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BRITISH AND FOREIGN.

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

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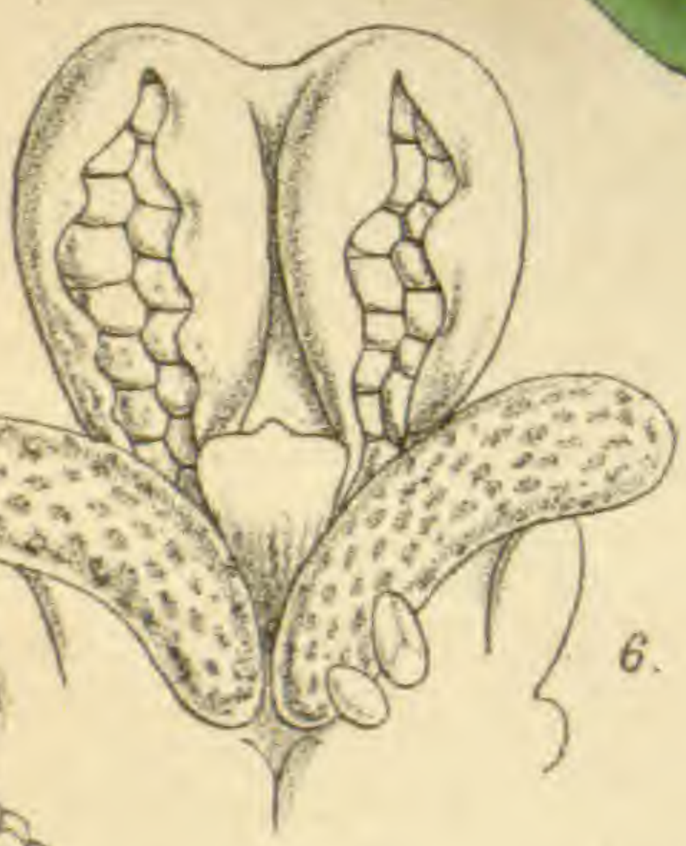
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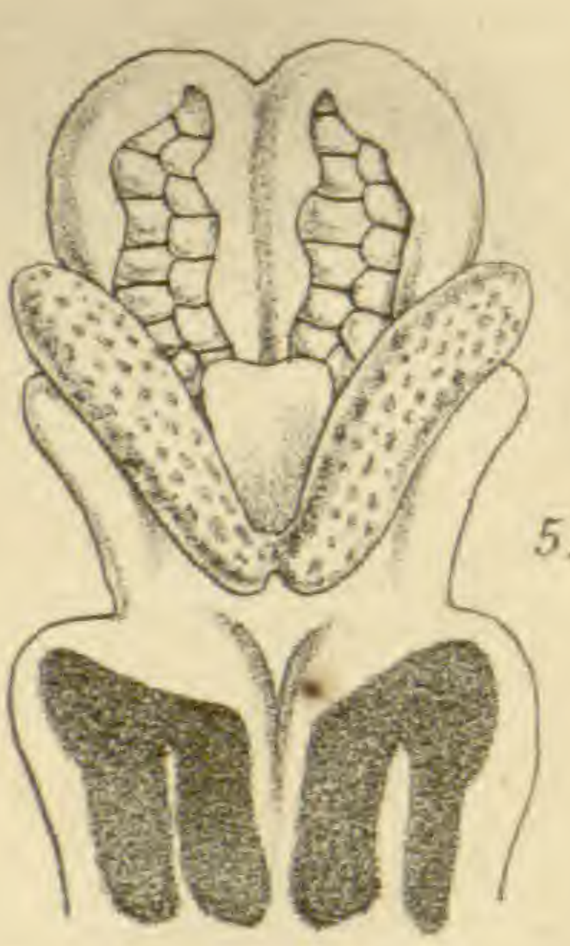
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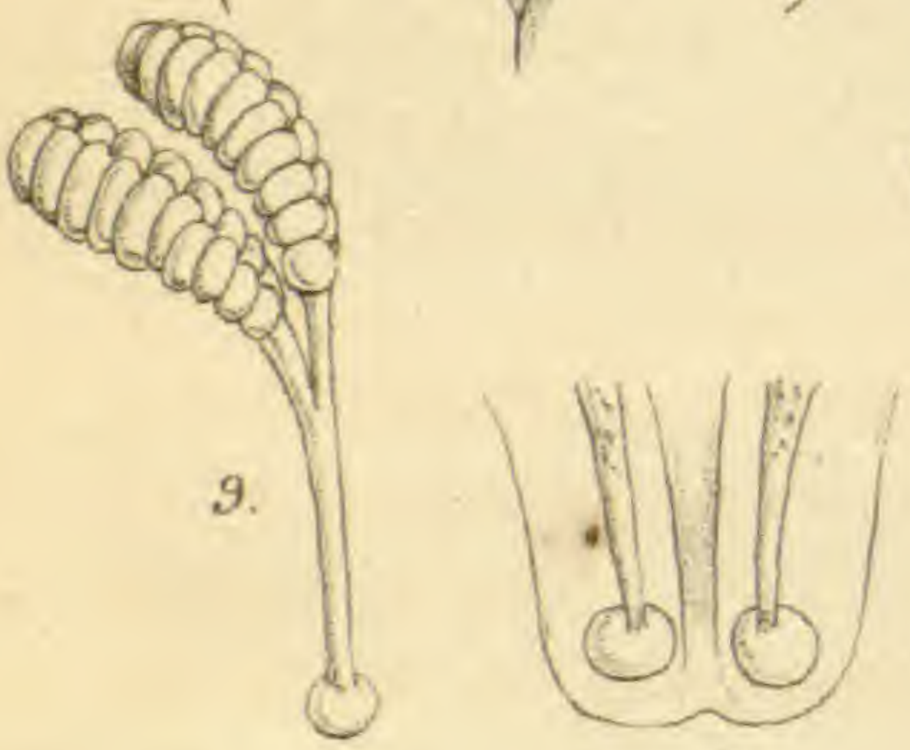
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NEOTINEA INTACTA, *Rchb. fil.*, THE NEW IRISH ORCHID.

By H. G. Reichenbach, Ph.D.

(Plate XXV.)

In the 'Journal of Botany' for August, 1864, p. 228, it was announced by Dr. D. Moore that *Neotinea intacta* had been found in calcareous pastures, at Castle Taylor, county of Galway, Ireland, by Miss More. This was a great botanical surprise. To me this Orchid has been one of the most difficult to understand. Though examining a great number of buds and flowers, I could not succeed in obtaining a correct idea of the structure of the column, as I commenced my investigation with the preconceived opinion that the plant ought to agree in structure with that of the other European *Ophrydeæ*. In my 'European Orchidography' I followed Lindley, who had seen the living plant, but who, probably misled by the lip, referred it to *Aceras*. I restored the oldest specific name (*Orchis intacta*, Lk., 1799), and remarked that I had neither seen the *glandulæ* nor the *caudicula*, and that it appeared to me as if fertilization took place in the bud (Orchid. Europ. p. 3). Only after the publication of that work, was I so fortunate as to see in the Leipzig Botanic Garden a living specimen, a few buds of which supplied me with materials—indifferent though they were—for renewed examination. I now began to perceive why I formerly failed. The whole structure of the column bears no relation to that of any *Ophrydeæ* of Europe, and comes nearer to that of the

Habenarieæ of the other continents. Two peculiarities characterize the genus. The plate seen between the anther-cells is not equivalent to the "processus rostellaris" of our common Orchids. It bears conjointly in two channels the caudiculæ; and the glandulæ are formed out of its own substance, so that there is either an impressed aperture (fig. 8), or an aperture with an outward slit (fig. 8). This organ can only be regarded as a union of the anther-channels and the upper lip of the rostellum. The second peculiarity is that two of the shanks of the stigma, which alone are developed, have the shape of two semicylindrical erect elevations. They are either united in the middle or quite distinct. The lower lip of the rostellum is undeveloped. It is also worthy of remark, that the border which usually surrounds the pit of the stigma is only indicated laterally at the origin of the shanks of the stigma. Unfortunately I have not given a lateral view of it from the living plant.

The supposition I formerly expressed (Orchid. Europ. 3), that fertilization takes place in the bud, is now confirmed. A similar process I noticed in *Maxillaria rufescens*, Lindl. (see Seemann's 'Bonplandia,' 1854, p. 16), and since frequently in *Dendrobium cretaceum*, Lindl. Similar observations have also been published by an accurate observer, Mr. J. Anderson, in the 'Journal of the Royal Horticultural Society,' 1863, March 17. With such facts before us, it is hard to believe that any Orchid is incapable of fertilizing itself, and requires some as yet undiscovered insect to act as sexual agent.

The synonymy of our plant is very extensive, viz. *Orchis intacta*, Link, in Schrad. Diar. 1799, p. 11; *Satyrium maculatum*, Desf. Atl. ii. 319; *Orchis Atlantica*, Willd. Spec. iv. 42; *Satyrium densiflorum*, Brot. Fl. Lus. i. 22; *Ophrys densiflora*, Desf. Coroll. 11; *Orchis secundiflora*, Bertol. Amœn. 82; *Gymnadenia Linkii*, Presl, Fl. Sic. xli.; *Himantoglossum secundiflorum*, Rchb. Exc. 120; *Aceras secundiflora*, Lindl. Bot. Reg. t. 1525; *Peristylus densiflorus*, Lindl. Orchid. 298; *Peristylus maculatus*, Lindl. Orchid. 300; *Aceras densiflora*, Boiss. Voy. 595; *Tinea cylindracea*, Biv. Bern. in Giorn. Sicil. 1833, 149; *T. cylindrica*, Tod. Orchid. Sicul. 1; *Orchis sagittata*, Munby, Revue, ii. 505; *Tinea maculata*, Visian. Dalm. iii. 353; *Neotinea intacta*, Rchb. fil. de Orchid. Pol. Gen., etc., p. 29; Walp. Ann. iii. p. 580.

A few words about the change from *Tinea* into *Neotinea*. I am a decided opponent of the view that the same generic name could not be

used in both the animal and vegetable kingdoms. Nowadays there are no longer any sound naturalists who are equally well acquainted with the whole vegetable or animal kingdom; much less are there any who, as was formerly so frequent, have an intimate acquaintance with both. Notwithstanding, I made the change, because such generally known names of animals as *Tinea*, *Bombyx*, *Papilio*, *Scarabæus*, *Bos*, *Equus*, *Rhinoceros*, *Ovis*, *Homo*, etc., cannot be received in botany, where they offend every time they are pronounced. Whoever agrees with me in this opinion will therefore use the name *Neotinea*, whoever does not may retain *Tinea*. With regard to the oldest specific name (*intacta*) discovered by me, I have to remark that Grenier and Godron ('Flore Française') reject it, and adopt instead *densiflora*, the third in chronological order, because Desfontaines' name (*maculatum*) is said to be older than Link's (*intacta*). But the second volume of Desfontaines' work appeared in 1800, whilst that of Schrader's 'Diarium,' containing Link's name, was published in 1799. I am inclined to think that it is, to say the least, singular to adopt a name the third as to time because the second is said to be not the first. They say literally, "Si l'on voulait absolument tenir compte de la priorité, il faudrait adopter pour cette plante le nom d'*Aceras maculata*, attendu que le nom spécifique '*intacta*,' admis par Reichenbach et appartenant à Link, est presque de deux ans plus récent que celui de Desfontaines. Toutefois, pour ne pas surcharger encore la nomenclature d'un nom nouveau, nous avons cru pouvoir adopter le nom qui rappelle la caractère le plus saillant de l'espèce."

Perigonium membranaceum. Sepala et tepala angustiora conniventia subgaleata. Labellum calcaratum. Anthera erecta bilocularis. Caudiculæ immersæ in laminam ex rostelli labro superiore ac ex antherarum processubus anticis connatis ortam. Glandulæ ex ipsa lamina exortæ. Stigmatis crura duo convergentia libera seu medio connata.

The plant may be described as follows:—Tubers ovate or nearly spherical. Secondary roots filiform. Stem from 2 to 12 inches high, more or less slender. Lower sheaths membranous, apiculate. Leaves from three to four, in rosettes, the blade oblong obtuse acuminate or acute, with brown spots on the upper surface. Stem leaves fewer (2–3), more sheath-like, and gradually merging into bracts. The spike is dense, cylindrical, close, and, especially in starved specimens, inclined to become one-sided. The bracts are semilanceolate or acute, semiovate,

membranaceous, 1-nerved, in some specimens with strong tendency to develope one or more points on the side, often pink or purplish; seldom as long as the ovary, which is slightly twisted at the time of flowering. The perianth, the tip of which is turned downwards, is extremely delicate, and in this respect reminds us of those of the most tender South African *Cynosorchis*. The three semilancet-shaped acute sepals and the linear-pointed tepals are together more or less helmet-shaped. The lip in its general outline is oblong tongue-shaped, 3-lobed; the lateral lobes are acute linear, bent forward; the central lobe is twice as long as the lateral ones, oblong, ligulate, either truncate or two-lobed, or with a minute tooth between the lobules. Sometimes the lateral divisions of the central lobe are extended, and then the shape of the lip resembles that of *Aceras anthropophora* (of course without the spur). The spur is acute conical, and very small. The colour of the perianth is pale pink. Sepals and base of the lip are occasionally blotched with purple. The structure of the column is very peculiar. The cells of the emarginate anther are parallel, and open in the usual manner; towards the base terminating in a common projection, on which the grooves of the *caudiculæ* rest. That the substance combining them is a *processus rostellaris* might be easily supposed. Every caudicula has its own glandul, which, as has been mentioned, is developed at the expense of the projection. I found the pollen-masses of the *pollinarium* on two threads, but of course I do not know whether that is constant. The fleshy stigma appears in the shape of two ascending shanks, which are either free or united. The lateral border of the column is slightly developed.

