at Vienuga, Viti Levu, *Horne*, 807! Mr. Horne's specimens materially extend the range of variation known for this species, and render it almost certain that my *Acrostichum cultratum* (Syn. Fil. edit., p. 524), from the Solomon Isles, is an abnormal form of it, with the pinnæ cut down to the rachis into round-quadrangular segments.

Acrostichum gorgoneum, Kaulf?—Woods near Navusa, on the Rewa river, Viti Levu. The specimens are not in fruit, and it is likely may prove to be a distinct species from the Sandwich Island plant, a near ally of which (*A. savaiense*, Baker) has lately been discovered in Samoa.

Selaginella latifolia, Spreng.—Forests in the mountains of Koro-i-vono, Vanua Levu, and on the Navua river, Viti Levu, *Horne*, 538! 842! New to Polynesia.

S. viridangula, Spreng. in Obs. Plant. Nov. Herb. Van Heurck, p. 29. Gathered in several places, *Horne*, 417! 468! 537!

Mr. Horne has also added *Marsilea* to the Fijian flora, but I am not certain as to the species.

NOVAM ARISTOLOCHIÆ SPECIEM

describit HENR. F. HANCE, Ph.D., e Societate Linnæana
Londinensi, etc.

ARISTOLOCHIA (*Siphisia*) MOLLISSIMA, *sp. nov.*—Caulibus scandentibus incano-lanosis, foliis cordato-ovatis obtusiusculis sinu angusto obtuso auriculas rotundatas separante supra sericeo-tomentosis subtus cano-lanatis basi pedati- superne penni-nerviis lucique obversis dense reticulatis $2\frac{1}{2}$ – $3\frac{1}{2}$ poll. longis $1\frac{1}{2}$ – $2\frac{3}{4}$ poll. latis petiolo pollicari, pedunculis axillaribus solitariis sericeo-lanosis petiolo brevioribus supra medium bractea ovata supra pubescenti subtus lanosa ad auctis, flore erecto pollicari, ovario clavato dense lanoso, perigonii extus lanosi intus glaberrimi venisque purpureis reticulatis picti utriculo oblongo-ovali apice refracto et in tubum eo breviorum producto limbo orbiculari-trilobo lobis latis acutiusculis, columna styliina obtuse triloba, antherarum catervis distantibus.

In collibus Feng-wang shan, prope Shang-hae, die 13, Maii, 1877, invenit amic. F. B. Forbes. (Herb. propr. n. 20719).

Pulcherrima, sane, et ab omnibus orientali-asiaticis apprimè distincta species, vix dubie proximam sibi vindicans necessitudinem cum *A. tomentosa*, Sims, ex Americæ septentrionalis civitatibus fœderatis australioribus oriunda.

A NOTE ON BORAGE.

BY H. F. HANCE, Ph.D., F.L.S., &c.

It seems very uncertain whether Borage was known to the Greek and Roman classical writers; for the *βούγλωσσον* of Dioscorides, which Sprengel referred to it,* is ascribed by both Billerbeck† and Fraas,‡ notwithstanding that the Greek physician attributes to it, when infused in wine, the property of raising the spirits, § to either *Anchusa italica*, Retz., or *A. officinalis*, Linn., the Romaic name of the former being *βοιδόγλωσσα*. And, when Lindley quotes Pliny, || as saying that wine with Borage infused in it cheers the spirits, he is evidently referring to the *Buglossos* of that author, ¶ the name, description and properties ascribed to which prove its identity with the plant of Dioscorides. Nor is there any herb mentioned by either Theophrastos, Theocritos, or Virgil** which has been taken for Borage.

Sprengel supposed †† that he recognised Borage in the *Borith* †‡ of St. Hildegard, abbess of Bingen (nat. 1098, ob. 1180), but Dr. Reuss thinks the name more likely refers to *Saponaria officinalis*, Linn. §§

Though now frequent in many parts of Europe (in Hispania australi abundat, writes Willkomm |||), the soundest authorities regard Borage as an alien. ¶¶ It is, I think, doubtful whether it

* 'Hist. Rei Herb.' i. 160.

† 'Fl. Class.' 39. Cæsalpinus also refers it to *Anchusa italica* ('De Plant. lib. xi. c. 2 & 3).

‡ 'Synops. Fl. Class.' 162. Bocquillon remarks of both species, "Elles sont employées comme la *Bourrache officinale*" ('Man. d'Hist. Nat. Med.' 1104).

§ ('Mat. Med.' lib. iv. c. 128 (opera ed. Saracenus, p. 290; Francof. 1598).

|| Loudon, 'Encycl. Plants,' 123.

¶ 'Hist. Nat.' xxiv. 8, 40.

** For the first-named author, I rely on the determinations of Sprengel and Fraas, brought together in the index appended to Wimmer's edition, prepared for Didot's 'Bibliotheca Græca'; for the second, to the copious indices to Theophrastos, Oppian, Nicandros, &c., together with their scholiasts, compiled for the same series by Bussemaker; whilst, for the third, I have carefully examined the 'Flora Virgiliana' of Retzius, the 'Flore et Faune de Virgile' of Paulet, Dumolin's 'Flore Poétique Ancienne,' and Bubani's 'Flora Virgiliana.'

†† *Op. cit.* i. 226.

‡‡ This word is Hebrew, and occurs in the Old Testament (Jerem. ii. 22; Malachi iii. 2). Rosenmüller 'Miner. and Bot. of Bible,' 112) refers it to *Salsola Kali*, Linn.; whilst the Vulgate renders it by the words "herba borith," and the English version by "soap." This latter translation is upheld by the Rev. W. L. Bevan (Smith's Dict. of Bible,' iii. 1337), and by Dr. Tristram ('Nat. Hist. Bible,' 2nd ed., 480).

§§ *Analecta ad antiq. fl. germ.*, appended to his edition of the *Hortulus* of Walatridus Strabo, p. 77 (Wirceburgi, 1834).

||| 'Prodr. Fl. Hispan.' ii. 492.

¶¶ "In hortis colitur, ibique et in ruderalis atque hortorum rejectamentis quasi sponte provenit" (Koch, 'Syn. Fl. Germ.' ed. 3, ii. 432). "Alien" (Watson, 'Cybele Brit.' ii. 280). "Naturalisé dans toute la France" (Gren. & Godr.,

was known much before the time of the Crusades; and it has been supposed to have been introduced from Aleppo.*

A confusion between *Anchusa* and *Borrago*,† and the reverential spirit with which the early Greek and Roman writers on medicine or *materia medica* were regarded, as authorities whose dicta were to be accepted implicitly, led the mediæval physicians to ascribe to Borage a very high though quite undeserved rank, as a cardiac and pectoral medicine.‡ Its renown indeed was so great that it passed into an adage. "Vulgaris versiculus est 'Dicit Borrage gaudia semper ago,'"§ writes Io. Bapt. Porta.||

It was doubtless the supposed cordial virtues with which the herb was credited that led to the very fanciful and no doubt quite groundless etymological notion that *Borrago* was a corruption of "cor ago."¶ Sir W. Hooker and Dr. Walker-Arnott accepted this derivation, adding that the name came more directly from *borrach*,

* Fl. de France, ii. 510). M. Alphonse De Candolle, in reference to the opinion of Bertoloni ('Géogr. Bot.' ii. 679, 992), allows that "on peut croire le *Borrago officinalis* originaire d'Italie"; but it is evident that he is opposed to the conclusion; and the adverse judgment of Cæsalpinus may fairly be cited, when, towards the close of the sixteenth century, he writes, "Existimo Borriginem in Italia quondam peregrinam fuisse, cum de ea nulla fiat mentio ab antiquis inter olera" ('De Pl.' xi. 3).

* De Candolle, 'Prodr. Syst. Nat. Regn. Veg.' x. 35. Littré says it is a native of Africa, introduced into Spain by the Arabs.

† Both Matthioli (Comm. in Dioscorid. lib. iv. c. 123) and Dodonæus (Pemptad. v. 1, 9) refer the βούγλωσσον of Dioscoridès to *Borrago officinalis*.

‡ Nostra ætas non modo herbam, sed præcipue flores subinde in vinum conjicit, v. acetariis inspergit, lætitiæ ac hilaritatis excitandæ causa: condiuntur et in hunc usum cum saccharo flores: tum et alia ex iis parantur, quibus ad cordis corroborationem, tristitiam pellendam, et animi lætitiã augendam medicæ passim utuntur (Dodonæus, l. c.)

§ "Antiquus versiculus 'Ego Borago semper gaudia ago'" (Dodonæus). Sir Wm. Hooker ('Brit. Fl.', *sub voce*) quotes a similar English adage, "I Borage always bring courage."

|| 'Phytognomonica,' lib. iii. c. 11.

¶ Both Dodonæus and Ray quote Appuleius as calling the plant *Corago*; and Dr. Prior writes ('Popular Names of Br. Pl.', 2nd ed., 26), "Apuleius says that its former name was 'corrago, quia cordi affectibus medetur.'" He gives no further specific indication where these words occur, but I should suppose him to refer to the work 'De Herbarum Virtutibus,' of the pseudonymous Appuleius, sometimes called 'Appuleius Barbarus,' a worthless compilation, chiefly from Dioscorides and Pliny, of very uncertain age, Dr. Greenhill (in Smith's 'Dict. Class. Biogr.') supposing it to have been written about the fourth century of our era, Sprengel (*op. cit.* i. 228) some time before A.D. 1200, whilst Mr. Cockayne assigns a date between A.D. 1000 and 1066 to one of the Old English codices he collated: and such a work in those days must have attained considerable vogue before it was translated. I have, however, carefully gone over the original Latin text, in the edition of 'Jo. Phil. de Lignamine' (Parisii, 1528), and also the Old English version edited by the late Rev. Oswald Cockayne, in the first volume of his learned 'Leechdoms Wortcunning and Starcraft of Early England,' and have failed to find any reference to Borage therein. Cap. 42, indeed, treats of *Buglossum*, but that is referred by Billerbeck to *Anchusa officinalis*. Linn., and by Mr. Cockayne to *Cynoglossum officinale*, Linn. The words of Dodonæus, "dicitur Apuleio et Corago, unde fortassis Boraginis nomen, C in B mutato, nisi apud Apuleium Borago pro Corago legendum sit," seem incompatible with the statement that Apuleius himself suggested this derivation.

a courageous or noble person, in Celtic.* Dr. Mahn, who made a thorough revision of the etymologies of the words in the latest recension of Webster's 'English Dictionary,' derives it from the Low Latin *borra*, the hair of beasts, flock, from its hairy leaves.† But this opinion is, in all likelihood, specious rather than well-founded. Dr. Prior remarks that "it is probably a Latinized oriental name, brought with the plant from Syria"; and Mr. Bentham says,‡ "Etymologia verbi valde incerta est, verisimiliter a nomine quodam orientali corrupta." To M. Littré, however, is probably due the credit of tracing the word to its real source, and his decision is in accord with the surmises of the two last-named authors. In the unrivalled work to which so many years of his honourable and laborious life have been dedicated, he derives the French word *Bourrache*§ from the Arabic *Abou rach*, "the father of sweat"; and he adds, "*Borrago* est du latin des botanists, formé de *bourrache*."|| If it be true that Borage was introduced into Europe either from Aleppo by pilgrims or from Mauritania by the Moors, this would support M. Littré's etymology. I notice with some surprise that in the 'Dictionnaire étymologique des mots d'origine orientale,' of M. Marcel Devic, appended by M. Littré to the lately issued Supplement to his 'Dictionary,' the word *bourrache* does not occur. Whether, however, this is due to oversight, or to a divergence of opinion as to its oriental origin on M. Devic's part, I am unable to say.

As regards the orthography, as Mr. Bentham observes, southern authors—as for example Cæsalpinus, Matthioli, the Bauhins and Tournefort—usually spell it with two R's; northern writers—as Dodonæus and Ray—with one. But the assertion that Linnæus followed the latter method is not strictly accurate, as may be seen by a reference to the excellent and useful compilation of Richter.¶ It is obvious that if either the mediæval idea of the origin of the word or the derivation given by M. Littré be correct, but one R should be employed, and two if Dr. Mahn's etymology be accepted.

* 'Brit. Fl.', ed. omn. *sub voce*.

† See also Dr. Ernst (Hardwicke's 'Science Gossip,' vii. 214). One writer in that periodical (vii. 165) derives Borage from the Greek *βορά*, food; another puts forth the eccentric suggestion "that it seems allied to or derived from the Latin and Greek Boreas" (vi. 214).

‡ 'Gen. Plant.' ii. 854.

§ 'Dict. de la langue franç.' i. 394.

|| The plant was also called *borraquia* in mediæval Latin (Maigne d'Arnis, 'Lexic. man. a' script. med. et inf. Latin,' 341).

¶ 'Codex bot. Linnæan.', 154.

FOUR NEW FERNS FROM SOUTH CHINA.

By J. G. BAKER, F.R.S.

In a small parcel of plants just received from Mr. Ford, of the Botanic Garden at Hong-Kong, are several ferns brought by a native collector from some distance up the North river from Canton, four of which prove to be new species.

1.* CHEILANTHES (ADIANTOPSIS) FORDII, *Baker*.—Stipe short, wiry, brown, covered with adpressed brown membranous lanceolate acuminate scales. Frond lanceolate, bipinnate, 5–6 in. long, $1\frac{1}{4}$ – $1\frac{1}{2}$ in. broad above the middle, narrowed gradually from the middle to the base, firm in texture, green and glabrous on both sides, its purplish-brown wiry rachis obscurely scaly. Pinnæ sessile, lanceolate, $\frac{1}{4}$ in. broad, cut down to the rachis in the lower part into oblong obtuse adnate lobes, the lower four or five pairs more distant than the others and growing gradually smaller. Sori round, distinct, placed all round the margin of the secondary lobes; involucre round, pale green, firm in texture, glabrous, persistent. Allied to the South American *C. Lindigii*.

152.* ASPLENIUM (EUASPLENIUM) FUSCIPES, *Baker*.—Stipe 3–4 in. long, wiry, flexuose, bright brown, naked. Frond lanceolate-deltoid, tripinnatifid, broadest at the base, 3–4 in. long, $1\frac{1}{4}$ – $1\frac{1}{2}$ in. broad, moderately firm in texture, green and glabrous on both sides, its slender rachis brown in the lower part, green upwards. Pinnæ subsessile, crowded, lanceolate-deltoid, cuneately excised on the lower side at the base, cut down to the rachis into contiguous sessile rhomboid deeply pinnatifid secondary segments, with linear-oblong 1-nerved tertiary lobes. Sori $\frac{1}{2}$ – $\frac{3}{4}$ line long, linear-oblong, touching the midrib of the pinnules, but falling short of the tip of the tertiary lobes. Allied to the Indian *A. tenuifolium*, Don., and American *A. rutaceum*.

283.* POLYPODIUM (NIPHOBOLUS) CALVATUM, *Baker*.—Rhizome wide-creeping, $\frac{1}{8}$ – $\frac{1}{6}$ in. diameter, with a wrinkled brown membranous cuticle. Stipe 4–5 in. long, green, naked, with a tuft of lanceolate acuminate rusty-brown membranous scales at the base. Frond lanceolate, entire, rigid in texture, a foot long, an inch broad, narrowed gradually from the middle to the base, bright green and naked on the upper surface, covered with a thin coat of deciduous drab tomentum beneath. Main veins fine, erecto-patent, distinct to the edge at a distance from each other of a quarter of an inch. Sori round, superficial, $\frac{1}{2}$ lin. diameter, confined to the upper part of the frond, filling up the whole of the space between the midrib and margin. Allied to the Indian and Malayan *P. stigmatosum*, Sw.

311.* POLYPODIUM (PHYMATODES) CANTONIENSE, *Baker*.—Rhizome wide-creeping, one-sixteenth of an inch diameter, densely clothed with small linear or lanceolate dull brown adpressed scales. Stipes distant, naked, greenish, 2–3 in. long. Frond entire, ovate, firm in texture, green and glabrous on both sides, obtuse, truncate at

the base, 2-3 in. long, $1\frac{1}{2}$ -2 in. broad. Veins anastomosing copiously in irregular areolæ, the main ones straight and distinct three-quarters of the way from the midrib to the edge, the lower ones spreading from the midrib at a right angle, the upper erectopatent. Sori not seen. Allied to *P. lineare* and *superficiale*.

HYPNUM (BRACHYTHECIUM) SALEBROSUM, HOFFM.,
AS A BRITISH MOSS.

BY RICHARD SPRUCE.

In the September number of 'Grevillea' Mr. G. Davies questions the genuineness of my Yorkshire specimens of *Hypnum salebrosum*, Hoffm., and of my Pyrenean ones of *Hypnum (Camptothecium) aureum*, Lag.; the former published in Wilson's 'Bryologia Britannica' (1855), the latter in the 'Transactions of the Bot. Soc. of Edinburgh' for 1849. If he should chance to visit my neighbourhood, and will favour me with a call, he shall see the originals of both, and decide for himself; or, if the British Museum be more easily accessible to him, I believe he will find there duplicates of the same, with my autograph attached, in the herbarium of the late Mr. Wilson.

I found very little of the *Hypnum aureum*, and all the plants were purely female and sterile; wherefore it could not possibly be* the monoicous *H. salebrosum*, which is one of the most fruitful mosses I know, and is never at any season without flowers of both sexes, except, of course, when very young. Moreover, at Paris I was able to examine an original specimen of *H. aureum*, gathered near Madrid by Lagasca himself, and to thus establish (to my own satisfaction) its perfect identity with my moss. My specimens were gathered on the ascent from Lac d'Oo to Lac d'Espingo, somewhat nearer the latter, but still a good way below the limit of the pine zone. It has since been found in a similar site in the eastern Pyrenees; and it grows and fruits abundantly in pine-woods in Provence (fide Schimper, Robert et al.), nearly two degrees of latitude to the north of my station for it. Yet Mr. Davies doubts the possibility of its occurring in the Pyrenees at all, because it is what he calls "a purely southern plant!" It grows also in the Isle of Sardinia, which is more nearly in the latitude of Madrid; and I have fine specimens gathered in the Sierra Morena by Prof. Schimper. If Mr. Davies knows Madrid, he must know also that the city itself is high enough above the sea to be sometimes very cold in the winter and spring months; while the Sierra de Guadarrama, which overlooks it from the north, and yields little to the Pyrenees in elevation, is at those seasons often more glacial and wind-beaten than Lake Espingo itself. When in the Pyrenees I had given to me a small collection of flowering-plants, recently made in the Guadarrama, some of them as alpine as any that grow by Lake Espingo.

* As Mr. Davies suggests.

If Mr. Davies could find no *Hypnum aureum* at Lake Espingo, he found there *H. salebrosum*, which no one but himself, so far as I know, has ever seen growing so high up on the Pyrenees. I gathered abundant specimens in the central Pyrenees, but always in temperate valleys, in woods of beech and fir (*Pinus Abies*)—never once above the upper limit of the latter, or within the zone of *Pinus sylvestris*. Lieutenant Renauld, a most accurate bryologist, who is at present stationed at Tarbes, at the foot of the central Pyrenees, and is doing excellent work in those mountains, the results of which are consigned to the pages of the 'Révue Bryologique,' says (apropos of *Brachythecium salebrosum* and its subspecies *Mildeanum*), "*Brach. Mildeanum*, Sch. Syn., ed. i. = *Brach. salebrosum*, var. *palustre*, ejusd. ed. ii., is abundant, well-grown, and fertile on moist grassy slopes, on clayey alluvium, at Séméac, near Tarbes (alt. 350m.). . . . It is not uncommon in similar sites all along the sub-Pyrenean plateau [at from 300 to 540 metres above the sea level.] *Brach. salebrosum*, on the contrary, flourishes most in fir-woods of the Pyrenees, where it grows on rotting trunks and vegetable humus. Spruce does not indicate *Br. salebrosum* at all in the plain, but comprises it in his upper montose zone (*zona montosa pars superior*), corresponding to the region of the *Pinus Abies*, which quite agrees with my personal observations." (Rév. Bryol., 1878, p. 73). Observe, I do not assert that this moss may not occasionally stray beyond its normal upper limit. I have had some experience of the capacity of mosses for climbing mountains—a feat far less easy of explanation than their descending along the course of streams. In the Pyrenees I have tracked *Hypnum molluscum* through every zone of altitude, from the plain up to the limit of eternal snow. In the first zone above the plain it is copiously fertile; in the upper alpine zones utterly sterile. Some grasses show a similar adaptability to enduring extremes of climate. The herbage around and above Lake Espingo is largely composed of *Nardus stricta*—a grass common also in the marshes of the Landes, barely above the sea-level.

Hypnum salebrosum grows, very sparingly, in the valley of the Yorkshire Derwent, in two woods a mile apart, viz., the wood by Castle Howard station and that opposite Kirkham Abbey, where I first found it in November, 1846, growing on the trunks of trees at a few feet from the ground. It was in fine fruit, and as I was then fresh from gathering *H. salebrosum* in the Pyrenees, I at once recognised it. In July, 1872, Professor Lindberg re-found it there, not on a tree, but on a decaying post. It was then out of season, but we satisfied ourselves it was the true plant.

In 1847-8, when I was drawing up my account of the mosses of the Pyrenees, I wished to cite a good figure of *Hypnum salebrosum*. The figure under that name in 'Muscologia Britannica' was plainly the dioicous *H. glareosum*, but there was a beautiful figure in Greville's 'Scottish Crypt. Flora,' t. 284, which seemed true *H. salebrosum*. For greater surety I sent specimens of the two species to Dr. Greville, and asked him to say to which of them his figure really belonged. In reply he sent me for examination the

original specimen he had figured and described. It consisted of four plants, or small tufts, glued on paper, and marked "Near Forfar, Drummond, 1824." I numbered, and then examined them, with the following result:—

Nos. 1, 2, 3. = *H. salebrosum*, *verum!* florescentia monoica—flore ♂ in caule et ramis primariis sæpe juxta fl. ♀ posito; pedicello lævissimo; fol. acumine breviora magis serrata quam *H. glareosi*.—No. 4. = *H. lutescens*, Huds., sterile, floresc. dioica; foliis confertis strictioribus, siccitate adpressis, striis profundioribus pereursis, acumine brevi.

That specimen doubtless still exists in Greville's herbarium, and I venture to predict that its re-examination by any competent bryologist would confirm my own report on it.

We have, therefore, at least two reliable stations for *Hypnum salebrosum* in Britain, and I can hardly doubt that a careful search would reveal others; for the plant is so like some states of *H. rutabulum* that, unless the smooth pedicel and the silky and somewhat slenderer foliage be noted, it is very likely to be overlooked for that ubiquitous species.

Brachythecium Mildeanum, Sch., I do not find that I gathered at all in the Pyrenees, although I found the very similar *Br. campestre*, whose pedicel is always somewhat scabrous. Schimper, in the 2nd edition of his 'Synopsis,' says that he founded the *Br. Mildeanum* of his 1st edition on a solitary imperfect specimen, and his ultimate decision on it (Syn., ed. ii., p. 642), is "nil aliud esse videtur quam forma *Br. salebrosi* robustior in locis humidis vel inundatis degens." Whatever its specific merits may be they have nowhere been more clearly stated than by Mr. Renauld, in the memoir already cited, and I translate his diagnosis for the benefit of those who may not possess the original.

"The differences are evidently slight, and yet the habit of *Br. Mildeanum* is sufficiently distinct from that of *Br. salebrosum* to make it recognisable at first sight. The characters that distinguish the two plants may be summed up as follows:—

"*Brach. salebrosum*.—Tufts *silky*, green or yellowish. Stems radiculose, often pinnately branched. Leaves running out to a long slender acumen, *denticulate*, rarely subentire, *strongly plicate*. Flowers monoicous, Male bracts oval acuminate.—*Hab.* on stones, the ground, and rotting trunks, under bushes, and in woods.

"*Brach. Mildeanum*.—Tufts a fine *golden yellow*. Stems *destitute of radicles*, *not pinnate*, the few branches being erect or erecto-patent. Leaves erecto-patent or imbricated, a little wider at the base, triangular, gradually narrowed into a shorter acumen, entire or nearly so, feebly plicate. Flowers monoicous or polygamous. Male bracts abruptly narrowed into a *long filiform acumen*.—*Hab.* moist clayey grassy sites." (Renauld, *l. c.*)

It must be confessed that the above differences seem rather local than specific, and merely sufficient to entitle the plant to rank as var. *Mildeanum* of *Brach. salebrosum*. Our Yorkshire plant, however, is not that variety, but exactly typical *Brachythecium salebrosum*.

THE CRYPTOGAMIC FLORA OF KENT—*FUNGI*.

By T. HOWSE, F.L.S.

(Continued from p. 242.)

Fam. 2.—GASTEROMYCETES.

Order 7.—HYPOGÆI.

HYMENOGASTER LUTEUS, *Vitt.*

Currey, Greenw. Rep.*

OCTAVIANA COMPACTA, *Tulasne.*Hillydeal Wood, near Otford, *C. E. Broome.*

Order 8.—PHALLOIDEI.

PHALLUS IMPUDICUS, *L. Grev.*, t. 213.Sydenham Hill; Bostol Wood; Knowle Park; Langton Green,
Forst. Fl. Tunb.; *Currey, Greenw. Rep.*CYNOPHALLUS CANINUS, *Fr. Sow.*, t. 330.

Sydenham Hill.

Order 9.—TRICHOGASTRES.

GEASTER COLIFORMIS, *P. Sow.*, t. 313.In lane from Crayford to Bexley Common, *Doody in Ray's Syn.*,
Berk. Eng. Fl., p. 300.G. FORNICATUS, *Fr. Sow.*, t. 198.Wickham, near Bromley, *Forst. Fl. Tunb.*TULOSTOMA MAMMOSUM, *Fr. Grev.*, t. 340.On a wall near the Halfway House to Greenwich, Mr. Sowerby.
*Grev. Scott. Cryp. Fl.*BOVISTA NIGRESCENS, *P. Berk. Out.*, pl. 20, f. 6.Dartford Brent, *M. C. Cooke.*LYCOPERDON GIGANTEUM, *Batsch. Grev.*, t. 336.Crystal Palace Grounds; Knowle Park; Beckenham Lodge,
*Percy Bicknell; Currey, Greenw. Rep.*L. CÆLATUM, *Fr. Huss. ii.*, t. 23.Field near Shoreham; Hayes, *Huss.*L. PUSILLUM, *Fr. Bolt.*, t. 117, f. C.

Grassy places near the sea, Deal.

L. SACCATUM, *Vahl. Huss. i.*, t. 14.Abbey Wood, *Holmes; Kent, Berk. Out.*; Keston, *Huss.*L. GEMMATUM, *Fr. Huss. i.*, t. 54.Willesboro' Lees Wood, *Holmes; Starvecrow Wood, Tunbridge,*
*W. T. T.; Currey, Greenw. Rep.*L. PYRIFORME, *Schaff. Grev.*, t. 304.Wood near Shoreham; Wrotham, Swanscombe Wood, and
Joyden's Wood, *Holmes; Currey, Greenw. Rep.*

* List of Fungi in Report of the Botanical Committee of the Greenwich Nat. Hist. Club, prepared and presented by Mr. Currey at their meeting in Greenwich, on the 3rd December, 1857.

SCLERODERMA VULGARE, *Fr.* Huss. i., t. 17.

Sydenham Hill; St. Paul's Cray Common; Ightham, and opposite High Rocks, Tunbridge Wells, *Holmes; Currey, Greenw. Rep.*

Order 10.—MYXOGASTRES.

(Arranged according to the method of Rostafinski in 'Myxomycetes of Great Britain,' by M. C. Cooke.)

PHYSARUM DIDERMOIDES, *Ach. Didymium congestum*, B. & Br.
Currey, Greenw. Rep.

P. CINEREUM, *Batsch.* Fl. Dan., t. 1980, f. 2. *Didymium cinereum*, *Fr.*
Sydenham Hill.

P. SINUOSUM, *Bull. Sow.*, t. 6. *Angioridium sinuosum*, *Grev.*
Darenth Wood, *M. C. Cooke.*

TILMADOE NUTANS, *Pers. Physarum nutans*, *Pers.*
Currey, Greenw. Rep.

CRATERIUM MINUTUM, *Leers.* Sow., t. 239.
On bramble, Tunbridge Wells, *Herb. Deakin; Currey, Greenw. Rep.*

C. LEUCOCEPHALUM, *Pers. Grev.*, t. 65.
Southboro', *Stavely; Currey, Greenw. Rep.*

LEOCARPUS FRAGILIS, *Dicks. Grev.*, t. 111. *Diderma vernicosum*,
Pers.
Fir plantation, Tunbridge Wells, *Herb. Deakin; Currey, Greenw. Rep.*

FULIGO VARIANS, *Sommf. Bolt.*, t. 134. *Æthalium septicum*, *Fr.*
Sydenham Hill; Deal; Tunbridge Wells, *Herb. Deakin; Currey, Greenw. Rep.*

BADHAMIA INAURATA, *Curr. Linn. Trans.*, xxiv. (1851), t. 25, f. 8.
St. Paul's Cray Common, on *Jungermannia*, *Currey.*

B. UTRICULARIS, *Bull. Bull.*, t. 417, f. 1.
Var. *Schimperiaana.*
Sydenham Hill.

DIDYMIUM MICROCARPON, *Fr. Didymium nigripes*, *Fr.*
Currey, Greenw. Rep.

D. SQUAMULOSUM, *A. & S. A. & S.*, t. 4, f. 5. *D. leucopus*, *Fr.*
Sydenham Hill; Currey, Greenw. Rep.

D. MICROCARPON, *Fr. Ditm.*, t. 42. *D. nigripes*, *Fr.*
Southboro', *Herb. Deakin.*

CHONDRIODERMA MICHELII, *Lib. Sow.*, t. 12. *Didymium hemisphericum*,
Fr.
Sydenham Hill.

C. SPUMARIOIDES, *Fr. Diderma spumarioides*, *Fr.*
Currey, Greenw. Rep.

C. DIFFORME, *Pers. Grev.*, t. 40. *Physarum album*, *Fr.*
Petts Wood, St. Mary Cray; Currey, Greenw. Rep.

SPUMARIA ALBA, DC. Grev., t. 267.

Sydenham Hill. On *Trifolium arvense*, sands near Deal. Specimen in British Museum. Darenth Wood, *M. C. Cooke*.

STEMONITIS FUSCA, Roth. Grev., t. 170.

Sydenham Hill; Darenth Wood, *Cooke*; Tunbridge Wells, *Herb. Deakin*; Stockholme Wood, Dunton Green, *Holmes*; *Currey, Greenw. Rep.*

S. FERRUGINEA, Ehr. Bolton, t. 93, f. 1.

Sydenham Hill.

COMATRICHA TYPHINA, Roth. *Stemonitis typhoides*, DC.

Currey, Greenw. Rep.

C. FRIESIANA, D. By. Sow., t. 259.

Var. α . OBOVATA. *Stemonitis obtusata*, Fr.

Sydenham Hill.

Var. β . OBLONGA. *Stemonitis ovata*, Pers.

Sydenham Hill; Tunbr. Wells, *Herb. Deakin*; *Currey, Greenw. Rep.*

ENERTHENEMA PAPILLATA, Pers. *Stemonitis papillata*, E. F.

Currey, Greenw. Rep.

RETICULARIA LYCOPERDON, Bull. Sow., t. 272. *R. umbrina*, Fr.

Sydenham Hill; Swanscombe Wood and Dunton Green, *Holmes*; *Currey, Greenw. Rep.*

TRICHIA FALLAX, Pers. P. Obser., t. 3, f. 45.