My herbarium contains specimens from the following localities:—

Europe.—Ireland, at Castle Taylor, county of Galway (Miss More, kindly communicated by Dr. David Moore, of Glasnevin); France, in Hyères (Jordan! Godron! Aunier! Reuter!), Grasse (Girandy!), Porquerolles (Aunier! Bourgeau!); Corsica, Ajaccio (Benard!), Bonifacio, Corte, Bastia (Kralik! Maire! Soleirol! de Charpentier!); Spain, Viznar; (Lange!); Balear. Majorca: en allant de Puy de Torolle à Soller (Cambessèdes!). Portugal, at Lissabon (Hochstetter fil.!), Serra d'Arrabida, amongst Laurel and *Viburnum Tinus* (Link! Hoffmansegge! Welwitsch!), Serra da Cintra, in steep granitic places (Welwitsch!). In arid saud near Coina (Welwitsch!); Island of Sardinia (Moris! P. Thomas!), Sicily (Gussone!). Italy: Mentone (Bourgeau!), Monti di

Porrosino and di Ficino (Gennari! De Notaris!), Sarzana (Bertoloni!), Apennines (Hall!), Stabbio (Gussone!), Rostaria (L.Thomes!), Ischia (Gussone!), Dalmatia: Lessina (Botteri! Visiani!); Greece (Sartori!).

Asia.—Bithynia Modania (Grisebach!).

Africa.—Algiers (Durieu de Maisonneuve!), Fouka (Guyon!). Canary Islands (Bourgeau! C. Bolle!).

May those who believe that every species was created in, and originated from one centre, determine what that centre was in the present instance, provided man has not already turned it long ago into fields or vineyards. The new theory of transmutation will be a great help to them; we may quite expect to hear that, at great intervals of time, our plant has by various favourable and unfavourable conditions and circumstances developed or retrograded into other species, perhaps *Orchis ustulata* or *Polygonum Bistorta*. But I must leave these points to our theory-spinners.

Explanation of Plate XXV., representing *Neotinea intacta*, life-size, from a specimen collected by Miss More.—Fig. 1, a front view of flower bud, from which the ovary has been removed; 2, lateral view of flower and bract; 3, lateral view of lip and tepala; 4, lip, spread out; 5, front view of column and base of lip, the stigmatic shanks connected; 6, the same, but the stigmatic shanks separated; 7, the plate on which the caudiculæ and glandulæ are placed; 8, the same, but caudiculæ and glandulæ removed; 9, a pollinarium:—*all magnified*, and Fig. 2, 3, and 4, made by Professor Reichenbach, fil., from the living plant.

Botanic Gardens, Hamburg; November 25, 1864.

ON THE MORPHOLOGY OF *CRUCIFERÆ*.

By B. Clarke, Esq., F.L.S., etc.

May I be allowed to make a few observations on the *Cruciferæ*, especially with regard to the particulars described in Mr. W. G. Smith's paper on the normal structure of that family ('Journal of Botany,' II. p. 290)?

I consider Mr. Smith's observations quite correct, and in connection with the two short stamens he has made one very interesting addition to our knowledge, *i. e.* he has repeatedly seen the short stamens occur in pairs (p. 270), the additional stamen being in apposition with the original one, not intermediate between the two. This has led me to take a modified view of the structure of the flower, because, if a short

stamen, which is obviously alternate with two petals, can become two in apposition with each other, it seems very probable that the two pairs of long stamens (each stamen being in close apposition with the other at its base) represent only two single ones, and agreeably with this explanation I find, on examining *Matthiola*, *Iberis*, and *Lepidium*, that each pair of long stamens is between two petals, and that in the latter genus the claws of the petals do not conceal any portion of the two filaments. If, then, it is admitted that the two pairs of long stamens represent only two single ones, the structure of the flower will be tetramerous throughout, with the peculiarity of having a decided tendency in the sepals, stamens, and carpels when the latter are four, to be in pairs, two within two, like the 4-sepaled calyx of *Epimedium*, and the position of each will then be quite normal.

As thus understood, the calyx consists of four sepals, two within two, and the corolla of four petals alternate with them; next come the two short stamens alternate with petals, and opposite the external pair of sepals, and then more internally the two pairs of long stamens (each pair representing one stamen) alternate with the petals and opposite the internal sepals. The two carpels would then be alternate with the last two stamens (*i. e.* the two pairs of long stamens) which, as far as my observation goes, is always the case. There is also in monstrous flowers a tendency in the carpels to develope by pairs, as, for instance, the second pair may become elevated on a kind of gynophore within the first pair, which have separated at their margins.

The glandular receptacles of the short stamens Mr. Smith has especially noticed (fig. 4, p. 270), and these, together with the six glands, I regard as showing a decided tendency in *Cruciferæ* to an increase of stamens, and, I believe, to become polyandrous, like *Capparideæ* and *Papaveraceæ*. I, however, take to some extent a different view of their nature. The receptacles of the short stamens being much larger than the glands, appears to indicate a tendency to the production of a larger number of stamens on the sides of the flower (*i. e.* laterally, opposite the two carpels which are right and left the axis), which would then agree with *Reseda*, among the species of which there is a distinct tendency of the stamens to develope on the sides of the flower more than either directly anterior or posterior: in *R. odorata* there are no stamens anterior.

I believe there is some variety in the number and form of the glands,

for in my specimen they were imperfect, there being only one gland at the base of each pair of long stamens, and in one instance I noticed it had become confluent with the glandular receptacle of one of the short stamens.* I would suggest that the two glands in *Iberis* are the same glandular structure as the glandular receptacle of a short stamen in *Cheiranthus*, because in *Matthiola* the short stamen is inserted between two large glands.†

I believe that if such a plant as *Dicentra*,‡ in which the parts of the flower regularly alternate with each other (the last two stamens, each of which is split in halves, being alternate the two carpels) were to become polyandrous like *Papaveraceæ*, the additional stamens would be produced in the same manner as if a stem produced numerous additional leaves in the space between two internodes, which, in the ordinary growth of the plant, is entirely destitute of leaves; such stamens I regard as supernumerary, but whether they are always so admits of a question. Would not the persistence of the two carpels of a dicarpous ovary in the same position, in the same Natural Order, whether the stamens were of the same number and alternate with the petals or very numerous, render such an hypothesis probable?§ The glands of *Cru-*

* My specimen was gathered from old walls at Winchester, where it had probably been wild for many years. The flowers are below the average size, so that a part of the glands are likely enough to be deficient.

† The diagram of *Cheiranthus* represents the two carpels as alternate with the short stamens, which does not accord with my observations on other *Cruciferæ*, e. g. *Matthiola*. But as this neither alters nor modifies his plan of the flower, probably it is a circumstance he did not attend to. As far as can be seen from the dried plant, I should expect it would agree in this character with other *Cruciferæ*.

‡ In *Dicentra spectabilis* the two external petals are alternate with the two sepals, and the two internal in consequence become opposite them. The two external stamens, having 2-celled anthers, are alternate with the two internal petals, and in consequence opposite the two external. And the two internal stamens, which are split in halves, each half having only a 1-celled anther, are alternate with the two external, and in consequence opposite the two internal petals. The split stamen occupies the same position relatively to the two carpels as the pair of long stamens in *Cruciferæ*, which looks like a tendency to unusual development at this point, especially as the half-filaments, if they were combined, would be broader at the base than the filament of a 2-celled anther. The two longer sides of two 1-celled anthers (which in their natural position when on the plant are turned towards each other), on being brought together, form an anther precisely like one of the 2-celled anthers, it having the same 4-lobed appearance with the two smaller ones external.

§ As regards leaves, I believe this really occurs in a new species of *Monochoria*, or perhaps a new nearly allied genus as the placentation is parietal (Brazil, Gardner), which has very numerous leaves in dense whorls, and appa-

ciferæ, and the increased number of stamens in *Megacarpæa*, might thus be accounted for, and it seems not unlikely to be the case in that genus, as the glandular receptacle on which the stamens are inserted (p. 272) probably indicates more stamens, as it undoubtedly does in *Reseda*.

But why two stamens longer than the single ones on the sides of the flower should be produced *so regularly* in the place of one remains to be accounted for, and I think this may be done by a comparison with *Resedaceæ* and *Capparideæ*. On examining the flowers of a species of *Cleome* having four sepals and four petals with six stamens, I found one with five sepals and petals all fully developed, but yet it had only six stamens. Supposing, then, such a flower to have six sepals and petals, it might be assumed that the production of two stamens in place of one was the consequence of a tendency in a tetramerous flower to become hexamerous; and as *Reseda* often has six sepals and petals or more, this explanation seems so far practicable. If, then, we suppose there exists in *Cruciferæ* the same tendency to become hexamerous that we find in *Reseda*, the cause of the production of the two long stamens in place of one would become apparent. The doubling of the short stamens would then be accounted for by a tendency to the production of more than six sepals and petals, which occurs in *Reseda*, or it might be the commencement of an increase of stamens like that of *Megacarpæa*, —more probably the latter.

I cannot conclude these remarks without especially acknowledging that whatever truth there may be in the hypothesis now advanced, it is entirely owing to the new observations and facts disclosed to us in Mr. Smith's very original and valuable paper.

rently quite opposite, the internodes being sometimes rather long. Each whorl is, however, found to be subtended by a sheathing leaf, the membranous extension of which includes all the others when very young, while they are quite destitute of sheaths, but are otherwise of the same linear form. These sheathing leaves, if traced up on the stem, prove to be alternate like those of any ordinary Endogen. In this plant the calyx consists of a very short cup with six linear segments, the anterior one being the larger, and having the only stamen attached at its base; the style is rather short with three stigmas, the anterior one being the longer; so that if in *Monochoria* the cells at all communicate, it might be referred to that genus.

OBSERVATIONS ON BAKER'S 'REVIEW OF THE BRITISH ROSES.'

Par M. Alfred Déséglise.

M. J.-G. Baker, de Thirsk, vient de faire paraître, dans les nos 1, 2, 3, 4, 5, 6, 7 et 9 de 'The Naturalist' du mois de Mai au mois de Septembre 1864, une Revue sur les Rosiers d'Angleterre. M. Baker ne décrit que les espèces qui lui sont parfaitement connues. En Angleterre, les botanistes les plus influents s'opposent énergiquement à la subdivision des espèces, préférant entasser sous un ou deux noms spécifiques, sans examen, voire même sans analyse, des formes innombrables, offrant des caractères aussi nets, aussi tranchés et je puis dire aussi faciles à exprimer et à saisir que les plus incontestées des espèces Linnéennes. Disons avec M. Planchon : " Il serait temps en effet que le juste respect pour l'autorité de Linné n'allât pas jusqu'au fétichisme, et jusqu'à faire considérer même ses erreurs comme des articles de foi." (1.)

M. Baker fait partie du petit nombre des botanistes Anglais qui sont disposés à apprécier les travaux de l'école moderne; il n'est pas douteux qu'il faudrait la vie d'un homme, ne faisant que cela, pour connaître les caractères des espèces de quelques genres seulement; ce qu'il importe pour nous, ce n'est pas de tout connaître ce qui est impossible, mais de se faire une idée juste de l'état des choses, et de travailler avec persévérance et méthode dans le but de connaître une partie des objets qui sont à notre portée. La nature n'est-elle pas un meilleur guide que les hommes? Il faut l'étudier telle qu'elle est, et non telle que des auteurs systématiques l'ont faite dans leurs livres.

Woods, 'Synopsis of the British Species of *Rosa*,' 1816, mentionne pour son époque 26 espèces, autour desquelles il range 40 variétés, dont quelques-unes viennent d'être élevées au rang d'espèces par M. Baker. Dix-neuf années après le mémoire de Woods, Hooker 'British Flora' (1837) ne signale que 19 espèces, laissant de côté le savant mémoire fait par Woods; en revanche le *R. canina*, Lin., se trouve doter d'une nombreuse postérité de variétés, servant plutôt à embrouiller la synonymie qu'à faire connaître le type Linnéen. M. Baker, 'Review of the British Roses, especially those of the North of England,' devance de beaucoup cette dernière flore, puisqu'il men-

tionne 45 espèces ou formes, divisées dans cinq sections. Il nous semble que les *R. vinacea*, Baker, *R. arvatica*, Puget, *R. tomentella*, Lem., *R. Bakeri*, Déségl., *R. Blondeana*, Ripart, ayant les folioles parsemées de glandes en dessous, seraient mieux placés dans la section *Rubiginosæ*, que dans les *Caninæ*, quoique formant un sous-groupe, où M. Baker place ces cinq espèces. Le *Rosa canina*, Boreau, Déséglise, étant identique à celui qui se trouve dans l'herbier de Linné, il devient inutile de changer le nom en "*lutetiana*," puisque la plante de Leman est la même que celle de Linné.

Le *Rosa tomentosa*, Smith, existe-t-il en France ou bien en Angleterre seulement? Les botanistes anglais ne confondraient-ils pas cette espèce avec d'autres? Smith dit: "Foliola elliptica-ovata, utrinque mollissime tomentosa" (Flora Britannica, vol. ii. p. 539, 1804). Toutes les flores de la France et de l'Allemagne marquent la plante de Smith étant dépourvue de glandes en dessous des folioles. Smith, l. c., en créant son *Rosa tomentosa*, dit: "Præcedente (*R. villosa*, Lin., qui aussi a les feuilles dépourvues de glandes) omnibus partibus minor est, et habitu cum *R. canina* convenit, nisi quod folia undique pubescunt, et subcinerea videntur."

De Candolle, Fl. Fr. vol. iii. p. 440 (1805), dit: "Les feuilles couvertes de poils mols, nombreux et couchés;" puis cite le synonyme de Bauhin, Hist. Pl. vol. ii. p. 44, f. 2? Certes le doute peut être permis, puisque la figure grossière de Bauhin représente une plante ayant les pédoncules, le tube du calice et les divisions calicinales glabres.

Gmelin, Flora Bad.-Alsat. vol. iv. p. 368, dit: "Foliola septem, quinque, subsessilia, ovalia, argute duplicato-serrata, utrinque pallide viridia, tomentoso-sericea;" puis cite la figure de Sowerby, Engl. Bot. tab. 990, qui est le tab. 467, *third edition*. Cette figure est très-mauvaise en ce sens qu'elle ne fait voir que la partie supérieure d'un rameau fleuri et toutes les folioles à la face supérieure, outre qu'elles sont simplement dentées, tandis qu'elles devraient être doublement dentées.

Woods, British Species of Rosa, p. 197, dit son *Rosa tomentosa*: "foliola . . . utrinque tomentosa, duplicato-serrata, subtus nunc tota superficie, nunc margine, venisve tantum glandulosa;" cite la figure 990 de Sowerby, d'après laquelle il est impossible de savoir si la plante a les folioles glanduleuses en dessous. Le type de Woods qui se trouve dans l'herbier de la Société Linnéenne de Londres, sous

les nos 38 et 39; le no 38 serait le *R. cuspidata*, Bieb. (Baker in litteris).

Tous les botanistes anglais décrivent la plante de Smith avec des feuilles glanduleuses en dessous, tandis que Smith, Fl. Brit. dit seulement: "Utrimque mollissime tomentosa;" ou alors l'espèce prise par les auteurs français serait autre chose que la plante d'Angleterre. Les botanistes anglais peuvent lever le doute en éclaircissant cette question spécifique; mais je dois le dire, tout ce que j'ai reçu d'Angleterre sous le nom de *Rosa tomentosa* est étranger à la plante de Smith décrite dans le 'Flora Britannica.'

Nous ne pouvons qu'encourager M. Baker à suivre avec persévérance l'étude des rosiers de son pays, où certainement il ne manquera pas d'observer des formes nouvelles par suite de l'étude attentive qu'il sera à même de faire. Le champ de l'observation est immense, car la nature agit toujours par les voies les plus simples, qui sont aussi les plus grandes.

Nous approuvons beaucoup la résolution de M. Baker de publier en exsiccata les types des rosiers de sa revue; c'est à notre avis la meilleure manière de faire bien connaître les espèces litigieuses et critiques.

Lamothe d'Insay, près Mehun-sur-Yèvre (Cher).
2 *Décembre* 1864.

TUBER EXCAVATUM, Vitt., A NEW BRITISH TRUFFLE.

By W. G. Smith, Esq.

We believe we are the first to record the above truffle as a British plant. It makes the number of species of the genus *Tuber* ten instead of nine, as previously given by the Rev. M. J. Berkeley, and other cryptogamic botanists. The specimens examined for identification were found in the truffle districts of Somersetshire, where it is not an uncommon species; it is probably frequent in the truffle grounds throughout the country. The following description is taken from Vittadini's 'Monographia Tuberacearum,' Mediolani, 1831, p. 49:—

Tuber excavatum, Vitt. (l. c. p. 49, tab. i. fig. vii.) Subglobosum, læve, papillosum, cavum, basi foveola vel rima in uteri cavitate ada-

perta instructum. Venæ polymorphæ, e centro uteri n carnem radiatim dispersæ. Sporangia subrotunda, echinata; sporidia dilute fuliginea."

THE SUNKEN ISLAND OF ATLANTIS.

A Lecture delivered by Dr. F. Unger, Professor of Botany in the Vienna University.*

Although our knowledge of the former condition of our globe, before man took possession of his inheritance, is but a recent acquisition, yet it is based upon such a solid foundation, that science, having fairly taken wing, already ventures to deal with the most difficult problems. A few decades have hardly elapsed since the playing with fossils assumed a serious character, and the geological structure of the solid land and the condition of the sea's bottom began to be regarded as the result of vast previous revolutions. If at present this knowledge is still in many points defective, and its shortcomings require to be supported by hypotheses, these should not prevent us from placing confidence in it and regarding it as an important scientific basis. To man as lord of the globe, it is merely a matter of precaution to take notice of the structure of the house which he inhabits, the foundation upon which it rests, and the materials of which it is built. What he has to hope or to fear may be of slight importance to the single individual, but surely it cannot be a matter of indifference to the whole human race, destined, as it would seem to be, to a more prolonged existence than is usually supposed. I may be permitted to sketch a brief geological period, not to show how unsafe is the ground we tread, and how changeable the condition under which we live, but how vast and incalculable is the final effect of even the most insignificant causes—causes from the sway of which neither the world nor we can emancipate ourselves.

The sketch I am going to give refers to a remote, though not to the remotest period of our planet,—one which, if not immediately preceding, at all events is very near man's appearance on earth. It has been named the Tertiary period, and is distinguished by its supplying us

* Translated from Dr. Unger's 'Versunkene Insel Atlantis,' 8vo, Wien, 1860, Braunmüller, and transferred to our pages by the kind permission of the author and publisher.

with the enormous masses of combustible materials preserved in argillaceous and arenaceous strata in the shape of lignite. There can be no doubt that the geological conditions of our globe were at that time very different from what they are at present; and the surface of our planet, the elevation of the solid land, must have essentially differed from what they are now. In this place it is not my intention to pass under review the whole of the earth's surface with regard to the distribution of land and sea, for which we have as yet but insufficient data, but I shall give a few hints about the aspect of Europe during that period, the condition of the adjoining eastern and the great western continent, and the intervening ocean. The interest attaching to this subject is increased by the fact that it is our present home we shall behold as it appeared millions of years ago. I shall begin by introducing such details as are essential to my argument.

It is well known that in the beds of brown-coal, when they have not become a compact mass, we find fragments of a great number of plants and animals. It is highly interesting to cast a glance at this subterranean herbarium, and twenty years ago I eagerly studied this singular collection under very favourable circumstances. At that time the botanical treasures of the much older coal formation and of the later deposits had been investigated, but those of the lignite still remained a sealed book. As might have been expected, the study of these vegetable fragments made a deep impression upon me, and caused me many a surprise. The plants and animals of earlier periods exhibit but slight analogy with those of the present. But here all was reversed. In these investigations (often difficult) one frequently came across known forms, and sometimes it would seem as if one had to deal with the sweepings of a park,—I say advisedly a park, planted as it is with indigenous and foreign trees and shrubs. The most surprising was, that a considerable number of these plants so closely resembled the trees and shrubs nowadays growing in North America as to be scarcely distinguishable from them. Justly attaching great importance to this fact, I may be permitted to refer, in support of it, to a few fossils. One of them is a rather large 3–5-lobed leaf, with toothed margin and long petiole. The leaf of only one tree now indigenous to North America resembles it entirely, or very closely, and that is the Amber-tree (*Liquidambar styraciflua*, Linn.) well known by the resin it exudes. That no mistake

has been committed in this instance is more than proved by the fruit, which has been met with in a fossil state, and closely resembles that of the Amber-tree. The fragments of leaves submitted next, one of which has been found in Switzerland, the other in limestone beds in Sinigaglia, are instantly recognized as those of the North American Tulip-tree (*Liriodendron tulipifera*, Linn.). Though they may not be quite identical with them, they must, at all events, be regarded as derived from the nearest ally. In Iceland, besides the leaves, the fruits (of *L. Procaccinii*, Ung.) have been observed. Amongst the other fragments frequently found in lignite are branches covered with minute lancet- or nearly needle-shaped leaves, pointing towards a Conifer, which is not met with in Europe, but has an extensive geographical range in North America. It belongs to the oldest vegetable monuments of that country, and is the *Taxodium distichum*, Rich. Other fossils of the lignite beds point towards trees, of which several species at present inhabit North America. They belong to the genus *Nyssa*. The fruits and seeds of *Pavia* and *Robinia*, occasionally encountered, prove that these two genera, now confined to North America, and admitted into our gardens as exotics, at one time flourished in Europe. It is well known that Europe is destitute of Walnuts, the one cultivated being derived from the woody mountains of the southern Caucasus. But a great number of different nuts are very common in lignite formations, and if compared with a large North American genus their close resemblance at once becomes manifest: the so-called grey Hickory (*Juglans cinerea*, Linn.) can scarcely be distinguished from the fossil *Juglans tephrodes*, Ung. I might enlarge upon the different Maples, Oaks, Poplars, Hornbeams, Firs, and Yews of the lignite flora, the nearest allies of which are not the species still existing in Europe, but almost exclusively those in North America; and I might add a great number of other details, all proving that *the lignite flora had not a European but a North American character*. This conclusion, which I published about fifteen [now twenty] years ago, has not been shaken by any subsequent investigations; on the contrary, every year has furnished additional proofs of its accuracy, now enabling me to give the following list of the fossil species and the corresponding living types of the North American flora.

Flora Tertiaria.	*Flora Boreali-Americana.*
Liquidambar Europæa, *Alx. Brn.*	Liquidambar styraciflua, *L.*
Liriodendron Procaccinii, *U.*	Liriodendron tulipifera, *L.*
L. Helvetica, *Heer.*	
Pavia salinarum, *U.* (*fruct.*)	Pavia macrostachya, *DC.*
P. septimontana, *Web.* (*fol.*)	
P. Ungeri, *Gaud.* (*fol.*)	
Nyssa Ornithobroma, *U.*	Nyssa aquatica, *L.*
Cissus Oxycoccos, *U.*	Cissus acida, *L.*
Robinia Hesperidum, *U.*	Robinia Pseudacacia, *L.*
Taxodium dubium, *Stenb. sp.*	Taxodium distichum, *Rich.*
Sequoia Langsdorfii, *Brong. sp.*	Sequoia sempervirens, *Endl.*
Platanus aceroides, *Göpp.*	Platanus occidentalis, *L.*
Ostrya Atlantidis, *U.*	Ostrya Virginica, *Willd.*
Acer trilobatum, *Alx. Brn.*	Acer rubrum, *Ehr.* A. dasycarpum, *Ehr.*
Juglans tephrodes, *U.*	Juglans cinerea, *L.*
J. elænoides, *U.*	J. olivæformis, *Michx.*
J. hydrophila, *U.*	J. aquatica, *Michx.*
Glycyrrhiza Blandusiæ, *U.*	Glycyrrhiza lepidota, *Nutt.*
Cercis Radobojana, *U.*	Cercis Canadensis, *L.*
Laurus primigenia, *U.*	Laurus Canariensis, *L.*
Rhododendron megiston, *U.*	Rhododendron maximum, *L.*
Bumelia Plejadum, *U.*	Bumelia tenax, *Willd.*
Quercus tephrodes, *U.*	Quercus cinerea, *Michx.*
Q. chlorophylla, *U.*	Q. virens, *Ait.*
Q. elæna, *U.*	Q. oleoides, *Schlecht.*
Q. myrtilloides, *U.*	Q. myrtifolia, *Willd.*
Q. Apollinis, *U.*	Q. laurifolia, *Michx.*
Q. Drymeja, *U.*	Q. Xalapensis, *H. B.*
Q. Lonchitis, *U.*	Q. lancifolia, *Schlecht.*
Q. Daphnes, *U.*	Q. laurifolia, *Tratt.* (aquatica, *Soland.*)
Prunus Mohikana, *U.*	Prunus Caroliniana, *Ait.*
P. Euri, *U.*	P. pumila, *L.*
Ilex Parschlugiana, *U.*	Ilex opaca, *Ait.*
I. stenophylla, *U.*	I. angustifolia, *L.*
Rhus Herthæ, *U.*	Rhus Toxicodendron, *L.*
R. stygia, *U.*	R. glabra, *L.*
R. Pyrrhæ, *U.*	R. aromatica, *Ait.*
Rhamnus Eridani, *U.*	Rhamnus Carolinianus, *Wall.*
Ulmus bicornis, *U.*	Ulmus alata, *Michx.*
Ceanothus zizyphoides, *U.*	Ceanothus Americanus, *L.*
Pinus Oceanines, *U.*	Pinus Douglasii, *Sab.*
P. lanceolata, *U.*	P. Canadensis, *Ait.*

Flora Tertiaria.	*Flora Boreali-Americana.*
P. balsamodes, *U.*	P. balsamea, *L.*
P. Leuce, *U.*	P. alba, *Ait.*
P. Götheana, *U.*	P. Teocote, *Cham.*
P. ambigua, *U.*	P. patula, *Schlecht.*
P. rigios, *U.*	P. rigida, *Mill.*
P. Mettenii, *U.*	P. Montæzumæ, *Lam.*
P. hepios, *U.*	P. mitis, *Michx.*
P. Freyeri, *U.*	P. inops, *Soland.*
P. centrotos, *U.*	P. pungens, *Michx.*
P. furcata, *U.*	P. Banksiana, *Lamb.*
P. Kotschyana, *U.*	P. monticola, *Dougl.*
P. spicæformis, *U.*	P. Strobus, *L.*

That Europe was at one time covered with plants, at present introduced into its gardens from a great distance; that amongst them are not a few which even in America no longer exist or which do not stand a transplantation to our climate,—is a strange phenomenon, demanding causes which must have wrought vast changes in the conditions under which these plants flourished, in the shape of the earth's surface and in the climate of these countries. The most singular is to find plants of a far distant continent strongly represented in the strata of our native country, whilst those of the adjacent eastern continent only appear in limited numbers.