Rowdow Wood, near Kemsing; Rusthall Common, *Herb. Deakin*.

T. VARIA, Pers. Mich., t. 95, f. 4.

Shoreham, *Holmes*; *Currey, Greenw. Rep.*

Var. NIGRIPES. *Trichia nigripes*, Pers. Mich., t. 96, f. 4.

Kent, *Cooke*; *Currey, Greenw. Rep.*

T. CHRYSOSPERMA, DC. Grev., t. 281.

Sydenham Hill; Petts Wood, St. Mary Cray; Darenth Wood, *Cooke*; *Currey, Greenw. Rep.*

Rostafinski includes *T. turbinata*, With. with this.

T. TURBINATA, With. Sow., t. 85.

Darenth Wood, *Cooke*.

ARCYRIA PUNICEA, Pers. Grev., t. 130.

Sydenham Hill; Shoreham; Petts Wood, St. Mary Cray; Darenth Wood, *Cooke*; Rusthall Common, Tunbridge Wells, *Herb. Deakin*; *Currey, Greenw. Rep.*

A. CINEREA, Schum. *Currey, Greenw. Rep.*

A. INCARNATA, P. P. Obs., t. 5, f. 4, 5.

Sydenham Hill; St. Mary Cray; Bostol Wood, *Currey, Greenw. Rep.*

A. NUTANS, Fr. Grev., t. 309.

Stockholme Wood, Dunton Green, *Holmes*; Tunbridge Wells, *Herb. Deakin*; *Currey, Greenw. Rep.*

LYCOGALA EPIDENDRUM, Bur. Grev., t. 38.

Sydenham Hill; Rosebank, Tunbridge Wells, *T. Walker*; Dunton Green, *Holmes*; Tunbridge Wells, *Herb. Deakin*; *Currey, Greenw. Rep.*

PERICHÆNA DEPRESSA, *Lib.* Corda. Ic., v., f. 13.
Sydenham Hill.

Order 11.—NIDULARIACEI.

CYATHUS STRIATUS, *Hoffm.* Currey, Greenw. Rep.

C. VERNICOSUS, *DC.* Berk. Out., t. 21, f. 1.

Pembury Woods, Tunbridge Wells, *T. Walker*; Tunbridge Wells,
Herb. Deakin; Currey, Greenw. Rep.

SPHÆROBOLUS STELLATUS, *Tode.* Berk. Out., t. 21, f. 2.

On a cucumber-frame, Sydenham Hill, *Currey, Greenw. Rep.*

CRUCIBULUM VULGARE, *Tul.* Currey, Greenw. Rep.

Fam. 3.—CONIOMYCETES.

Order 12.—SPHÆRONEMEI.

LEPTOSTROMA FILICINUM, *Fr.*

On dead *Pteris aquilina*. Darenth Wood, *M. C. Cooke*; Currey,
Greenw. Rep.

L. LITIGIOSUM, *Desm.*

On dead *Pteris aquilina*. Darenth Wood, *M. C. Cooke.*

PHOMA DEPRESSUM, *B. & Br.*

On *Robinia pseudacacia*. Tunbridge Wells, *Herb. Deakin.*

P. EXIGUUM, *Desm.*

On elders. Tunbridge Wells, *Herb. Deakin.*

P. NEBULOSUM, *Berk.*

On nettle-stems. Tunbridge Wells, *Herb. Deakin.*

SEPTORIA ULMI, *Kze.* Currey, Greenw. Rep.

S. CORNICOLA, *Desm.*

On dogwood. Dartford, *M. C. Cooke.*

S. HEDERÆ, *Desm.*

Darenth Wood, *M. C. Cooke.*

S. ANEMONES, *Desm.*

Darenth Wood, *M. C. Cooke.*

CYTISPORA RUBESCENS, *Fr.*

On dried fruit of *Cydonia japonica*. Tunbr. Wells, *Herb. Deakin.*

C. LEUCOSPERMA, *P.*

On dried fruit of *Cydonia japonica*. Tunbr. Wells, *Herb. Deakin.*

Order 13.—MELANCONIEI.

MELANCONIUM BICOLOR, *Nees.*

On birch, Sydenham Hill; Currey, Greenw. Rep.

ASTEROSPORIUM HOFFMANNI, *M. & N.* *Stilbospora asterosperma*, *Pers.*

Currey, Greenw. Rep.

STILBOSPOA MACROSPERMA, *P.* Currey, Greenw. Rep.

NEMASPOA CROCEA, *P.* Currey, Greenw. Rep.

Order 14.—TORULACEI.

TORULA MONILIOIDES, *Cord.* Currey, Greenw. Rep.

T. OVALISPOA, *Berk.*

On birch, Tunbridge Wells, *Herb. Deakin*; Currey, Greenw. Rep.

T. HERBARUM, *Lk.*

Sydenham Hill; Darenth Wood, *M.C.Cooke*; *Currey, Greenw. Rep.*

SPORIDESMIUM LEPRARIA, *B. & Br.*

Ashover Wood, *Penshurst, Holmes.*

CONIOTHECIUM AMENTACEARUM, *Cd.*

Darenth Wood, *M. C. Cooke.*

Order 15.—PUCCINÆ.

PHRAGMIDIUM MUCRONATUM, *Link.* *Currey, Greenw. Rep.*

P. BULBOSUM, *Schl.* *Currey, Greenw. Rep.*

P. GRACILE, *Grev.* *Currey, Greenw. Rep.*

P. OBTUSUM, *Link.* *Currey, Greenw. Rep.*

P. ACUMINATUM, *Fr.* On burnet leaves, *Dartford, M. C. Cooke.*

TRIPHAGMIUM ULMARLE, *Link.* *Currey, Greenw. Rep.*

PUCCINIA GRAMINIS, *Pers.* *Currey, Greenw. Rep.*

P. SYNGENESIARUM, *Link.* *Currey, Greenw. Rep.*

P. STRIOLA, *Link.* *Currey, Greenw. Rep.*

P. PRIMULÆ, *Grev.* *Currey, Greenw. Rep.*

P. MENTHÆ, *Pers.* *Currey, Greenw. Rep.*

P. SCORODONLÆ, *Link.* *Currey, Greenw. Rep.*

P. VINCÆ, *B.* *Currey, Greenw. Rep.*

P. VIOLARUM, *Link.* *Currey, Greenw. Rep.*

P. LYCHNIDEARUM, *Link.* *Currey, Greenw. Rep.*

P. PULVERULENTA, *Grev.* *Currey, Greenw. Rep.*

P. CIRCEÆ; *Pers.* *Currey, Greenw. Rep.*

P. PRUNORUM, *Link.* *Currey, Greenw. Rep.*

P. DIFFORMIS, *Kze.*

On bedstraw, *Greenhithe, M. C. Cooke.*

P. TRUNCATA, *B. & Br.*

Swanscombe Wood, Holmes; *Darenth Wood, M. C. Cooke.*

P. ADOXÆ, *DC.*

Swanscombe Wood, M. C. Cooke.

P. SCORODONLÆ, *Lk.*

Darenth Wood, M. C. Cooke.

P. CLANDESTINA, *Carm.*

On *Scabiosa succisa.* *Joyden's Wood, Holmes.*

P. COMPOSITARUM, *Schl.*

On *Centaurea nigra.* *Homewood, Jenner Fl. Tunbr.; Currey, Greenw. Rep.*

P. DISCOIDEARUM, *Link.*

On *Artemisia maritima.* *Northfleet marshes, M. C. Cooke; Currey, Greenw. Rep.*

P. VARIABILIS, *Grev.*

On *Leontodon Taraxacum.* *Tunbridge Wells, W. W. Reeves Jenner Fl. Tunbr.*

- P. *APII*, *Corda*. Northfleet marshes, *M. C. Cooke*.
- P. *SANICULÆ*, *Grev*.
Darent Wood, *M. C. Cooke*; Joyden's Wood, *Holmes*.
- P. *ANEMONES*, *P.* Abbey Wood, *Holmes*.
- P. *UMBILICI*, *Guép*.
On living *Luzula*, Darent Wood, 'Grevillea,' 1876, p. 109.
- P. *SAXIFRAGARUM*, *Schl*.
Greenhithe, *M. C. Cooke*; Swanscombe Wood, *Holmes*; *Currey*,
Greenw. Rep.
- P. *SPARSA*, *Cooke*.
On *Tragopogon pratensis*, *M. C. Cooke*.
- P. *MALVACEARUM*, *Mont*. Sydenham Hill; *Currey*, *Greenw. Rep.*
(To be continued.)

 SHORT NOTES.

NOTES ON *CARICA PAPAYA* AT BANTAM, JAVA.—I was much struck here with the fruiting of the *Papaya* trees. In some trees I perceived that the fruit was sessile and growing directly from the true stem, while in others it dangled from the extremities of long slender peduncles—sometimes, however, two or three fruits were attached to one peduncle by short pedicels. The fruit was about equal in size on both trees, the stalked being somewhat more pear-shaped, rougher, and more distinctly furrowed. I then observed that the sessile fruits were on female trees, and the stalked on males. I could not for a long time find an explanation for this singular latter circumstance, for on examining this particular male tree I could find no flower with any but rudimentary pistils. I then requested the natives to bring me flowers from all the neighbouring trees, but of these a male only here and there produced fruit. Such male trees as produce fruit produce it normally year after year from their youth, and do not suddenly or spasmodically produce one year and as suddenly cease bearing. At last five branches of a *Papaya laki*, which I afterwards examined,—a male tree,—were brought to me, having fruit suspended on long stalks, and bearing thirty-seven male, female, or hermaphrodite flowers, the sexes proportioned as follows:—Fifteen males (all decandrous, epipetalous, but one flower had five short and five long stamens, and the pistil shorter than all, and in four unopened buds the anthers had dehisced); four female (one flower had one stamen abortive); eighteen hermaphrodite (in one flower the stamens formed an outer calyx-like row with ovules on the inner faces). Between the producing capabilities of the two kinds the natives tell me there is no difference; but the fruit of the female tree is preferred to that of the male when ripe. The long stalks to the fruit is easily explained, as the female flowers occur on inflorescences which are many-flowered and long, and the fructifying ones remain after the male flowers fall. After very careful search I have failed to discover any male flowers on female trees.—

HENRY O. FORBES. [Mr. Forbes' observations corroborate generally those of Senhor Mello and Mr. Spruce recorded in the 'Journal of the Linnean Society,' vol. x., p. 1 and tab. 1, and made in the province of San Paulo, Brazil.—ED. JOURN. BOT.]

A CORRECTION.—In this Journal for 1874 (p. 369), I have put on record a supposed variety of *Zannichellia* with spiral fruit, a fragmentary specimen of which I found, without any indication of locality, in the Kew Herbarium. Having lately passed through my hands the *Potamogetons* in the British Museum, I can refer this with confidence to the N. American *P. Spirillus*, Tuck.,* and take the first opportunity of rectifying my previous erroneous determination. This remarkable species bears both submersed and emergent spikes, which differ considerably; the latter being on longish peduncles and many-flowered, whilst the subaqueous ones are almost sessile and reduced to a very few (1-4) flowers. Very frequently the whole plant is submersed, and neither floating leaves nor stalked spikes are then produced, the plant with its sessile fruit and linear leaves closely resembling a *Zannichellia*. A very similar specimen to the one I so misnamed is in Nuttall's herbarium. He made it the type of a new genus, bearing the (unpublished) name *Cochlosperma* from the shell-like fruit, and described it as without calyx and corolla! The specimen being wholly in fruit must account for this, unless there should really be any difference in this respect in the submersed flowers.—HENRY TRIMEN.

DEVON PLANTS.—A notice of my discovery of *Scirpus parvulus* at Aveton Gifford, on the Avon, S. Devon, appeared in the 'Journal of Botany' last year. On Sept. 1st of the present year I found it at a second S. Devon station, growing in considerable quantity in the mud and sand of some drains about the River Teign, at Newton. At both of its Devon stations it occurs some miles from the sea, where the waters are tidal, but cannot be strongly saline. I could not find any of the plants at Newton in either flower or fruit, owing perhaps to the very wet season we have had. On Sept. 6th last my brother found *Empetrum nigrum* in plenty among *Calluna*, about half a mile to the north-east of the hill of Great Mistor, Dartmoor. Some years ago a friend brought me a piece gathered on the moor in the neighbourhood of South Brent, many miles to the south-east of the Mistor station. Mr. Watson has recorded it for S. Devon in 'Topographical Botany,' so its occurrence at the two places I have named makes no addition to the list of species of the vice-county.—T. R. ARCHER BRIGGS.

EUPHORBIA PARALIAS, L.—It is well known that the late Dr. W. A. Bromfield sowed the seeds of *Euphorbia Paralias* on the sandy spits of St. Helen's and of Norton, both in the Isle of Wight. On St. Helen's Spit I this year noted several plants in a flourishing state; I am not aware whether descendants exist from the seed sowed at Norton. With the exception of a single plant

* In 'Silliman's Journal,' ser. 2, vi., p. 228 (1848).

observed by Mr. J. Pristo in Gurnet Bay, in 1868, the species has not, to my knowledge, been recorded as native in the Island. This month I found it in plenty on the sandy and gravelly shore immediately east of Burnt Wood, between Newtown and Thornes Bays. The ground suited for its growth is about 200 yards in length, and throughout this distance the plant flourishes, with every appearance of having occupied the spot for any length of time; so that, unless some record exists of the species having been intentionally introduced, it must henceforth rank as a native of the Isle of Wight.—F. TOWNSEND.

PIMPINELLA MAGNA IN SUSSEX.—The earliest and only reliable statement of *Pimpinella magna* having been found in Sussex is that contained in Turner and Dillwyn's 'Botanists' Guide,' published in 1805, which contains a notice from Mr. Borrer of "a single plant on Silver Hill, near Robertsbridge, which is all I have seen in Sussex." Mr. Hemsley, in his 'Outline Flora of Sussex,' published in the 'Journal of Botany' for 1875-6, mentions *Pimpinella magna* from the East Rother district, on the authority of Mr. Borrer; but there is no specimen in his herbarium now preserved at Kew. The record in Mr. Watson's 'Topographical Botany' of "*P. magna*, Sussex East, Hall Cat.," I have ascertained is an error; Miss Hall having marked this plant, instead of *Seseli Libanotis*, almost equally rare, which was found amongst furze-bushes on the downs near Seaford, at a field-meeting of the Eastbourne Natural History Society, in 1873 or 1874. It is therefore seventy-five years since we have any record of *Pimpinella magna* as a Sussex plant. I was consequently highly pleased on having some specimens brought me from Jevington at the end of July by Mr. E. Elmore, of Berwick, and on visiting the spot on my return from the country at the end of August I found the plant growing in tolerable abundance in a copse at Jevington Shott, about half a mile west of the church.—F. C. S. ROPER.

Extracts and Notices of Books & Memoirs.

OFFICIAL REPORT FOR 1878 OF THE DEPARTMENT OF BOTANY IN THE BRITISH MUSEUM.

BY WILLIAM CARRUTHERS, F.R.S.

THE work of incorporating plants in the General Herbarium has been actively carried on during the past year. In its progress the plants belonging to the following Natural Orders have been greatly increased, and more or less completely re-arranged:—*Meliaceæ*, *Leguminosæ*, *Loranthaceæ*, *Araliaceæ*, *Rubiaceæ*, *Gesneraceæ*, *Nepenthaceæ*, *Smilacæ*, *Restiaceæ*, *Filices*, and *Fungi*.

The following collections have been either entirely or in part incorporated in the General Herbarium:—The plants collected in Central Africa by Oudney and Clapperton; of Malaya, collected by Lobb; of the Samoan Islands, collected by the Rev. S. J. Whitmee; of Brazil, collected by Warming and others; of the

Argentine Republic, collected by Lorentz; of the Arctic Regions, by various collectors; the Ferns of Africa and Java, by various collectors; and the Cellular plants collected in the "Challenger" Expedition, by Moseley. Besides these, extensive series of plants, from various regions and by different collectors, belonging to the Orders *Leguminosæ*, *Passifloræ*, *Proteacæ*, and *Filices*, have been incorporated with the General Herbarium.

The separation of the study set of the great Herbarium of Australian Plants, collected by Robert Brown, and bequeathed to the Trustees by J. J. Bennett, has been completed, and this extensive series of plants, accompanied with the original manuscript notes, has been incorporated in the General Herbarium.

The transcription of the original labels and the separation of the collection of Tropical African plants made by Dr. Welwitsch have been completed, with the exception of those relating to the collection of fruits and seeds, which is making rapid progress.

The large Herbarium of Shuttleworth, acquired in 1877, has been systematically arranged, and some of the more important desiderata have been incorporated in the General Herbarium. The large series of plants from the Southern States of North America, collected by Rugel, has been separated from this Herbarium, and the Polypetalous Orders have been placed in the General Herbarium.

The sheets of the Herbarium of John Ray, presented to the Museum by the Apothecaries Company, have been carefully re-mounted on cartridge paper, and placed for preservation and easy reference in solander cases.

The whole of the different collections of British Phanerogamous Plants, except those contained in the volumes of the Sloanean Herbarium, have been incorporated in the British Herbarium, and this Herbarium has been completely revised and re-arranged during the year. Progress is being made in laying down the extensive collections of Mosses of the late W. Wilson. The British Elvellacei have been greatly added to and completely re-arranged.

The recently-formed Collection of Drawings and Illustrations of Plants has received the large addition of 8025 engravings and 42 original drawings, and progress has been made in the systematic arrangement of the whole collection for convenient reference.

The principal additions to the Herbarium during the year have been plants from Greece, by Pichler; from Palestine, by Post; from Eastern Lapland, by Fellman; from Sitka, by Comrie; from Eastern Tropical Africa, by Hildebrandt; from Western Tropical Africa, by Kalbreyer, presented by the Messrs. Veitch; from Australia, presented by Baron von Mueller; from the Samoan Islands, by Whitmee; from Rarotonga, by Wyatt Gill; from Brazil, by Warming, presented by W. P. Hiern, Esq. and illustrating his memoirs on Warming's plants; from Paraguay, by Balansa; from Uruguay and the Argentine Republic, by Lorentz; and from Trinidad, by Fendler.

Collections of Fungi from Saccardo, Rehm, Thuemen, Kunze, Rabenhorst, and Ravenal, have been added to the Herbarium;

and an interesting series of preparations of *Mycoides parasitica*, by Dr. Cunningham, in illustration of his Memoir in the 'Trans. Linn. Soc.,' has been presented by the Council of that Society.

Specimens of Algæ from Rabenhorst, Wittrock and Nordstedt, and of Hepaticæ from Rabenhorst, have been incorporated in the Herbarium.

The number of visits during the year 1878, paid to the Herbarium for scientific enquiry or research, was 1085.

The following foreign Botanists may be specified as having used the Herbarium in prosecuting their various studies:—Dr. Baillon, of Paris, for his works on Systematic Botany; M. Casimir DeCandolle, of Geneva, for his Monograph on *Meliaceæ*; Prof. Reichenbach, of Hamburg, for his works on *Orchideæ*; Mr. T. P. James, of Cambridge, United States, for his works on Mosses; M. Barbey, of Geneva, for his Monograph on *Epilobium*; Dr. Wittmack, of Berlin, for his Monograph on *Marcgraviaceæ*; and Baron von Ettingshausen, for his work on the Tertiary Plants of Britain. Among British Botanists the following may be specified:—Prof. Bentley, in connection with Bentley and Trimen's 'Medicinal Plants'; Mr. C. B. Clarke, for his work on the Flora of India; Mr. J. G. Baker, for his various systematic memoirs; Dr. I. B. Balfour, for his Monograph of the *Pandanaceæ*; the Rev. J. M. Crombie, Mr. Larbalestier, and Mr. Joshua, in connection with their investigations into British Lichens; Mr. Holmes, Curator of the Museum of the Pharmaceutical Society, for his investigations in connection with officinal plants; Mr. Christy, in the prosecution of his inquiries into the plants of commerce; Dr. Braithwaite, for his works on British Mosses; Mr. Broome and Mr. Howse, for the investigation of British Fungi; the Messrs. Groves, for their work on *Characeæ*; Mr. J. S. Gardner, for his investigations into the plants of the Tertiary Clays of Bournemouth; and Messrs. Packe, De Crespigny, Grindon, Churchill, Stratton, Bennett, Mansel-Pleydell, Glasspoole, Boulger, Gray, Jackson, and Newbould, for the critical study of European and British Plants.

The Native Plants of Victoria, succinctly defined by Baron FERD. VON MUELLER, C.M.G., &c. Part I. Melbourne, 1879.

THE indefatigable Government Botanist of Victoria has rapidly followed up his small volume of 'Botanic Teachings'* by a popular systematic Flora, the first part of which, now before us, contains the polypetalous Orders, among which are intercalated in their supposed places the apetalous or monochlamydeous ones. Each species is shortly described in very plain language, synonyms are omitted, and very few references are given; it would have been useful to have had in all cases a citation of the 'Flora Australiensis.' The derivations of the names and the localities and distribution are stated, and a special feature in the book is the illustration of every Order by an excellent series of wood-cut illustrations intercalated in the text. All introduced weeds, however common, are designedly omitted. The Colonial schools are fortunate in already possessing an

* 'Journ. Bot.,' 1878, p. 26.

instalment of a popular guide to a knowledge of the native vegetation, such as is still wanting in many European countries. H. T.

Aufzählung der von K. Graf von Waldburg-Zeil im Jahre 1876 in West Sibirien Gesammelten Pflanzen. Von F. KURTZ. Berlin, 1879.

THIS is an account of the herbarium formed by Count Waldburg-Zeil in O. Finsch's expedition to Western Siberia in 1876. It contains a description of the route of the expedition, a special florula of the Arctic Ob-district (155 species), and a complete catalogue of the species collected, with localities and geographical distribution. This contains 340 phanerogams and vascular cryptogams; it appears to be very carefully compiled, and is a valuable addition to our knowledge of Arctic and sub-Arctic botany. There are no new species. H. T.

DR. WARMING continues his researches into the *Cycadeæ* in a short memoir, illustrated with two plates in the 'Overs. ov. d. K. Danske Vid. Selsk. Forhandl.' for 1879.

IN the Trans. and Proc. of the New Zealand Institute for 1878 (published May, 1879) are a number of botanical articles. Dr. Hector describes a new species of *Pomaderris* (*P. Tainui*); Mr. J. Buchanan one of *Celmisia*; and Mr. W. Colenso two new Ferns. Mr. Cheeseman records the occurrence of the genera *Poranthera* and *Kyllingia* and of *Juncus tenuis* in New Zealand, and Mr. T. Kirk gives accounts of the botany of Okarito, and of the islands in the Hauraki Gulf, and describes several new species. There is another fine contribution to New Zealand botany by Dr. Berggren in the Lund University's 'Minneskrift' for 1878, with seven admirable plates of new and rare species.

OTHER NEW BOOKS. — A. ENGLER, 'Versuch einer Entwicklungsgeschichte der Pflanzenwelt,' Band. i., Leipzig, W. Engelmann, 1879.—C. F. W. JESSEN, 'Deutsche Excursions-Flora,' Herman Cohen, 1879 (9mk. 50pf.)—O. KUNTZE, 'Der Irrthum des Species begriffes' (Leipzig. Geograph. Gesellsch., 1879).—R. C. A. PRIOR, 'On the Popular Names of British Plants,' ed. 3, London, Williams & Norgate, 1879. F. STEPHANI, 'Deutschlands Jungermannien,' tab. 32 (8s.) C. J. HARTMAN, "Handbok i Skandinavians Flora," ed xi., Stockholm, 1879 (10kr.)

ARTICLES IN JOURNALS.—AUGUST.

Flora.—O. Penzig, 'The thorns of *Arduina ferox*, E. M.' (tab. 9).—K. A. Henniger, 'Hybridization in plants' (contd.)—Nylander, 'Addenda nova ad Lichenographiam europæam' (contd.).—F. Arnold, 'Lichenological fragments.'—W. J. Behrens, 'The nectaries of flowers.'—C. Muller, 'Musci Africæ orientali tropicæ Hildebrandtiani.'

Bot. Zeitung.—F. von Mueller, 'Some remarks on the first edition of Linné's Sp. Plant. in reference to the right of priority.'—O. Drude, 'On the nomenclature question.'—J. Vesque, 'New

researches on the development of the embryo-sac in angiosperms.'—J. Reinke, 'Obituary of A. Grisebach.'—L. Kny, 'Frank's memoir on the parasites in root-knobs of *Papilionaceæ*.'—Darapsky, 'The nucleus of the embryo-sac and the endosperm' (tab. 7).—L. Wittmack, 'On the *Marcgraaviaceæ*, especially the structure of their nectaries.'

Hedwigia.—Rehm, 'Remarks on the *Ascomycetes*.'

Oesterr. Bot. Zeitschr.—F. von Heldreich, '*Teucrium Ha'acsyanum*, n. sp.'—F. Hauck, 'Algæ of the Adriatic' (contd., t. 4).—S. Schulzer, 'Mycological notes.'—V. v. Borbas, 'A Hungarian Crucifer with a four-celled fruit.'—A. Heimerl and J. Schuler, 'On the flora of the Prater.'—H. Zukal, 'Mycological notes.'—W. Vatke, 'Plantæ a Hildebrandt in Africa coll.' (contd.)—F. Hegelmaier, 'Excursion in the Alicante Hills.'

Magyar Nov. Lapok.—F. von Mueller, 'On the genera *Brassia* and *Brassiaopsis*.'—'Report of the Brassai festival at Kolozsvár.'—V. de Janka, 'Botanical excursion in Turkey' (contd.)

Ann. des Sc. Nat. (ser. 6, viii., 1 & 2).—G. Bonnier, 'On nectaries.'

Bull. Soc. Bot. France (1878, pt. 4).—Mouillefaimé 'Notes of botanizing in 1878.'—G. Bonnier 'On anatomy and physiology of nectaries.'—E. Bonnet, 'Revision of sect. *Holosepalum* of *Hypericum*.'—M. Cornu, 'Note on two *Ustilagineæ*.'—Id., 'Enumeration of *Peronosporæ* of France.'—P. Sagot, 'Botanizing from a canoe in the rivers of tropical forests.'—L. Quelet, 'Some new Fungi.'—C. Bonnier and C. Flahault, 'On variations with latitude in the same species.'—A. Pellat, 'On some variations with altitude.'—P. von Tieghem, 'Anatomy of the Rose, and general anatomical character of invaginated axes.'—G. Bonnier, 'On the rôle assigned to coloured organs of flowers.'—E. Malinvaud, 'On a species of *Tilia grandifolia* with bracteolated peduncles.'

Journ. Linn. Soc. (No. 102, Aug. 20).—J. Miers, 'On some S. American genera of uncertain position and others not recognised by botanists.'—M. T. Masters, 'Note on the occurrence of a Restiaceous plant in Cochin China.'—F. M. Bailey, 'On *Carpesium* as indigenous to Queensland.'—T. M. Fries, 'On the Lichens collected during the English Polar expedition, 1875-6.'—J. Miers, 'Note on *Moquilea*, with description of a new species.'—J. G. Baker and S. Le M. Moore, 'Contribution to flora of N. China' (tab. 16).—J. M. Crombie, 'Enumeration of Australian Lichens in Herb. Rob. Brown.'—W. Phillips, '*Helvella californica*' (abstr.).—C. B. Clarke, 'On Ferns of N. India' (abstr.).

Botanical News.

DR. ODOARDO BECCARI, the celebrated botanist and traveller, has succeeded the late Prof. Parlatore as Professor of Botany and Director of the Gardens at Florence.

THE vacancies at Paris have been filled up by the appointment of P. VON TIEGHEM as Prof. of Botany (Anatomy and Physiology) at the Muséum in place of Brongniart, and of F. HERINCQ as Conservateur de l'herbier, in the place of Spach.

PROF. J. G. AGARDH having retired from the chair of Botany at Lund, Dr. F. W. C. ARESCHOUG, well known by his researches on the anatomy of plants and on the species of *Rubus*, has been appointed his successor.

THE death is announced of ERNEST FAIVRE, Professor of Botany at Lyons. He was knocked down by a carriage whilst on his way to an excursion with his pupils.

WE regret to have to record the death, on September 13th, at the age of 70, of WILLIAM WILSON SAUNDERS, formerly of Hillfield, Reigate, and lately of Raystead, Worthing, Sussex. At the former place he had amassed a magnificent collection of living plants, which were dispersed by sale a few years ago. His love of horticultural science led him to publish the 'Refugium Botanicum,' a periodical devoted to the illustration of little-known and rarely cultivated species, the descriptions being furnished by Professor Reichenbach and Mr. Baker. Of this Vol. i., containing 72 plates, was completed in 1868, and two parts of Vol. ii. have since appeared. To Mr. Saunders's liberality we also owe 'Mycological Illustrations,' figures and descriptions of new and rare Hymenomycetous Fungi. Only two numbers of this, each containing 24 plates, some of which were drawn by Mr. Saunders, were published (in 1871-2.)

THE exsiccata of Billot have been continued for several years by M. Paillot. He now gives up the labour with the issue of the 41st Fasciculus. The work will be continued by M. X. Vendrely, pharmacien à Champagny (Haute Saone), to whom parcels are in future to be addressed.

THE following has been the round of the papers:—Intelligence has reached St. Petersburg from Turkestan of the expulsion of Dr. Regel from Kashgaria. The *savant*, who is the Government botanist at Tashkend, set out a few weeks ago with a small exploring party, among the members being a staff officer, to investigate the flora in the vicinity of the Chinese head quarters at Chikho. The passport which the doctor took with him described the expedition as being purely scientific, but General Tso-Tsoun-Tan stopped the party half way to Chikho, and had them conducted back to the Kulja frontier. Dr. Regel protested against this treatment, asserting the aim of the expedition to be exclusively botanical, but Tso-Tsoun-Tan retorted that the Chinese had already investigated everything that grew within their dominions, and that Russia could have as much botanical information as she wished for on applying to the Chinese Government botanists at Peking.

MR. BERNARD HOBSON, of Tapston Elms, Sheffield, intends to compile and publish a directory of naturalists, and will be glad if all interested in botany will send him their names and addresses before November 3rd.

Original Articles.

ON ALTERNATION OF GENERATIONS IN THE THALLOPHYTES.

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THE discovery of the fact that an alternation of generations, comparable to that already known in the case of certain animals, takes place in the life-history of certain plants, is due chiefly to the labours of Hofmeister.* So far back as 1849 he pointed out that the prothallium of the Vascular Cryptogams is morphologically equivalent to the Moss-plant; that a Fern, a Lycopod, or a Rhizocarp, is the homologue of the Moss-fruit; and further, that in both Mosses and Ferns the asexual is interrupted by a sexual reproduction, this interruption occurring at an earlier stage in Ferns than in Mosses, and that the sexual and asexual generations regularly alternate.

So soon as these views were generally accepted, attempts were made to apply them to the life-histories of the Phanerogams on the one hand, and of the Thallophytes† on the other. Such an application is rendered difficult in the case of the former group, by the very intimate connexion of the two generations in the ovule, which makes their exact distinction a matter of some uncertainty; in fact, in spite of the considerable recent additions to our knowledge of the structure of the ovule and of the process of fertilisation, this question is still under discussion: in the case of the latter group it is rendered difficult by the more or less complete independence of the two generations, and by the frequent repetition of the one before the recurrence of the other. Some Thallophytes, however, viz. the *Conjugatæ*, *Fucaceæ*, and *Characeæ*, are generally considered not to exhibit any alternation of generations. It is the object of this paper to discuss the application to the Thallophytes of this doctrine, and to inquire in how far such an application is justifiable.