An explanation of this phenomenon we can hope to find only in the laws regulating the first appearance and distribution of plants. Without entering too far into a subject by no means sufficiently cleared up, I may direct attention to some of the most striking laws at present admitted as regulating the geographical distribution of plants and equally in force in former geological periods. The plants of any given district can have taken possession of it in two ways only. They must either have been created in it—the species were formed on the spot—or they reached it by some agency or other from abroad. In applying this to the lignite flora of Europe, we do not see any reason for assuming that the plants which at that period existed in Europe were created in that continent. The striking resemblance which many of the most characteristic species bear to those nowadays living in North America, encourages us to suppose that some connection or other existed between the two floras. Only one alternative is possible. Either our Molasse flora has gradually spread to North America, or the reverse

has taken place and is derived from the North American Flora which since that time has not undergone any essential changes, whilst that of Europe, as is actually the case, has experienced vast revolutions. That the vegetation of North America has retained since the Tertiary period the same character, is proved by several facts, which I shall afterwards specify. There can therefore be no doubt that the plants of our lignite formations must seek their progenitors, not in our, but North American soil. When there are so many corresponding characteristics, we must necessarily assume a community of origin, and it would be offending against the economy nature practises to suppose that the creative power manifested itself in both Europe and North America in exactly the same manner. In short, there is more than *one* reason for thinking that the centre from which our lignite flora has sprung, was far away from Europe,—in the southern parts of the United States.

If these conclusions be correct, then there will be no difficulty in finding out how the descendants of American Robinias, Liquidambars, Tulip-trees, Hickories, Maples, etc., could reach Europe, and a soil favourable to their further extension. Here also there is one alternative only. Either these winged or unwinged descendants found their way to the western coasts of Europe through the air or sea, or they availed themselves of a bridge which at that time existed between the two continents, but which the Great Architect of the universe has since removed. That plants, especially their seeds, often travel far by the agency of wind and waves, and so effect a migration from one continent to another, is a well-known fact. We have several cosmopolites swept by the Gulf-stream from the coast of Mexico to Norway. The great range which the Cocoa-nut Palm enjoys is, it will be remembered, ascribed to its fruit floating uninjured across the ocean. But if the distribution of plants, effected by wind and waves, or the intervention of migratory animals, is more closely investigated, it becomes evident that the number of species which in this way became cosmopolitan is very limited, as plants require constitutions sufficiently tough to bear up against the greater or lesser changes which they must necessarily undergo. The number of species diffused in this way is a very limited one, and can never reach a sufficiently high figure to influence the character of the vegetation of a foreign country.* The plants imported

* The vegetation of St. Helena and Ascension being almost entirely derived

by wind and waves always remain more or less strangers, or rather curiosities, which never mix properly with the natives of the soil, and show by their very look that they are intruders.

If therefore the plants of the lignite are to be considered natives of the great western continent, we must reject their importation by wind and waves, or migratory birds and other animals, unless we are prepared to grant for their migration an enormous lapse of time and circumstances of an extraordinarily favourable nature. Experiments made for this purpose with seeds, testing their power to retain vitality and extend their geographical range, have shown that these means are quite insufficient to explain the distribution of plants over our globe.*

But there is another means of intercommunication, that of gradual migration, which, though slow, is always in steady progression, and the only mode which plants at all times must have adopted to find their way from the centre of their creation to the limits of their distribution, *i. e.* spreading as far as the nature of the soil and the climate was favourable to the progress of the individuals. Rivers, mountain-ranges, great lakes, etc., oppose an extension of this kind, but these difficulties are generally such as time and the changes wrought by it will overcome. Great oceans only place an insurmountable barrier to this gradual migration.

All these considerations force us to the conclusion that there must have been a continental connection. *In the Tertiary period, or at the time when lignite was formed, Europe must have been connected with North America, and the Atlantic Ocean must have been divided at one place or other by a continent.* This conclusion, founded upon strictly scientific reasoning, would become more certain if it were possible to furnish positive proof that a continent, as a connecting link between the two worlds, really existed, or if we could trace the outline of this central continent. In attempting this by no means easy task,

from foreign sources, would seem opposed to this conclusion, but it should be remembered that man was the principal agent who effected the change in those islands.—Ed.

* From the experiments made by Darwin, Berkeley, Salter, Alph. de Candolle, and Martius, it is clear how insignificant is the part played by the sea and its waves as an agent in the distribution of plants. Of 98 species, the seeds of which were experimentalized upon, only 19 retained their germinating power after being six weeks submerged in sea-water, and only 7 after three months. The rest either became rotten or sank in the water, and could therefore not have reached a distant shore. (Bibl. Univers. de Genève, 1858, i. pp. 89–92; Neue Jahrbüch. für Min. 1858, p. 877.)

I shall, in the first instance, examine Europe and America in the Tertiary period with regard to their boundaries; in other words, attempt to answer the question, "How did Europe and America look, at the time when lignite was being formed?"

Who can doubt that the two continents in question had formerly very different boundaries than they have at present? The former vegetation of Europe indicates a mild climate. Where Camphor-trees and Palms flourished, and rhinoceroses and elephants inhabited impenetrable forests, there cannot have been snowy mountains or extensive plains. Even the present configuration of this continent, with its deep indentations, proves that in former periods there were other partitions and groupings of these parts. Geological investigations bear out these speculations, and enable us to construct a map of Europe and that part of North America situated under the same parallels of latitude. Nothing is required but to know the geognostic condition of the territory. It is evident that as far as the sediments of the lignite-beds extended there must have been water, because they can only form as the sediments of greater or lesser basins of water. Then, as now, rivers, rivulets, and all running streams, carried along with them the loose parts of the solid land, in the form of mud, sand, and rubbish, to a deeper basin filled with water, and deposited them there. The extent and thickness of these deposits, spread as they are over whole countries and reaching several thousands of feet in depth, show that these operations were continued for a long series of ages and conducted upon a gigantic scale. Whole mountains must have been decomposed and carried away before the valleys could be filled up and the plains over which the Tertiary ocean extended could be covered over; but on the continent there must also have been numerous reservoirs of fresh water, whilst the water of the ocean was more or less charged with saline particles. It requires no demonstration to prove that the sea-water became brackish at a greater or lesser distance from the mouth of the rivers. Instances were not wanting where, by the destruction of the dams or a change in the level of the land, inland lakes discharged their contents into the ocean, or the sea broke inland, effecting in this manner a change both in the sediments of the sea as well as in those of the fresh water.

During these continued and destructive changes, which did not allow the boundaries of the continent to assume a permanent shape, there

had sprung up, assisted by favourable circumstances, a rich vegetation. Everywhere the soil seems to have been covered with thick virgin forests, whilst swampy valleys offered favourable conditions for the accumulation of vast vegetable masses, which can be only vaguely compared to our peat formations continued through thousands of years. Innumerable skeletons of plants heaped upon each other, and finally covered with mud and sand, form our lignite beds. Nevertheless, in the great deposits of clay, sand, and gravel, they occupy only an insignificant part, and in extent they are far more limited than the latter, just as the formation of the peat was always dependent upon local conditions. Now if we trace the boundaries of Europe as they existed in that period and as they present themselves in the Europe of our own days, we have a space much more limited and of a very different shape to the existing continent. Instead of a great continent, we have a group of larger and smaller islands, connected in various ways, and amongst which we generally recognize no more than our principal mountain-chains. I may add that they certainly did not attain the great height they assume at present; that the whole formed rather a hilly country without spreading out in large and wide plains. The details of this general sketch and the special reasons for my belief in its correctness I must reserve for another occasion.

North America, unlike Europe, was at that time larger in territory than it is now. The present highly practical inhabitants of that continent would not mind exchanging their native country for the America of the Tertiary period. The very few and insignificant Tertiary deposits of the northern parts of that continent are proofs that in its whole present extent it must have been in the period alluded to above the sea-level. Moreover, deep sea-soundings taken in the Atlantic Ocean show, and render it more than probable, that its eastern shores extended far into the Atlantic Ocean.

The most important point, however, is to find out about the islands which in those days existed between Europe and America, for, if there was a communication between the two continents, they must in some way have been connected with it. Proofs to that effect are not wanting. It must excite surprise to find in the northernmost of them, a volcanic island, numerous traces of brown-coal and the plants accompanying it. A considerable number of them agree exactly with species which at one time covered the whole European continent; the eight

Coniferæ have all their analogues in North America.* Iceland, at present entirely without trees,† was densely wooded in the Tertiary period. Fragments of trees are preserved in the lignite or "Surturbrand" of that island, and, as they are still covered with bark, they cannot have reached it as drift-wood.‡ Besides Iceland, there are only a few small groups of islands between Europe and America, viz. the Azores, Madeira, the Canaries, and the Cape de Verds, all volcanic. In only one of them, Madeira, remains of plants have been found deeply buried in trap-tuff. These remains are very fragmentary, and, as they seem to belong to species more resembling those still living on the island than the members of the Tertiary flora, their deposition and existence on the globe have been referred to a more recent period than the Tertiary. But this does not seem to be correct. The few Tertiary plants hitherto discovered in North America agree, it is true, with our European Tertiary species, but they *do* also not essentially differ from the character at present borne by the flora of that country. Nor could it be otherwise, if the Tertiary flora of Europe ever did have a North American character. The North American flora has not altered at all or but slightly, whilst that of Europe has assumed since that period an entirely new face. The same has taken place in the Atlantic islands. It cannot be denied that the Tertiary flora of Europe not only agrees with the present flora of North America, but also reminds us of that of the Atlantic islands, which at present inclines in its character quite as much towards America as to Europe. About a dozen Tertiary plants may easily be picked out, agreeing with species at present growing in the Atlantic islands.

Flora Tertiaria.		*Flora Atlantica.*
Woodwardia Rossneriana, *U.*		Woodwardia radicans, *Cav.*
Pteris Göpperti, *Web.*		Pteris arguta, *Vahl.*
Aspidium elongatum, *Heer.*		Aspidium affine, *Lowe.*
Cheilanthes Laharpii, *Heer.*		Cheilanthes fragrans, *L. sp.*
Myrica salicina, *U.*		Myrica Faya, *Linn.*
Persea Braunii, *Heer.*	}	Persea Indica, *Spgl.*
P. speciosa, *Heer.*		

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* See more ample details in O. Heer's Tert. Flora der Schweitz, ii. p. 315.

† In a recent work of travels it is stated that there are still a few indigenous trees.—Ed.

‡ See an exhaustive article on the Tertiary Flora of the Arctic Region in 'Journ. of Botany' (1863.)

Flora Tertiaria.	*Flora Atlantica.*
Laurus princeps, *Heer.*	Laurus Canariensis, *Sm.*
Clethra Teutonica, *U.*	Clethra alnifolia, *Linn.*
Olea Osiris, *U.*	Olea excelsa, *Ait.*
Salix varians, *Gopp.*	Salix Canariensis, *Sm.**

We can therefore not be surprised if the Tertiary plants of Madeira agree with the present vegetation of the Atlantic islands; on the contrary, as the same is the case in North America, it would be singular if it were otherwise. The great bridge which connected the two continents must therefore have led by way of these islands, as well as by that of Iceland. At present it is impossible to speak more precisely on this subject. Perhaps a more accurate definition of the extent and connection of this central continent might be given by availing ourselves of the well-known soundings taken in the Atlantic Ocean; but it would always be a difficult and dangerous undertaking, and we might be thrown by the waves of this treacherous ocean of speculation from one hidden rock upon the other. It also seems to be, in more than one respect, unsafe to regard the Sargassum sea as the remains of a former coast-line. At present we must be content to know that during the Tertiary period an intermediate continent, which we shall call Atlantis, really existed, and that it extended northwards as far as Iceland, and southwards beyond the present Atlantic islands. But any attempt at tracing its exact configuration must be regarded as ideal.

It would be highly interesting to know the fate which this continent afterwards experienced, until it altogether disappeared, a few islands only remaining behind. Atlantis assumed, without doubt, the form of an island, separated from both continents. But how long Atlantis existed as an island has been as little ascertained as its exact extent. It is well known that the Tertiary period, rich in plants and flowers, was succeeded by evil days, putting a stop to all life. The European Tertiary group of islands had by rising gained considerably in extent, but for this very reason lost much of its mild insular climate.† The cur-

* Of 27 of the fossil plants found in the lignite beds of St. Jorge, Madeira, 7 have already died out. See O. Heer's 'Ueber die Fossilen Pflanzen von St. Jorge, Madeira,' in N. Denkschrift der all. Schweiz. Gesellschaft, xv., and Tert. Flora der Schweitz, iii.

† Heer (Tert. Fl. d. Schweiz, ii. p. 333) thinks it probable that the temperature of the Lower Miocene period was about 9° C., and the Upper Miocene 7° C. (*i. e.* 8° C. mean) higher than that of present Central Europe.

rents which, like our great Gulf-stream, conducted warm water from the Indian Ocean to the Pannonic Bay, and to the hills about Vienna, could flow no longer. A great continent in the east placed Europe in direct connection with Asia. All this, and the partial sinking of Atlantis, must have seriously affected the condition of Europe. True, the cooling-down process was gradual, but nevertheless so marked that the accumulation of snow on the heights of the hills—now grown into mountains—by degrees assumed such an extent, that the whole country, at least northwards of our central mountain-chain, became one immense glacier. Thus was ushered in the glacier period, which also must have lasted a considerable time, till the climate, in consequence of favourable geological changes, began to improve. The open polar way to the Arctic seas was closed, and by the desiccation of the North African sea an oven was created in the desert of Sahara, which constantly supplied Europe with heated air. The British islands came in closer connection with the continent, but Atlantis sank below the level of the ocean, leaving a few traces only behind. Europe as well as America thus obtained nearly their present shape. This was the time of the cave bears (*Ursus spelæus*), the aurochs (*Bos primigenius*, Boj.), of the last European elephant and rhinoceros (*Elephas antiquus*, Falk., and *Rhinoceros leptorhinus*, Cuv.), and in North America of the Missourium (*Missourium theristocaulodon*, Koch). In Europe these great changes in the climate were followed by the introduction of an entirely foreign vegetation, not derived, as formerly, from the west, but from the east, passing from the Russian steppes by way of the Caucasus and Crimea to Europe, where it took possession of the plains covered with gravel and mud. The time necessary for this eastern influx of plants and animals we may conjecture, but we have no safe date of the commencement or duration of this period. Nor are we able to prove positively whether at that time man already existed, though we have succeeded in finding bones of him with those of animals of that period, and in North America a gigantic Missourium slain by stone weapons.

The early history of man is still wrapt in obscurity. It is therefore the more surprising to meet with a tradition of the highest importance with respect to that geological period, and containing as it were a confirmation of the former connection of Europe with America, though we should have thought that this connection had ceased long before man's appearance on earth. This curious tradition is found in Plato's dialogue

entitled 'Timæus.' Here direct mention is made of a great island of Atlantis, situated beyond the Pillars of Hercules, and the seat of a powerful nation. A priest of Saïs made this singular communication to Solon, who had gone to Egypt to become acquainted with the wisdom of that caste.* It is mixed with a great deal that must appear unhistorical, and it puzzles us to know how an Egyptian priest could have come by this tradition, or how Plato could arrive at so singular a conception. Let us hear Plato himself:—"After the said priest has pointed out that Egypt is the only country where traces of the oldest history of man could be preserved, he informs Solon that Greece, and especially Athens, had a very ancient history, which, however, had been lost there; he draws his attention to the fact that that country was settled earlier even than Saïs by the goddess Neith (Athenæ), enjoyed at remote times a well-regulated political organization, and possessed a great intellectual and strategic power. As the goddess loves war as much as wisdom," he continued, "she selected a country which would produce men closely resembling herself. Under such laws and excellent political institutions did your nation then live, exceeding all others in virtue, as was fit for a people descended from the gods, and educated by them. Many of the great deeds of your nation, preserved in our writings, cause surprise. But one of them exceeds all others in magnitude and splendour. It is recorded how your country once opposed a power, which with great arrogance pushed its way into Europe and Asia from the Atlantic Ocean, for in those days that sea was navigable. Beyond the entrance, which you call the Pillars of Hercules, there was an island larger than Libya and Asia together. From it naviga-

* The hypothesis of a former connection between Europe and America is supported by additional evidence. Here I merely mention the correspondence observable in the character of the littoral faunas of the two continents, which can be explained only by a former connection of the two countries. The insect fauna of the Tertiary period also presents greater analogies with that of America than any other part of the world. For instance, Heer mentions a *Belostomum* from Œningen, the nearest ally of which is the Brazilian *B. giganteum*. The same remark applies to the indigenous population of America, closely connected as it is with that of the Canary Islands and Africa. Retzius (Archiv für Phys. 1858, p. 134) thinks it probable that the dolichocephalous natives of America (Guaranis, Caribs, etc.) are closely related to the Guanches of the Canary Islands and the Atlantic people of Africa (Moors, Berbers, Tuariks, Copts, etc.); and he draws attention to the striking resemblance there is in the skull of the Guaranis of Brazil, the Guanches, and the Copts.

[Professor Unger has overlooked the many striking characters which the floras of Brazil and western tropical Africa have in common.—Ed.]

tors passed to the other islands, and from them to the opposite continent which surrounded that ocean. For the sea, situated inside that strait of which we speak, appears to be a sea with a narrow entrance, but the other would justly be termed an ocean, and the adjacent land a continent. On this extensive Atlantic island there was a powerful and singular kingdom, whose dominion extended not only over the whole island, but over many other islands and parts of the continent. It ruled also over Libya as far as Egypt, and over Europe as far as Tyrrhenia. This kingdom, with the whole of its forces united, tried to subjugate, in one campaign, your and our country, and all the districts inside the straits. At that time, O Solon, your nation shone out from all others by bravery and power. Taking the lead by courage and in the arts of war, be it as leaders of the Hellenes, be it necessarily isolated by the withdrawal of allies, it was placed in great danger, but it defeated the attacking army, and erected triumphal monuments. It also prevented those who had as yet preserved their independence from becoming subjugated, and generously freed all the others living inside the Pillars of Hercules. But when at a later period severe earthquakes and great floods took place, the whole of your united army was swallowed up during one evil day and one evil night, and at the same time the island of Atlantis sank into the ocean. That is the reason why, at present, that sea is difficult to pass and to explore, the deep mud which the island formed in sinking being an obstacle to navigation."

Thus far the curious passage in 'Timæus,' a satisfactory explanation of which historians, philologists, and naturalists have hitherto attempted in vain. That this tradition is entirely imaginary would be bold to assume, since we have shown that its most important substratum is sound, and that at one time a continent did exist in the Atlantic Ocean. It is not my province to make this tradition harmonize with geological facts and the conclusions derived from them, or to place Plato's mystification and the vauntings of an Egyptian priest in their proper light. But I may venture to predict that by the united efforts of philologists and naturalists this, as well as many other problems in the history of primeval man at present regarded as urgent scientific questions, will be solved.* May this opinion of a modern man of science

* It may not be out of place to add a list of the whole literature referring to Atlantis :—

Besides Plato's Dialogues, 'Timæus,' vol. iii. pp. 20–25, and 'Critias,' pp. 109–

not be regarded like that of the ancient priest of Saïs as an overrating of human power!

CORRESPONDENCE.

Ammi majus *on the banks of the Severn.*

I have much pleasure in forwarding to you a small specimen of a plant (the *Ammi majus*, Linn.) which I found this year on the banks of the Severn, near Gloucester. I also beg to enclose copy of a letter from Mr. Kippist, who placed my specimens before the Linnean Society. He says:—

"I showed your plant to our President, and he thinks it a mere form of *Ammi majus*, which is very common on the Continent; in all probability it has been introduced with ballast, and, like many aliens so imported, may disappear in a year or two. *A. glaucifolium* has been referred by Bertoloni, Grenier and Godron, and other Continental authorities, to *A. majus*, but De Candolle, Woods ('Tourist's Flora'), and others, keep them apart. Certainly, your plant *looks* very different from the form of *A. majus* contained in Smith's herbarium, and which is admirably figured in the 'Flora Græca,' with the leaves *all* biternate, and the leaflets all lanceolate, beset along the entire margin with numerous close-set serratures. This form does not exist in the herbarium of Linnæus, whose type-specimens of *Ammi majus* is very like your plant, but unluckily pinned to something very different."

Perhaps you may be interested in the following description, which I have drawn up from one of my specimens:—

Root long and tapering, hard and woody. Stems procumbent at the base, from 1–2 feet high, much branched, angular, deeply striated, glabrous. Leaves all ternate, with short but distinct sheathing-footstalks; leaflets wedge-shaped, deeply cut, all segments ending in a long, straight point. Umbels on long peduncles, either terminal or opposite the leaves; general involucres of ternate, spreading bracts, with fine linear segments; partial involucres of narrow-lanceo-

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127 (Plato t. ix. pp. 287–297; t. x. pp. 39–66, ed. Bipont.), should be named Diod. Sicul. iii. 207, c. pp. 45; Ammian. Marcell. i. 17 (both confirming that the Egyptians knew Atlantis); M. Bailly, 'Lettres sur l'Atlantide de Platon, et sur l'Ancien Histoire de l'Asie,' Paris, 1779 (places Atlantis east of Europe); A. Humboldt, 'Examen Critique de l'Histoire de la Géographie du Nouveau Continent,' Paris, 1836, i. p. 167 (thinks the tradition based upon plutonic revolutions (Lyctony) taken place in historic time in the Mediterranean, and enlarged by the imagination); Branston, Misc. a. d. n. ausl. Literatur, viii. (regards St. Helena and Ascension as possible remnants of Atlantis); Letrone, 'Essai sur les Idées cosmographiques qui se rattachent au nom d'Atlas,' 1831; Bekkeri Comment. in Plat. t. ii. p. 395; Ch. Bunsen, 'Aegyptens Stelle in der Weltgeschichte,' vi. (thinks Nimrod and his conquests to be the foundation of the tradition about Atlantis); P. Flourens, 'Des Manuscrits de Buffon,' Paris, 1860, p. 261; Luke Burke, Destruction of Atlantis, in Ethnol. Journ. 1848, July.

late bracts, broadest at the base, with scarious margins. Flowers white; petals small, round, and equal. Fruit smooth, tipped with the spreading styles; carpels with prominent ridges.

I have been in correspondence with Mr. Syme, from whom I learn that it is a very variable plant, and like *Pimpinella Saxifraga* is very changeable in the forms of its leaves. Owing to these variations, the older botanists, in dividing it into three species, viz. *A. majus*, *A. intermedium*, and *A. glaucifolium*, described as species the two latter, from mere forms of the first; and as Mr. Syme remarks, modern authors consider them all one and the same species.

Yours, etc.,

Gloucester, Dec. 21, 1864. O. St. Brody, Ph.D., F.L.S.

On Plants producing Double Flowers.

Permit me to add to your list of plants producing double flowers *Viola tricolor*, a handsome variety of which I saw in bloom last September at the Liverpool Botanic Gardens. Allow me also to remind you of the White Water Lily.

In your list, I perceive that you class double flowers according to their Natural Orders. Would it not be preferable to do so according to their physiological peculiarities? Some, for example, as *Chelidonium majus*, multiply their petals without losing any of their stamens, and produce abundance of ripe seed. Others, such as *Ribes sanguineum*, not only multiply their petals, but the stamens also, every flower becoming, as it were, two or three rolled into one. In others, again, we have a gradual transition, few or no perfect stamens being retained, though the number of floral pieces, intermediate in character between stamen and petal, is increased, often very greatly so, as in the double Tulip. This latter circumstance shows that double flowers become so, not as supposed by some authors, simply through the portions that would naturally have appeared as stamens presenting themselves as petals, but, in the large number which have less than ten stamens in the single state, by a considerable extra development. Double flowers of this description should be carefully distinguished from such as are polyandrous in the single state. Among those that show the gradual transition, some retain the pistil unchanged, while in others it is corrupted, and in others again it becomes an irregular cluster of expanded carpels bearing imperfect ovules, and reminding us of the fully ripe and expanded carpels of a *Sterculia* or a *Firmiana*. This last is remarkably exemplified in occasional states of the double Tulip. I have had them every season for many years past. In others, again, both the stamens and the pistil are almost or entirely obliterated, as in the common Daffodil. It would be well further to distinguish those which lose the whole of their stamens, retaining not a trace of them, yet preserve the pistils intact, and, like the double *Chelidonium*, produce ripe seed, insects conveying the pollen to them from single flowers somewhere in the neighbourhood. This occurs in the double Pæony, and appears to me to be one of the most interesting pheno-

mena connected with the subject. Several curious questions have to be considered in relation to double flowers. Do not they often begin to bloom *earlier* than the single states of the same species? If the common double Daffodil of every garden be *Narcissus Pseudo-narcissus*, it supplies a ready example. Have double flowers more or less odour than the single states of the same species? What has been observed in reference to their capacity for relapse? I have many memoranda upon these and collateral points, and propose to collect them. I believe also that I can add slightly to the general list.