Before proceeding to do this it will be well to give a brief sketch of the life-history of a Moss, which may serve in some sort as a standard for comparison. Calling the sporogonium (the asexual generation or sporophore) the first generation, we find that

* Ueb. die Fruchtbildung und Keimung der höheren Kryptogamen, 'Bot. Zeit.,' 1849, No. 45.—Vergl. Unters. 1851. On the Higher Cryptogamia, 'Ray. Soc.,' 1862. Zur Uebersicht der Geschichte von der Lehre der Pflanzenbefruchtung, 'Flora,' 1867, p. 120.

† For instance, Pringsheim, Ueb. die Befruchtung und den Generationswechsel der Algen, 'Monatsber. der Berl. Akad.,' Mai, 1856:—Braun, Ueb. Parthenogenesis bei Pflanzen, 'Abhandl. d. k. Berl. Akad.,' 1856.

it is developed from a sexually-produced reproductive cell, the oospore, and that it bears asexually-produced reproductive cells, the spores, from which the second generation, the Moss-plant (oophore), is derived: in other words, the spore *always* gives rise to an oophore, and the oospore *always* gives rise to a sporophore.

The following account of the current views on alternation of generations in the Thallophytes is taken mainly from Sachs' 'Lehrbuch,'* where they are clearly and fully stated. Beginning with the *Zygosporææ*, and taking *Mucor Mucedo* as an example of the Fungi belonging to that Class, we find that the zygosporæ is regarded as the equivalent of the fertilised oosphere (oospore) of the Moss, and that consequently the product of its development is the homologue of the sporogonium. According to Brefeld's very complete account † of the life-history of this plant, the zygosporæ gives rise, on germination, to a simple mycelium bearing a single sporangium: this mycelium is then the sporophore of the plant. When the spores (conidia) developed in this sporangium germinate, they usually give rise to mycelia which bear only conidia, and several generations of these may be produced before the recurrence of a sexual mycelium bearing zygosporæ. It is evident that these conidia-bearing generations are not the equivalents of repeated Moss-sporogonia, for it is the peculiarly modified generation developed directly from the zygosporæ which is considered to be the sporophore: under these circumstances, the successive conidia-bearing mycelia must be regarded as being *potentially* sexual, that is, as being capable of producing zygosporæ under certain favourable conditions, but in the absence of those conditions they produce only conidia. Comparing this life-history with that of a Moss, it appears that the mycelium, developed from the germinating zygosporæ and never producing zygosporæ, is the asexual generation or sporophore, and is equivalent to the sporogonium: the spores (conidia) which it produces give rise to a generation which, unlike the corresponding generation of the Moss, may or may not be sexual according to the conditions under which it exists.

If we take *Pandorina* as an example of the algal forms of this Class, we find the sporophore represented only by the zygosporæ; from it, swarm-spores are liberated, which are considered to correspond to the spores of a Moss. In this case the mode of development of the spores from the zygosporæ is much simpler than in *Mucor Mucedo*; no vegetative organs whatever are developed, but the zygosporæ is itself the sporangium in which the spores are formed. These two modes of development have been distinguished by Pringsheim as "*mycelienkeimung*" (*Mucor*) and "*sporangienkeimung*" (*Pandorina*). ‡ Each of these swarm-spores gives rise to a cœnobium, which, like the mycelium of *Mucor Mucedo*, is either

* '4te Auflage,' 1874, pp. 231, 238, &c.

† 'Bot. Unters. üb. Schimmelpilze,' Heft I., 1872.

‡ Ueb. den Generationswechsel der Thallophyten etc., 'Jahrb. f. wis. Bot.,' Bd. XI., p. 42.

actually or potentially an oophore; the cells of the cœnobium divide and give rise to motile cells which, according to circumstances, either conjugate in pairs and form zygospores, when they are termed gametes,* or simply divide and form new cœnobia, when they are termed zoogonidia.

The oospore of the *Oosporeæ*, like the zygospore of the preceding Class, is regarded as the sporophore. Its development may resemble that of the zygospore of *Pandorina*, swarm-spores being formed within it which either give rise to potentially sexual individuals reproducing by means of spores (conidia, gonidia), or at once to sexual individuals; or it may resemble that of the zygospore of the *Mucorini*, and form a mycelium (*e.g.*, *Peronospora Valerianellæ*) † which, in this case, does not differ materially from the mycelium produced by a germinating conidium. It is of interest to note that both modes of development are exhibited by closely allied plants in the *Peronosporeæ*, and by the same plant ‡ in the *Saprolegniæ*.

In the *Carposporeæ* it is the cystocarp which is regarded as the sporophore, and the plant developed from the carpospore is the actual or potential oophore. The cystocarp varies much in structure; in *Coleochæte* it is not very different from an oospore or a zygospore, but in the *Ascomycetes* and in the *Florideæ* it is an organ of considerable complexity.

These views may be conveniently tabulated as follows:—

	<i>Sporophore.</i>	<i>Oophore.</i>
Moss	Sporogonium.	Plant.
Fern	Plant	Prothallium.
<i>Zygosporææ.</i>		
Mucor	Zygospore and rudimentary mycelium. .	Mycelium.
Pandorina . .	Zygospore.	Cœnobium.
<i>Oosporeæ.</i>		
Peronospora. .	Oospore	Mycelium.
Edogonium. .	Oospore	Thallus.
<i>Carposporeæ.</i>		
Ascomycetes. .	Cystocarp (apothecium)	Mycelium.
Florideæ . . .	Cystocarp	Thallus.

This interpretation of the life-history of Thallophytes has been recently criticised by Pringsheim. § He lays it down as a fundamental axiom, that the generations of Thallophytes, like those of Cormophytes, begin in all cases with a free cell, the spore, but that, unlike those of Cormophytes, the generations are distinct and

* See Strasburger, 'Befruchtung und Zelltheilung,' p. 9.

† De Bary, 'Beitr. z. Morphol. u. Physiol. d. Pilze,' Heft II., p. 40.

‡ Pringsheim, 'Jahrb. f. wiss. Bot.,' Bd. IX.

§ Ueb. d. Generationswechsel der Thallophyten, &c., 'Jahrb. f. wiss. Bot.,' XI.

do not remain in organic connexion; consequently, it is impossible to regard the "fruits" of Thallophytes as representing an entire generation. In illustration of this he points out that the zygospores of the *Mucorini* are not fructifications comparable to the sporogonium of a Moss, but that they are, like those of the *Conjugatæ*, the initial cells of a new generation, and he regards the rudimentary mycelium developed from the zygospore as the "first neutral generation," which differs from the succeeding neutral generations in the very slight development of its vegetative organs. He does not mean to imply that no alternation of generations occurs in the life-history of the *Mucorini*; on the contrary, he endeavours to show that there is an alternation, not indeed between the zygospore with its rudimentary mycelium and the sexual mycelium, but between dimorphic sexual and asexual mycelia. He deduces an argument against the current views from Brefeld's observations upon *Mucor dichotomus*.* Brefeld has found that the zygospore of the *Mucorini* does not give rise in all cases to a simple asexual mycelium as in *Mucor Mucedo*: in *Mucor dichotomus*, when the zygospores germinate under appropriate culture, they produce well-developed mycelia which bear a number of zygospores. Here then is a case in which the sexually-produced reproductive cell of an oophore gives rise at once to a new oophore, a fact which is obviously irreconcilable with the Moss-type of alternation of generations. Although this fact affords some support to Pringsheim's objections to the current views, it is of no positive value as evidence in favour of his own views of the alternation of generations, as will be shown hereafter. In the other group of the *Zyggosporeæ*, the *Pandorineæ*, the alternation, according to Pringsheim, is not of a motile sexual cœnobium and a resting zygospore, but of sexual and asexual cœnobia.

In applying his views to the *Oosporeæ*, he rejects the suggestion of Braun † that the oospore is a rudimentary one- or many-spored fruit, and he regards it as the initial cell of the new generation, so that in this Class, as in the preceding, the alternation is that of dimorphic, independent, sexual and asexual plants.

Passing on to the *Carposporeæ*, we find that in the case of *Coleochate*, Pringsheim considers the mass of cells formed within the cystocarp to be the "first neutral generation" of the plant, which produces a second neutral generation by means of swarm-spores. With regard to the other sexual *Carposporeæ*, the *Ascomycetes* and the *Florideæ*, he considers that the "fruits" are not to be regarded, any more than those of *Coleochate*, as the direct products of fertilisation, but simply as the female reproductive organs which have been indirectly affected by it, and which resemble, in this particular, the calyptra of Mosses and the cushion on the prothallia of Ferns. The trichophore and the ascogonium, he urges, are to be regarded as an archegonium which undergoes direct fertilisation, the fertilising influence being conveyed from cell to cell of the organ until it reaches the ascospores. If this view be correct,

+ 'Bot. Zeitg.,' 1875, p. 848.

+ *Loc. cit.*, p. 372.

the ascospores must necessarily be regarded as oospores. The alternation of generations in the *Ascomycetes* and the *Florideae* is then that of independent sexual and asexual plants, and not that of cystocarp and sexual thallus. He considers, partly on account of their structure and partly on account of the products of the germination of the stylospores, that probably the pycnidia are the neutral fructifications. This view derives support from Bauke's observations on *Pleospora herbarum*,* in which the perithecium and pycnidia appear to represent the two generations, though their succession is very irregular.

It cannot be denied that Pringsheim's objections to the accepted interpretation of the life-histories of Thallophytes, according to the Moss-type of alternation of generations, are well-founded. The fact that such groups as the *Conjugatae* and the *Fucaceae* exist, which exhibit no such alternation, is presumptive evidence against it; this is supported by the above-mentioned development of a sexual mycelium from the zygosporangium of *Mucor dichotomus*: moreover it must not be overlooked that in *Peronospora*, where the oospore produces an ordinary mycelium, there cannot be an alternation of generations according to the Moss-type; and finally, it will be readily granted that a great part of the fructification of the sexual *Carposporeae* belongs, as Pringsheim states, to the parent-plant, so that the "fruit" cannot be regarded as constituting a distinct generation, and the view that the carpospores are really oospores is at least not contrary to our knowledge of the mode of fertilisation in these plants.†

Admitting then that it is not possible to interpret the life-history of Thallophytes in the same way as that of a Moss, the question arises whether or not there is any ground for continuing to use the expression "alternation of generations" with reference to Thallophytes as Pringsheim does. Nearly all the arguments brought by Pringsheim against the Moss-type theory are equally valid against any theory of alternation of generations whatsoever; and when it is also borne in mind that in certain of these plants, such as *Ulothrix zonata* ‡ for instance, the differentiation of sexual and asexual reproductive cells is so slight, that if the former fail to conjugate and to form zygosporangia they germinate like ordinary zoogonidia, there seems to be good reason for answering this question in the negative. It seems to be more in accordance with fact to say simply that a sexual Thallophyte may reproduce itself either sexually or asexually, the mode of reproduction depending more especially upon the external conditions. Speaking generally, it is not possible to say of a spore (conidium, gonidium) of any given Thallophyte that the product of its germination will necessarily be a sexual plant, nor is it possible to say of the oospore (zygosporangium, carposporangium) that the product of its germination

* Zur Entwicklungsgeschichte der Ascomyceten, 'Bot. Zeit.,' 1877.

† See Thuret and Bornet, on the fertilisation of the *Florideae*, 'Ann. d. Sci. Nat.,' 1855 and 1867; also Stahl, Ueb. die geschlechtliche Fortpflanzung der Collemaceen, 1877.

‡ Dodel, Ueb. *Ulothrix zonata*, Prings. 'Jahrb. f. wiss. Bot.,' X.

will be necessarily an asexual plant, conditions which are accurately fulfilled in those plants (*Bryophyta*, *Pteridophyta*) in which an alternation of generations undoubtedly takes place. Since this is so, it appears to be quite unnecessary and even unwarrantable to introduce the idea of an alternation of generations into our general conception of the life-history of Thallophytes.

There is reason, however, for believing that in two groups of Thallophytes, the *Characeæ* and the *Coleochatæe*, a distinct alternation of generations, more or less resembling that of Mosses, occurs.* In a previous number of this Journal† I have fully discussed the indications of such an alternation in the life-history of the *Characeæ*; it is therefore unnecessary for me to say anything on the subject in this paper. As regards *Coleochatæe*, the oospore becomes divided by the formation of successive walls, so that it is converted into a mass of cells united to form a parenchymatous tissue. This mass of cells is the sporophore of the plant, or, according to Pringsheim's view, the "first neutral generation," which differs but little, excepting in size, from the ordinary thallus.‡ When the wall of the cystocarp ruptures in the spring, the sporophore is set free, and from each of its cells a single swarm-spore escapes which gives rise to an asexual individual. It is only after a long succession of asexual generations, continuing through the whole summer, that sexual plants are produced. Pringsheim, in an earlier publication,§ pointed out the homology of the body thus formed in the oospore of *Coleochatæe* with the sporogonium of a Moss, a view to which he still adheres. The alternation, in this case, is that of a sporophore with a succession of potential oophores terminated by an actual oophore; it deviates from the Moss-type in the intervention of a number of potential oophores between the sporophore and the true oophore; it is, as it were, a middle term between the fortuitous succession of sexual and asexual generations in Thallophytes generally, and their regular alternation in Mosses and Ferns.

From this point of view, Pringsheim's expression for the sporophore of *Coleochatæe*, "first neutral generation," is inadmissible, for it suggests that the sporophore is of the same nature as the succeeding generations, and this, as we have seen above, is not the case. Moreover, it suggests also that the sporophore of *Coleochatæe* is of the same nature as the "first neutral generation" of the *Edogoniae*, of *Bulbochate*, *Spharoplea*, *Hydrodictyon*, *Pandorina*, and *Cystopus*, where it is simply a sporangium, or of *Mucor*, where the vegetative organs are developed to some extent. Now Pringsheim has already pointed out, in the last-mentioned publication, that in those Thallophytes which exhibit "*sporangienkeimung*," the changes taking place in the germinating, or more correctly, the developing zygospore or oospore suggest rather the

* Possibly this may be also true of the *Florideæ*: see Pringsheim, Ueb. Befruchtung und Keimung der Algen; Monatsber. d. Berl. Akad., 1855.

† December, 1878.

‡ At least in *C. scutata*.

§ Die Coleochatæen: 'Jahrb. f. wiss. Bot.,' 11.

development of several embryos from a single fertilised oosphere, than the formation of spores in a sporangium; that these are, in fact, cases of polyembryony comparable to those occurring in Gymnosperms.* If this be so, the expression "first neutral generation" is inapplicable to these zygospores and oospores, and the products of their development. Again, it has been shown above that in those Thallophytes which exhibit "*mycelienkeimung*," the product of the germination (here this word is the correct one) of the zygospores and the oospores is by no means always an asexual generation, and therefore it cannot be generally described as a "first neutral generation." On these grounds it may be fairly concluded that the phrase "first neutral generation" is of no value as a general expression, and that it tends, therefore, rather to confuse than to make clear our ideas of the life-histories of the different groups of Thallophytes.

The results of this discussion may be briefly summed up as follows:—It appears that it is impossible to detect any distinct alternation of generations in the life-histories of Thallophytes, with the exception of the *Coleochetææ* and the *Characææ*. In both these groups the oospore undergoes division whilst it is still enclosed in the oogonium, and gives rise to a mass of cells, combined together into a tissue, which constitute an embryo: in the former, each cell of the embryo, which is the sporophore, subsequently gives rise to a swarm-spore from which a potential oophore is developed; in the latter, the embryo develops into an aposporous sporophore from which the oophore is produced by a process of lateral budding.

ERYTHRÆE IN THE ISLE OF WIGHT.

BY FRED. TOWNSEND, M.A., F.L.S.

I HAVE been asked by the Editor of the 'Journal of Botany' if I would send a notice of an *Erythraæ* which I collected this summer on the chalk downs in the neighbourhood of Freshwater and the Needles, in the Isle of Wight. I have with me few books and no specimens, but an early notice may lead to light being sooner thrown upon the subject by engaging the attention of botanists who have materials ready to hand. After the examination of very numerous specimens, I drew up, on the spot, the following characters:—

Stem usually simple, solitary, or several from the crown of the root; lower leaves ovate, obtuse, 3–5 nerved, shorter than the intermediate, and forming a rosette; intermediate linear-oblong, somewhat narrowed below, uppermost bract-like, often broader below, one or two usually equalling or exceeding the flowers; flowers sessile, numerous, densely corymbose, bracts linear, obtuse but apiculate; calyx equalling or exceeding the corolla-tube; *stamens*

* For a typical instance see Strasburger's account of *Ephedra altissima* in his 'Zellbildung und Zelltheilung.'

inserted at the base of the corolla-tube; upper part of the ovary exerted beyond the mouth of the corolla at the time of flowering. Annual, flowering in August. The outer bracts sometimes produce from their axils a long-stalked secondary cluster of flowers.

From this description it will be seen that the plant differs from all our *Erythræas* by the stamens, *i.e.*, the filaments, being inserted at the base of the corolla-tube, and free throughout the rest of their length,—a character which would take the plant out of the genus as described by Griesbach in De Candolle's 'Prodromus.' In other respects the plant presents a somewhat intermediate character between *E. littoralis*, Fries, and dwarf *E. Centaurium*, Pers. The leaves are narrower than those of *E. Centaurium*, and the calyx equals or exceeds the corolla-tube at the time of flowering; thus approaching *E. littoralis*. But the length of the calyx, as compared with that of the corolla-tube, is inconstant in both *E. Centaurium* and *E. pulchella*, dwarf specimens of both these latter species frequently having the calyx as long as the corolla tube, though it is shorter in the normal forms. The upper bract-like leaves immediately beneath the corymb are broader at the base, one or two of them usually equalling or exceeding the flowers; this character again connects our plants with *E. littoralis* rather than with *E. Centaurium* or *E. pulchella*. The bracts are obtuse-apiculate, those of the two last-named species being acute. About one-fourth of the upper part of the ovary is exerted beyond the mouth of the corolla-tube at the time of flowering, while in *E. Centaurium* and *E. pulchella* it is wholly concealed within the corolla-tube. I do not know what the comparative length of the ovary is in *E. littoralis*. The corolla-tube is so nearly of the same colour and form as *E. Centaurium* that no distinctive character can be drawn from it.

In height the plant is from one to three inches, and it grows in company with densely-flowered compact dwarf forms of both *E. Centaurium* and *E. pulchella* of a similar height. Our plant could not be confounded with the latter species; it might be with the former, though a careful botanist could never be in doubt when he had the plant in his hand. It grows in plenty on the Downs both to the east and west of Freshwater. I failed to find it eastward of Afton and Compton Downs, but to the west its range extends to the Needles and Alum Bay. I think it very probable that it is *in part* the *E. littoralis* of Dr. Bromfield's 'Flora Vectensis,' the stations for which he gives as "Alum Bay, between Grove's Hotel and the sea," "Headon Hill, within twenty yards of Mr. Ward's cottage," "Sea-banks near Compton."

Mr. A. G. More, in his 'Supplement' to 'Flora Vectensis,' page 15,* writes as follows:—"Erythræa Centaurium, L., var. *capitata*, Rœm. et Sch.—On Freshwater Down and in the warren at Alum Bay, plentifully. This is, I believe, the plant given in 'Flora Vectensis' as *E. littoralis*, which I have not succeeded in finding in the Isle of Wight." Does Mr. More's var. *capitata* include the plant which is the subject of this notice? He gives no

* 'Journ. Bot.,' 1871, p. 167.

description, and the only one I have seen of Røemer's; is that in Lloyd's 'Flore de l'Ouest de la France,' ed. iii. '*E. Centaurium*, Pers. . . . β. *E. capitata*, Røem.—Plante courte, ramassée à corymbe toujours compacte; feuil. rad. nombreuses, grandes, arrondies, obtuses, à 5–7 nervures. Rochers, pelouses sablonneuses graviers de la région maritime, surtout de la côté du nord.' This description applies to the dwarf states of *E. Centaurium*, but not to our plant. I do not know whether Røemer's *E. capitata* is the same as that of Willdenow, the following description of which has been copied out from Røemer and Schultes' 'Syst. Veg.':—" *Erythræa capitata*, Willd.—Foliis ellipticis lanceolatis obovatisque 3- et 5-nerviis sessilibus, floribus capitatis bracteatis, *Herb. Willd. MSS.* Caulis 2 poll. simplex, basi dense tectus foliis obovatis lanceolatis, ovalibusque obtusis apice subnudus tetragonus, capitulo multifloro, foliis binis ternisve cincto. Bracteæ lineares acutæ, floribus intermixtæ. Calycis lacinia acutæ, longitudine tubi. Corolla *Centaurii* sed lacinia acutiores, angustiores. Caulis sæpe in superiore parte, immo ad ipsum capitulum, ramum unum alterumve emittit nudiusculum capitulo terminatum ut planta prolifera videatur. *Willd. In Markbrandenburgensi.*" R. & S., 'Syst. Veg.,' vol. iv. p. 786 (1819). It applies fairly to our plant, except in the characters "Bractæ acutæ" and "Corolla *Centaurii* sed lacinia acutiores." I am not, however, disposed to place great value on the degree of obtuseness of the corolla segments, for they are variable in *E. Centaurium*. They are usually obtuse, but I have seen them even acute. Willdenow does not allude to the place of insertion of the stamens.

ERYTHRÆA TENUIFLORA, *Link.*—I am not aware that there has been any notice of *Erythræa tenuiflora*, *Link.*, as a British plant. I gathered specimens lately in the Isle of Wight, on the west bank of the Medina, between West Cowes and Newport, which I believe to be *Link.*'s plant. The Isle of Wight specimens approach *E. pulchella* in the flowers, but are very different in habit from that species, the stem being as stout as that of *E. Centaurium*, simple, dichotomously branched above the middle, the branches all fastigiate, the flowers axillary and terminal, subsessile, hardly corymbose, but forming numerous few-flowered clusters. The radical leaves are few and do not form a rosette. I have not with me sufficient materials to give an opinion of the distinctness of the plant as a species, but Mr. James Lloyd now accords it that rank, having formerly united it to *E. pulchella* as "var. *scoparia.*" I only noticed it in one spot, where there might have been from twenty to thirty plants. The idea then occurred to me that it might be a hybrid between *E. Centaurium* and *E. pulchella*, both of which are very common throughout the Island.

ON SOME NORTH DEVON PLANTS.

BY REV. W. MOYLE ROGERS.

THE plants mentioned in these notes were seen by me this year, either during a two days' stay, in the end of July, at Zeal Monachorum, on the River Yeo, near Morchard Road Station, between Crediton and Chulmleigh, or two or three weeks later by that part of the coast of Barnstaple Bay which lies near Instow, at the junction of the estuaries of the rivers Taw and Torridge. By "new record" is here meant a species or variety not recorded for N. Devon in 'Topographical Botany' or the Reports of the Botanical Locality Record Club, nor having N. Devon stations given for it in either 'Flora Devoniensis' or Mr. Ravenshaw's 'List of the flowering plants and ferns growing wild in the county of Devon' (the 'Reissue, with Supplement,' published in 1872).

Ranunculus Baudotii, Godron; the type or var. *confusus* (new record).—By Instow Burrows, in a slightly brackish pool, near high-water mark, on the left side of the Taw Estuary; in considerable quantity.

R. hirsutus, Curtis (new record).—Zeal Monachorum, in a cornfield; abundant. Perhaps not indigenous. In another more stony cornfield between Zeal and Down St. Mary I saw a good many plants of *R. parviflorus*, L.

Diplotaxis maralis, DC.—Near Instow. Roadside in front of gardens; abundant, and becoming established on the edge of the Burrows. So at Ilfracombe, in 1877, I found a few plants on the cliffs, but only in one place, about thirty yards from a house in the garden of which it was the most conspicuous gravel-walk weed. I believe not otherwise recorded for N. Devon.

Cochlearia anglica, L.—Fremington and near Barnstaple, on both sides of the Taw Estuary.

Senebiera didyma, Pers.—Zeal Monachorum. A weed as abundant in the streets of this village in the heart of the county as about seaside towns. So, in S. Devon, I have seen it in Chudleigh and near Bovey Tracy.

Viola Curtisii, Forster.—Northam Burrows and Instow Burrows; on grass-covered sandhills. Widespread in the former station, and in considerable quantity in both, though not nearly so abundant as at the northern end of Braunton Burrows, four or five miles distant. Mr. T. R. Archer Briggs tells me that it has also been found this year by his brother on Woollacombe Sands, between Braunton Burrows and Ilfracombe.

Sagina nodosa, Meyer.—Northam Burrows and Instow Burrows; also on the sea-wall at Instow, and in a meadow about half a mile from Instow towards Bideford.

Spergularia neglecta, Syme, E. B.—The type. Instow; on and by the sea-wall, &c. The variety *media* occurs on Instow Burrows and near Barnstaple.

S. marginata, Syme, E. B. (new record).—Northam Burrows, in moist sandy hollows; very stunted, with long stout woody root-

stocks (as I find it on Dawlish Warren, S. Devon). The more luxuriant plant of muddy inlets is abundant at Fremington and near Barnstaple on the Taw, and between Instow and Bideford on the Torridge. In these stations the calyces and pedicels of most of the plants are clothed (often very densely) with fine glandular hairs; only occasionally are they quite glabrous.

Linum angustifolium, Huds.—Zeal Monachorum, and near Instow; frequent, as it is in S. Devon.

Trifolium striatum, L.—In the stony field above referred to, between Zeal Monachorum and Down St. Mary; in some quantity. Queried for the vice-county in 'Topographical Botany.'

T. scabrum, L.—Instow Burrows and Northam Burrows; very common. This trefoil is remarkably abundant on most parts of the Devon sea coast.

Potentilla procumbens, Sibth.—Zeal Monachorum, and near Morchard Road Station. Good typical specimens by roadsides; common. Confirms my previous record for the vice county (see Journ. Bot., December, 1877, p. 362), based on some less satisfactory Lundy Island plants.

Rosa tomentosa, Sm. (new record).—Zeal Monachorum; frequent in lanes and fields. Not the type, but forms ranging from good *R. scabriuscula*, Sm., to *R. sylvestris*, Woods.

R. micrantha, Sm.—Zeal Monachorum, but only in two places. Near Instow, on the Bideford Road.

R. canina, L.—Hitherto, I believe, there has been no published record of the occurrence in N. Devon of any of the segregates included under this name. I carefully examined all the bushes I met with this summer, with the following result:—*R. lutetiana*, Leman, *R. dumalis*, Bechst., and *R. urbica*, Leman, are all frequent at Zeal Monachorum, and on the coast near Fremington. Near Fremington I also found a luxuriant globose-fruited rose answering well to Mr. Baker's description of *R. spherica*, Gren. *R. obtusifolia*, Desv., is not uncommon at Zeal Monachorum, where I saw also two or three bushes of *R. frondosa*, Steven, and several of *R. arvatica*, Baker.

R. leucochroa, Desv. (new record).—Zeal Monachorum; near Morchard Road Station; and by Instow Burrows; common.

R. systyla, Bast. (new record).—Between Barnstaple and Bideford, common; but apparently quite absent from Zeal Monachorum.

R. arvensis, Huds.—Zeal Monachorum, and near Morchard Road Station, common; much less so on the sea coast. The variety *R. bibracteata*, Bast. (new record) is rather frequent near Morchard Road Station, and near Instow.

Epilobium tetragonum, L.—The segregate (new record). Near Morchard Road Station, in some quantity. Also between Northam and Northam Burrows; in a ditch near Instow Burrows; and by the roadside between Instow and Bideford.

Rubia peregrina, L.—As common on the N. Devon coast as through the greater part of S. Devon.

Artemisia maritima, L.—Near Fremington and near Barnstaple, in great quantity.

Senecio squalidus, L.—Bideford; still abundant on old walls. I saw it on both sides of the Torridge.

Aster Tripolium, L.—The discoid variety is the prevailing form on both sides of the Taw Estuary.

Erythraea pulchella, Fries.—Instow Burrows, and between Instow and Bideford; but most abundant on Braunton Burrows.

Mentha hirsuta, L., variety.—In sandy hollows on Braunton Burrows (with *Teucrium scordium*), a small, densely hairy and remarkably decumbent form very unlike the type.

Nepeta Cataria, L.—On left bank of Taw Estuary, between Instow Burrows and Fremington; a few plants at intervals for no great distance.

Myosotis caspitosa, Schultz.—Abundant in the meadows bordering the Yeo at Zeal Monachorum; also on Braunton Burrows. The only water Forget-me-not that I have seen in N. Devon.

Statice Limonium, L.—Instow Burrows; two or three plants only.

S. binervosa, G. E. Sm., b. *intermedia*, Syme.—Northam Burrows; very abundant. The only variety of the species that I have yet seen in N. Devon.

Polygonium Raii, Bab.—Braunton Burrows and Northam Burrows, but apparently in very small quantity. Lacks personal authority for N. Devon in 'Topographical Botany.'

P. maritimum, L.—Braunton Burrows. This species, which I had the good fortune to discover here in September, 1877, was abundant this year in two of the sandy hollows with *Scirpus Holoschanus*, *Teucrium Scordium*, and other rarities. The plants, though in flower and fruit, were small, growing frequently five or six together, with the remarkably tough (but hardly woody) stems nearly meeting in the middle of the clump, often partly buried, and having the exposed part much forked and with very short internodes. This forked and crowded state of the stem makes quite small individuals of the species easily distinguishable from the far less frequent specimens of *Raii* growing near, even when the leaves of the latter have decidedly recurved margins, and are nearly as glaucous and fleshy as in *maritimum*. The species certainly appears only annual in this station.

Euphorbia portlandica, L.—Braunton Burrows. This spurge, so common on the coast of S. Devon, appears rare on that of N. Devon; while *E. Paralias*, L., rare there, is common here.

Typha latifolia, L. (new record).—Near Barnstaple and elsewhere.

Ruppia rostellata, Koch. (new record of the segregate).—In the brackish pool on Instow Burrows above referred to. In Mr. Ravenshaw's list Braunton Burrows is named as a station for the aggregate *R. maritima*, L.

Juncus acutus, L.—On Instow Burrows, but in far less abundance than in the previously recorded stations of Northam Burrows and Braunton Burrows.

Scirpus sylvaticus, L. (new record).—Zeal Monachorum, by the Yeo; abundant.

Carex muricata, L. (new record).—Zeal Monachorum; roadsides; frequent. The marshy meadows by the Yeo at Zeal are singularly deficient in Carices, the only ones that I could find there being *glauca* and *ovalis*. By roadsides in the same parish, besides *muricata*, I saw only *remota* and *sylvatica*.

C. distans, L.—Instow Burrows; between Instow and Bideford; Northam Burrows; in great quantity.

C. extensa, Good.—Instow Burrows; near Fremington; between Instow and Bideford. As abundant as the last.

Gastridium lendigerum, Gaud.—Near Instow Beach, on Bideford Road; probably the station named for it in 'Flora Devoniensis.' In 'Topographical Botany' it is queried for N. Devon.

Avena flavescens, L. (new record).—Instow Burrows; Cliffs near Northam.

Sclerochloa maritima, Lindl.—Instow; on mud. Lacks personal authority for N. Devon in 'Topographical Botany.'

S. distans, Bab.—Instow; abundant along sea-wall, and by roadside to the Burrows.

Festuca uniglumis, Soland.—Northam Burrows.

Bromus commutatus, Schrad. (new record).—In ditches by Instow Burrows.

THE CRYPTOGAMIC FLORA OF KENT—*FUNGI*.

BY T. HOWSE, F.L.S.

(Continued from p. 313.)

Order 16.—*CÆOMACEI*.

URED O CARYOPHYLLACEARUM, *Johnst.* Currey, Greenw. Rep.

U. SAXIFRAGARUM, *DC.* Currey, Greenw. Rep.

U. FILICUM, *Desm.* Currey, Greenw. Rep.

U. POTENTILLARUM, *DC.* Sydenham Hill; Maidstone, *Holmes.*

U. HYPERICORUM, *DC.* Darenth Wood, *M. C. Cooke*; Dunton Green, *Holmes.*

U. CONFLUENS, *P.* On *Mercurialis perennis*. Darenth Wood, *M. C. Cooke*; Abbey Wood, *Holmes.*

UROMYCES APICULOSA, *Lév.* On *Hieracium*, Hurst Wood, Tunbridge Wells, *Jenner Fl. Tunbr.*

U. IRIDIS, *Lév.* Darenth Wood, *M. C. Cooke.*

U. SPARSA, *Lév.* On *Spergularia rubra*. Northfleet marshes, *M. C. Cooke.*

COLEOSPORIUM CAMPANULÆ, *Lév.* Darenth Wood, *M. C. Cooke.*

MELAMPSORA BETULINA, *Desm.* Sydenham Hill.

M. ARLE, *Fukl.* Swanscombe Wood, *M. C. Cooke.*

LECYTREA SALICETI, *Lev.* Currey, Greenw. Rep.

L. EUPHORBIE, *Lév.* Field near Joyden's Wood, *Holmes*; Currey, Greenw. Rep.

- CYSTOPUS CUBICUS, *Str.* New Cross, *M. C. Cooke.*
 C. CANDIDUS, *Lév.* Tunbridge Wells, *Herb. Deakin.*
 C. LEPIGONI, *DBy.* On *Spergularia rubra.* Northfleet marshes,
M. C. Cooke.
 USTILAGO CARBO, *Tul.* *Uredo segetum*, *Pers.* Currey, Greenw. Rep.
 U. LONGISSIMA, *Tul.* *Uredo longissima*, *Sow.* Currey, Greenw. Rep.
 U. HYPODYTES, *Fr.* On grass-stems. New Cross, *M. C. Cooke.*
 U. RECEPTACULORUM, *Fr.* New Cross, *M. C. Cooke.*
 U. ANTHERARUM, *Tul.* On *Stellaria Holostea.* Joyden's Wood,
W. W. Reeves.

Order 17.—ÆCIDIIACEI.

- ROESTELIA CORNUTA, *Tul.* On *Mespilus germanica.* Tunbridge Wells,
Herb. Deakin.
 R. LACERATA, *Tul.* Sydenham Hill; Tunbridge Wells, *W. W. Reeves,*
Jenner Fl. Tunbr.
 ÆCIDIUM ALBESCENS, *Grev.* On *Adoxa moschatellina.* Greenhithe,
M. C. Cooke; Swanscombe Wood, *Holmes.*
 Æ. EPILOBII, *DC.* Twenty-acre Wood, on *Epilobium montanum,*
W. W. Reeves, Jenner Fl. Tunbr.
 Æ. TRAGOPOGONIS, *Pers.* New Cross, *M. C. Cooke.*
 Æ. EUPHORBÆ, *Pers.* Darent Wood, *M. C. Cooke.*
 Æ. BERBERIDIS, *Pers.* Dartford, *M. C. Cooke;* Currey, Greenw. Rep.
 Æ. CRASSUM, *Pers.* On *Rhamnus catharticus.* Hever, *W. W. Reeves,*
Jenner Fl. Tunbr; Otford, *Holmes.*
 Æ. PERICLYMENI, *DC.* Frequent about Tunbridge Wells, *Jenner*
Fl. Tunbr.
 Æ. RANUNCULACEARUM, *DC.* On *Ranunculus Ficaria.* Maidstone,
Holmes.
 Æ. GALII, *Pers.* Near Greenhithe, *M. C. Cooke.*
 Æ. BUNII, *DC.*, var. β . POTERII, *Cooke.* On *Poterium Sanguisorba.*
 Darent, *Cooke.*
 Æ. VALERIANACEARUM, *Dub.* Between Rusthall Common and Speld-
 hurst, *Jenner Fl. Tunbr.*
 Æ. URTICÆ, *DC.* Hever, *W. W. Reeves, Jenner Fl. Tunbr.;* Tun-
 bridge Wells, *Herb. Deakin.*
 Æ. OROBI, *DC.* Homewood, near Tunbridge Wells, *W. W. Reeves,*
Jenner Fl. Tunbr.
 Æ. SANICULÆ, *Carm.* Bidboro', *Holmes;* Darent, *M. C. Cooke.*
 Æ. VIOLÆ, *Schum.* Boro' Green and Abbey Wood, *Holmes.*
 Æ. POTERII, *Cooke.* Dartford Brent, *M. C. Cooke.*
 Æ. PRIMULÆ, *DC.* Swanscombe Wood, *Holmes.*
 Æ. ALBESCENS, *Grev.* On *Adoxa moschatellina.* Swanscombe Wood,
M. C. Cooke.
 Æ. RUBELLUM, *Pers.* Currey, Greenw. Rep.

Fam. 4.—HYPHOMYCETES.

Order 18.—ISARIACEI.

- ISARIA FARINOSA, *Fr.* On chrysalis, Darent Wood ; Currey, Greenw. Rep.
 CERATIUM HYDNOIDES, *A. & S.* On rotten wood. Sydenham Hill ; Currey, Greenw. Rep.

Order 19.—STILBACEI.

- VOLUTELLA SETOSA, *Berk.* Sydenham Hill.
 EPICOCUM NEGLECTUM, *D.* Sydenham Hill.
 STILBUM TOMENTOSUM, *Schr.* Currey, Greenw. Rep.

Order 20.—DEMATIEI.

- HELMINTHOSPORIUM MACROCARPUM, *Grev.* On hazel. Tunbridge Wells, *Herb. Deakin* ; Darent Wood, *M. C. Cooke* ; Currey, Greenw. Rep.
 H. TILLÆ, *Fr.* On lime leaves. Penshurst, *Herb. Deakin*.
 H. SCOLECOIDES, *Cord.* Sydenham Hill.
 H. VELUTINUM, *Link.* Currey, Greenw. Rep.
 H. TILLÆ, *Fr.* Currey, Greenw. Rep.
 H. SMITHII, *B. & S.* Currey, Greenw. Rep.
 SPORODUM CONOPLEOIDES, *Cord.* *Dematium hispidulum*, *B.* Currey, Greenw. Rep.
 CLADOSPORIUM HERBARUM, *Link.* Currey, Greenw. Rep.

Order 21.—MUCEDINES.

- ASPERGILLUS GLAUCUS, *Link.* Sydenham Hill ; Currey, Greenw. Rep.
 A. CANDIDUS, *Link.* Sydenham Hill.
 A. VIRENS, *Link.* On *Polyporus annosus*. Sydenham Hill.
 NEMATOGONUM AUREUM, *Berk.* On bark. Sydenham Hill ; Currey, Greenw. Rep.
 BOTRYTIS JONESII, *B. & Br.* Woolwich, *Berk. & Br. in A. N. H.*, No. 760.
 B. TERRESTRIS, *P.* Darent Wood ; Sydenham Hill.
 PERONOSPORA PARASITICA, *Cord.* On Shepherd's purse. Tunbridge Wells, *Herb. Deakin*.
 P. INFESTANS, *Mont.* *Botrytis infestans*, *B. & Br.* Currey, Greenw. Rep.
 P. PYGMEA, *Ung.* On wood anemone. Swanscombe Wood.
 P. GRISEA, *Ung.* Margate, *Berk. Eng. Fl.*, p. 342.
 POLYACTIS VULGARIS, *Link.* Sydenham Hill ; Currey, Greenw. Rep.
 P. CANA, *Berk.* Sydenham Hill.
 P. CINEREA, *Berk.* Darent Wood, *M. C. Cooke* ; Currey, Greenw. Rep.
 PENICILLIUM CRUSTACEUM, *Fr.* Sydenham Hill ; Currey, Greenw. Rep.
 P. CANDIDUM, *Link.* Currey, Greenw. Rep.

- OIDIUM BALSAMII, *Mont.* On *Verbascum*. Sydenham Hill.
 O. FRUCTIGENUM, *Schrad.* Currey, Greenw. Rep.
 STYSANUS STEMONITIS, *Cord.* Sydenham Hill.
 DACTYLUM ROSEUM, *Berk.* *Trichothecium roseum*. Currey, Greenw.
 Rep.; Darent Wood, *M. C. Cooke.*

Order 22.—SEPEDONIEI.

- SEPEDONIUM CHRYSOSPERMUM, *Link.* Sydenham Hill; Currey,
 Greenw. Rep.
 S. ROSEUM, *Fr.* St. Paul's Cray Common.

Fam. 5.—PHYSOMYCETES.

Order 23.—MUCORINI.

- MUCOR RAMOSUS, *Bull.* On decaying *Amanita vaginatus*. Sydenham
 Hill; Currey, Greenw. Rep.
 M. MUCEDO, *L.* Sydenham Hill; Currey, Greenw. Rep.
 M. CANINUS, *P.* On dog's dung. St. Paul's Cray Common; Currey,
 Greenw. Rep.
 M. FUSIGER, *Link.* On *A. epiphyllus*. St. Paul's Cray Common.
 PILOBOLUS RORIDUS, *Schum.* Currey, Greenw. Rep.
 P. CRYSTALLINUS, *Tode.* On cow and horse dung. Sydenham
 Hill; Currey, Greenw. Rep.
 SPORODINIA DICHOTOMA, *Cord.* On decaying *Russula rosacea*. Syden-
 ham Hill.
 ACROSTALAGMUS CINNABARINUS, *Cord.* *Botrytis lateritia*, *B.* Currey,
 Greenw. Rep.

Fam. 6.—ASCOMYCETES.

Order 24.—PERISPORIACEI.

- SPHEROTHECA PANNOSA, *Lév.* On rose trees. Sydenham Hill, in
 the conidiophorous condition.
 S. CASTAGNEI, *Lév.* On hop leaves. Sydenham Hill, in the con-
 idiophorous condition; Currey, Greenw. Rep.
 MICROSPHERIA HEDWIGII, *Lév.* On *Viburnum Lantana*. Greenhithe,
M. C. Cooke.
 M. MOUGEOTII, *Lév.* On *Lycium barbarum*. Dartford, *M. C. Cooke.*
 M. BERBERIDIS, *Lév.* On barberry. Dartford, *M. C. Cooke.*
 EUROTIIUM HERBARIORUM, *Link.* On cheese. Sydenham Hill; Currey,
 Greenw. Rep.
 ERYSIPE TORTILIS, *Link.* On dogwood. Dartford, *M. C. Cooke.*
 CHÆTOMIUM ELATUM, *Kze.* Currey, Greenw. Rep.
 C. CHARTARUM, *Fhb.* Currey, Greenw. Rep.

(To be continued).

RECENT ADDITIONS TO THE MOSS-FLORA OF THE WEST RIDING OF YORKSHIRE.

By CHARLES P. HOBKIRK, F.L.S.

[Read before Sect. D., British Association, Sheffield, 25 Aug., 1879.]

In the year 1873 I read before the British Association at Bradford a short paper on the Mosses of the West Riding, appended to which was a list comprising 294 species.* Since that date considerable activity has been manifested, by both Natural History Societies and private investigators, in working out, more thoroughly than had hitherto been done, the flora and fauna of this large county. In a great measure this activity has been due to the union of the chief Natural History Societies of the county into an amalgamated Society, now called "The Yorkshire Naturalists' Union." This Society holds meetings and makes excursions monthly during the summer; having its sections and sectional officers, meeting immediately after each excursion, and examining the gatherings of the day; followed by the general meeting, to which the sectional officers report the chief results brought before them. Every species gathered is also recorded by the sectional recorder, and each section publishes the results of its labours in the 'Transactions' of the Union. In this manner a great many new species, both of animals and plants, have been discovered, and old records either confirmed or corrected. It seemed therefore that this, the first meeting of the British Association in this county since the Bradford Meeting in 1873, presented a fitting opportunity for announcing what additions and corrections had been made to the list of Mosses previously referred to.

In my paper I stated that the Valleys of the Don and the Dearne, including the moorlands south of Penistone, and the districts around Barnsley, Askern, Thorne, Doncaster, Goole, Rotherham, and Sheffield, were, in a bryological point of view, almost virgin ground. These portions of the county have now been visited by the Union, and to a certain extent their botanical productions have been investigated and published by them in the 'Naturalist' and the Union 'Transactions.'

Further research has also shown that the divisions I made in that paper of the river-basins of the Riding could be advantageously modified; and in place of the eight divisions I then proposed, we now recognise ten, *viz.*, proceeding from N.W. to S.E., the Lune, Ribble, Ure, Nidd, Wharfe, Aire, Colne with Calder, Mersey, Don with Dearne, and Trent tributaries. These are the divisions published in Messrs. Davies and Lees' 'West Yorkshire' with which Mr. Lees issued a map showing their respective boundaries, and giving in a note their approximate areas. Of these the Mersey, containing about 30 square miles, and the Trent, about 50 square miles, are the smallest; and the Wharfe, 470 square miles, and the Don, 600 square miles, are the largest.

* Printed at length in 'Journ. Bot.' 1873, pp. 327, 358.

In this paper I have given four lists, viz. (1) Species new to the Riding since the publication of my last list; (2) Species recorded in 1873 list, but since found in fresh localities; (3) Species known to occur in the Riding before my list was published, but not recorded therein, from not being known to me at the time; (4) Species recorded in that list in error. The number of species known to occur in the Riding will now be as follows:—

Recorded in 1873 list	294
Less recorded there in error (List 4)	8
	286
New species recorded (List 1).	48
	334

Add to these the number of species found in new localities (as given in list 2), 142, we shall have a fair idea of the work that has been done in this department during the last six years in our own division of the county.

Of the species given in list 1 a few require some further remark.

Seligeria tristicha, Brid. This moss, first discovered in Britain in the Blair Athole district by Miss McInroy, in 1860, has now been found in another locality—and that in the W. R. on dripping limestone rocks at Litton in Arncliffe dale by Messrs. S. Ashton and J. Whitehead, in June, 1878. The locality given in Schimp. Syn. 2nd. ed., p. 856, “in rupibus calcariis pr. Castleton Angliæ (Whitehead)” is an error, as Mr. Whitehead states he never either gathered or recorded it from that place, and has, since his attention was called to it, searched the locality twice in vain for it. Jæger in ‘Adumbratio’ gives its distribution as wet calcareous rocks in shady places in the German, Swiss, Austrian, and Italian Alps.

Aulacomnium turgidum, Wahl. This moss again is not only new to the Riding, but also to Britain. It was gathered by Prof. Barker on Ben More about eight years ago (1871), and again by Messrs. Lees and West on Whernside in 1878, but in neither case was it recognised at the time. The Ben More specimens were identified by Rev. J. Fergusson in September, 1878, and the Whernside plant by Mr. Boswell some little time afterwards. Distribution: the Norwegian Alps, Lapland, Greenland, Styria, and Northern America.

Fontinalis gracilis, Lindb. This is another of Prof. Barker’s discoveries, at Malham Cove, in 1876, and has since been gathered there by myself and Mr. Geo. Brook, F.L.S., in 1879, but without fruit. It had previously been found in Scotland by Messrs. Fergusson, Roy, Bisset, and Anderson, in various localities. Distribution: Silesia, the Black Forest, Wildbad, Bohemia, and Finland.

Plagiothecium nitidulum, Wahl., was first discovered as a Yorkshire and British Moss by Messrs. Whitehead and Percival at Heseltine Ghyll, Penyghent. Its distribution appears to be [Jæger’s Adumbratio, where he refers it to *Isopterygium nitidum*,

Wahl.] Northern and Central Europe, on rotten trunks in wet places; all the region of the Alps, Jura, the Vosges, Sweden, Norway, and New Zealand.

Since commencing this paper I have received a list of the Mosses growing around Wetherby, gathered by Dr. Wesley, for publication in the 'Naturalist,' and have taken the liberty of incorporating them in my lists.

In this paper he rightly says, that the inclusion of the following species in the W. R. Moss-flora rests solely on the Wetherby district localities, viz., *Pottia intermedia*, *Didymodon cylindricus*, *Thuidium abietinum*, and *Hymnum Sendtneri*. He also includes *Fissidens viridulus*, but in this he is mistaken, as I have specimens in my herbarium gathered by the late John Nowell, of Todmorden, near Pontefract.

In conclusion, I must state that in the following lists, the names of the persons who gathered the species are always, where known, given after the locality: many of them, however, merely refer to the pages of the 'Naturalist,' where they are recorded, and in these cases it is always uncertain who gathered the specimens.

The Roman capitals immediately following the specific name and that of its author indicate the river areas by their initial letters.

LIST I.—NEW SPECIES.

- Sphagnum intermedium*, Hoff. **L. C.** Whernside, Lees & West, Nat. iv. 136; Marsden Moors, C. P. H.
- S. teres*, Angst. **L.** Dent Dale, G. Stabler, Nat. iv. 113.
- S. subsecundum*, Nees. **M.** Greenfield, J. Whitehead.
- „ var. *β. contortum*. **M. C.** Greenfield, J. Whitehead. Norland Moor, Nat. iii. 48.
- S. papillosum*, Lind. **L. R.** Whernside, Lees & West, Nat. iv. 136. Bowland Knotts, Nat. iii. 19, 21.
- Andreaea crassinervia*, Bruch. **L. C.** Penyghent; Hebden Bridge, Nat. iii. 19.
- Gymnostomum squarrosum*, Nees. **L.** Ingleton district, Nat. iv. 159.
- Weissia crispula*, Hed. **N.** Harrogate, Hicks, 1876, Nat. iii. 19.
- Dicranum saxicola*, Ferg. **D.** Wharncliffe Woods, Dr. Parsons, Nat. iv. 115.
- D. scoparium* var. *paludosum*. **L.** Whernside, Lees & West, Nat. iv. 137.
- Dicranodontium longirostre*, W. & M. **A.** Shipley Glen, Dr. Parsons, Nat. iii. 20.
- Campylopus paradoxus*, Wils. Rombalds Moor, Dr. Wesley.
- Seligeria acutifolia*, Lind. **W.** Arncliffe, J. Whitehead, Nat. iv. 108.
- S. tristicha*, Brid. **W.** Litton, near Arncliffedale, Whitehead & Ashton, Nat. iv. 11.
- Pottia intermedia*, Turn. **W.** Wetherby, Dr. Wesley.
- Didymodon luridus*, Hornsch. **W. D.** Wetherby, Dr. Wesley; Wentbridge, Nat. iii. 10.
- D. flexifolius*, var. *β. gemmescens*, Mitt. **L.** Ingleboro', M. & C.
- Ditrichum flexicaule* var. *densum*. **A.** Malham Moor, 1879, C. P. H.

- Trichostomum nitidum*, Mitt. **D.** Wentbridge, Dr. Parsons, Nat. ii. 10.
Barbula muralis var. *rupestris*. **L.** Whernside, Lees & West, Nat. iv. 137.
B. unguiculata var. γ . *apiculata*. **A.** Rawcliffe, Nat. ii. 156.
B. recurvifolia, Schp. **W.** Wetherby, Dr. Wesley.
B. cylindrica, Tayl. (*insulana*). **W. C.** Harewood, Nat. iii. 19; Huddersfield, C. P. H.
B. revoluta, Schw. **C.** Near Todmorden, rare, T. Stansfield.
B. intermedia, Brid. **R. N. W. D.** Slaiburn, F. A. Lees, Nat. iii. 19; Pateley Bridge, C. P. H.; Wetherby, Dr. Wesley; Wentbridge, Nat. iii. 175.
Grimmia conferta, Funk. **L.** Dentdale, Barnes, Nat. iv. 113.
G. ovata, W. & M. **R.** Slaiburn, F. A. Lees, Nat. iii. 19.
Racomitrium heterostichum var. *alopecurum*. **L.** Whernside, Lees & West, Nat. iv. 137.
Ulota intermedia, Schpr. **L. N.** Ingleton district, Nat. iv. 159; Pateley Bridge, Nat. iv. 175.
Orthotrichum affine, Schrad. **W. A. D.** Wetherby, Dr. Wesley; Rawcliffe, Nat. ii. 156; Wrax: both by Dr. Parsons. Must be more frequent.
Webera annotina, Hed. **W.** Wetherby, Dr. Wesley.
Bryum roseum, Schreb. **U. C.** Near Ripon, Miss Morton; Penant Clough and Hebden Valley, T. Stansfield.
Aulacomnium turgidum, Wahl. **L.** Whernside, Lees & West, Nat. iv. 85. (This is new to Britain: this and the Scotch locality being its only known habitats. The Scotch discovery is the earliest by some years, but it was not recognised until the present year).
Polytrichum strictum, Banks. **L.** Slope of Ingleboro', W. West, Nat. iv. 11; Whernside, Lees & West, Nat. iv. 137.
Fissidens incurvus, Schw. **W. C.** Wetherby, Dr. Wesley; Royd Hills, Todmorden, T. Stansfield.
F. pusillus, Wils. **A.** Railway Bank, near Pontefract, Dr. Wood.
Fontinalis gracilis, Lind. **A.** Malham Cove, Prof. Barker, Nat. iv. 86. (C. P. H., 1879.)
Habrodon Notarisii, Schp. **L.** Dentdale, G. Stabler, Nat. iv. 113.
Thuidium abietinum, L. **W.** Wetherby, Dr. Wesley.
Scleropodium caespitosum, Wils. **W.** Roots of trees by Riv. Cock, near Tadcaster, R. Spruce.
Rhynchostegium murale, var. β . *complanatum*. **C.** Near Liversedge, Rev. W. Fowler, Nat. iii. 159.
Plagiothecium nitidulum, Wahl. **W.** Heseltine Ghyll, Penyghent, J. Whitehead & J. Percival: first detected by them as a British species.
Hypnum vernicosum, Lindb. **C.** Bog near Slaithwaite, C. P. H.
H. Sendtneri, Schp. **W.** Wetherby, Dr. Wesley.
H. epressiforme var. *nigro-viride*. **C. W.** Walls near Huddersfield, C. P. H., and similar places near Wetherby, C. P. H.
H. arcuatum, Lindb. **U. W. C.** Near Hackfall, J. G. Baker; Wetherby, Dr. Wesley, Nat. iii, 20; Harley Wood, Todmorden (*a*), J. Nowell.

- H. eugyrium*, Schp. **L.** Dentdale, at Cautley Waterfall, J. Nowell (Auct. Schimper).
H. giganteum, Schpr. **W.** Cow and Calf rocks, above Ilkley, Dr. Wesley, Nat. iii. 139.
Hylacomium umbratum, Schreb. **U.** Dallen Ghyll, near Ripley, Nat. iii. 20.

LIST 2.—NEW LOCALITIES.

- [The letter (*a*) after any locality signifies should also be in List 3.]
Sphagnum cuspidatum, Dill. **Lune.** Whernside, Lees & West, Nat. iv. 137.
S. cuspidatum var. *β. plumosum*. **L. C.** Whernside, Lees & West, Nat. iv. 137; Stansfield Moor, J. Stansfield.
Gymnostomum rupestre, Schw. **L.** Whernside, Lees & West, Nat. iv. 136.
Weissia viridula, Brid. **W. C. D.** Meanwood, near Leeds, F. A. Lees; Killington, Dr. Parsons; Wetherby, Dr. Wesley.
Dichodontium pellucidum, L. **W. M.** Wetherby, Dr. Wesley; Greenfield, J. Whitehead.
Dicranella squarrosa, Schrad. **L. N. M. C.** Cautley Spout, W. West; Knaresbro', F. A. Lees; Greenfield, J. Whitehead; Harden Moss, near Huddersfield, C. P. H.
Dicranum majus, Turn. **N. C.** Pateley Bridge, Nat. iv. 175; Rag Scouts, Todmorden and Hebden, J. Stansfield.
D. palustre, Brid. **M. C. D.** Greenfield, J. Whitehead; Todmorden, T. Stansfield; Sharleston, Nat. ii. 192; Ackworth, J. Brown.
Campylopus flexuosus var. *densus*. **C. D.** Staups Clough, Todmorden, T. Stansfield; Hebden Valley, C. P. H.; near Goole, Dr. Parsons.
C. pyriformis, Brid. **W.** Wetherby, Dr. Wesley.
Pleuridium nitidum, Hed. **R. M.** Bowland Knotts, F. A. Lees; Greenfield, J. Whitehead.
Leucobryum glaucum, L. **W. M. C. D.** Ilkley and Otley Chevin, Dr. Carrington; Cottingley Moor, L. C. Miall; Greenfield, J. Whitehead; Marsden Moors, C. P. H.; Goole Moor, Dr. Parsons.
Seligeria recurvata, Hed. **W. M.** Litton in Arncliffe Dale, Nat. iv. 59; Ingleboro', Nat. iv. 159; Greenfield, J. Whitehead.
S. pusilla, Hed. **L. W.** Dentdale, W. West; Litton in Arncliffe Dale. Nat. iv. 59.
Brachyodus trichodes, W. & M. **N. M.** Pateley Bridge (*a*), R. Spruce; Greenfield, J. Whitehead.
Blindia acuta, Hed. **L. W.** Dentdale, Lees & West, Nat. iv. 136; Bolton, S. Gibson (*a*).
B. acuta var. *β. trichodes*. **C.** Wet rocks, Wessenden, J. Whitehead.
Phascum cuspidatum, Schreb. **W.** Wetherby, Dr. Wesley.
P. rectum, Sm. **W.** Wetherby, Dr. Wesley.

(To be continued.)

SHORT NOTES.

CARDAMINE IMPATIENS IN SUSSEX.—During a visit to the neighbourhood of West Grinstead last June, in search of some of Borrer's *Charas*, I came across the above plant growing in tolerable abundance near Maplehurst. It occurred on a bank by the road-side for some distance between that place and West Grinstead, and had every appearance of being wild. The only previous record for the county is from the neighbourhood of Slinfold, where it is believed to have been an escape from cultivation. Maplehurst is about ten miles from Slinfold in a straight line.—W. H. BEEBY.

DORSETSHIRE PLANTS.—In the botanically prolific district between South Haven, Poole Harbour, and Swanage, with its records of *Festuca ambigua*, Le Gall, *Cynodon Dactylon*, L., *Lotus hispidus*, Desf., *Cyperus longus*, L., *Phalaris paradoxa*, L., &c., I have recently met with *Carex punctata*, Gaud., growing in some profusion on a moist sandy saline soil near Little Sea, Studland, the shore of which is the habitat of the rare *Eleocharis parvula*, Hook. It was growing with *Carex extensa*, Good., and *C. distans*, L., from which it may readily be distinguished by its nerveless, smooth-beaked, shining and spreading perigynes. This was noticed during a walk from South Haven to Swanage, when I was fortunate enough to have for my companion Dr. Trimen. We also occasionally observed *Carex Œderi*, Ehrh., in a very depauperated state; but as we approached the neighbourhood of *Carex punctata* we found it more vigorous, and in its normal state as to height and size. I take this opportunity of noticing a few other Dorset plants which have not, I think, been mentioned in any published record.—*Potamogeton rufescens*, Schreb., grows abundantly in the water-courses near Wareham, between the town and the railway-station, associated with *Potamogeton acutifolius*, Link.—*Hieracium murorum*, L., var. *β. canescens* of Syme, grows in the Isle of Portland, on the weirs between the Convict Prison and Pennsylvania Castle. The discovery of this plant restores it to our county list, for it has not been found since the time of Pulteney, who says of it, "Found on old walls about Shaftesbury, and on walls and in rocky and stony places, and on the cliffs in Purbeck," where now it is, without any doubt, extinct.—*Sedum rupestre*, Huds., sub-sp. *Forsterianum*, grows in the same places and under similar conditions with *Hieracium murorum*.—*Ranunculus confusus*, Godr., in brackish water, Weymouth. This plant is separated from *R. Baudotii* by the difference of a trifoliate and tripartite leaf, and the length of the stamens as compared with the heads of pistils.—*Enothera odorata*, Jacq., roadside near Lyme Regis; doubtless a casual, introduced among agricultural seed.—*Fritillaria Meleagris*, L., moist meadows at Chetside and Pulham. With the exception of the hearsay testimony of Dr. Pulteney, Gillingham has been hitherto the only recorded station for this plant; these two new stations are therefore of special interest.—J. C. MANSEL-PLEYDELL.

SURREY PLANTS.—*Potamogeton zosterifolius*. All the grass-leaved *Potamogetons* recorded in Brewer's 'Flora of Surrey' are well known to inhabit the county, with the exception of the above species, for the occurrence of which we have only the unconfirmed testimony of the late John Stuart Mill. He gives three stations for it, *viz.*, the Great Pond, Gatton Park; Cut Mill Pond, near Godalming; and a pool by the Wey above St. Catherine's Hill, Guildford. I have not been able to detect it in Gatton Pond, although *P. mucronatus*—also recorded by Mill from this station—is abundant. Mr. A. Bennett has ascertained that Mill's specimens named *P. zosterifolius*, from Gatton, in the herbarium of the Holmesdale Natural History Club, are undoubtedly *P. mucronatus*. Mr. Bennett has several times visited Cut Mill Pond, but has never seen the plant in question there. With regard to the Guildford station, I fear the "weedy pool" does not now exist: in the position indicated there is now some partially drained marshy land, and very possibly a pool existed there fifteen years ago. In the Wey itself at Guildford I did not see any grass-leaved species, but *P. pectinatus* and well-marked *P. flabellatus* were abundant. Taking into consideration the above facts, I think that unless fresh evidence can be adduced as to the occurrence of *P. zosterifolius* in the county, it must be struck out of the list of Surrey plants. It is of course possible that it grows in Gatton Pond, for this piece of water is about thirty-five acres in extent. I observed that the leaves of most of the Gatton plants which I examined were seven-veined in the lower part. — *Chara hispida*. I do not remember that this species has been recorded for Surrey. It occurs in profusion in Gatton Pond, literally covering acres of the bottom. — *Carex ovalis* var. *bracteata*. This variety seems to be widely distributed in Surrey. I find it abundant in Pease Marsh near Godalming, and sparingly on Earlswood Common; while Mr. Bennett has noted it on Mitcham Common and near Epsom.—
W. H. BEEBY.

SURREY PLANTS.—*Potamogeton heterophyllus*, Schreb. In 'English Botany' Dr. Boswell (Syme), under *P. nitens*, Web., remarks, "Less branched than *P. heterophyllus*, from which it also differs—at least judging from Dr. Moore's specimens, collected in September, 1866—by sending forth, in autumn, from the axils of even the upper leaves numerous slender stolons similar to those of *Epilobium obscurum*: I have not seen stolons from the uppermost leaves in any other British *Potamogeton*." Mr. W. W. Reeves and myself collected, this month, in the Basingstoke Canal near Woking, specimens of *P. heterophyllus* with exactly similar stolons to those described in *P. nitens*, Web.; they proceed from quite the uppermost leaves. — *Chara fragilis*, Desv. In describing *C. fragifera* (Journ. Bot., 1877, p. 354) Dr. Trimen mentions a plant from Christiansand, Norway (referred to *C. fragilis* by Norstedt & Wahlstedt), as having large compound bulbils at the basal nodes. When out with Mr. W. W. Reeves early this month, I gathered, in the Basingstoke Canal near Woking, *Chara fragilis* (monoecious) with

similar bulbils to those of Mr. Curnow's specimens from Cornwall, except that they are rather smaller,—A. BENNETT.