I am, etc.,

LEO H. GRINDON.

85, *Rumford Street, Manchester, Nov.* 24, 1864.

[The considerations here urged upon my attention were not overlooked by me, but I stated that I had at present no time to work out the subject to its legitimate conclusion, and published my list of double flowers merely to place it at the service of those who had. Nevertheless, I am much obliged to the author for his remarks; they will be useful to all those who may take an interest in the subject.—EDITOR.]

MEMORANDA.

Agaricus cartilagineus, Bull. A specimen of this fungus was lately sent to the herbarium of the British Museum, which was found growing below the pavement in Goswell Road, London. Its mycelium was developed into an enormous spongy mass, and in pushing up its many-headed pileus, it raised a stone weighing two hundredweight, and measuring 4 feet 1 inch by 2 feet 1 inch. Some years ago, the town of Basingstoke had to be repaved, on account of the rapid growth of large Toadstools below the pavement. The damage in Goswell Road has however been confined as yet to the work of this one plant.

ON THE SYSTEMATIC POSITION OF HYMENOPHYLLEÆ.—Mettenius, in his recent publication on 'Hymenophylleæ' (Leipzig, 1864), arrives, after a careful examination of this interesting group of Ferns, at the conclusion that "on account of the numerous peculiarities of *Hymenophyllum* and *Trichomanes*, it would appear natural to remove them from the position they have hitherto held between the *Cyatheaceæ* and *Gleicheniеæ*, and place them before the *Polypodieæ*, *i.e.* assign to them the lowest rank amongst the Ferns; in their downward relationship they would border on Mosses, especially the *Sphagneæ*, with which they agree in their development and still more in the prothallium, at the same time differing very widely, and being very far removed in these points from the *Ophioglosseæ*." The considerations which Mettenius here advances in 1864 determined the elder Reichenbach, as early as 1828 ('Conspectus Regni Vegetabilis,' p. 37), to regard the *Hymenophylleæ* as the lowest group of the Ferns; and in his 'Repertorium Herbarii, sive Nomenclator Generum Plantarum' (Dresden and Leipzig, 1841), he placed them in that position, removing from them the *Cyatheaceæ* as a higher group by

intercalating the *Polypodieæ*. A view advanced thirty-six years ago cannot therefore be termed *a new one*. In 1828, at the time of the first publication of this new arrangement, the relationship of *Hymenophylleæ* to the *Hepaticæ* was clearly indicated, and may be called a natural one, because based upon a consideration of the whole development of the *Hymenophylleæ*, whilst their relation to the *Sphagneæ* can only be termed an artificial one, based as it is upon a few characters unconnected with the morphological development. (A. W. in 'Leopoldina,' Nov. 1864, p. 128.)

A NEW AMERICAN STATION FOR HEATHER (*Calluna vulgaris*).—The Newfoundland habitat of *Calluna vulgaris* (*vide* 'Journal of Botany,' ii. 55) having been confirmed, we have now the pleasure to announce that Professor Lawson (late of King's College, Kingston, now of Dalhousie College, Halifax) has had the good fortune to bring to light a new locality from the island of Cape Breton. The flowering specimen which Professor Lawson sends us was collected, on the 30th of August last, "in a wet, springy place, among Spruce stumps, in peaty soil, overlying clay, on the farm of Mr. Robertson, St. Ann's, Inverness county, Cape Breton Island." He states that "it has been known there for ten years, having been noticed by a Highlander when mowing, who immediately ran to his master, Mr. Robertson, exclaiming, 'I have found Heather.' Full inquiry into the whole circumstances leads me to the belief that the *Calluna* has not been planted at St. Ann's, but is a genuine native. There is only a small patch of it, not much than a yard across. . . . Its surroundings at St. Ann's are most appropriate. Both in scenery and vegetation there is striking resemblance to the Scotch Highlands. Gaelic is the common language, and all the genuine manners and customs of the Highlanders are there." It is interesting to notice that the Heather appears to be even more restricted in this new station than in that at Tewksbury, Mass., the indigenous character of which it helps to establish. We may now fairly infer that the Heather once flourished throughout our eastern borders, from Massachusetts to Newfoundland, but is verging to extinction, not being able to compete here with the rival claimants of the boggy soil. (A. Gray, in 'Silliman's Journal.')

NEW PUBLICATION.

Plantæ Lignosæ Imperii Austriaci. Oesterreichs Holzpflanzen. Von Dr. Alois Pockorny. Wien, 1864. 4to, pp. 524, with 1640 Nature-printed Illustrations.

When it is practicable to make out and classify so many fossil plants from fragments of their leaves only, it must be still more practicable to determine living species from the same materials, and such has been attempted by Dr. Pockorny, of Vienna. In the well-got-up volume now before us we have a complete enumeration and description of all

the woody plants of the Austrian empire. "It is well known," says the learned author, "that there are plants the leaves of which are so characteristic as to be determinable at first sight with ease and precision. Ferns, Palms, Conifers, Oaks, Roses, and similar well-marked types, cannot be mistaken in their leaves. But whether perfectly isomorphous leaves exist in closely allied species, or in different Natural Orders, can only be determined approximately by a careful comparison of numerous forms. An examination of the woody plants of Austria shows that, although many large genera exist and similar leaf-forms appear in very different Natural Orders, isomorphism of the leaves is observed only in such species the soundness of which is highly problematical. Even in large genera,—for instance, *Salix*, *Rosa*, *Prunus*, *Genista*, *Acer*, etc., —it is possible to draw up good diagnoses of the different species from the leaf only, if all characters are carefully noted. Similar leaf-forms belonging to different Natural Orders,—for instance, *Coniferæ* and *Ericaceæ*, *Salicineæ* and *Amygdaleæ*,—can also be distinguished. It may therefore be regarded as settled that the members of any given flora may be known by their leaves only, provided the species are tolerably sound,—a result important, not only as regards fossil, but also as regards existing vegetation. But this must be evident to any one looking over the illustrations accompanying this work, or, still better, by consulting a herbarium. Practical gardeners and pomologists are able to distinguish by the leaf only, not only closely allied species, but also their numerous varieties and even forms. Indeed, it is not the isomorphism, but the polymorphism, of leaves which offers the greatest difficulties in determining a species."

Many of the difficulties of characterizing leaves are removed by nature-printing, which enables us to reproduce the shape and skeleton of a leaf far exceeding in correctness any description of figure that can be given. Constantin von Ettingshausen, by his valuable publications on the venation of fossil and recent plants, was the first who availed himself of this new process to demonstrate the importance of venation for systematic purposes; and the terminology which Ettingshausen was compelled to invent, has been adopted, with a few modifications, in the present volume. The arrangement followed in enumerating the species is that of Bartling-Endlicher. But at the end there is made an "attempt"—the term is the author's own—to arrange them according to their leaves only. Leaves (*folia*) are divided into—

I. PENNINERVIA.

A. *Without a distinct net of veins.*

1. Uninervia (example, *Taxus baccata*).
2. Cryptonervia (*Hippophae rhamnoides*).
3. Dysnervia (*Elæagnus angustifolia*).

B. *With a distinct net of veins.*

4. Arcunervia (*Rhamnus Frangula*).
   a. Acronervia (*Cornus mas*).
   b. Proprie arcunervia (*Rhamnus Frangula*).
   c. Laqueonervia (*Periploca Græca*).
   d. Retinervia (*Berberis vulgaris*).
5. Marginervia (*Carpinus Duinensis*).

II. PALMINERVIA.

A. *Without a distinct net of veins.*

6. Parallelinervia (*Phœnix dactylifera*).
7. Curvinervia (*Ruscus Hypophyllum*).

B. *With a distinct net of veins.*

8. Radionervia.
   a. Radionervia acrodroma (*Smilax Mauritanica*).
   b. Radionervia laqueoformia (*Cerris Siliquastrum*).
   c. Radionervia cheilodroma (*Acer platanoides*).

The immediate effect of this publication will probably be that greater attention is paid to venation in Floras, especially when it is found what important help may be obtained from this source in handling large and perplexing genera; while the fossil botanist will fully appreciate this attempt to meet some of the peculiar difficulties which beset his path. We can cordially recommend the work to all who still believe in species, and are glad of any new character that may help them to define species; to the Darwinians it may be of minor importance, as merely recording a phase through which a portion of the vegetation of our globe is just passing.

BOTANICAL NEWS.

Five years having elapsed since a Committee was appointed to administer the Royal Society Relief Fund, the first Report of the Committee has been printed, with a list of subscriptions received. The subscriptions to the Fund are invested without any deductions, and consequently the total sum applicable at any time for relief is limited to the balance in hand arising from the amount of dividends previously received. No application for relief is entertained except on the recommendation of the President of the Astronomical, Chemical, Geographical, Geological, Linnean, or Royal Society; it being understood that the several Presidents will consult their respective Councils as to the persons whom they intend to recommend for relief. It formed no part of the scheme to attempt the grant of annuities; it was rather intended to afford *prompt* relief of the immediate wants of those upon whom sudden affliction had fallen; although at the same time it in no way debarred a continuation of such relief being given, should the funds admit thereof. On the 19th March, 1860, subscriptions to the amount of £3204. 14*s*. had been received, and invested in £3351. 7*s*. 6*d*. New Three per Cents. In 1860 there was only one applicant for relief; a sum was voted, but in consequence of the applicant's sudden decease, the cheque was subsequently returned. In 1861 there were six applicants, to five of whom relief was afforded. In 1862 there were four applicants, of whom three were relieved. In 1863 there were five applicants, of whom four were relieved. In 1864 there were two applicants; both were relieved. The total amount thus expended has been £460; and there still remains £233. 1*s*. 11*d*. applicable for relief, exclusive of £17. 2*s*., subscriptions to be invested. The economical principle on which this Fund was originally founded has been strictly carried out. At this time there appears a balance somewhat larger than usual, but this arises from there having been only two applicants this year instead of five, as in 1863. It is very probable that if the *existence* of such a Fund were more generally known, further subscriptions, payable to Messrs. Robarts, Lubbock, and Co., bankers, Lombard Street, or to Mr. Walter White, at Burlington House, would be tendered.

Mr. James Britten, 18, Shawfield Street, Chelsea, London, who is collecting notes for a Flora of Buckinghamshire, will be much obliged to any of our readers who can furnish him with information on the botany of that county.

'Icones Muscorum' is the title of a new work on eastern North American Mosses which have heretofore not been figured, by W. S. Sullivant (London: Trübner and Co.). It contains 129 copper-plates, illustrating 130 species.

Dr. Ascherson has returned from a botanical tour to the Carpathian Mountains. M. Bourgeau will be attached to a French scientific expedition to Mexico.

The second part of Dr. Bolle's 'Ferns of the Canary Islands,' and the concluding part of Dr. Thwaites's 'Enumeration of Ceylon Plants,' are now ready. F. Müller's 'Vegetation of the Chatham Islands,' and Wichura's 'Bastardbefruchtung im Pflanzenreich,' have reached us.

W. Fitch, del. et lith.

Vincent Brooks, Imp.

WELWITSCHII ITER ANGOLENSE.

(*Continued from Vol. II. p.* 339.)

II.—HEDERACEÆ NOVÆ A CL. DR. WELWITSCH IN AFRICA ÆQUINOCTIALI OCCIDENTALI LECTÆ, AUCTORE DR. B. SEEMANN.

(PLATE XXVI.)

Hederaceæ are represented in Africa by the genera *Hedera*, Linn., *Maralia*, Thouars, *Astropanax*, Seem., *Grotefendia*, Seem. (*Botryodendron*, Miq.), *Gastonia*, Comm., *Sciadopanax*, Seem., *Cussonia*, Thunb., and *Hydrocotyle*, Linn., and from the tropical parts of the west coast we know only two woody species (*Astropanax Manni*, Seem., and *A. elatum*, Seem.), which have a natural ally in *A. Abyssinicum* (*Aralia Abyssinica*, Hochst.). To these the indefatigable Dr. Welwitsch has made a valuable addition by the discovery of a new genus, which I propose to name *Sphærodendron*, in allusion to the perfectly round crown of the tree (see Fig. 1 of our Plate). This feature is so striking that on account of it, *Sphærodendron* is planted as a boundary tree of fields, a purpose for which its ready and quick growth otherwise well qualifies it.* According to Dr. Welwitsch this species often grows gregariously, and even forms entire woods, the singular aspect of which one of his sketches enables me to realize. The wood is hard, tough, and durable, and serves for many useful purposes.

Sphærodendron differs from *Cussonia* by its non-ruminate albumen, from *Nothopanax* by its inarticulate pedicels, from *Tetrapanax* by its dry fruit, and from *Sciadopanax* by its evittate fruit and inarticulate pedicels. The following generic characters have been drawn up from a fine set of specimens and copious notes, kindly placed at my disposal by the discoverer.

SPHÆRODENDRON (gen. nov.), Seem. Pedicelli articulati. Flores ecalyculati, hermaphroditi. Calyx tubo ovato, limbo minute 5-dentato. Petala 5, ovato-triangularia, 1-nervia, apice incurvula, libera, æstivatione valvata. Stamina 5, petalis alterna; filamenta filiformia, antheræ ovatæ. Ovarium inferum, 2-loculare, loculis 1-ovulatis.

* In the Isthmus of Panama and about Carthagena, *Sciadodendron excelsum*, Griseb. Bonplandia, 1858, p. 7, a remarkable *Araliacea*, is used for making living fences; large poles, struck into the ground, take root as readily as our Willows do.

Ovula pendula. Styli 2, basi connati, erecti, demum recurvi, apice stigmatosi. Drupa ovata, obscure angulata, evittata, exsucca, 2-locularis. Semina solitaria, dorso convexa, faciei plana. Albumen æquabile.—Arbor Angolensis, 15–30-pedalis, trunco 1–2-ped. diam., strictissime recto, adulto longe nudo, apice comam exacte sphæricam ramorum foliorumque ferente, aspectu admodum singulari, cortice spongioso, ligno albo tenace durabili, ramulis junioribus petiolis costisque foliolorum floccoso-ferrugineo-tomentosis mox glabratis, foliis alternis digitatim 6–8-foliolatis, foliolis longe petiolulatis ovatis acuminatis, irregulariter subduplicato-serratis, stipulis binis linearibus denticulatis cum petiolo basi connatis, racemos elongatis in apice ramorum clavato spongiose tumido, congestis, floribus solitariis pedicellatis viridescentibus, basi bracteatis.

1. *S. Angolense*, Seem. Tab. XXVI.—Habitat in sylvis humilioribus distr. Ambaca et juxta ripas Rivi de Luxillo et fluminis Cuanza, locis minus humidis, 2400–3800 ped. alt. (Welwitsch! Iter Angol. n. 479, 480.)

Petiole about 1–1½ ft. long, at the insertion of the petiolules with a tuft of brown hair. Leaflets coriaceous, green, shining, 3–5 inches long, 2½–3 inches broad; petiolule 1½–3 inches long. Stipules 1–1½ inches long. Racemes about 1½ feet long, scaly at base, the scales broadly ovate, acute or acuminate, and gradually merging into bracts; rhachis and bracts crowned with a short brown tomentum, afterwards glabrescent. Pedicels pubescent. Calyx and corolla glabrous.

Explanation of Plate XXVI., representing *Sphærodendron Angolense*.—Fig. 1. Portrait of the tree, from a sketch by Dr. Welwitsch. 2. One of the larger leaflets. 3. An entire flower. 4. Portion of the raceme in fruit. 5. A fruit (not quite ripe). 6. The same, cut across. Figs. 3, 4, 5, and 6, magnified.

III. AROIDEÆ NOVÆ, AUCTORE DR. H. SCHOTT.

1. *Sauromatum (?) Nubicum*, Schott. Vaginæ terminales 2, elongato-lanceolatæ, sparse maculatæ, 6–12 poll. longæ, pollicem vel sesquipollicem latæ, interior productior. Petiolus ultra vel bipedalis, immaculatus? Lamina fol. segmentis 7–11, lanceolato-ovatis vel oblongis basi arcuato-cuneatis, angustissima portione parenchymatis subapproximate confluentibus, apice acuminatis. Spatha . . . Spadicis appendix elongata, sensim attenuata, juxta ovaria organis neutris filiformibus longiusculis haud crebris obsita.

Hab. Sat rarum in fissuris rupium cavernæ magnæ dictæ Puri-

Cacarambola, districti Ambaca, et in Baranco da Pedra Songue, Præsidii de Pungo-Andongo (Welw. Iter Angol. n. 229).

Obs. Spadices jam mutilatos Octobr. invenit clariss. collector.

2. *Hydrosme Angolensis* (Welw. Iter Angol. n. 288). Folium adultum 4–5-pedale. Petiolus lævigatus, basi rubro-maculatus. Laminæ fol. segmenta cuspidato-acuminata. Pedunculus 6-pollicaris, tandem prolongatus, crassus, e viridi et purpureo variegatus. Spatha atropurpurea, late cucullata, subacuminata, margine undulata, intus basi hirtella, 11–12-poll. longa, spadice brevior. Spadix longissimus (sæpe bipedalis). Spica feminea subbipollicaris, mascula pollicaris; appendix teres proportione tenuis, atropurpurea.

Hab. In convallibus rupestribus montium Præsidii de Pungo-Andongo, sed rarius, florens Decemb. Jan. (Welw.).

3. *Richardia angustiloba*, Schott. Herba spectabilis, 4–5-pedalis. Petioli crassi, 2–2½-pedales, inferne vaginati, superne teretes. Lamina fol. hastata, lobo antico lanceolato, 20 poll. longo, 3 poll. basi lato, apicem versus sensim lineæ rectiusculæ angustato, posticis 5–7 poll. longis, sesquipollicem basi latis, sensim angustatis, exitu obtusulo subsursum curvulis, sinu lato triangulari profundiusculo distantibus, retrorso-extrorsis. Pedunculus elongatus.

Hab. Frequens in stagnis profundis inter Ins. Calemba et Quisonde, ad dextram fl. Cuanza, distr. Pungo-Andongo (Welw. Iter Angol. n. 230).

4. *Culcasia Angolensis* (Welw. Iter Angol.). Altissime scandens. Petioli vagina infra geniculum desinente prædíti, 5–8 poll. longi. Lamina fol. oblonga, late oblonga vel oblongo-elliptica, 9–12 poll. longa, 5–7 poll. lata, basi rotunda vel sæpius leviter cordata, apice rotundata vel arcuatim angustata, semper cuspidulo pollicari circiter aucta, supra lucida, subtus glauco-pallescens; inflorescentiæ primum in racemum contractum bracteatum collocatæ, tandem remotæ, racemum 6–7 poll. longum formantes; bracteis lanceolatis 3–4-pollicaribus, ¾ poll. latis, sensim acutatis; pedunculis firmis, erectis, 3 poll. longis. Spatha nivea vel albicans, cochleariformis, pollicaris vel sesquipollicaris. Spadicis spica feminea brevis, pauciflora, mascula leviter clavata, apice rotundata. Baccæ coccineæ, abortu interdum monospermæ.

Hab. Frequens in sylvis primævis totius districti Golungo-alto, in districto Pungo-Andongo minus frequens (Welw. Iter Angol. n. 239).

ON THE STRUCTURE AND AFFINITIES OF *CALLITRICHACEÆ*.

By B. Clarke, F.L.S., etc.

The species of *Callitriche* are small herbaceous plants, which are perhaps terrestrial rather than aquatic, as they grow more luxuriantly and produce much more seed out of the water on the margins of rivers and ponds, than when they grow immersed, and they will grow with their usual vigour and fruit abundantly in a flowerpot. In habit they resemble *Portulaceæ* and *Caryophyllaceæ*, *C. verna* when growing out of water being much like *Montia fontana*, and *C. pedunculata* when growing on banks becomes tufted, much like a *Sagina* or *Stellaria*, and in the venation of their leaves they also agree with *Caryophyllaceæ*.

They further agree with *Caryophyllaceæ*, and with the nearly allied *Tetragoniaceæ*, in the surface of their stems (especially when the plant grows out of the water) having a crystalline appearance, which is owing to its being covered with crystalline glands. These have been very accurately described by Dr. E. Lankester (Linn. Proc. vol. ii. p. 94), and require no further notice, and are in all probability, as he suggests, analogous to hairs. In *Tetragoniaceæ*, as in *Callitriche*, they occur thickly on the young branches, and more sparingly or scarcely at all on the leaves, and I have no doubt about their identity, those of *Tetragoniaceæ* differing in being globular, so that they have not the stellate appearance of those of *Callitriche*.

In *C. verna* there is a decided tendency in the flowers to become polygamous, as the stamen and ovary in the hermaphrodite flowers are neither of them smaller than usual. The stamen in the hermaphrodite flower is remarkable for being posterior without any inclination to either side, a very rare occurrence; and it is precisely hypogynous, the filament being attached partly to the receptacle, and in a slight degree to the base of the short stalk which supports the ovary. The anther has been described as having but 1 cell, but in *C. pedunculata* it is 2-celled, at all events nearly up to the period of maturity, so that the pollen can be removed from one of the cells, and the firm intervening membrane distinctly seen; in the 1-celled anther of *C. verna*, therefore, the two cells have become confluent. In its dehiscence, the anther of *C. verna* closely resembles that of *Campylostachys abbreviata*,

presenting a semilunar 1-celled appearance, as if the cells had become confluent, and this is equally remarkable in one species of *Stilbe*.*

The ovary is, as described by Prof. Babington, dicarpous, the dorsal suture of each carpel projecting inwards and uniting with the placenta, so as to make it 2-celled. The ovule is amphitropal, the raphe not being more than half its length, and what is remarkable it scarcely increases in length as the seed ripens, so that in the matured seed it is scarcely more than a fourth of the length of the seed itself; and another peculiarity is, that the nucleus and subsequently albumen incompletely distend the tunic at the upper part of the inner side next the placenta, and in the ripened seed a membranous portion of the tunic is left in that situation, like a portion of a wing. The radicle is distant from the hilum by nearly half the length of the seed, so that, together with the shortness of the raphe, the seed differs considerably from that of the *Euphorbiaceæ*, with which *Callitriche* has been compared. The embryo is nearly as long as the albumen and almost half its diameter, and the cotyledons are about one-third of the length of the embryo itself, so that in these characters it does not differ much from *Elatinaceæ* and *Caryophyllaceæ*. And another circumstance in which *Callitriche* agrees with *Elatinaceæ* is, that the achenium or half-carpel, when growing separately, so that it can take its natural form, becomes curved in the same manner as the seeds of *Elatine*. This curvature, as in other similar cases, is owing, there appears no reason to doubt, to the curvature of the seed, not of its carpellary covering.

It appears that botanists are undecided as to whether the ovule at the time of flowering has a coat, or consists only of a naked nucleus, Dr. Hegelmaier having very recently in his valuable monograph on *Callitriche* advocated the latter opinion. Whether a tunic is present at the earliest stage at which the ovule is distinctly visible I am unable to say, and take it for granted it is to that period at which the nucleus and tunic may not have become differentiated to which Dr. Hegelmaier alludes; but in *C. verna*, at that time which appears to be the flowering stage (the flowers being unisexual, the flowering stage in the female cannot be exactly defined) the ovule has a distinct, nearly transparent

* I have never been able to find any trace of a petal in the female flowers of these two genera, although of the latter I have examined some in an early stage, apparently some time before flowering. I therefore conclude that the female flowers of *Stilbaceæ* are apetalous, and this would diminish the distance between *Callitriche* and *Stilbe*.

coat, having the ordinary appearance of the external tunic where two (primine and secundine) are present, through which the nucleus, which is opaque, may be very distinctly seen. The foramen is also distinctly marked, having a slightly fringed or indented margin, and the canal leading from it to the pointed apex of the nucleus is in most instances visible. It is of an oval form, the foramen not being terminal but bent inwards towards the placenta, bringing to mind *Caryophyllaceæ*, and from the point of its attachment, which is near the middle, descends the short raphe. From this time up to the maturity of the seed this tunic is always distinctly visible, and, as before noticed, forms in the seed a small wing, extending from the hilum to the micropyle. The radicle does not point directly to the micropyle, the latter being halfway between it and the hilum.

The position of *Callitriche* appears to me to be between *Caryophyllaceæ* and *Elatineæ* on the one hand, and *Batideæ* on the other (as the ovary of *Batis* consists of 2 carpels, as in *Callitriche* right and left the axis, with 4 cells), and the latter being so near *Verbenaceæ* that it may almost be regarded as a section of that family (Trans. Linn. Soc. vol. xxii. p. 412), will account for the similarity of the ovary and ovule of *Callitriche* to that of the *Borragineæ*. In the stamen posterior this genus agrees with the *Podostemoneæ*, where in *Castelnavia* the two stamens are posterior; *Castelnavia* has also numerous glands on its flattened stems closely resembling those of this genus.