SOME HANTS PLANT-LOCALITIES. — The following plants, which we have noticed recently, are, as far as we know, unrecorded for their respective divisions of Hampshire. The first is from the northern, the remainder from the southern, division of the county. *Viola permixta*, Jord. Very sparingly on a hedge-bank near Selborne. — *Spergularia marginata*, Syme. Between Eling and Hythe. — *Hypericum montanum*, Linn. Hedge-bank near King's Sombourne. — *Trifolium scabrum*, Linn. Stokes Bay; Hamble Common. — *Diotis maritima*, Cass. Sandy shore near Christchurch, a few patches only. [Mr. Moggridge has also sent us this from "near Bournemouth," collected this year, probably from the same locality. Query, an introduction?—*Ed. Journ. Bot.*] — *Campanula patula*, Linn. Hedge-bank near Nursling. Recorded with a query in 'Topographical Botany.' — *Orobanche elatior*, Sutton. Border of corn field near Horsebridge, parasitical on *Centaurea Scabiosa*. — *Ruppia spiralis*, Hartm. In one of the pools at the former salt-works, and in most of the neighbouring ditches, Newtown (Isle of Wight); very abundant, occurring with, but much commoner than, *R. rostellata*. — It may be worth while to mention that *Polygonum maritimum* still grows near Christchurch, where we had understood it to be extinct until kindly directed to a locality for it by Mr. George Brownen, who found it plentifully two years ago. This year, however, it was by no means abundant.—H. & J. GROVES.

GALLITRICHUM RUBELLUM, *Jord. & Fourr.*—In July of the present year I found on the Surrey bank of the Thames, near Kew, two or three plants of a very peculiar and interesting variety of *Salvia Verbenaca*, the flowers being much smaller than in the type and of a red colour. On looking over the different forms figured by Jordan & Fourreau in their 'Icones,' I at once identified the Kew plant with *Gallitrichum rubellum*, *Jord. et Fourr.*, which is given as occurring in South-east France at Aix, in the department of Bouches-du-Rhône. Living specimens of the common form of *Salvia Verbenaca*, collected by the Thames above Richmond, seemed quite to agree with *Gallitrichum anglicum*, *Jord. & Fourr.*, the figure of which was prepared from specimens procured from Wembury, Dorset. From the first-mentioned this, however, differs abundantly in the size and colour of the corolla, in its calyx, bracts, &c.; and transverse sections of the stems of the two plants exhibit totally dissimilar outlines. The decided red of the stem, petioles and midribs of the leaves of *G. rubellum* renders it at first sight sufficiently distinctive even when out of flower.—GEORGE NICHOLSON.

HYPNUM (BRACHYTHECIUM) SALEBROSUM, *Hoffm.* — Through the courtesy of Mr. F. M. Webb, and with the approval of Prof.

Dickson, I have had the pleasure of examining the specimens referred to by Mr. Spruce (p. 307), they being now in the University Herbarium at the Royal Botanic Gardens, Edinburgh. They appear to be just in the condition referred to by Mr. Spruce, his numbers still remaining, and a note in his handwriting pinned to the sheet, a copy of which I append, as it is slightly different in form but not in sense from the quotation as above referred to:—"1, 2, 3. *Hypnum salebrosum*, Hoffm., florescentia monoica (fl. masculis in caule divisionibusque primariis sæpius juxta flores femineos dispositis), pedicello lævissimo, &c. 4. *H. lutescens*, Huds., foliis confertis, strictioribus, siccitate arcte adpressis, striis profundioribus notatis, acumine paulo brevior. R. S. Jan. 1847." The specimens, being glued fast to the paper, were not easily to be examined, but they apparently agree in all essential characters with *B. salebrosum*. The fructification is distinctly monoicous; the setæ quite smooth; the capsule olive, of the usual shape and inclination; the leaves longly acuminate, but not quite so strongly serrulate as in some specimens I have, particularly so with respect to no. 286 of Gravet's 'Bryoth. Belg.'; the stem is densely clothed with radicles, and distinctly but irregularly pinnate. It cannot be *rutabulum* from its smooth setæ, and its monoicous inflorescence prevents its being referred to *glareosum*. *Camptothecium aureum* I am not acquainted with.—C. P. HOBKIRK.

Extracts and Notices of Books & Memoirs.

REPORT OF THE HERBARIUM OF THE ROYAL GARDENS, KEW, FOR 1878.

By SIR J. D. HOOKER, K. C. S. I., &c.

PHYSIOLOGICAL LABORATORY.—During the past year the Jodrell Laboratory has been employed by Prof. Burdon Sanderson, F.R.S., in his continued researches on the electrical phenomenon of plants exhibiting spontaneous movements; by Prof. Church in studying albinism in plants; by the Rev. R. Abbay in working at the development on living coffee plants of *Hemileia vastatrix*; and by Mr. F. Darwin for observations on the physiology of leaves.

HERBARIUM.—The most considerable contribution to this department, and, considering its importance in respect of the agricultural interests of this country, India, and the colonies, the most important of the kind, perhaps, ever contributed to such an institution as Kew, is the Mycological Collection of the Rev. M. J. Berkeley, F.R.S. For upwards of half a century Mr. Berkeley has been well known as the most accomplished and persevering student of the *Fungi*; his labours and writings on the ravages which these plants inflict on our field-crops, gardens, orchards, vineyards, forests, &c., have benefited mankind, and greatly

enlarged the domain of science; whilst his systematic and microscopical researches into their structure and the classification of the vast natural family to which they belong have been extended to species from every quarter of the globe. The herbarium in question contains type specimens of the microscopic and other vegetable parasites, whose effects have been known from time immemorial, but the nature of most of which has been determined only within the last half century; and it illustrates his numerous published contributions to the 'Journal of the Royal Horticultural Society,' the 'Gardeners' Chronicle,' Linnean Society's Journal and Transactions, and many other works of a like nature. As examples of the value to the country of Mr. Berkeley's labours, it needs only to allude to the potato, vine, hop, and onion diseases, upon which he has written valuable memoirs and suggested remedies that have earned for him the gratitude of his countrymen and the recognition of the Government.

Mr. Berkeley's herbarium is of great extent, in perfect order and preservation, and he is now occupied with its transference to Kew, to which it is presented.

The herbarium of the late N. J. Dalzell, Esq., of the Hon. East India Company's service, has been presented by his widow. As containing the type specimens of 'The Bombay Flora,' a work published by himself and the late Dr. Gibson, it is of special interest. It contains upwards of 1200 species, and many duplicates; and its contents have been shared with the herbariums of the Botanical Gardens of Calcutta and Saharanpore,

M. E. Cosson, of Paris, has been a most liberal contributor to the Kew Herbarium for very many years. His gifts during the present year amount to nearly 2000 species, chiefly from Southern Algeria, Morocco, and Eastern Persia, on the borders of Afghanistan, which latter, collected by the veteran botanist and traveller, Bunge, are of especial interest.

Other contributions of exceptional interest are Godefroy-Lebeuf's Cambodian plants; Welwitsch's Angolan, &c. (from the Portuguese Government); Post's Syrian; Burbidge's Bornean, presented by Messrs. Veitch, and containing a magnificent series of pitcher-plants; Hildebrandt's tropical E. African; and many Central African were from Dr. Kirk, Col. Grant, Mr. Wakefield, &c.

Mr. John Miers, F.R.S., the eminent South American traveller and botanist, has presented the duplicates of his extensive herbarium. It contains many types of his published plants of Chili, Brazil, and the Argentine Provinces.

M. Casimir DeCandolle has presented a valuable set of tracings of drawings of *Aroidæ*, and Mr. W. Saunders, F.R.S., photographs of upwards of 70 species of *Agave*.

The very complete collection of cones and leaves of Pines belonging to Mr. George Gordon, late of the Royal Horticultural Society's Gardens, has been presented by the Director, and deposited, the cones in the Museum, and the foliage specimens in the Herbarium. It contains the type specimens of almost every species described in Gordon's *Pinetum*, a standard work amongst

nurserymen and foresters, of which a second edition has lately appeared. He has also presented the late Dr. Burchell's collection of drawings of St. Helena plants, made in the beginning of the century, and many of the plants of which are now all but or altogether extinct.

The following is a list of the names of the principal contributors to the Herbarium during 1878:—

EUROPE.—Archangeli, Dr.; Italian (128). Beccari, Dr. (Herb. Mus. Florent.); Italian (181). Ball, J.; various (180). Brother-ton, —; British (10). Church, Prof.; drawings of British ferns (13). Cosson, Dr. E.; Schur's European plants (590). Geheeb, A.; mosses (100). Godefroy-Lebeuf, A.; Portuguese (300). Groves, H.; Italian (112). Henriquez, J.; Portuguese (316); *Algæ*, *Fungi*, and drawings (89). Jardin des Plantes, Paris; *Hepatica* (105); various (44). Massalongo, Prof.; Italian *Hepatica* (purchased, 70). Plowright, C. B.; British *Fungi* (purchased, 100). Rabenhorst, Dr. L.; *Algæ* (purchased, 100). Société Dauphinoise; French (purchased, 530). Thuemen, Baron von; Mycotheca (purchased, 300). Todaro, Prof.; Palermo (4). Vize, J. L.; *Micro-Fungi* (purchased, 100). Wittrock and Nordstedt; *Algæ* (purchased, 100).

ASIA.—Aitchison, Dr.; N.W. Indian (27). Brandis, Dr.; *Eucalypti* (cult.) (14). Burton, Capt.; Midian (272). Cosson, Dr. E.; Bunge's Persian plants (690). Dalzell, Mrs. (Herbarium of N. J. Dalzell (1297). Davidson, Col., R.E.; N.W. Indian (41). Godefroy-Lebeuf, A.; Cambodian, &c. (571). Jamieson, Dr. G. H. T.; N. Indian (39). Jardin des Plantes, Paris; Malayan and Polynesian (520). King, Dr., of Calcutta; Kurz's Burmese plants (282); various Indian (84). Macarthy, Rev. J.; Chinese (23). Murton, H. J.; Malayan (62). Perry, W. Wykeham, R.N.; Aden (94). Post, Prof. G. E.; Syrian, &c. (780). Preston, Rev. T. A.; Everard's Chinese and others (69). Scheffer, Dr.; Malayan Archipelago (263). Veitch, Messrs.; Burbidge's Bornean and Suluan (547); Marie's Chinese and Columbian (29).

AFRICA.—Balfour, Prof.; Buchanan's Tropical African (78). Bolus, Harry; South African (87). Cantly, N.; Mauritian *Fungi*. Christy, T.; Liberian (6). Cordukes, S.; Natal (12). Cosson, Dr. E.; Marion's Atlantic (92). Letourneux's Egyptian (104); Moroccan (133). Duthie, J. F.; Tropical African (9). Grant, Col.; Wakefield's East African (142). Hildebrandt, Dr.; Tropical African (purchased, 241). Horne, J.; Mauritian *Fungi*. Keit, N.; Natal mosses, &c. (32). Kirk, Dr. J.; Bishop Steere's E. African (242). Knobel, W.; S. African (27). Macowan, Principal P.; S. African (36). Monteiro, Mrs.; Delagoa Bay plants collected by the late J. T. Monteiro (8). Oates, C. G.; S. African (30). Perry, W. Wykeham, R.N.; Somali Land (14). Phillips, R. E.; S.W. African (12). Portugal, Government of; continuation of Welwitsch's collections (705). Rehman, Dr.; Cape *Fungi* (purchased, 520). Stone, General; Pfundt's Kordofan (500). Whitehead, Rev. H.; St. Helena (6). Wood, J. M.; Natal (133).

AMERICA.—*North America and West Indies*.—Austin, Mrs. R. M.; Californian (153). Barlee, His Excellency F. P.; Honduras (13). Brace, L. J. K.; Bahamas (135). Cosson, Dr. E.; Mexican (373). Curtiss, A. H.; Florida (purchased, 200). Davenport, G. E.; Ferns of N. America (9). Farlow, Eaton & Anderson's American *Algae* (50). Fendler, —; Trinidad Ferns (purchased, 78). Gray, Prof. A.; various N. American (337). Jardin des Plantes, Paris; W. Indian (116). Jenman, G.; Jamaica Ferns (120). Murray, H. B.; St. Lucia Ferns (77). Pringle, C. G.; Northern U. States (300). Ravenel, —; N. American *Fungi* (purchased, 200).

SOUTH AMERICA.—Balansa, M.; Paraguay (purchased, 2044). Glaziou, A.; Brazilian (703), Grisebach, Prof.; Argentine (710). Lorentz, Dr.; Uruguay (purchased, 170). Miers, J.; South America, various. Veitch, Messrs.; Kalbreyer's New Grenada (303).

AUSTRALIA AND POLYNESIA.—Bennett, J. J., Executors of the late; continuation of R. Brown's Australian (1,400). Cheeseman, T. F.; New Zealand (11). Kirk, T.; New Zealand (26). Powell, Rev. Thos.; Samoa (90). Whitmee, Rev. T. J.; Polynesia (248).

It will be interesting to place on record here, as evidence of the continually growing interest of botanists in all parts of the world in the Kew Herbarium, the following statement of the total number of distinct contributions, large and small, made to it for each successive year since 1864:—1864, 92; 1865, 132; 1866, 110; 1867, 148; 1868, 165; 1869, 131; 1870, 157; 1871, 131; 1872, 188; 1873, 186; 1874, 182; 1875, 181; 1876, 193; 1877, 202; 1878, 237.

Conspectus Floræ Europææ. Auctore C. F. NYMAN. II. *Pomaceæ*
—*Bicornes*. Orebro, Sueciæ, 1879.

AFTER the interval of a year, we have now a second part of this useful and laborious compendium. From the short introduction given with it we learn that the author has been honoured by the award of the Letterstedt Prize from the Royal Swedish Academy, and that he hopes to bring out a third part before the end of next year. The full notice given of the previous portion renders it unnecessary to say anything here on the plan of the book, but merely to give a few notes on some of the British species in continuation of those then given.

This part concludes the *Rosaceæ*, and carries on the enumeration to the end of the *Ericaceæ*. *Pyrus cordata*, Desv. (*P. communis* var. *Briggsii*, Syme) is maintained as a species, and so are *Circæa intermedia*, *Daucus gummifer*, and *Gnaphalium norvegicum*. So, too, is the perennial Scotch sea-shore *Matricaria maritima*, and so is *Taraxacum palustre*. On the other hand, our *Physospermum cornubiense* is regarded as but a sub-species of *P. aquilegifolium*, and *Arctium intermedium*, Bab. ("Angl. Scot." only), is suggested to be a hybrid between *A. majus* and *A. nemorosum*. The Fennel is given as a native of this country and so is *Smyrniolum Olusatrum*,

but *Archangelica* is not considered British, and *Petroselinum sativum* is labelled "subsponte." [By the way, it is to be wished that our botanists would examine the plant of our western coasts, which it is not unlikely may prove to be *P. peregrinum*, Lag., of Portugal and North Spain.] Probably most of the above views as to nativity would be endorsed by the majority of British botanists, but more doubt may be felt as to *Centranthus ruber* and *Aster salignus*, both of which are given as British natives. *Enanthe fluviatilis* is one of the very few plants restricted to Britain; it is, however, regarded by Nyman only as a sub-species of *(E. Phellandrium)*. There are no less than 107 European species of *Saxifraga*, of which 15 are British (or 16, if we add the Faroe islands, which are here credited with the Greenland and Arctic American species *S. tricuspidata*, Röttb., doubtfully given in Rostrup's list). It is not quite clear how our names fit in. Britain is not given as a locality for *S. hypnoides*; probably our plant is considered to be *S. sponhemica*, Gm. *S. grænlandica* (sub-species of *S. decipiens*) has Scotland after it, as well as *S. cæspitosa*. There is a similar obscurity in the case of our maritime *Artemisia*: *A. gallica* and *A. maritima* are here treated as separate species; the former grows in "Brit.," the latter doubtfully in "Angl.," but its sub-species *A. salina*, Willd., is native in "Brit."

Space will not permit of further notes, but they might be indefinitely extended; e.g., a list of the 21 British *Hieracia* (several peculiar) out of 185 European species might be given. The synonymy shows evidence of very careful work. Indeed, in looking through the book, one cannot help wishing that the author, who has so clearly grasped the limits of his species, and grouped them so excellently well under the genera, had given us—as he could better than any one else—a short diagnostic character of each species and genus, and thus supplied the urgent want of a general European Flora.

One accidental omission should be noted: *Herniaria glabra* and its close allies, *H. ciliata*, &c., have been left out on p. 256.

H. T.

Beitrage zur Keimungsgeschichte der Schizaceen. Von H. BAUKE.
(Seperatabdruck aus Pringsheim's Jahrbücher für wissenschaftliche Botanik, Band xi.)

THE prothallia of *Aneimia* and *Mohria*, though different in minor details one from the other, represent an altogether peculiar type of development. In the pro-embryo a number of rows of cells are formed by longitudinal partitions, either simultaneously with or anteriorly to division of its terminal cell. This growth by longitudinal septa has been held by Burek, who has studied the prothallo-geny of *Aneimia*, to be peculiar to that genus; the fact being that in *Polypodiaceæ* and *Cyathaceæ* such septa occur, but only after division of the apical cell. In the two genera examined by the author he found that the apical cell divides longitudinally

into two more or less unequal halves, one of which gives origin, by partitions at right angles to the primary one, to a complex of cells enlarging by marginal growth, while the other either is wedge-shaped and divided by walls inclined successively to the left and to the right (*Mohria*), or else there are formed in its several parallel walls usually at right angles to the primary longitudinal septum (*Aneimia*, and frequently also *Mohria*). From the lowermost of the two cells formed by the division of the last mentioned half, after some regular segmentation, a peculiarly-shaped marginal cell is formed. This grows forwards parallel to the border of the pro-embryo, and divides from time to time by transverse walls, thus giving origin to a row of cells of which it constitutes the top cell. This, which we shall refer to as the "lateral row," gives origin to the special reproductive tissue (*Gewebepolster*).

The pro-embryo of *Aneimia* at this time is reniform with the "lateral row" on the concave side; that of *Mohria* at first broadly spatulate, afterwards roundish.

Immediately after the completion of the "lateral row" (*Mohria*), or some time afterwards, (*Aneimia*) periclinal and the anticlinal divisions appear in it. The cells thus formed divide, in conjunction with the neighbouring superficial cells of the pro-embryo, by means of walls parallel in direction to the plane of the latter, and so form the special reproductive tissue. The marginal cells developed from the "lateral row" form in *Aneimia* the upper border of that tissue, and these cells, either immediately or after periclinal and anticlinal division, grow out perpendicularly to the margin, dividing by periclinal septa. The upper border in *Mohria* is, however, present in only a rudimentary condition.

In both genera the special reproductive tissue is, as a rule, placed laterally with respect to the pro-embryo. On the prothallia of both grow papillæ, those of *Aneimia* on the margin, those of *Mohria* almost exclusively on the surface. In either case the papillæ first appear near the "lateral row." The cover-cell of the anthridium of *Mohria* is entirely cast off, that of *Aneimia* bursts in a stellate manner. From the side of unfertilised prothallia of *Aneimia* the special reproductive tissue grows out as a shoot of almost uniform breadth, until either fertilisation ensues or the pro-embryo dies. Moreover, adventitious shoots from the special reproductive tissue of older pro-embryos are of almost constant occurrence.

S. M.

Pringsheim's 'Jahrbuch' for 1879 (xii, 1) contains memoirs by F. Hildebrand, 'On the glands of *Crucifera*' (tab. 1); by Caspary, 'On hereditary knobs and buds in the roots of *Brassica Napus*'; by J. Moeller, 'On the anatomy of some medicinal barks' (*Quebracho blanco* and *Curtidor* bark, tab. 2); and by F. R. v. Höhnel, 'On air and sap-movements in plants.'

OTHER NEW BOOKS. — 'Monographiæ Phanerogamarum.' II. *Araceæ*, auctore A. ENGLER. Paris, Masson, Sept. 1879 (18 fr.) — 'Biologia Centrali-Americana.' Botany, by W. B. HEMSLEY. Part I. London, Dulau, Sept. 1879 (12s. 6d.) — K. A. ZITTEL, 'Handbuch der Palæontologie,' Bd. II., Lief. 1. Munich, 1879 (8 mk.) — Von der Decken's 'Reisen in Ost Afrika, 1859-65.' Band. III., Abth. 3, Botanik, von ASCHERSON, BÖCKELER, KLATT, &c. Leipzig, Winter, 1879 (5 tab.). — A. DE SILVESTRI, 'Le Piante pratensi.' Torino, 1879 (30 lire). — 'Seboth's Alpine plants painted from nature,' edited by A. W. BENNETT. Swan Sonnenschein & Allen, London. — FERD. VON MUELLER, 'Eucalyptographia,' Decades 1 & 2. Melbourne; London, Trübner (5s. each).

ARTICLES IN JOURNALS.—SEPTEMBER.

Grevillea.—M. C. Cooke, 'New British Fungi.'—Id. & J. B. Ellis, 'New-Jersey Fungi.'—Id., 'On *Peniophora*' (tab. 122-126).—Id., 'Undescribed Fungi in the Kew herbarium.'—G. Davis, '*Brachythecium salebrosum*.'—W. Lauder Lindsay, 'Experiments on the colorific properties of Lichens.'—L. Quelet, 'New Fungi of the Jura.'

Midland Naturalist.—J. E. Bagnall, 'Flora of Warwickshire.'

Flora.—S. Schulzer, 'Mycological notes.'—K. A. Henniger, 'Hybrids' (contd.)—F. Arnold, 'Lichenological fragments' (contd.)—O. Kuntze, 'Connexion of Algæ and Phanerogams' (t. 10).

Bot. Zeitung.—H. Hoffmann, 'Experiments in culture' (contd.)—M. Waldner, 'On development of sporogonia of *Andræa* and *Sphagnum*.'—P. Falkenberg, 'On endogenous structure of shoots in *Rhytiphlea*, *Vidalia* and *Amansia*.'—E. Zacharias, 'On secretion-reservoirs with corky walls.'

Oesterr. Bot. Zeitschr.—L. Celakovsky, 'Bot. Miscellanies' (*Festuca amethystina*, &c.)—M. Willkomm, 'Remarks on new or critical plants of the Pyrenæan peninsula and Balearic Islands.'—J. S. Poetsch, 'New Austrian Fungi.'—F. v. Heldreich, 'Insect-eating plants of Greece.'—C. Erdinger, 'Flora of Gamsstein bei Hollenstein.'—H. Zukal, 'A question of parthenogenesis in certain *Conjugatæ*.'—F. Hegelmaier, 'Excursion in Alicante Hills' (contd.).

Magyar Nov. Lapok.—V. de Janka, 'Gladiolorum Europæorum clavis analytica.'—Id., 'Botanical excursion in Turkey' (contd.): Kalofer and River Akdere.'

Bull. Soc. Bot. Belg. (xviii. 1).—F. Crépin, 'Biographical notice of B. C. Dumortier' (with portrait).—A. Gravis, '*Schinzia Alni*, Wor.' (tab. 1).—Mesdames E. Bommer & M. Rousseau, 'List of Fungi in the environs of Brussels.'

Nederlandsch Kruidk. Arch. (2, iii. 2).—Van der Sande Lacoste, 'Distribution of the Mosses found in the Netherlands' provinces.'—H. J. K. Ankersmit, 'List of plants found near Apeldoorn.'—Oudemans, 'Additions to mycology of Holland.'—H. F. Jonkman, 'On the development of *Kaulfussia asculifolia*.'

Hedwigia.—G. Winter, 'Mycological notes.'

Bot. Notiser (15 Sept.)—A. P. Winslow, 'The Salix- and Rose-flora of Göteborg.'—S. Almquist, 'Various notes.'—A. N. Lundstrom, 'Remarks on cell-division in living material.'—P. G. E. Theorin, 'Hymenomyces Gothoburgensis.'

Botanical News.

A LOCAL Flora of great interest will very shortly be published, the Flora of Plymouth, by our valued correspondent, Mr. T. ARCHER BRIGGS. It is rarely that a district has been so completely examined botanically as has this by Mr. Briggs, and his book will be a nearly exhaustive account of the vegetation for twelve miles round the town.

MR. R. I. LYNCH, of Kew Gardens, has been appointed to succeed the late Mr. Mudd as Curator of the Cambridge Botanic Garden.

THE death of EDOUARD FENZL occurred on September 29th, in the 72nd year of his age. A few years ago he retired from the chair of Botany in Vienna, which he had held for many years, along with the Directorship of the Botanic Gardens. Fenzl has written several memoirs on the *Alsinea* and allied Orders, the *Compositæ* and other obscure plants, and on the floras of the East and of North Africa.

WE have also now to record the death, at the great age of 90, of the Nestor of English botanists, JOHN MIERS, on October 17th. As we hope to give a fuller obituary of this distinguished botanist, we need now only say that he has been a constant friend to and supporter of this Journal from its commencement, and has contributed several valuable memoirs to its pages.

ALFRED FRENCH, whose death (æ. 40) has lost to the Botanical Department of the British Museum an excellent attendant, was a man of considerable natural ability, which only wanted opportunity for its exercise. Whilst working at his trade (baking), at Banbury, in Oxfordshire, he devoted his scanty leisure to botany, formed a herbarium, and acquired a good knowledge of British Phanerogams and Mosses, as well as an acquaintance with other departments of Science. This he was desirous to turn to the best account, and the opportunity he sought seemed to present itself on the offer of one of the subordinate places in the British Museum, to which he was appointed in 1874. On first coming to London he also lectured on Botany at the Polytechnic Institution, but the number of students was not sufficient to make him continue with a second course. His health soon began to give way, and he became subject to fits of an epileptic character, in one of which he died on Oct. 22nd. French had accumulated a large amount of material for a new Flora of Oxfordshire, his native county; he contributed a short paper on *Salvia pratensis* to this Journal in 1875.

Original Articles.

PHYLLORACHIS, A NEW GENUS OF GRAMINEÆ FROM WESTERN TROPICAL AFRICA.

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

(TAB. 205).

THE grass here described is a native of the district of Pungo Andongo, in Angola, where the only specimens I have seen were collected by Dr. Welwitsch, in March, 1857. Among the numerous interesting species, many undescribed, of this family contained in his herbarium, no one is more remarkable than the subject of this notice, which, both in habit and in structure of the inflorescence, appears to differ from all known genera to a very unusual extent. I propose to name it *Phyllorachis*, a descriptive title sufficiently self-explanatory.

Before giving a formal definition of this genus I may call attention to the peculiarities of the floral arrangement upon which that definition is founded, and to some other particulars; and I cannot but regret that the specimens before me are not sufficient to do this with completeness, since their flowering season being over when gathered a large number of the spikelets have fallen, and stamens are wanting in those which remain, which, however, present us with the nearly-ripe grain.

At first sight the long inflorescence might be supposed to be partially enclosed in a leaf-sheath, and it is not until the edges of the veined leafy organ are raised that this latter is seen to be the rachis itself, greatly dilated, somewhat after the manner of the *Ceresia* section of *Paspalum*, and bearing on its thickened central rib the branches of the inflorescence. This consists of a number (12–20) of contracted branches or compound spikelets, sessile and articulated on either side of the inner surface of the central rib of the rachis; they are not closely placed, but overlap one another, and when detached, which readily happens, they leave a small oval scar. The parts present in each are rather puzzling, and their precise relationships not very clear, but it appears that each compound spikelet must be regarded as consisting of an abbreviated secondary rachis and three spikelets, of which the lowest one is alone fertile and 1-flowered, the upper two (borne upon the very broad, flattened truncate secondary rachis, and pressed closely against the side of the lowest spikelet) being much smaller, and consisting merely of empty glumes. The lowest (fertile) spikelet has four glumes, if we are to give the lowest minute and subulate bract that name;* the

* General Munro, who has with his usual kindness examined, at my request, the structure of a compound spikelet of *Phyllorachis*, and agrees generally with

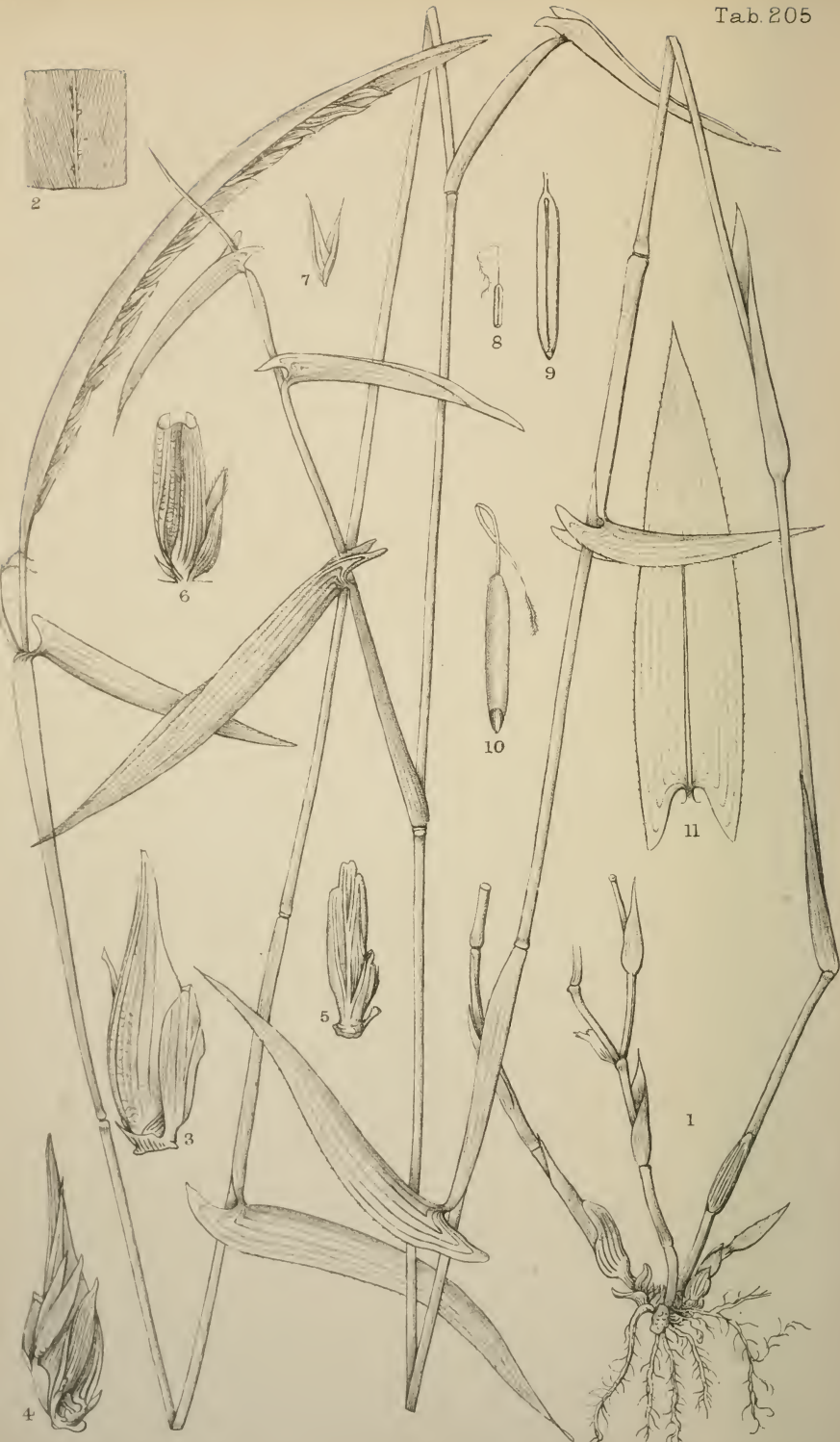
next glume is short and acute; the third is three times as long, very acuminate, and forms the most conspicuous part of the spikelet, being wrapped round the inner organs and deeply furrowed down the back; the fourth glume (flowering glume or lower pale) and the palea are shorter, equal and very similar to one another, chartaceous, acuminate, glabrous, and enveloping but not attached to the grain. The fruit is one-fourth of an inch long, oblong-linear, laterally compressed, deeply grooved down the inner face, smooth, and capped with the withered remains of an elongated apparently bifid style with pilose branches.

But besides this main inflorescence, other flowers are produced in spikelets of a different character arising from the axil of the upper leaf-sheaths, and supported on a long filiform peduncle concealed within them, the spikelet itself appearing just above the top of the sheath; a second one being sometimes found half-way down the peduncle, and thus entirely concealed in the sheath. These spikelets consist of the same elements as the fertile one already described, but the flowering glume and palea are much more elongated, attaining a length of an inch and a quarter, and twice the length of the third glume; the two pilose stigmas project beyond the points of these, at the top of the spikelet.

The genus may be thus defined:—

PHYLLORACHIS.—Flowers unisexual?, arranged in 1-flowered spikelets; palea entire, acute, with two stronger and six faint equidistant nerves; lodicules?; stamens?; style elongated, with two long pilose branches; fruit free, linear, laterally compressed, deeply grooved down the inner face. Spikelets mostly arranged in threes; the lower fertile, sessile; the upper and intermediate (?) ones barren and connected with a broad flat truncate veined secondary axis; the whole three forming a compact compound spikelet, which is articulated on the main rachis of the inflorescence; this last is four or five inches long, leaf-like, more than half an inch wide when flattened out, but folded over the sides of the line of compound spikelets so as to form a spathe-like covering, and extending beyond the last of them as a leafy point, with a strong midrib, to which, on alternate sides of its inner surface, the compound spikelets are attached, and from which very numerous parallel straight slender veinlets pass at an acute angle to the margin; the whole forming a narrow, terminal, erect, somewhat falcate inflorescence; a few spikelets solitary on very long peduncles in axil of the upper leaves; glumes several and very different, the two lowest ones subulate and short, the third large and strong, in the fertile spikelet strongly sulcate down the back, and furnished with five very closely placed veins on either side of the furrow connected by short transverse reticulations; the uppermost glume (flowering glume in the fertile spikelet) very like the palea in appearance and texture, glabrous, rounded on the

the above interpretation, suggests that this subulate glume-like body "is probably the point of the axis of the raceme similar to that seen in *Atheropogon* and other allied genera."



back, with nine very slender equal and equidistant nerves, all acute or very acute; no awns.*

The only species, *P. sagittata*, is a grass about two or three feet high, with very much the habit of *Olyra pauciflora*, Sw. From the crown of the rootstock, which gives off many long tough roots, arise several stiff, slender, strong, wiry, cylindrical, smooth, solid, slightly branched stems, which are thickened and slightly kneeed at the lower nodes, and bear short brown acute sheaths without a leaf-blade. The leaves are few, distant, the lowest ones somewhat reduced in size; in the fully developed ones the sheaths are rather shorter than the blade, close, smooth or roughish with a few very minute prickles, slightly ciliated at the margin above; ligule none; the blade spreads at right angles or is somewhat deflexed, and is very shortly stalked; it is two and a half to three inches long, ovate-lanceolate, tapering to the acute apex, deeply sagittate at the base, the auricles being about one-fourth of an inch long and subacute, smooth but for an occasional minute prickle on the midrib beneath and numerous forward-pointing ones on the margin; usually it is markedly conduplicate, being folded along the midrib, which is but little more strongly marked than the four slender parallel nerves which run on either side after first bending down into the auricles.

As regards the affinities of the genus they are by no means obvious. Gen. Munro is inclined to place it in *Chlorideæ*, as somewhat approaching *Spartina* in some respects, especially in the style and large loose caryopsis, and it will for the present be well to leave it in that position. Yet the structure of the fertile spikelet presents some resemblances to the *Phalarideæ*, whilst in habit the grass suggests an affinity with some genera of the *Olyreæ*.

The precise locality where this singular grass was found by Dr. Welwitsch was in sandy woods on the larger island of Calemba, in the river Cuanza, in Pungo Andongo, and the date, March, 1857.

DESCRIPTION OF TAB. 205, representing *Phyllorachis sagittata*, Trimen, drawn from specimens in the British Museum collected in Angola by the late Dr. Welwitsch.—1. A plant *nat. size*. 2. Small portion of the dilated rachis showing the scars left by the fallen compound spikelets, *nat. size*. 3. Back, and 4, front view of a compound spikelet, *enlarged*. 5. The flattened secondary axis with the spikelets detached, *enlarged*. 6. Glumes of the lowest spikelet, the upper portion of the third one cut off, *enlarged*. 7. Flowering-glume and palea of the same, *nat. size*. 8. Inner surface of grain, *nat. size*. 9. The same, *enlarged*. 10. Outer side of the same, *enlarged*. 11. A leaf flattened out, *nat. size*.

* I think the terminology employed for the parts of the grass-spikelet by Mr. Bentham worthy of general adoption, being most in accordance with their actual nature as now generally recognised by botanists.

NOTES ON *SAPOTACEÆ*.—II.

BY MARCUS M. HARTOG, M.A., B. SC., F.L.S.

[Read at the Meeting of the British Association at Sheffield, 1879.]

THIS paper is a continuation of my notes on *Sapotaceæ* published in the 'Journal' last year. It is intended to form part of a series of prolegomena to a descriptive monograph of all the species of the Order, which I trust to be able to work up in due time. The order of these notes has, unfortunately, to be decided by that in which I am able to study the material.

In the paper above referred to ('Journ. Bot.,' 1878, pp. 65-72) I proposed a division of this Order into three tribes, founded on what appeared to me the most constant characters, *i. e.*, the fertility of the alternipetalous stamens, or their reduction to staminodes or abortion, and the presence or absence of stipular appendages to the true petals. My first section, *Bassieæ*, has exstipulate petals and all the stamens fertile; the second, *Chrysophylleæ*, has exstipulate petals and the alternipetalous stamens sterile; the third, *Mimusopeæ*, has stipulate petals and the alternipetalous stamens sterile, except in two species. The present paper is devoted to a critical examination of the genera of this last section. The genera recognised by Bentham and Hooker are as follows:—*Bumelia* and *Dipholis*, both pentamerous, but the one with albuminous, the other with exalbuminous seeds; *Mimusops* with a 2-seriate, 3-merous, or 4-merous calyx, the outer whorl valvate, and a 6- or 8-merous corolla; *Imbricaria* differing from *Mimusops* essentially only in the deep lobing of the stipular appendages to the petals; *Labramia* marked by the laciniate stipular appendages of *Imbricaria*, but 3-merous and with the staminodes reduced (said to be absent), and a diplomerous gynæceum. To these I have brought under the name of *Muricea* two other species, formerly ascribed to *Labourdonnaisia*, which, however, possess the flowers of *Mimusops*, but with both whorls of stamens fertile. Finally, there remains another genus, with several whorls of stamens or staminodes, represented by a solitary specimen (Coll. Blackburn in Herb. Hort. Kew), of which the locality is not known, and the flowers are too imperfect to determine their exact symmetry.

Bumelia is one of Swartz's genera. *Dipholis* was founded by A. DeCandolle in the 8th volume of the 'Prodromus.' Both these genera are found side-by-side in the New World, to which they are equally confined. They show no real diversity in structure or habit. The presence of albumen is a very inconstant character in this Order, and loses its practical importance from the rarity of fruiting specimens. The total number of species in the two genera is not large, and the argument from convenience, forcible in the nearly parallel case of *Lacuma* and *Sideroxylon*, is wanting here. Hence, in the absence of any strong reason to the contrary, I propose to abolish *Dipholis*, even as a distinct section.

Of the remaining *Mimusopeæ*, including the rich Mascarene collections in the Paris Herbarium, I have analysed nearly all the species, with the following results:—

Imbricaria coriacea, DC., is identified by Bentham and Hooker with the type and sole species of *Labramia*, DC.; I find, on dissecting flowers of a large number of specimens, that the staminodes, instead of being absent as hitherto described, are well developed, deltoid-subulate, shaggy behind. Hence this plant is only separated from *Imbricaria* by the 3-merous flower and the pleiomerous gynæceum. But 3-merous and 4-merous flowers exist side-by-side in *Mimusops* (on the same branch in *M. Roxburghiana*, Wt.). And pleiometry of the gynæceum, not held of sufficient importance to separate *Chrysophyllum Caimito* from the 5-carpellary species of *Chrysophyllum*, cannot be of more weight here. I have, too, found an undoubted *Mimusops* of Boivin's from Zanzibar, which is a true *Mimusops* in every other respect, but possesses a 12-merous gynæceum (*M. annectens*, mihi, in Herb. Mus. Par.) Again, *Labramia* is confined to Madagascar, and, with one exception, *Imbricaria* is limited to Madagascar and the Mascarene Islands. Therefore *Labramia* must lose its autonomy.

Now, I turn to *Imbricaria* itself: I found, in Paris, a beautiful specimen of Chapelier's from Madagascar (*Mimusops Chapelierii*, mihi), which has the flowers of a "*Labramia*," save for the petaline appendages, which are quite entire, as in *Mimusops*. Where is this to be placed under the existing nomenclature? I have just stated that *Imbricaria* is, with one exception, Mascarene, using the word in a wide sense. On turning over the species in the Kew herbarium, I find that *Mimusops Cruegeri*, Grisebach, from the Antilles, has the lobed petaline appendages of *Imbricaria*, and, indeed, has the 4-merous flower and habit of one. Can the entire or lobed form of such secondary structures be alone used to form a genus? I think not.

Synarrhena was founded by Fischer and Meyer for two South American species, of which the only distinctive character is the connation of stamens and staminodes at their base into a tube, distinct for a short distance from the corolline tube, to which, however, it is adnate. It has been reduced to a section of *Mimusops* by all subsequent authors.

Finding that two 3-merous species of this group, distinct from *Mimusops* proper only in the fertility of the alternipetalous stamens, had been confounded with *Labourdonnaisia*, I regret to say that I formed them into a distinct genus under the name *Eichleria*, afterwards altered to *Muriea*. But of the two species, one is from Natal, the other from the Antilles. Besides, they are of very different habit. I now therefore regard them as independent reversionary forms to a diplostemonous type, such as I have found in a flower (normal in other respects) of a specimen of *Sideroxylon sandwicense*, A. Gray.* What was monstrous has become normal.

* Of staminodes, one was petaloid normal, another irregular in shape and bearing an anther; the other three converted into true stamens like the anti-petalous.

Hence, I reduce *Muriea* to an artificial section of *Mimusops*, of which the revised character will run as follows:—

MIMUSOPS.—Calyx 2-seriata; sepalis exterioribus crassis valvatis, interioribus imbricatis. Petala 6–8, sepalis alterna appendicibus geminatis interdum laciniatis stipatis, imbricata subcontorta rarissime (nunquam?) vere contorta. Androceum biseriatum, vel pseudo-1-seriatum; staminibus alternipetalis fere semper sterilibus petaloideis, integri 2-fidis, v. laciniatis, limbo plerumque ante utrumque fertilia collateralem expanso; antheris (fertiliis) extrorsis (*ordinis*) gynæceum *ordinis*, 6–8 loculare vel diplomerum.

1. EUMIMUSOPS (incl. *Synarrhena*).—Petalorum appendices integri; stamina antisepala sterilia petaloidea; gynæceum isomerum, rarissime diplomerum (*M. annectens*). [Region. omn. calid.]
2. IMBRICARIA.—Omnino *Mimusopsis* sed appendicibus petalorum laciniatis. Sp. ad. 6. [1 Antilles; cæt. Madagascar. et Ins. Mascarens.]
3. LABRAMIA.—Petala *Imbricariæ*; gynæceum diplomerum. [Madagascar. et Ins. Mascarens.]
4. LABRAMIOPSIS.—Petala *Eumimusopsis*; staminodia et gynæcium *Labramiæ*. Sp. 1. [Madagascar.]
5. MURIEA.—Flores omnino *Eumimusopsis* sed stamina antisepala fertilia. Sp. 2. [1 Antilles, 1 Natal.]

The *Chrysophylleæ*, especially *Lucuma*, need a revision from the same point of view, and this I trust to be able to make in a future communication. I will only note that *Cryptoqyne*, Hook. f., is *exstipulate*. Gerrard's specimens, which formed the type of the genus, have indeed some of the leaves reduced; and in one they present a most deceptive resemblance to stipules; but I found in the Paris herbarium a beautiful specimen of Dup. Th., unmistakably of the same species as Gerrard's, and unequivocally *exstipulate*. This enabled me to see, on close examination, the true character of the stipuloid organs in Gerrard's, which are irregularly interspersed among ordinary foliage-leaves, and by no means paired at the base. Another very good specimen turned up in the *Sapotaceæ ignota* at the British Museum. This, too, has the well-marked foliage of the Paris specimen, and is, perhaps, a duplicate of it.

I may here mention that a dissection of the very young buds on a specimen of the "*Capucine*" of the Seychelles prove it to be not a *Sideroxylon*, but a 3-merous *Mimusops*. As the petals were so young as to be still *exstipulate*, I could not determine the section. I name it, therefore, *M. Hornei*, after its collector, Mr. Horne, to whom systematic botany owes so many prizes. Full descriptions of the new species referred to in this paper will shortly be published in the 'Journal.'

A revision of the *Bassieæ* must also be deferred, for it would require a complete study of all the Bornean and Javan types, to be acquired by a visit to Leyden and Florence. I feel very uncertain what is meant by the floral symmetry of several of these species, as described by their authors. *Dichopsis elliptica*, B. H. (*Bassia*,

Dalz.), is interesting as furnishing the first unmistakable instance of *dédoublement* I have found. The flowers are those of *Dichopsis* (C 3 + 3, P 6, st 6 + 6, G 6); but the anti-petalous stamens are *usually* replaced each by a pair. This is not constant, even for the same flower, so that the number of stamens varies from twelve to eighteen. Hence it will stand in the genus where B. H. have placed it. Stipules are very frequent in this group, but it is difficult to be sure of their presence, as they are almost always deciduous, and can only be found on growing shoots—even on these sometimes with difficulty. Their presence varies from species to species in such natural genera as (*Eu-*) *Mimusops* and *Sideroxylon*, as noticed by Baker.

NOTE UPON *HYPNUM SALEBROSUM*, HOFFM., AND ITS BRITISH DISTRIBUTION.

BY F. ARNOLD LEES, F.L.S.

As bearing upon the inference to be drawn from Mr. Spruce's remark (p. 307) that there are "at least two reliable" stations in Britain for *H. salebrosum*, Hoffm., I can confirm the refutation of Mr. G. Davies' doubts as to the correct determination of the name by Mr. Spruce. I know three wide-apart stations additional to those mentioned in Mr. Spruce's paper; possibly unknown to him, since, during his long absence from England, British bryology has acquired many new votaries. Further, I may assert that the following particulars amply corroborate Mr. Spruce's prediction as to a careful search revealing a wider distribution in Britain.

I found *B. salebrosum*, Hoffm., in 1876, growing on fallen, rotting bark and sticks, by a rivulet, running eastward, at the lower end of Ledsham Park, in the West Riding of York. It was gathered as *B. rutabulum*, the yellower-green of the foliage being set down by me—then just beginning moss study—as due to growth in shade. The differences so felicitously summed up by Mr. Spruce, however, afterwards revealed the species.

Again, in December, 1877, I gathered the same moss from off decaying tree-stumps, and off a bank composed mainly of rotten vegetable matter, by the roadside a mile out of Market Rasen going towards Tealby. It was fruiting only sparingly where first found, but later I detected it in several other thickets in the same district, Claxby Wood, Wickenby Holt, &c. The Lincolnshire moss, pronounced by Mr. H. Boswell, of Oxford,—surely no more careful authority could be desired by Mr. Davies,—to be the veritable *B. salebrosum* of Hoffmeister, was *always* found by me upon decayed bark, humus, rotten fir-needles, &c., in shade, *exactly* as Renauld, quoted by Spruce, asserts it to occur in the Pyrenees. Singular to say, it is not the only sub-montane and Pyrenean moss (occurring *also* near Castle Howard, yet almost unknown elsewhere in England) which I have found upon the extensively fir-wooded greensand tract near Rasen, for *Eurhynchium striatulum*, Spruce (for instance), grows not two miles from where I first noticed *B. salebrosum*.

Finally, in April, 1879, just before I left Rasen, Mr. W. Allen and myself were "moss-trooping" across some swampy uncultivated ground at Woodhill, near Rasen, where are several old clay-bottomed pools,—on Kimmeridge clay, not red sand,—when my companion drew my attention to a dwarf, strikingly golden-tinged moss growing with undoubted *B. rutabulum* upon a damp clayey grassy ridge close by one of the pools. I was led to examine it carefully, when of course it turned out to be the palustral form or variety *Mildeanum*, Schimp. Here was a further confirmation of the accuracy of Renauld's restriction as to site of growth in the variety. The Woodhill plant was not fruiting; but I have seen *B. Mildeanum* from Southport (H. Boswell), and Hayle sands, Cornwall (W. Curnow).

An old record (1838) of William Wilson's names Helk's Wood, Ingleton, in West Yorkshire, as a station for *H. salebrosum* (Baines's 'Flora of Yorkshire,' 1840), but there I have, so far, only been able to find *Brachythecium glareosum*—which, by-the-bye, is *H. salebrosum* of Hooker and Taylor, but not of Hoffmeister. To my eyes *H. salebrosum*, Hoffm., is quite as likely to be passed-by as *H. glareosum* as is *H. rutabulum*; especially is it like a rank and barren state of *H. glareosum*, which is common on damp shady banks in old limestone quarries near Wetherby.

Of importance as extending the range of *H. salebrosum*, Hoffm., much beyond the limits already alluded to, must be stated the fact that Mr. Mitten is said (Hobkirk, 'Synopsis,' p. 148) to have found it in Sussex. Has Mr. G. Davies seen this last? The authority is too good for it to be a likely error.

It is quite needless for me to attempt to add anything to Mr. Spruce's account of the differences between *B. salebrosum* and allied species; yet, let me say, lest it should be thought, in my effort to confirm Mr. Spruce, I appreciate differences only *after* others point them out, that in the Yorkshire 'Naturalist' for February, 1878, I placed on record my discovery of the true *B. salebrosum* in Lincolnshire; and that I there drew attention to the very differences Mr. Spruce alludes to in 1879, and in words not so very dissimilar pointed out the hue of green as one readily appreciable, noting the silkier more plumose tufts, and more gradually-acuminate leaves of *B. salebrosum* as compared with *B. rutabulum*, and the fact that when once carefully observed, side by side, they can be distinguished at a glance by the 'colour-test' alone.

ON A VARIETY OF *HIERACIUM CÆSIUM* FROM THE GREAT ORMES HEAD.

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

THERE is a *Hieracium* on the Great Ormes Head of which I have known for many years, but have never had the opportunity of gathering or seeing alive under cultivation, of which the remembrance has just been revived in my mind by receiving a specimen to be named collected there in last July by the Rev. W. H. Painter.

In its inflorescence it agrees closely with the plant common upon the limestone scars of the North of England, figured by Smith in 'English Botany,' t. 2082, under the name of *H. murorum*, and which we now look upon in this country as our typical *H. casium*: but it differs from this conspicuously in its leaves, which are as glaucous as in any native *Hieracium*, and in shape much more lanceolate, with remarkably large acute teeth. As has been already pointed out by Backhouse in his 'Monograph,' and by Dr. Boswell in 'English Botany,' this English *casium* is by no means absolutely identical with the common Scandinavian plant first called by that name by Fries. Type specimens of the latter are given under No. 86 of the Fasciculus of dried specimens of *Hieracia*, issued in 1866 by Fries. It comes about midway between the English *casium* and ordinary *vulgatum*, receding from the former in its less rosulate narrower leaves and more numerous and smaller flower-heads. In order to make the matter plainer I will give short comparative descriptions of the three forms.

H. casium, the typical plant of Fries, 'Symbolæ,' p. 112, and 'Epicrisis,' p. 92, No. 86.—Whole plant 1–1½ foot high. Developed leaves 4–6 in a radical rosette cotemporary with the flowers: blade grey-green, thin in texture, oblong, acute, 2–3 rarely 4 in. long, 1–1¼ in. broad, narrowed to the petiole except in the primordial leaves, furnished with 3–4 deltoid or lanceolate teeth of moderate size on each side in the lower half, with a few soft crisped hairs near the margin; petiole shorter than the blade, moderately hairy. Stem bearing one large stalked toothed lanceolate leaf above the base and often another small one higher up, and 4–8 corymbose heads, all on long peduncles, with a little white stellate down and very few short black bristly hairs without glands at the tip. Involucre globose, in flower about ½ in., finally ½ in. diameter, ½ in. long; phyllaries linear, acute, dark olive in the centre, paler towards the margin, with a keel of black bristly hairs without glands and in the lower part white ones intermixed, without any white floccose tomentum. Styles livid. Outer flowers ¾ in. long.

H. casium, var. *Smithii* = *H. casium*, Engl. Bot., 3rd edit., tab. 847.—Whole plant 1–1½ foot high. Developed leaves about half a dozen in a radical rosette cotemporary with the flowers; blade greyish green, thin in texture, oblong or ovate-oblong, acute, 2–4 in. long, 1½–2 in. broad, often narrowed suddenly to the base, furnished with a few small teeth on each side and a few short soft hairs near the margin; petiole rather shorter than the lamina, densely pilose. Stem without any leaves or furnished with a single small one near the base; bearing usually 3–4 corymbose heads, all on longish peduncles, with a little white stellate down and a few black bristly hairs, not gland-tipped. Involucre finally ½–⅝ in. diameter, ½ in. long; phyllaries linear, acute, with many black bristly hairs mostly without glandular tips. Styles livid. Flowers often an inch long. This is the Giggleswick *casium* spoken of in Backhouse's 'Monograph,' and the *casium*, var. *a. genuinum*, described by Dr. Boswell. It is frequent in the limestone cliffs of Yorkshire, Durham and Derbyshire, and ranges in Britain from

Sutherland southward to Herefordshire. I have never seen it in the low country of the South of England, where *murorum* and *vulgatum* are not infrequent.

H. casium, var. *cambricum*.—Whole plant 1-1½ foot high. Developed leaves 4-5 in a radical rosette cotemporary with the flowers; blade thin in texture, as glaucous as in *pallidum* or *argenteum*, lanceolate, acute, at most an inch broad, including the very large ($\frac{1}{4}$ - $\frac{1}{2}$ inch) teeth, narrowed to the base, nearly glabrous; petiole shorter than the blade, nearly glabrous. Stem without any leaves or bearing only a single small one near the base; heads 3-4, all on longish peduncles, thinly coated upwards with white stellate down; black bristly hairs nearly absent. Involucre finally $\frac{1}{2}$ - $\frac{5}{8}$ in. diameter, $\frac{1}{2}$ in. long; phyllaries linear, tapering to an acute point, matted with a little white stellate tomentum down the edge, the outer ones nearly all black, the inner with a black keel and greenish margin; black bristly hairs short and not gland-tipped. Styles not seen in the living plant. Flowers not quite an inch long. Great Ormes Head, on limestone rocks.

H. murorum, of Backhouse, and Engl. Bot., edit. iii., tab. 846, has thin rosette-leaves suddenly narrowed at the base, usually one large distinctly-petioled leaf placed some distance above the base of the stem, more numerous much smaller heads than in *casium Smithii*, the central heads of the corymb on very short peduncles, and the black-based hairs of the involucre and top of the peduncles furnished with abundant glands. *H. stelligerum* of Backhouse (*H. flocculosum*, Engl. Bot., edit. iii., tab. 848), which Fries cites under *casium* as a mere synonym, not even as a variety, has heads like those of *casium Smithii*, but differs by having mostly two large stem-leaves, and is a more robust plant than the Scandinavian *casium*, with leaves hoary on both sides with thin white stellate down. If we look upon the three forms above described as varieties of one species, we must place *flocculosum* as a fourth.

THE CRYPTOGAMIC FLORA OF KENT—FUNGI.

By T. HOWSE, F.L.S.

(Concluded from p. 336.)

Order 25.—ELVELLACEI.

MORCHELLA ESCULENTA, Pers. Maplescombe Valley, G. Bird; Currey, Greenw. Rep.

M. PATULA, Pers. Kent, Jacob Rayer, Berk. Eng. Fl., p. 183.

HELVELLA GIGAS, Kromb. Blackheath Park, Currey, Linn. Trans., xxiv., t. 25, f. 25.

H. CRISPA, Fr. Starvecrow Wood, W. T. T.; near Dunton Green; Otford.

H. LACUNOSA, Afz. Near Shoreham; near Otford; Currey, Greenw. Rep.

H. ELASTICA, Bull. Rusthall Common, Herb. Deakin; Currey, Greenw. Rep.

- MITRULA PALUDOSA, *Fr.* Keston Common, *W. W. Reeves.*
- SPATHULARIA FLAVIDA, *Pers.* In a larch wood near Shoreham.
- LEOTIA LUBRICA, *Pers.* Shoreham; Rusthall Common, *Herb. Deakin*;
Starvecrow Wood, *W. T. T.*; Currey, Greenw. Rep.
- GEOGLOSSUM GLABRUM, *P.* Starvecrow Wood, *W. T. T.*; Sydenham Hill.
- G. DIFFORME, *Fr.* Tunbridge Wells Common, *Herb. Deakin.*
- PEZIZA BADIA, *P.* Hayes Rectory, *Huss.*
- P. AURANTIA, *Fr.* Sydenham Hill; Currey, Greenw. Rep.
- P. REPANDA, *Wahl.* Rowdow Wood, near Kemsing.
- P. CUPULARIS, *L.* Knowle Park, *C. E. Broome.*
- P. GRANULATA, *Bull.* Sydenham Hill; Tunbridge Wells, *Herb. Deakin*; *Currey, Greenw. Rep.*; Ightham Common, *Holmes.*
- P. CONSTELLATIO, *B. & Br.* Near Addington, *Berk. & Br. in A. N. H.* p. 143.
- P. HUMOSA, *Fr.* Dover, *Holmes*; Tunbridge Wells, *T. Walker*;
Currey, Greenw. Rep.
- P. CROUANII. On *Jungermannia*. Ightham, *Holmes.*
- P. FASCICULARIS, *A. & S.* Currey, Greenw. Rep.
- P. COCHLEATA, *Huds.* Currey, Greenw. Rep.
- P. VESICULOSA, *Bull.* Currey, Greenw. Rep.
- P. MACROPUS, *Pers.* Currey, Greenw. Rep.
- P. CURREYANA, *Tul.* Currey, Greenw. Rep.
- P. CYATHOIDEA, *Bull.* Currey, Greenw. Rep.
- P. COCCINEA, *Jacq.* Rochester Road, Maidstone, *Holmes*; Southboro',
Herb. Deakin; St. Mary Cray.
- P. VENOSA, *P.* *Peziza reticulata*, *E. F.* Hayes Rectory, *Huss.*
- P. SCUTELLATA, *L.* Rusthall Common, *Herb. Deakin.*; Sydenham Hill; Currey, Greenw. Rep.
- P. UMBRATA, *Fr.* Tunbridge Wells, *T. Walker.*
- P. VIRGINEA, *Batsch.* Sydenham Hill; St. Mary Cray; Darent Wood; Tunb. Wells, *Herb. Deakin*; Currey, Greenw. Rep.
- P. NIVEA, *Fr.* Darent Wood; Currey, Greenw. Rep.
- P. BICOLOR, *Bull.* Tunbridge Wells, *Herb. Deakin*; Ightham.
- P. CALYCINA, *Schum.* Sydenham Hill; Currey, Greenw. Rep.
- P. DIPLOCARPA, *Curr.* Joyden's Wood, *Currey, Linn. Trans., xxiv.,* p. 153, t. 25, f. 30-33.
- P. SCHUMACHERI, *Fr.* Darent Wood, *M. C. Cooke.*
- P. HYALINA, *P.* Darent Wood, *M. C. Cooke.*
- P. SULPHUREA, *P.* Darent Wood, *M. C. Cooke.*
- P. BERKELEII, *Blox.* Darent Wood, *M. C. Cooke.*
- P. TAMI, *Lamy.* On hop bine, Darent Wood, *M. C. Cooke.*
- P. CAMPANULA, *Nees.* In a chalk pit, Margate, *Berk. Eng. Fl.,* p. 201.
- P. ALBO-VIOLACEUS, *A. & S.* Currey, Greenw. Rep.

- P. EPISPHERIA, *Mart.* Currey, Greenw. Rep.
 P. FIRMA, *Pers.* Currey, Greenw. Rep.
 P. DOMESTICA, *Sow.* Currey, Greenw. Rep.
 P. LEUCOSTIGMA, *Fr.* Currey, Greenw. Rep.
 P. VULGARIS, *Fr.* Currey, Greenw. Rep.
 P. CINEREA, *Batsch.* Sydenham Hill; Darenth Wood; Tunbridge Wells, *Herb. Deakin.*
 P. CHAILLETHI, *P.* Tunbridge Wells, *Herb. Deakin.*
 P. ATRATA, *P.* Darenth Wood, *M. C. Cooke*; Currey, Greenw. Rep.
 P. LACUSTRIS, *Fr.* On submerged stems of *Alisma Plantago*. Near Blackheath, *Cooke*; Darenth, *M. C. Cooke.*
 P. PTERIDIS. Darenth Wood, *M. C. Cooke.*
 P. ESCHAROIDES. Darenth Wood, *M. C. Cooke.*
 P. VINOSA, *A. & S.* Currey, Greenw. Rep.
 HELOTIUM ACICULARE, *Fr.* Tunbridge Wells, *Herb. Deakin.*
 H. ÆRUGINOSUM, *Fr.* Rowdow Wood, near Kemsing.
 H. LUTEOLUM, *Curr.* St. Paul's Cray Common, *Linn. Trans.*, xxiv., p. 153, t. 25, f. 11, 12, 18.
 H. AQUATICUM, *Curr.* St. Paul's Cray Common, *Linn. Trans.*, xxiv., p. 154, t. 25, f. 19.
 H. TUBA, *Fr.* St. Paul's Cray Common.
 H. VIRGULTORUM, *Fr.* *Peziza fructigena*, *Bull.* Currey, Greenw. Rep.
 H. CITRINUM, *Fr.* *Peziza citrina*, *Fr.* Currey, Greenw. Rep.
 H. PALLESCENS, *Fr.* *Peziza pallescens*, *Fr.* Currey, Greenw. Rep.
 H. HERBARUM, *Fr.* *Peziza herbarum*, *Fr.* Currey, Greenw. Rep.
 H. FAGINEUM, *Fr.* *Peziza faginea*, *Fr.* Currey, Greenw. Rep.
 H. CONIGENUM, *Fr.* *Peziza conigena*, *Fr.* Currey, Greenw. Rep.
 H. ACICULARE, *Fr.* *Peziza acicularis*. Currey, Greenw. Rep.
 H. PRUINOSUM, *Jerd.* On *Diatrype quercina*. Sydenham Hill.
 H. OCHRACEUM, *Fr.* Sydenham Hill, on bramble.
 PATELLARIA RHABBARBARINA, *Berk.* *Peziza rhabarbarina*, *E. F.* Currey, Greenw. Rep.
 P. LIVIDA, *B. & Br.* Sydenham Hill.
 P. PALUSTRIS, *Curr.* St. Paul's Cray, *Linn. Trans.*, xxiv., p. 155, t. 25, f. 35.
 CENANGIUM CERASI, *Fr.* Currey, Greenw. Rep.
 C. FULIGINOSUM, *Fr.* Currey, Greenw. Rep.
 STICTIS RADIATA, *Pers.* Currey, Greenw. Rep.
 S. VERSICOLOR, *Fr.* *Cryptomyces versicolor*, *E. F.* Currey, Greenw. Rep.
 ASCOBOLUS ARGENTEUS, *Curr.* On cow-dung. Eltham, *Cooke.*
 A. FURFURACEUS, *P.* On cow-dung. Sydenham Hill; Currey, Greenw. Rep.

- A. CILIATUS, *Schum.* On cow-dung. Sydenham Hill.
 A. CARNEUS, *P.* On horse-dung. Sydenham Hill.
 A. SACCHARINUS, *B. & Curr.* On old leather and on old rag.
 Chislehurst, *Cooke.*
 A. IMMERSUS, *Pers.* On horse-dung. Sydenham Hill.
 BULGARIA INQUINANS, *Fr.* Sydenham Hill; Halstead; Ightham;
 Duntun Green, *Holmes*; Hayes, *Huss.*; Currey, Greenw. Rep.
 B. SARCOIDES, *Fr.* St. Paul's Cray Common; Currey, Greenw.
 Rep.

Order 26.—TUBERACEI.

- TUBER EXCAVATUM, *Vitt.* Hillydeal Wood, near Otford, *C. E. Broome.*
Tuber astivum is said to have been found on Otford Mount,
 near the above locality.
 ELAPHOMYCES GRANULATUS, *Fr.* Rusthall Common and Southboro',
Herb. Deakin.
 CHOIROMYCES MEANDRIFORMIS, *Vitt.* Currey, Greenw. Rep.

Order 27.—PHACIDIACEI.

- PHACIDIUM REPANDUM, *Fr.* Darent Wood, *M. C. Cooke.*
 HYSTERIUM VIRGULTORUM, *DC.* *Hysterium Rubi*, *Fr.* Currey, Greenw.
 Rep.
 H. PULICARE, *Pers.* Ightham and Chelsfield, *Holmes.*
 H. ELONGATUM, *Wahl.* On the hoop of an old cask, Tunbridge
 Wells, *Herb. Deakin.*
 H. ANGUSTATUM, *A. & S.* On decayed wood, Ightham, *Holmes.*
 H. FRAXINI, *P.* Tunbridge Wells, *Herb. Deakin.* Currey, Greenw.
 Rep.
 H. PINASTRI, *Schrad.* On fir leaves, Tunbridge Wells, *Herb. Deakin.*
 RHYTISMA ACERINUM, *Fr.* Currey, Greenw. Rep.
 COLPOMA QUERCINUM, *Wahl.* *Cenangium quercinum*, *H. F.* Tun-
 bridge Wells, *Herb. Deakin*; Darent Wood, *M. C. Cooke*;
 Ightham, *Holmes.* Currey, Greenw. Rep.
 STEGLIA LILICIS, *Fr.* St. Paul's Cray Common; Currey, Greenw.
 Rep.

Order 28.—SPHERIACEI.

- TORRUBIA MILITARIS, *Fr.* Sydenham Hill; Rusthall Common,
Holmes.
 T. ENTOMORRHIZA, *Fr.* Southboro', *Fawcett.*
 T. CAPITATA, *Fr.* On *Elaphomyces granulatus*, Southboro', *Herb.*
Deakin.
 EPICHLÖE TYPHINA, *B.* *Dothidea typhina*, *Fr.* New Cross, *M. C.*
Cooke; Tunbridge Wells, *Herb. Deakin.* Currey, Greenw.
 Rep. Hurst Wood, *Fawcett*; Southboro' and Queendown
 Warren, *Holmes.*
 HYPOCREA GELATINOSA, *Fr.* Currey, Greenw. Rep.

- NECTRIA CINNABARINA, *Fr.* Tunbridge Wells, *Herb. Deakin*; Sydenham Hill; Currey, Greenw. Rep.
- N. INAURATA, *B. & Br.* Currey, Greenw. Rep.
- N. SANGUINEA, *Fr.* Currey, Greenw. Rep.
- N. EPISPHERIA, *Fr.* Currey, Greenw. Rep.
- XYLARIA POLYMORPHA, *Grev.* Knowle Park; Dunton Green, *Holmes.*
- X. DIGITATA, *Grev.* Sydenham Hill; Currey, Greenw. Rep.
- X. HYPOXYLON, *Grev.* Sydenham Hill; Southboro', *Fawcett*; Tunbridge Wells, *Herb. Deakin*; Currey, Greenw. Rep.
- THAMNOMYCES HIPPOTRICHOIDES. On matting made of *Scirpus lacustris*, in a damp pew at Cobham Church, *Dr. Leach, Berk. Engl. Fl.*, p. 284.
- HYPOXYLON USTULATUM, *Bull.* Ightham, Dunton Green, and Toy's Hill, *Holmes.*
- H. COCCINEUM, *Bull.* *Sphæria fragiformis*, *Fr.* Sydenham Hill; also the conidiophorous form, *Isaria unbrina*, *Pers.* Tunbridge Wells, *Herb. Deakin*; Knowle Park. Currey, Greenw. Rep.
- H. MULTIFORME, *Fr.* On birch; Tunbridge Wells, *Herb. Deakin*; Sydenham Hill; Knowle Park; Currey, Greenw. Rep.
- H. ARGILLACEUM, *Fr.* On ash, Hurst Wood, *Herb. Deakin.*
- H. FUSCUM, *Fr.* Ightham; Darent Wood, *M. C. Cooke*; Currey, Greenw. Rep.
- DIATRYPE STIGMA, *Fr.* St. Paul's Cray Common; Hurst Wood, *Herb. Deakin*; Darent Wood, *M. C. Cooke*; Currey, Greenw. Rep.
- D. ASPERA, *Fr.* On oak, Hurst Wood, *Herb. Deakin*; Currey, Greenw. Rep.
- D. FAVACEA, *Fr.* *Sphæria favacea*, *Fr.* Currey, Greenw. Rep.
- D. BULLATA, *Fr.* *Sphæria bullata*, *Hoffm.* Currey, Greenw. Rep.
- D. UNDULATA, *Fr.* *Sphæria undulata*, *Pers.* Currey, Greenw. Rep.
- D. DISCIFORMIS, *Fr.* *Sphæria disciformis*, *Hoff.* Currey, Greenw. Rep.
- D. ANGULATA, *Fr.* *Sphæria angulata*, *Fr.* Currey, Greenw. Rep.
- D. VERRUCEFORMIS, *Fr.* Dover, *Holmes*; Currey, Greenw. Rep.
- D. QUERCINA, *Fr.* Sydenham Hill.
- D. VARIANS, *Curr.* Eltham, *Currey, Linn. Trans.* 22, p. 270, t. 46, f. 77.
- D. FERRUGINEA, *Fr.* Darent Wood, *M. C. Cooke*; Tunbridge Wells, *Herb. Deakin*; Currey, Greenw. Rep.
- D. FLAVO-VIRENS, *Fr.* Currey, Greenw. Rep. Darent Wood, *M. C. Cooke.*
- D. CORNICULATA, *B. & Br.* On hazel, Tunbridge Wells, *Herb. Deakin.*
- D. CINCTA, *B. & Br.* Blackheath, *Currey, Linn. Trans.* 22, t. 45, f. 135.

- EUTYPA LATA, *Fr.* Sydenham Hill.
- NUMMULARIA BULLIARDI, *Tul.* *Sphæria nummularia*, *Fr.* Currey, Greenw. Rep.
- DOTHIDEA RIBESII, *Pers.* On currant branches. Tunbridge Wells, *Herb. Deakin.*
- D. FILICINA, *Fr.* On *Pteris*, Southboro', *Holmes.*
- D. ULMI, *Fr.* On elm leaves, Tunbridge Wells, *Herb. Deakin*; Currey, Greenw. Rep.
- D. GRAMINIS, *Fr.* *Sphæria graminis*, *Pers.* Currey, Greenw. Rep.
- MELANCONIS LANCIFORMIS, *Tul.* *Sphæria lanciformis*, *Fr.* Currey, Greenw. Rep.
- M. BERKLEYI, *Tul.* *Sphæria inquinans*, *B. & Br.* Currey, Greenw. Rep.
- VALSA PRUNASTRI, *Fr.* Currey, Greenw. Rep.
- V. STELLULATA, *Fr.* Currey, Greenw. Rep.
- V. PROFUSA, *Fr.* Currey, Greenw. Rep.
- V. TURGIDA, *Fr.* Currey, Greenw. Rep.
- V. AMBIENS, *Fr.* Currey, Greenw. Rep.
- V. PULCHELLA, *Fr.* Currey, Greenw. Rep.
- V. HYPODERMA, *Fr.* Currey, Greenw. Rep.
- V. QUATERNATA, *Fr.* Currey, Greenw. Rep.
- V. VESTITA, *Fr.* Currey, Greenw. Rep.
- V. TILLÆ, *Tul.*
- V. CORNICOLA, *Cooke.* Darenth Wood, *Grevillea*, 1879, p. 83.
- V. CIRCUMSCRIPTA, *Mont.* On *Viburnum*, Darenth, *Cooke*; Tunbridge Wells, *Herb. Deakin.*
- V. LEIPHEMIA, *Fr.* On oak, Tunbridge Wells, *Herb. Deakin*; Currey, Greenw. Rep.
- V. FAGINEA, *Curr.* Eltham, *Currey*, *Linn. Trans.* 22, p. 281, t. 48, f. 168.
- V. ONCOSTOMA, *Duby.* On *Robinia pseud-acacia*. Swanscombe, *Cooke.*
- MASSARIA PUPULA, *Tul.* *Sphæria pupula*, *Fr.* Currey, Greenw. Rep.
- M. INQUINANS, *Tode.* *Sphæria gigaspora*, *Desm.* Currey, Greenw. Rep.
- M. FIMETI, *Fr.* *Sphæria fimeti*, *Pers.* Currey, Greenw. Rep.
- CUCURBITARIA BERBERIDIS, *Gray.* Dartford, *M. C. Cooke.*
- C. LABURNI, *DeNot.* *Sphæria Laburni*, *Pers.* Tunbridge Wells, *Herb. Deakin.* Currey, Greenw. Rep.
- SPHÆRIA AQUILA, *Fr.* Sydenham Hill.
- S. OVINA, *Pers.* Currey, Greenw. Rep.
- S. STERCORARIA, *Sow.* On cow-dung, Sydenham Hill.
- S. SPERMOIDES, *Hoffm.* Darenth Wood, *M. C. Cooke*; Currey, Greenw. Rep.

- S. MORIFORMIS, *Tode*. On a cabbage-stalk, Tunbridge Wells, *Herb. Deakin*; Currey, Greenw. Rep.
- S. PULVIS-PYRIUS, *P.* Sydenham Hill; Tunbridge Wells, *Herb. Deakin*; Darenth Wood, *M. C. Cooke*; Currey, Greenw. Rep.
- S. CALLICARPA, *Curr.* On old palings, Blackheath, *Currey, Linn. Trans.* 22, p. 324, t. 58, f. 62.
- S. LABURNI, *P.* On laburnum, Tunbridge Wells, *Herb. Deakin*.
- S. ANGUSTILABRA, *B. & Br.* On furze, Tunbridge Wells, *Herb. Deakin*.
- S. VELATA, *P.* On lime, Penshurst, *Herb. Deakin*.
- S. OBTECTA, *Curr.* Tunbridge Wells, *Herb. Deakin*.
- S. SALICELLA, *Fr.* *Sphæria salicina*, *Curr.* The conidiophorous form, *Disecella carbonaria*, *B. & Br.*, on willows, Tunbridge Wells, *Herb. Deakin*. Currey, Greenw. Rep.
- S. ACUMINATA, *Sow.* Darenth Wood, *M. C. Cooke*.
- S. RUBELLA, *P.* Darenth Wood, *M. C. Cooke*; Currey, Greenw. Rep. Sydenham Hill.
- S. ACUTA, *Moug.* Darenth Wood, *M. C. Cooke*; Currey, Greenw. Rep.
- S. HERBARUM, *P.* On a gourd, Tunbridge Wells, *Herb. Deakin*. On *Campanula*, Darenth, *M. C. Cooke*; Currey, Greenw. Rep.
- S. DOLIOLUM, *P.* On nettle-stems, Tunbridge Wells, *Herb. Deakin*.
- S. COMPLANATA, *Tode*. On *Heracleum*, Tunbridge Wells, *Herb. Deakin*; Currey, Greenw. Rep.
- S. ARÆ, *DC.* On leaves of *Pyrus Aria*, Darenth, *Cooke*.
- S. FIMBRIATA, *Pers.* Currey, Greenw. Rep.
- S. JUGLANDIS, *Fr.* Currey, Greenw. Rep.
- S. CLIVENSIS, *B. & Br.* Currey, Greenw. Rep.
- S. SETACEA, *P.* On petioles of sycamore leaves, Tunbridge Wells, *Herb. Deakin*.
- SPHÆRELLA OBLIVIA, *Cooke*, On the under side of dead chestnut leaves, mixed with *S. maculæformis*, Darenth Wood, *Cooke*.
- S. MACULÆFORMIS, *P.* Darenth Wood, *Cooke*.
- S. ARCANA, *Cooke*. On dead leaves of *Castanea vesca*, Darenth Wood, *Cooke*. Intermixed with the two preceding.
- S. ISARIPHORA, *DeNot.* On dead leaves of *Stellaria holostea*, Darenth Wood, *M. C. Cooke*.
- STIGMATEA ROBERTIANI, *Fr.* Darenth Wood, *M. C. Cooke*.
- S. POTENTILLÆ, *Fr.* Darenth Wood, *M. C. Cooke*.
- ISOOTHEA PUSTULA, *Berk.* *Phoma pustula*, *Fr.* Currey, Greenw. Rep.

ADDENDA.

Most of the following species are those about which there was a doubt previous to the visit of Dr. Quelet in October last. English botanists are much indebted to him for information about difficult and critical species.

A. (TRICHOLOMA) CINERASCENS, *Bull. Bull.*, t. 428, f. 2. Sydenham Hill,

A. (CLITOCYBE) METACHROUS, *Fr.* Sydenham Hill.

A. (COLLYBIA) CIRRHATUS, *Schum. Fr. Icon.*, t. 68, f. 1. Sydenham Hill.

A. (INOCYBE) LACERUS, *Fr. Hoffm. Icon.*, t. 12, f. 1. Sydenham Hill. This has been erroneously recorded as *I. trechisporus*.

A. (INOCYBE) OBSCURUS, *Pers. Fr. Icon.*, t. 107. Sydenham Hill.

The *A. (Hebeloma) fastibilis* figured by Saund. & Sm., pl. 42, f. 3, 4, is considered by Dr. Quelet to be a form of *H. crustuliniformis*. The true *H. fastibilis* has a veil and a silky stem. There is a figure of it in *Fr. 'Icones.'*

CORTINARIUS (PHLEGMACIUM) TRIUMPHANS, *Fr. Huss. ii.*, t. 22. Knowle Park.

C. (TELAMONIA) HEMITRICHUS, *Fr.* Sydenham Hill.

C. (HYGROCYBE) IMBUTUS, *Fr.* Sydenham Hill

C. (HYGROCYBE) LEUCOPUS *Fr. Bull.*, t. 533, f. 2. Sydenham Hill.

BOLBITIUS FRAGILIS, *Fr. Hoffm. Icon.*, t. 21, f. 2. On dung, Sydenham Hill.

RECENT ADDITIONS TO THE MOSS-FLORA OF THE WEST RIDING OF YORKSHIRE.

BY CHARLES P. HOBKIRK, F.L.S.

[Read before Sect. D., British Association, Sheffield, 25 Aug., 1879.]

(Concluded from p. 337).

Pottia truncata, L. **W. C.** Wetherby, Dr. Wesley; Huddersfield, C. P. H.

P. Heimii, Hed. **U.** Quarry Moor, Ripon, Miss Morton.

P. lanceolata, Dicks. **W. A.** Walls between Addingham and Steeton, Miall & Carrington; Garforth, 1876, Dr. Parsons.

Didymodon rubellus, B. & S. **L. W. A. D. M. C. T.** Whernside, Lees & West, Nat. iv. 137; Wetherby, Dr. Wesley; Harewood, F. A. Lees; Greenfield, J. Whitehead; Huddersfield, C. P. H.; Wentbridge, Nat. iii. 175; Roche Abbey district, Nat. iii. 185.

Eucladium verticillatum, B. & S. **N.** Pateley Bridge, Nat. iv. 175.

Ditrichum flexicaule, Schw. **L. A. W.** Dentdale, Lees & West, Nat. iv. 136; Wetherby, Dr. Wesley; Malham Moor, 1879, C. P. H.

Trichostomum tophaceum, Brid. **W. D.** Wetherby, Dr. Wesley; Wentbridge, Nat. iii. 175.

Barbula rigida, Schulz. (*stellata*, Schreb.) **N. W.** Knaresbro', W. Brunton; Addingham, L. C. Miall.

- B. ambigua*, B. & S. **W. T.** Wetherby, Dr. Wesley; Roche Abbey district, Nat. iii. 185.
- B. aloides*, Koch. **C.** Todmorden, T. Stansfield; Huddersfield, C. P. H., Nat. ii. 156.
- B. unguiculata*, Dill. **W. A. C.** Wetherby, Dr. Wesley; Wyke and Adel, F. A. Lees; Todmorden (*a*), T. Stansfield.
- B. fallax*, Hed. **W.** Wetherby, Dr. Wesley.
- B. rigidula*, Hed. **T.** Roche Abbey district, Nat. iii. 185.
- B. spadicca*, Mitt. **L. W.** Whernside, Lees & West, Nat. iv. 137; Wetherby, Dr. Wesley.
- B. convoluta*, Hed. **W. C. D. T.** Wetherby, Dr. Wesley; Norland Moor, Nat. iii. 68; Huddersfield, C. P. H.; Wentbridge, Nat. iii. 175; Roche Abbey district, Nat. iii. 185.
- B. tortuosa*, L. **L. C. D.** Whernside, Lees & West, Nat. iv. 137; Clough, Todmorden (*a*), T. Stansfield; Conisborough, Dr. Parsons; Wentbridge, Nat. iii. 10, 175.
- B. subulata*, L. **L. U. N. W. C. D.** Whernside, Lees & West; Nat. iv. 137; near Ripon, Miss Morton; Wetherby, Dr. Wesley; Huddersfield and Hebden Bridge, C. P. H.; Camblesforth, Dr. Parsons.
- B. levipila*, Brid. **A.** Rawcliffe, Dr. Parsons.
- B. ruralis*, L. **L. A.** Whernside, Lees & West, Nat. iv. 137; Rawcliffe, Dr. Parsons.
- Eucalypta vulgaris*, Schreb. **N. D.** Knaresbro', F. A. Lees; Wentbridge, Nat. iii. 10, 175.
- E. streptocarpa*, Hed. **W. C. D. T.** Wetherby, Dr. Wesley; Huddersfield, C. P. H., Nat. ii. 156; Wentbridge, Nat. iii. 10, 175; Roche Abbey district, Nat. iii. 185.
- Grimmia apocarpa*, L. **W. A. D.** Wetherby, Dr. Wesley; Selby, Dr. Parsons; Wentbridge, Nat. iii. 175.
- G. pulvinata*, Dill. **L. W. A. M. C. D.** Whernside, Lees & West, Nat. iv. 137; Wetherby, Dr. Wesley; Pontefract, Nat. ii. 160; Greenfield, J. Whitehead; Todmorden (*a*), T. Stansfield; near Huddersfield, rare, C. P. H.; Swinefleet, Dr. Parsons.
- G. Donniana*, Sm. **L. C.** Whernside, Lees & West, Nat. iv. 137; Todmorden (Stansfield Moor) (*a*), "now seldom seen," T. Stansfield.
- Racomitrium aciculare*, L. **M. C.** Greenfield, J. Whitehead; Hudson Clough and Hebden Valley, T. Stansfield; Norland Moor, Nat. iii. 48.
- R. fasciculare*, Schrad. **L. M. C.** Whernside, Lees & West, Nat. iv. 137; Greenfield, J. Whitehead; Todmorden, T. Stansfield (*a*).
- R. lanuginosum*, Hed. **L. N. M. C.** Whernside, Lees & West, Nat. iv. 137; Middlesmoor, C. P. H.; Seal Bark, J. Tinker, 1822 (*a*); Greenfield, J. Whitehead; Todmorden, T. Stansfield (*a*).
- Amphoridium Mougeotii*, B. & S. **L. W. A. C.** Brant Fell, W. West; near the Strid, Bolton Woods, H. Ibbotson; Gordale (*a*), Jno. Nowell; Greenfield, J. Whitehead.
- Zygodon viridissimus*, Dick. **A. C. D.** Rawcliffe, Nat. ii. 156;

- Storthes Lane, near Huddersfield, C. P. H.; Pontefract, Nat. ii. 160.
- Ulotia Bruchii*, Hornsch. **L.** Dentdale, Lees & West, Nat. iv. 136.
- Orthotrichum savatile*, Brid. **W.** Wetherby, Dr. Wesley.
- O. cupulatum*, Hoffm. **L.** Dentdale, Lees & West, Nat. iv. 136.
- O. rupestre*, Schleich. **L.** Whernside, 2400 ft., Lees & West, Nat. iv. 85.
- O. Lyellii*, H. & T. **L.** Ingleton district, Nat. iv. 159.
- Splachnum sphericum*, Hed. **A.** Malham Moor, F. A. Lees; Greenfield, J. Whitehead.
- Discelium nudum*, Dicks. **M. C.** Near Saddleworth, J. Whitehead; Hebden Valley, T. Stansfield.
- Physcomitrium pyriforme*, L. **W. C. D.** Pateley Bridge, Nat. iv. 175; Wetherby, Dr. Wesley; Harley Wood, Todmorden. T. Stansfield; Goole, Dr. Parsons.
- P. ericetorum*, Bals. **M.** Wet banks at Greenfield, J. Whitehead.
- Bartramia pomiformis*, L. **N. M.** Pateley Bridge, Nat. iv. 175; Greenfield, J. Whitehead.
- B. Ederi*, Gunn. **L.** Deepdale, Dent, W. West; Whernside, C. P. H.
- Pilonotis fontana*, L. **L. M. C.** Near Ingleborough, C. P. H.; Whernside, Lees & West; Nat. iv. 137; Greenfield, J. Whitehead; Holme Moss, Saddleworth, and Hebden Bridge, C. P. H.
- Breutelia arcuata*, Dicks. **L.** Whernside, C. P. H.
- Leptobryum pyriforme*, Schp. **W.** Wetherby, Dr. Wesley.
- Webera nutans*, Schreb. **W. M. C. D.** Harewood Park, F. A. Lees; Greenfield, J. Whitehead; Huddersfield and Hebden Bridge, C. P. H.; Goole Moor, Dr. Parsons.
- W. cruda*, Schreb. **L. C.** Whernside, Lees & West; Nat. iv. 137; Storthes Hall Woods, near Huddersfield, C. P. H.
- W. carnea*, L. **M. C. D.** Greenfield, J. Whitehead; above Stanely, T. Stansfield; Thorp-Willoughby, Dr. Parsons.
- W. albicans*, Wahl. **W. M. C.** Wetherby, Dr. Wesley; Greenfield, J. Whitehead; Hebden Valley, T. Stansfield.
- Bryum pallens*, Swartz. **W. L. N. M.** Whernside, Lees & West, Nat. iv. 137; Wetherby, Dr. Wesley; Pateley Bridge, Nat. iv. 175; Greenfield, J. Whitehead.
- B. pseudo-triquetrum*, Hed. **L. W. C.** Whernside; Wetherby, Dr. Wesley; near Slaithwaite, C. P. H.
- Mnium undulatum*, Hed. **W. M. C. A.** Washburne Valley and Harewood, F. A. Lees; Greenfield, J. Whitehead; Holme, near Huddersfield, and Hebden Bridge, C. P. H.; Gateforth, Dr. Parsons.
- M. rostratum*, Schrad. **L. U. W. A. C. D. T.** Clapdale and Helk's Wood, Dr. Carrington; Whernside, Lees & West Nat. iv. 137; Bolton Woods, L. C. Miall; Esholt Wood and Gordale, J. Nowell; Todmorden, T. Stansfield; Ackworth, J. Brown; Roche Abbey district, Nat. iii. 185. [Several of these localities should probably be in List 3.]
- M. serratum*, Schrad. **W.** Wetherby, Dr. Wesley.

- M. punctatum*, Hed. **W.** Wetherby, Dr. Wesley.
M. stellare, Hed. **L. N. T.** Inglebro' district, Nat. iv. 159;
 Pateley Bridge, Nat. iv. 175; Roche Abbey district, Nat. iii.
 185.
Aulacomnium androgynum, Schwg. **W. A. D.** Wetherby, Dr.
 Wesley; Drax and Hook, Dr. Parsons.
A. palustre, L. **L. W. A. C. D.** Whernside, Lees & West, Nat.
 iv. 137; Wetherby, Dr. Wesley; Sharleston, Nat. ii. 192;
 Todmorden (*a*), T. Stansfield; Goole Moor and Rawcliffe,
 Dr. Parsons; Askern.
Oligotrichum hercynicum, Ehr. **L. M. N. C.** Whernside, Lees &
 West, Nat. iv. 137; Greenfield, J. Whitehead; Gt. Whern-
 side, J. G. Baker (*a*); Harden Moss, near Huddersfield,
 C. P. H.
Pogonatum nanum. Neck. **A.** Malham Moor, C. P. H.
P. urnigerum, L. **B. W. M.** Slaidburn, F. A. Lees; Wetherby,
 Dr. Wesley; Greenfield, J. Tinker.
Polytrichum gracile. Menz. **C.** Hebden Bridge, C. P. H.
P. formosum, Hed. **L. U. C.** Whernside, Lees & West, Nat. iv.
 137; Studley Park, Dr. Carrington; Highgreen Wood,
 Heptonstall (*a*), J. Nowell; Hebden Valley, T. Stansfield.
P. piliferum, Schreb. **L. W. M. C.** Whernside, Lees & West,
 Nat. iv. 137; Wetherby, Dr. Wesley; Greenfield, J. White-
 head; Harley Wood, T. Stansfield.
P. juniperum, Hed. **L. U. C. A.** Whernside, Lees & West,
 Nat. iv. 137; Hackfall, F. A. Lees; Todmorden, T. Stans-
 field; Rawcliffe, Dr. Parsons, Nat. ii. 156.
Fissidens exilis, Hed. **W.** Wetherby, Dr. Wesley.
F. viridulus, Wils. **W.** Wetherby, Dr. Wesley.
F. adiantoides, Hed. **W. C. D.** Wetherby, Dr. Wesley; Marsden
 Moors, C. P. H.; Wentbridge, Nat. iii. 10, 176.
F. taxifolius, L. **L. W. C. D.** Whernside, Lees & West, Nat.
 iv. 137; Wetherby, Dr. Wesley; Hebden Valley, F. A. Lees;
 Norland Moor, Nat. iii. 48; Hook, Dr. Parsons.
Cinclidotus fontinaloides, P. Beauv. **W.** Wetherby, Dr. Wesley;
 Naburn Lock. Nat. iv. 192.
Fontinalis squamosa, L. **R.** Slaidburn, F. A. Lees.
Hedwigia ciliata, Dicks. **L.** Ingleboro' district, Nat. iv. 159.
Leucodon sciuroides, L. **W.** Wetherby, Dr. Wesley.
Neckera crispa, L. **L. U. W. A. D.** Whernside, Lees & West,
 Nat. iv. 137; Mackershaw Wood, near Ripon: and Hackfall,
 F. A. Lees; Wetherby, Dr. Wesley; Malham, Dr. Carrington
 (*a*); Hebden Valley, sparingly, T. Stansfield; Wentvale
 J. W. Watson.
N. complanata, L. **L. W. A.** Whernside, Lees & West, Nat. iv.
 137; Rawcliffe, Nat. ii. 156; Wetherby, Dr. Wesley.
Omalia trichomanoides, Brid. **C. W.** Near Hudson Mill, Hepton-
 stall, very rare, T. Stansfield; Wetherby, Dr. Wesley.
Pterygophyllum lucens, Sm. **L. U. W. A. M. C.** Given as
 "frequent" in former list—has been recorded in all the above
 riversheds.

- Leskea polycarpa*, Ehr. **W. D.** Wetherby, Dr. Wesley; Wentbridge, Nat. iii. 176.
- Anomodon viticulosus*, L. **L. W. D.** Dentdale, W. West; near Cottingley Bridge, C. P. H.; Wentbridge, Nat. iii. 10, 176.
- Thamnum alopecurum*, L. **W. C. T.** Wetherby, Dr. Wesley; Staups Clough and Stoodley Clough, Todmorden, T. Stansfield; Roche Abbey district, Nat. iii. 185.
- Cylindrothecium concinnum*, De Not. **W.** Wetherby, Dr. Wesley.
- Climacium dendroides*, L. **L. U. W. D.** Whernside, Lees & West, Nat. iv. 137; Hackfall and Washburne Valley, F. A. Lees; Rawcliffe and Askern, Dr. Parsons; Askham Bog, Nat. iv. 192; Wetherby, Dr. Wesley.
- Isothecium myurum*, Poll. **W. D.** Wetherby, Dr. Wesley; Wentbridge, Nat. iii. 10.
- Homalothecium sericeum*, L. **L. U. W. A. C.** Whernside, Lees & West, Nat. iv. 137; Studley, Miss Morton; Bramham, F. A. Lees; Todmorden, T. Stansfield; Huddersfield, C. P. H.; Pontefract, Nat. ii. 160; Rawcliffe, Dr. Parsons; Wetherby, Dr. Wesley.
- Camptothecium lutescens*, Schp. **L. W. D.** Whernside, Lees & West, Nat. iv. 137; Jackdaw Crag, near Tadcaster, H. Ibbotson; Wetherby, Dr. Wesley; Wentbridge, Nat. iii. 10, 176.
- C. nitens*, Schreb. **W.** Wetherby, Dr. Wesley.
- Brachythecium albicans*, Neck. **A.** Rawcliffe, Nat. ii. 156.
- B. rivulare*, B. & S. **L. R. W.** Whernside, Lees & West, Nat. iv. 137; Hodder Banks, above Slaidburn, F. A. Lees; Wetherby, Dr. Wesley.
- Eurynchium myosuroides*, L. **W. C.** Rag Scouts, Todmorden, T. Stansfield; Wetherby, Dr. Wesley.
- E. striatum*, Schreb. **L. A. W.** Helks Wood, J. Nowell; Pontefract, Nat. ii. 160; Wetherby, Dr. Wesley.
- E. crassinervium*, Tayl. **L. D.** Whernside, Lees & West, Nat. iv. 137; Wentbridge, Nat. iii. 10.
- E. piliferum*, Schreb. **W.** Wetherby, Dr. Wesley.
- E. Swartzii*, Turn. **W. C.** Cawood, Dr. Parsons; Wetherby, Dr. Wesley; Todmorden, T. Stansfield.
- Hypocmium flagellare*, Dicks. **M. C.** Greenfield, J. Whitehead; Norland Moor, Nat. ii. 48.
- Rhynchostegium tenellum*, Dicks. **N. W. D.** Near Knaresbro' (a), J. G. Baker; Wetherby, Dr. Wesley; Wentbridge, Nat. iii. 176.
- R. depressum*, Bruch. **C.** Hough Stones, near Todmorden, rare, T. Stansfield.
- R. confertum*, Dicks. **W. A. M. C.** Wetherby, Dr. Wesley; Pontefract, Nat. ii. 160; Greenfield, J. Whitehead; Todmorden, T. Stansfield.
- R. murale*, Hed. **W. D.** Wetherby, Dr. Wesley; Wentbridge, Nat. iii. 10, 176.
- Plagiothecium pulchellum*, Hed. **L.** Whernside, Lees & West, Nat. iv. 136.

- P. Borrerianum*, Spruce. (*elegans*, Auct., non Hooker) **U. W. A. C.**
Near Ripon, Miss Morton; near Collingham (fr.), C. P. H.;
Pontefract, Nat. ii. 160; Wistow, Dr. Parsons; Hebden
Bridge, C. P. H.
- P. sylvaticum*, L. **W.** Wetherby, Dr. Wesley.
- Amblystegium riparium*, L. **W. D.** Wetherby, Dr. Wesley;
Wentbridge, Nat. iii. 10.
- A. serpens*, L. **W.** Wetherby, Dr. Wesley.
- Hypnum exannulatum*, Gumb. **U.** Cowmire, near Ripon, Miss
Morton.
- H. lycopodioides*, Schw. **D.** Thorne Moor, F. A. Lees.
- H. revolvens*, Swartz. **R.** Bowland Knotts Moor, F. A. Lees.
- H. fluitans*, L. **L. C. A. D.** Whernside, Lees & West, Nat. iv.
137; Marsden Moors, C. P. H.; Rawcliffe and Goole, Dr.
Parsons.
- H. filicinum*, L. **L. W. C.** Whernside, Lees & West, Nat. iv.
137; Wetherby, Dr. Wesley; Hebden Bridge, C. P. H.
- H. commutatum*, Hed. **L. W. A. M. C.** Whernside, Lees & West,
Nat. iv. 137; Wetherby, Dr. Wesley; Shipley Glen, C. P. H.;
Greenfield, J. Whitehead; Todmorden, T. Stansfield.
- H. falcatum*, Brid. **W.** Wetherby, Dr. Wesley.
- H. molluscium*, Hed. **L. W. A. D.** Whernside, Lees & West,
Nat. iv. 137; Wetherby, Dr. Wesley; Pontefract, Nat. ii.
160; Conisbro' and Wentvale, Dr. Parsons, Nat. iii. 10, 176.
- H. palustre*, L. **W.** Wetherby, Dr. Wesley.
- H. ochraceum*, Turn. **L. M. C.** Inglebro' district, Nat. iv. 159;
Diggle, J. Whitehead; Marsden Moors, C. P. H.
- H. chrysophyllum*, Brid. **W. D.** Jackdaw Crag, near Tadcaster,
R. Spruce; Wetherby, Dr. Wesley; Wentbridge, Nat. iii. 10,
176.
- H. stellatum*, Schreb. **U. W. C.** Cowmire, near Ripon, Miss
Morton; near Tadcaster, W. Kirkby; Wetherby, Dr. Wesley;
Todmorden, T. Stansfield.
- H. cordifolium*, Hed. **W. C.** Askham Bag, H. Ibbotson;
Wetherby, Dr. Wesley; Sharleston Common, Nat. ii. 192.
- H. cuspidatum*. **L. W. A. C.** Whernside, Lees & West; Nat. iv.
137; Wetherby, Dr. Wesley; Pontefract, Nat. ii. 160;
Rawcliffe, Nat. ii. 156; Sharleston Common, C. P. H.
- H. Schreberi*, Ehr. **L. M. C. A. W.** Whernside, Lees & West;
Nat. iv. 137; Greenfield, J. Whitehead; Todmorden, T.
Stansfield; Rawcliffe, Nat. ii. 156; Wetherby, Dr. Wesley.
- H. purum*, L. **W. A. C.** Near Harewood, F. A. Lees; Colling-
ham, C. P. H.; Pontefract, Nat. ii. 160; Temple Hirst, Dr.
Parsons; near Huddersfield, also Hebden Bridge, C. P. H.
- H. stramineum*, Dicks. **M.** Greenfield, J. Whitehead.
- H. scorpioides*, L. **C.** Stansfield Moor, very rare, T. Stansfield.
- Hylocomium splendens*, Dill. **L. N. W. C.** Whernside, Lees &
West, Nat. iv. 137; Knaresbro', W. Kirkby; near Tadcaster, H.
Ibbotson; Wetherby, Dr. Wesley; Todmorden, T. Stansfield.
- II. brevirostre*, Ehr. **N. C.** Pateley Bridge, Nat. iv. 175; Hebden
Valley, very rare, T. Stansfield.

- H. squarrosus*, L. **L. W. A. M. C.** Whernside, Lees & West, Nat. iv. 137; Wetherby, Dr. Wesley; Rawcliffe, Dr. Parsons; Pontefract, Nat. ii. 160; Greenfield, J. Whitehead; Holmfirth Moors, C. P. H.; Todmorden, T. Stansfield.
- H. loreum*, L. **L. R. N. W. M. C.** Whernside, Lees & West, Nat. iv. 137; Slaidburn, F. A. Lees; Pateley Bridge, Nat. iv. 175; Washburne Valley, F. A. Lees; Greenfield, J. Whitehead; Todmorden, T. Stansfield; Holmfirth Moors, C. P. H.; Wetherby, Dr. Wesley.
- H. triquetrum*, L. **L. W. C.** Ingleton district, Nat. iv. 159; Aberford, F. A. Lees; Wood at Collingham, C. P. H.; Todmorden, T. Stansfield; Dungeon Wood, near Huddersfield, C. P. H.; not seen lately, and I believe the locality is destroyed by the Meltham Railway.

LIST 3.—UNRECORDED SPECIES, PREVIOUSLY KNOWN.

- Andreaea petrophila*, Ehr. **C.** Hudson Moor and Harley Wood, near Todmorden, T. Stansfield.
- Gymnostomum tenue*, Schrad. **U. W.** Fountain's Abbey; Thorparch, R. Spruce.
- G. curvirostrum*, Ehr. **L.** Ingleborough, Dr. Carrington.
- Anactangium compactum*, Schw. **L.** Whernside, Dr. Carrington.
- Cynodontium Bruntoni*, B. & S. **W. C.** Rag Scouts, near Todmorden, very rare, T. Stansfield; Rocks opposite the Strid, at Bolton Abbey, Dr. Carrington.
- Dicranella rufescens*, Turn. **M. C.** Greenfield, J. Whitehead; Langfield Moor and Pennant Clough, T. Stansfield.
- Dicranum fuscescens*, Turn. **M. C.** Greenfield, J. Whitehead; Hebden Valley, T. Stansfield.
- Didymodon flexifolius*, Dicks. **W. A. C.** Near Addingham and Malham Moor, Dr. Carrington; Eaves Wood, near Heptonstall, J. Nowell; Hudson Moor, near Todmorden, T. Stansfield.
- Trichostomum mutabile*, Bruch. **L. W. A. D.** Whernside and Clapdale, Dr. Carrington; near the Strid, Bolton, Dr. Carrington; Malham Cove, J. Nowell; Wentbridge, Nat. iii. 175.
- T. crispulum*, Bruch. **L. A.** Ascent of Ingleboro', and Gordale, Dr. Carrington.
- Distichium capillaceum*, L. **M.** Greenfield, J. Tinker, 1822.
- Ptychomitrium polyphyllum*, Dicks. **C.** Todmorden, T. Stansfield.
- Splachnum ampullaceum*, L. **A.** Adel Bog, near Leeds, W. Kirkby, 1860.
- Philometis calcarea*, B. & S. **C.** Todmorden, J. Nowell.
- Bryum uliginosum*, Bruch. **C.** Hebden Valley, T. Stansfield.
- Mnium affine*, Bland. **C.** Todmorden, T. Stansfield.
- M. serratum*, Schrad. **M. C.** Greenfield, J. Tinker; Staups Clough, Todmorden, J. Stansfield.
- Pogonatum alpinum*, L. **C.** Stiperden Bank, Stansfield Moor, J. Nowell & T. Stansfield.

- Heterocladium heteropterum*, Bruch. C. Shipley Grove, Dr. Carrington; Stanely Clough, Todmorden, T. Stansfield.
- Thuidium Blandovii*. A. Malham Tarn, 1868, J. Percival.
- Pterogonium gracile*, Dill. L. Austwick, J. Nowell; Low Gill, near Sedbergh.
- Pylaisia polyantha*, Schreb. W. Askham Bog, R. Spruce.
- Orthothecium intricatum*, Schp. L. A. C. Swallowhole, Clapdale, Dr. Carrington; Gordale and Malham, J. Nowell; Eaves Wood, Heptonstall, J. Nowell.
- Brachythecium glareosum*. C. Todmorden, T. Stansfield.
- Eurinchium Teesdalii*, Sm. L. Near Sedbergh, Rev. G. Pinder.
- Amblystegium Sprucei*, Bruch. A. Malham, J. Nowell.
- Hypnum falcatum*, Brid. W. A. Bolton Woods, Dr. Carrington; Rombalds Moor, Dr. Carrington.
- H. Crista-castrensis*, L. L. R. Near Sedbergh and Dentedale, Rev. G. Pinder; near Settle, A. O. Black.

LIST 4.—SPECIES RECORDED IN ERROR IN 1873 LIST.

- Rhabdoweissia denticulata*, B. & S. At Greenslough, Todmorden: this station is not in the West Riding, but across the Lancashire border.
- Campylostelium saxicola*, B. & S. Ramsden Clough, Todmorden, is in Lancashire.
- Orthotrichum obtusifolium*, Br. Near York: not in the Riding.
- O. fallax*, Schp. Near Ripon, excluded, locality doubtful.
- Mielichhoferia nitida*, Hornsch. var. β . Ingleby Greenhow. Station is in N. Riding.
- Paludella squarrosa*, Brid. Between Malham and Arncliffe,—record more than doubtful.
- Entosthodon Templetoni*, Schw. Langdale: not in the Riding.
- Hypnum elodes*, Spruce. Stockton Forest, near York: is in the N. Riding.

SHORT NOTES.

ROSA SEPIUM, Thuill.—Among some Sussex roses which Mr. J. G. Baker has recently named for me are specimens of *Rosa sepium*, Thuill. This is an interesting addition to the Sussex list. I find it quite commonly in hedges, extending for more than two miles eastward from Lewes, and it also occurs in the small clumps of bushes which skirt the base of the Downs in the same direction. Some of the old stems are as much as two inches in diameter.—J. H. A. JENNER.

REPRODUCTION OF SAGINA NODOSA, Meyer.—For the last two years I have observed that, in the autumn, the entire plant becomes disarticulated at the nodes, each fascicle, after it has fallen to the ground, throwing old roots, so that there are as many

new plants found as there are clusters of leaves on the stem. I may remark, in passing, that I do not remember to have seen ripe seed of this plant; have any of your readers?—A. CRAIG-CHRISTIE.

PLANTS OF ISLE OF WIGHT.—*Ceratophyllum demersum*, Linn.—The only records of the occurrence of this plant in the Isle of Wight are the somewhat unsatisfactory ones referred to in Mr. A. G. More's Supplement to the 'Flora Vectensis,' published in the 'Journal of Botany' for 1871 (vol. ix., p. 142). It may therefore be of interest to state that it grows abundantly in Westminster Mill-pond near Newport, where it was discovered by Mr. Fred. I. Warner, F.L.S., and myself, on the 18th October. I have been able to find a few staminate flowers only.—*Crepis taraxacifolia*, Thuill. This plant has not been hitherto recorded for the Isle of Wight. I found it growing in an arable field at the south-west side of Totland Bay in September. The upper leaves of my specimens are almost entire, with broadly auricled bases, and all the leaves seem to be nearly or quite glabrous. Probably the plant is the variety *præcox* of Koch's 'Synopsis' (3rd ed., p. 374).—FRED. STRATTON.

ERUCASTRUM POLLICHI.—This plant is of frequent occurrence in this neighbourhood [Saffron Walden] this season; it grows very abundantly in an old lime-kiln here, and on the road-sides, on the waste ground, and among potatoes and other green crops on the chalk land.—J. CLARKE, in 'Gardener's Chronicle,' 25th Oct., 1879, p. 534. [This is the species described and figured in this Journal for 1865, p. 165, t. 31; we had supposed it long since extinct in Essex.]

Notices of Books and Memoirs.

Ueber Lichtwirkung und Chlorophyll-Function in der Pflanze. Von N. PRINGSHEIM. ('Monatsb. der König. Akad. der Wiss. zu Berlin,' July, 1879).

THIS paper records the effect of concentrated sunlight on animal and vegetable cells and tissues placed in the plane of an image of the sun, formed with the aid of a heliostat, in the focus of an achromatic lens of 60 mm. diameter. By this means it becomes possible to study the action of light on entire tissues and on single cells, as also on the separate constituents of the cell, to separate precisely the thermal from the chemical action, to determine the nature of this latter action, and to estimate the relative power of diathermancy possessed by the wall of the cell and its contents.

The author finds that if he puts under the microscope any chlorophyll-containing tissue or single cell, so that it is immersed in the image of the sun, very marked changes occur in from three

to six minutes. The chlorophyll dies, the tissue appearing as if kept for days in alcohol; and gradually the other cell-contents follow; protoplasmic movement, if present, ceases, and the threads break up; the nucleus, if occupying any fixed position, strays away from it; the primordial utricle contracts, and loses its property of impermeability by colouring-matters; the turgidity of the cell vanishes; and all the phenomena are presented of hastily induced and irrevocable destruction.

It is plain that these are not the immediate results of high temperature, since if coloured glasses and solutions are interposed the same general effect is seen, the particular effects varying according to the colour used, *e. g.*, blue light being more powerful than red. With a solution of iodine in carbon-bisulphide, so concentrated as to transmit no spectrum-influencing rays besides red ones, with a wave-length of $\cdot 00061$ mm., none of the described phenomena occur, although at least about eighty per cent. of the heat of the white light is present. With a dark blue solution of sulphuric acid and ammoniac cuprate a quick and powerful action is seen; as also, if the light be transmitted through a screen of deep green glass possessing little diathermancy.

Experimenting with atmospheres of different constitution, Pringsheim finds that death of the tissue or cell never occurs in media free of oxygen. If, however, experiments be continued beyond measure in other media (*e. g.*, in hydrogen), phenomena occur attributable solely to the action of heat. If pure carbonic acid be added to the oxygen, there is no photo-chemical action under whatever light be employed. The action is also less vigorous in carbonic acid than in oxygen-holding air.

The conclusion from all this is "that the destruction of chlorophyll by light, in the living plant, is an act of combustion influenced and promoted by light, and stands in no relation to the decomposition of carbonic acid by the plant."

What becomes of the destroyed chlorophyll was not made out; it is probable that it passes off directly as a gaseous product of respiration. This much is certain, though, that where the chlorophyll is attacked by concentrated light, even to the slightest extent, it never recovers, which proves its destruction to be a pathological and not a physiological phenomenon.

The destructive effects on protoplasm and other colourless constituents of the cell-contents are to be referred directly to a photo-chemical source, the intensity of illumination increasing the affinity of oxygen for the intracellular matters. Now, it is observed that where, as in *Nitella*, the protoplasm is covered by chlorophyll, its movements are not interfered with even after the expiration of weeks, although where there is no chlorophyll they are speedily terminated.

Pringsheim thinks therefore that the chlorophyll, so long as it exists in a cell, protects the protoplasm from the injurious effects of sunlight. Another function which he suggests for chlorophyll is to diminish the intensity of respiration by reason of its strong absorption, especially of the chemical rays, and so serve as a

regulator of respiration, the materials of which are furnished by the protoplasm including the primordial sac and the grains imbedded in it.

The author has also discovered in the ground substance of all examined chlorophyll-grains, and of all amorphous chlorophyll, a new body very sensitive to light and easily destroyed by it. This he calls *hypochlorin* or *hypochromyl*, and it may be obtained by placing any green tissue in weak hydrochloric acid for from twelve to twenty-four hours. It then appears in the form of very small drops or masses, of semi-fluid consistence, gradually becoming crystalline scales or agglomerations, and finally longer reddish-brown obscurely crystalline scales. In the unprepared tissue it is an oily substance extending throughout the chlorophyll-grains, soluble in alcohol, ether, oil of turpentine, and benzole, but insoluble in water and saline solutions. "The universality of the appearance of this body in all green chlorophyllaceous plants, its origin in light, its behaviour to oxygen, and its relation to the starchy contents of chlorophyll-grains, allow scarcely a doubt to arise that it is the true primary product of assimilation of green plants, from which are derived, by oxidation under the influence of light, the starchy and oily contents of chlorophyll-grains." For ordinary illumination chlorophyll is a sufficient protection to hypochlorin; but this is no longer the case under more powerful illumination, nor under ordinary illumination in an atmosphere of oxygen.

Accumulation and growth of the starchy contents of the chlorophyll-grains proceed hand-in-hand with a decrease of the hypochlorin in it. In darkness hypochlorin is more stable than starch, showing that its conversion into more highly-organised bodies in the cell is favoured by the increased respiration occurring in light.

S. M.

Eucalyptographia. A Descriptive Atlas of the Eucalypts of Australia and the adjoining Islands. By BARON FERD. VON MUELLER, K.C.M.G., &c. Decades 1 & 2. Melbourne, Ferres; London, Trübner, 1879.

WE have here the first two parts of a work which will be of wide usefulness. Its author has been long accumulating material for it; he has already published much on the genus in the 'Journal of the Linnean Society,' in his 'Fragmenta,' and elsewhere. The complete monograph by Bentham, in the third volume of the 'Flora Australiensis' (1866), brought into a well-ordered system all that was then known of the botany of the genus. Still comparatively few of the numerous species have been figured, and as they form the chief timber over the whole Australian Continent, and some are becoming widely circulated in other countries, a series of good illustrations is much wanted.

The plates are of quarto size, lithographs of the same kind as those in the author's 'Victorian Plants,' clear, but somewhat stiff in drawing. Ten species are given in each part, and each also

contains a plate of analytical details, of the leaf-structure and the forms of the anthers respectively. The text, besides the botanical description, affords much information on the distribution, peculiarities, history, and economic uses of the species. No plan seems to have been formed as to the probable extent of the work; hence the plates are unnumbered, and can be quoted only by the decade in which they are published,—an unquestionable drawback to ready consultation, and not compensated by the doubtful advantage to the possessor of being able to arrange them in any sequence he pleases.

H. T.

M. CASIMIR DE CANDOLLE has published in the 'Mémoires de la Soc. de Physique et d'Hist. Nat. de Genève,' a paper on the comparative anatomy of the leaves in certain Dicotyledonous Orders. His observations are restricted to the structure and arrangement of the vascular bundles, and the author has given a list of the large number of species he has examined (under their natural Orders and genera), upon which his results are founded. Two beautifully-executed plates exhibit the very various arrangement of the intra-medullary bundles in the petioles or midribs accurately drawn from the author's preparations.

Mr. A. BENNETT, of Croydon, sends us some 'Notes on the Flora of Surrey,' consisting of a tabular list of species found in one or more of the five adjacent counties, not yet observed with certainty in Surrey itself; excluding maritime species, these are 118 in number.

M. MICHELI's valuable annual review of the principal memoirs on Physiological Botany is published in the number for 15th Sept., of the Geneva 'Archives des Sciences physiques et naturelles.'

OTHER NEW BOOKS.—A. FOERSTER, 'Ueber die Polymorphie der Gattung Rubus,' Aachen, 1880 (1 *mk.* 50 *pf.*).—'Botanischer Jahresbericht,' 1877, 3rd and concluding part. Berlin, Borntraeger, 1879 (8 *mk.*).—O. COMES, 'Illustrazione delle Piante rappresentate nei dipinti Pompeiani.' Napoli, Giannini, 1879.—W. H. FITCH & W. G. SMITH, 'Illustrations of the British Flora.' London, L. Reeve, 1879 (12*s.*).—S. H. SCUDDER, 'Catalogue of Scientific Serials of all Countries, including the Transactions of Learned Societies, in the Natural, Physical, and Mathematical Sciences.' Cambridge, U.S.A., 1879.—E. FRIES, 'Icones Selectæ Hymenomycetum Sueciæ,' vol. ii., pt. 4 (t. 131-140).—FLÜCKIGER & D. HANBURY, 'Pharmacographia,' ed. 2. London, Macmillan.

ARTICLES IN JOURNALS.—OCTOBER.

Scottish Naturalist.—Drummend Hay, 'Effects of past winter and present summer on hard-wooded plants.'—J. Cameron, 'Gaelic names of plants' (contd.).—F. Buchanan White, 'Preliminary list of Fungi of Perthshire.'

Journ. Linn. Soc. Lond. (No. 103).—J. G. Baker, 'Synopsis of *Colchicaceæ* and aberrant tribes of *Liliaceæ*.'

Flora.—W. J. Behrens, 'On the nectaries of flowers' (contd.)—A. Engler, 'Note on *Saxifraga multijida*, Rosbach.'—K. A. Henniger, 'Hybrids of plants' (contd.)—L. Celakovsky, 'On viridescent ovules in *Hesperis matronalis*, L.' (tab. 11).—A. Geheeb, 'On the moss-flora of West Siberia.'

Oesterr. Bot. Zeitschr.—V. v. Janka, '*Silaua vriescens*.'—F. Hauck, 'Algæ of Adriatic' (contd.)—W. Voss, 'Mycology of Carinthia.'—F. Karo, 'On the flora of Polen.'—V. v. Borbas, 'Botanical notes.'—S. Schulzer, 'Mycological notes.'—F. Hegelmaier, 'Tour in Alicante Hills (contd.)'

Journ. R. Microsc. Soc.—F. Kitton, 'New species and varieties of *Diatomaceæ* from Caspian Sea.'

Botanisk Tidsskrift (3, iii., 3).—J. L. A. K. Rosenvinge, 'Researches on *Ulothrix* and *Conferva*' (tab. 1).—A. Jorgensen, 'On the natural history of the vascular bundles' (t. 2, 3).—J. P. Jacobsen, 'Plants of Laeso and Anholt in 1870.'

Nuov. Giorn. Bot. (10 Oct.)—L. Caldesio, 'Floræ Faventinæ tentamen' (*Ranunculus (Batrachium) Cesatianus*, n. s.)—A. Borzi, 'Note on morphology and biology of phycochromaceous Algæ' (t. 9–12. *Coleodesmium*, n. g.)—A. Bertoloni, 'New *Oideum* of *Laurocerasus*' (*O. Passerinii*, n. s.)

Bot. Zeitung.—E. Zacharias, 'On secretion-reservoirs with corky walls.'—H. de Vries, 'On shortening of plant-cells by absorption of water.'—A. Engler, 'On the fruiting of *Zostera marina* and the growth of the same.'—O. Drude, 'On the natural relationship of *Adoxa* and *Chrysosplenium*' (t. 8A.)—R. Cario, 'On *Nartheicum ossifragum*, Huds.' (t. 8B.)—W. Breitenbach, 'On floral arrangement of *Arum ternatum*, Th.'—K. Prantl, 'Influence of light on bilaterality of fern-prothallia.'

Magyar Nov. Lapok.—O. Tomosvary, '*Bacillariaceæ* in Dacia observat.'—Schwann, 'On the comparative cell-theory.'

Proceedings of Societies.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE,
MEETING AT SHEFFIELD, 1879.

Section D. BIOLOGY. *Department of Zoology and Botany*.—*August 25th*.—The following botanical papers were read:—"On *Mimosopæa*, a section of the Order *Sapotaceæ*," by M. M. Hartog. [This is reprinted in '*Journ. Bot.*' p. 356.]—"On Fruits and Seeds," by Sir John Lubbock, Bart. This paper consisted of an account of the various forms and coverings of seeds and fruits, and their means of dispersion, with a brief allusion to the "mimicking" of insects by some.—"The Embryology of *Gymnadenia conopsea*," by H. Marshall Ward. The researches of the last two years,

especially of Strasburger* and Warming,† and also of Vesque,‡ have yielded results sufficiently at variance with the older ones to warrant a serious reconsideration of the whole question of homologies. The main points may be put somewhat as follows:—The embryo-sac is not the result of simple enlargement of one cell; a cell of an axial series of the ovule enlarges and cuts off two or more cells from its apex—the remainder becomes the embryo-sac,§ and causes dissolution of the others as it enlarges, their remains persisting as refractive caps for some time. The protoplasmic contents of the embryo-sac separates into two chief masses, which pass to the opposite ends of the enlarging sac, a large vacuole forming between. Each mass then suffers division into four by planes cutting one another at right angles. In this way eight nucleated masses of protoplasm without cell-walls arise, three of which remain at each end of the embryo-sac, while one from each end wanders towards the centre of the sac and then fuses with its neighbour to form the nucleus of the sac. Of the three anterior nucleated masses, two become elongated, fit into the top of the embryo-sac as the “Gehülfinnen,” or “synergidæ” of Strasburger, and are probably what Schacht described as the “filiform apparatus”; their function is somewhat obscure, but appears to be related to the act of fertilisation between the end of the pollen-tube and the third nucleated mass, which has rounded off as a large bright egg-cell or ovum, and is suspended from the base and sides of the “Gehülfinnen.” The three posterior masses may not become completely isolated, or they may remain passive, or some may disappear, or they may multiply by division. Where endosperm is formed they appear to enter into its formation. The author finds in *Gymnadenia*,|| *Butomus*, *Alisma*, *Anthericum*, and *Ranunculus* ovules confirmation of these views. With reference to Warming and Vesque’s view that the origin of the embryo-sac is comparable to that of the mother-cell of pollen, and that the eight nucleated masses arranged in fours are therefore homologues of pollen grains (*i.e.*, spores), the following facts are of importance, as failing to support the theory:—1. The diffluent cell walls which form between the cells cut off by the embryo-sac mother-cell, are in no way important on account of their resemblance to the diffluent walls in pollen formation; they also resemble the diffluent walls formed in the suspensor (pro-embryo), or any other organ rapidly absorbed, &c. 2. The division into fours by planes crossing at right angles is common to many other processes besides pollen formation, *i.e.g.*, the embryo itself. 3. Vesque’s view as to the

* ‘Ueber Befruchtung u. Zelltheilung,’ and ‘Die Angiospermen u. Gymnospermen.’

† ‘Ann. des Sc. Nat. Bot.,’ 1878.

‡ ‘Ann. des Sc. Nat. Bot.,’ 1878.

§ Vesque, however, thought a fusion of at least two superposed cells produced the embryo-sac.

|| Strasburger has partly worked this, so far as the first division of the embryo-sac mother-cell are concerned. He also gives figures of *Anthericum*. Vesque’s account of *Butomus* is not supported by the author’s drawings.

embryo-sac arising by fusion of several cells is not supported by the existence of the remains of the *two cap cells* above the embryo-sac—the remains of the supposed fusing cells.—“Comparison of the Effects of the Frosts of 1860–61, and of 1878–9,” by E. J. Lowe, F.R.S. The greatest cold of 1860 exceeded that of last winter by 10° ; it was 6° below zero in 1860, and 4° above zero in the late-frost. The present paper records the great difference in the effects on plants of the two frosts at Highfield House, Nottingham.—“Recent additions to the Moss Flora of the West Riding,” by C. P. Hobkirk. [Printed at pp. 337, 369.]

Botanical News.

MR. B. D. JACKSON'S ‘Guide to Botanical Literature,’ one of the first volumes of the Index Society, is in the press; the author, well known as a bibliologist, will be glad to receive, in connection with his work, any corrections or additions to Pritzel's ‘Thesaurus Lit. Bot.’ Address, 30, Stockwell Road, S.E.

THE quinquennial prize of the Geneva Physical and Natural History Society, founded by A. P. DeCandolle, for the best monograph of a family or genus of plants, has been adjudged to M. A. Cogniaux, of Brussels, for his monograph of *Cucurbitaceæ*, which will form the next volume of the ‘Suites au Prodrome.’

THE death, in his 78th year, of JOHANN FRIEDRICH VON BRANDT, the author of a ‘Flora Berolinensis’ so long ago as 1824, and better known by his book on medicinal plants published in 1858, of which he was joint author with the late Dr. Ratzeburg, is announced; it occurred on July 16th.

CARLO BAGNIS, the Professor of Botany in the new University of Rome, died on August 6th, at the early age of 24. Though so young, he had already done good work in cryptogamic botany; in 1878 he received the Prix Desmazières of the French Academy for his memoir on *Puccinia*, and Prof. Beccari lately dedicated to him one of his curious new genera of *Burmanniaceæ* from New Guinea.

WE have also to record the death, on August 26th, of CARL JULIUS MEYER VON KLINGGRAFF, of Paleschken, in West Prussia, at the age of 70. He was the author of a ‘Flora of Prussia,’ 1849, with supplements in 1854 and 1866, and lately published a valuable memoir (in 1875) on the plant geography of Northern and Arctic Europe.

THE Economic Museums at Kew Gardens will receive the collection of vegetable products of the India Museum, the authorities there undertaking to distribute the numerous duplicates to other establishments. A sum of £2000 is to be granted for building a new wing to one of the Kew museums to accommodate the collection, and a further small annual grant will be made to “secure the services of an expert cryptogamist” in connection with it. It is expected that Mr. M. C. Cooke will thus be retained in charge of the collection with which he has been for many years connected at the India Museum.

HAVING accepted the appointment of Director of the Botanical Gardens in Ceylon, I feel that it would not be possible for me properly to carry on the editorial conduct of this Journal at so great a distance from England. I have, therefore, secured the services of my colleague in the Museum, Mr. BRITTEN, who has for several years been intimately acquainted with the work, and who will act as responsible editor during my absence. No change in the character of the Journal is contemplated; it will be carried on in the same manner and on the same principles as hitherto.

In thus resigning the active supervision of the 'Journal of Botany' I confidently expect that under my successor it will continue to be as useful to botanists in the future as I trust it has proved in the past. I thankfully acknowledge that this has been due chiefly to the disinterested help of many friends and correspondents, both at home and abroad; and it is in the well-founded hope that they will continue such kind co-operation, that after ten years' experience of it I now commit my duties to other hands.

HENRY TRIMEN.

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ERRATA ET CORRIGENDA.

- Page 25 line 2 from bottom, for "organs," read axil.
 27 bottom line, for "*Lycopodium*," read *Lygodium*.
 32 line 10 from bottom, for "varieties," read rarities.
 55 17 for "*Minusops*," read *Mimusops*.
 86 12 from bottom, after "vol.," insert xix. pp.
 „ 9 „ for "realising," read reaching.
 90 2 „ for "*subcorjugatus*," read *subconjugatus*.
 96 22 „ for "different," read difficult.
 107 24, and p. 108, line 19, for "Fort George," read Fort Royal.
 176 21 from bottom, for "staminirus," read staminibus; for "acqui-
 longis," read *æquilongis*.
 191 the last line should be the commencement of a fresh paragraph.
 219 line 11 for "petiologi'al," read petrological.
 222 20 for "*Oudnega*," read *Oudneya*.
 243 17 for "*H. pseudo-myurus*," read *F. pseudo myurus*.
 245 25 for "R.," read *Rosa*.
 270 24 for "Trim," read *Trin*.
 278 9 for "H. C.," read H. P.
 288 6 from bottom, for "MARTIUS," read MARTIN.
 289 18, 19 for "Caulshiels," read Cauldshiels.
 291 4 from bottom, for "Blyth," read Blytt.
 319 21 for "Mouillefaine," read Mouilletarine.
 „ 31 for "species," read specimen.
 320 2 for "VON," read VAN.
 345 16 for "olive," read is also.

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* ~~The portrait in February No. to be the frontispiece.~~

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