In the opinion of those botanists who would place *Callitriche* near *Haloragaceæ* I am unable to concur, for how can a genus having the single stamen posterior (in *Hippuris* it is anterior*) an ovary of precisely the same structure as *Borragineæ*, and having the same appearance, except that the walls are thinner, be well compared with *Haloragaceæ?* The ovule and seed also more nearly resemble those of the *Borragineæ* (especially where the cells are nearly erect and closely approximated) than those of any other family I recollect to have examined, except perhaps *Molluginеæ*, among which *Adenogramma* has an ovule attached by its side with a superior foramen. In both these the raphe, as in *Callitriche*, is next the placenta, but in *Hippuris* and other *Haloragaceæ*, as far as is known, it is lateral, and in the nearly-allied *Onagraceæ*, when

* In *Onagraceæ* the single stamen, if I remember correctly, has the appearance of being posterior, but the filament is clearly twisted half round the style, a singular phenomenon.

suspended, dorsal. The quantity of albumen is not large as the embryo is not slender, so that this character would not offer any material difficulty in comparing the seed with those of the families referred to.

NEW HOLLAND IN EUROPE.

A Lecture delivered by Dr. F. Unger, Professor of Botany in the Vienna University.

[In presenting this second important lecture of Professor Unger, translated from his 'Neu Holland in Europa' (8vo, Wien, Braunmüller), by the kind permission of the publisher, we have to offer our best thanks to Professor Unger and Chevalier Auer, the Director of the Imperial Printing Office, of Vienna, for the woodcuts and electrotypes by which it is illustrated.—Ed.]

New Holland and Europe—what a contrast! The former, an island in the uttermost corner of the earth, the latter, an integral part of a great, though much indented continent; the one in the south of our globe, the other in its antipodes in the north. But there are other contrasts yet. Amongst the countries and peoples of the world, New Holland ranks the lowest, Europe the highest. There nature is yet in her cradle, man scarcely distinguishable from the wild beasts; here is displayed the whole wealth of development, and mankind arrived at the highest state of cultivation, customs and speech; finally, there history is still an unwritten page, here a volume of joyful and sorrowful events, most honourable, on the one hand, most disgraceful to our race on the other. But enough of such antitheses. My introductory remarks were intended merely to show what disparity of things, what apparently irreconcilable contrasts are here united, ere I proceed to prove that New Holland exercised a decided influence on the formation of our much favoured continent, and, paradoxical as it may sound, contributed to make it what it is. My object in choosing "New Holland in Europe" for my theme was not to show how intimate is the intercourse sprung up between the two continents since the latter was discovered, how its numerous productions have raised it in our appreciation, or how intimate is the net woven by commerce and navigation

between the two; but a higher and more earnest one, one which touches the very marrow of the world's history. I shall show what part was played by that despised, decrepit, or scarcely born fifth quarter of the world, when the fate of the continents was decided for myriads of years. I shall show the venerable age of an island apparently cast aside as unimportant, and in what relation it stood to Europe,—if at that distant period we may speak of a continent of Europe. Finally, I will endeavour to prove, according to what grand and far-seeing plan the earth's surface was arranged in order to make not only room for the last born, but also supply the newly created with the means of rendering its existence subordinate to higher objects. In the time I speak of no decrepit Papuans wandered through the desolate and impoverished plains. When New Holland stood in the connection I allude to with Europe, the land was inhabited only by untamed animals, and the soil covered with plants, wild and luxuriant as they had issued from the hand of the Creator. The continent was youthful and vigorous, full of precious germs destined for distribution over the globe.

In constructing history which goes beyond human chronology, we are dependent upon the archives preserved in the bowels of the earth. Their use, comparison, and unriddling, form the most important of those preliminary studies which lead us to the creation itself. In offering myself as a guide, I must make a few explanatory remarks. Whenever we disturb the earth's surface, it is generally done to our advantage. We break stones, dig for earths, get coal, salt, sulphur, ore, etc., to enrich ourselves and make life comfortable. On such occasions it happened more than once, that along with the useful minerals objects came to light which not only excited our greatest surprise, but became, on closer examination, the surest basis for an acquaintance with the organisms of an entirely new world. The numerous shells, bones, teeth, horns, and other remains, have thus made us acquainted with animals no longer found among the existing Fauna. In the same way, a number of fossil or carbonified woods, leaves, fruits, and seeds, have introduced us to a set of plants which no longer grow on the globe, search it in whatever direction we may. By the labour of many eminent men, these otherwise useless materials have been collected and arranged, and Palæontology having thus been called into existence, a desire has arisen to make them available for the history of the successive geological epochs. Though the collections obtained from the

bowels of the earth are as yet incomplete, they have at all events allowed us to form some general views, and shown that the organic world of bygone geological periods was not a mere chaos of forms, but a development of life proceeding on a regular plan, of which the present creation constitutes the most perfect part. Amongst this series of existing and extinct vegetable forms is one to which I desire to draw special attention. It belongs to a comparatively early geological period, but to one which is apparently completely separated from former ones. It is the first in which organic forms came into existence, which could hardly be expected from those that preceded them, but which, for that very reason, became the foundation of an entirely new series of organisms. This has been termed the Eocene period, to indicate the dawn of the present order of things. I was much surprised when years ago I first began to study a collection of Eocene fossils. Accustomed to meet in the plants of the more recent periods, the only ones then examined, analogous European or closely related North American forms, I found here types peculiar to the southern hemisphere; and in my first attempts at determining them, hardly ventured to declare them related to those of New Holland and the adjacent islands.* But subsequent labours have constantly added to ourlist of these plants, and the finding of characteristic specimens has enabled us to render their determination more and more certain. A considerable number of them from different European localities are now accessible, and must be compared with the living Australian plants, with which they are so closely related.

Who does not know that New Holland and the neighbouring islands are characterized by a vegetation not met with in other parts of the earth? Several Natural Orders and genera of plants are there found in such overwhelming majority that the vegetation derives from them its distinguishing character. There are, amongst others, certain Myrtaceous plants—*Eucalypti*, or gum-trees—diffused over New Holland

* This view I first advanced publicly at Gratz in 1849, and afterwards in my 'Fossile Flora von Sotzka' (1850) in Denkschrift. d. Kais. Acad. d. Wissenschaften, Math. Naturw. Classe II., where I stated at p. 14, "The general character was tropical; the particular corresponded in surprising degree with that of the present Polynesian and New Holland flora, and required a mean annual temperature of 18° to 22° Réaum. The proof that the recent lignite flora had the characters of that of the southern parts of North America, I furnished in 1848, on publishing in the 'Steyermärk'sche Zeitschrift,' new series, ix., a synopsis of the 'Fossil Flora of Parschlug.'

in such numerous species, and the species are represented by such innumerable individuals, that they alone determine the features and the condition of the forests. The same remark applies to the countless multitude of those heath-like plants, the *Epacrids*, which are to New Holland what the *Ericas* are to the Cape of Good Hope. The peculiarity of these trees and shrubs, and their abundance, have induced botanical geographers to designate the extra-tropical parts of New Holland "the region of gum-trees and *Epacrids*." But these are not the only types characteristic of this quarter of the globe: the *Proteaceæ*, *Santaleæ*, *Monimiaceæ*, and *Anthoboleæ* are equally prominent. True, some of them have sent outposts to other continents; but their principal army is stationed in New Holland and the adjacent islands: the *Proteaceæ*, especially, are spread over the whole continent in numerous genera and species. Nor must we omit to mention as characteristic of New Holland several genera of *Leguminosæ* and *Coniferæ*. There are also numerous species of *Acacias*, with curiously enlarged leafstalks peculiar to the Australian types; and, amongst the *Coniferæ*, the genera *Araucaria*, *Podocarpus*, and partly *Callitris*.

Let us now see how far these characteristic plants of New Holland are represented in our European Eocene formation. Not only do we meet with several fragments of the polymorphous Order *Myrtaceæ*, but it is plain the genus *Eucalyptus* itself is represented amongst the fossils. Of several species, the peculiar leaves, as well as the fruit, have been found. The same is the case with the *Epacrids*, although as yet only a single leaf furnishes evidence of the former existence of this now widely-diffused Natural Order. But much more stress has been laid upon the *Proteaceæ* than the *Myrtaceæ* and *Epacrids* as the characteristic plants of the Eocene period. We have found of them different leaves, fruit, and seed, and are in a position to make out even certain genera, such as *Banksia*, *Dryandra*, *Hakea*, *Embothrium*, *Grevillea*, *Lomatia*, *Persoonia*, *Petrophyllum*, etc. Thus it would appear that the *Proteaceæ*, now constituting a principal part of the peculiar scrub-vegetation of New Holland, played a similar *rôle* during a former geological epoch of Europe. Greater stress has, however, to be laid—because the character of New Holland and the Southern Hemisphere is more especially determined by them—upon the presence of certain members of the Natural Orders *Santalaceæ*, *Anthoboleæ*, and the allied *Monimiaceæ*. I allude particularly to the genus *Leptomeria*, of which

several species, easily recognizable, have been discovered at Häring in the Tyrol, and in the lignite deposits of the lower Rhine. Closely related to these leafless shrubs is the Australian Cherry (*Exocarpus*), which, strange to mention, is found amongst the fossils at Radoboj. Nor must we omit to enumerate the genus *Laurelia*, which is peculiar to New Zealand and the mountains of southern Chili, and of which we possess highly characteristic fragments. All these specimens, imperfect though they be, make it evident that the flora of the Eocene period bore the characteristic features of the present Australian vegetation. But what am I to add about the *Coniferæ*, *Cupuliferæ*, *Casuarineæ*, *Araliaceæ*, *Leguminosæ*, etc.? Amongst the most common fossils of Sotzka and Häring are the branches of a coniferous plant which has its exact counterpart in the genus *Araucaria;* and *Araucaria*, as is well known, belongs exclusively to the Southern Hemisphere, New Holland and Norfolk Island possessing three [five] species. *Podocarpus*, *Libocedrus*, and *Callitris* may also be named as natives of the same hemisphere, and fragments of them are found in nearly all localities of the Eocene formation. Who does not know the *Casuarinas* of our greenhouses, and that those leafless, Equisetum-like, shadeless, and weeping trees are almost exclusively found in New Holland? They also seem to have been represented in prehistoric ages, although every doubt respecting their former existence is not yet removed. It is worthy of remark that amongst the numerous fossil Oaks of the Eocene period, there is one with the type peculiar to the Javanese ones of the existing vegetation, and that the dwarf Beeches of Tierra del Fuego, Chili, Van Diemen's Land, etc., of the present day probably also existed formerly. I could cite many more instances; but I will content myself with casting a look upon the widely-diffused and polymorphous class of *Leguminosæ*. As is well known, it is divided into several tribes, every one of which, preferring a certain climate, has selected this or that country as its principal dwelling-place. Amongst those with pea-flowers the *Dalbergieæ* and *Cæsalpineæ* are only met with in the tropics; the *Mimoseæ* form a considerable portion of the tree-vegetation of New Holland. Amongst the fossils of the Eocene formation, we have corresponding with them the genera *Pterocarpus*, *Drepanocarpus*, *Centrolobium*, *Dalbergia*, *Cassia*, *Cæsalpinia*, *Bauhinia*, *Copaifera*, *Entada*, *Acacia*, *Mimosa*, and *Inga*,—*Acacia* being perhaps most numerously represented.

After this review, showing what a considerable portion of the Australian and Polynesian flora was already represented by characteristic types in the Eocene vegetation, there can no longer be any doubt that *Europe stood in some kind of connection with that distant continent.* All now required is to determine more exactly their mutual relationship. Wherever in the investigation of natural phenomena we perceive similar or the same effects, we are justified by a recognized general law to ascribe them to similar or the same causes. A vegetation in Europe, bearing the same character as that of New Holland and the adjacent islands of the present day, compels us to admit that, at that geological period, a set of conditions prevailed in our continent similar to those under which the Australian flora at present exists. It is not conceivable that the climate and soil should have been the same as now, when our forests were formed by Arauracias instead of Pines, and our underwood of *Proteaceæ*, *Santaleæ*, etc. instead of Rhamni, Privets, and Hazels. We know but too well what peculiar conditions of temperature, light, moisture, etc., certain plants and whole groups of plants require, and how closely we are tied to certain rules in our cultivation of foreign plants. True, *Araucarias*, *Proteaceæ*, and *Epacrideæ* grow, at present, exceedingly well in Europe, but only when protected by glass, in a certain artificial temperature and light, and a well-prepared soil,—all calculated to approximate the exceptional conditions under which these plants are grown to those of their native country.* We may therefore conclude with good reason that the conditions which at present are produced artificially in order to grow these plants existed in the whole of Europe; in short, that *at the Eocene period Europe must have had a climate like that of New Holland at the present day.* I shall not enter into the details of these climatic conditions, the prevailing temperature, change of the seasons, the state of the atmosphere, the prevailing winds, and all the other causes which at present so strongly influence the vegetation of New Holland, and which, in a great measure, can give us some idea of those formerly existing in Europe.

* Professor Unger seems unaware that in the milder parts of Ireland and England many Australian plants grow well in the open air, and are uninjured by frost. Even at Kew there is a *Eucalyptus*, which was planted in 1845, and is now about twenty feet high, and which, without any protection, has stood twenty English winters uninjured by frost and snow. But these facts do not invalidate his general argument; on the contrary, they would rather tend to bear it out.—Ed.

But even by thus limiting the climate of Europe during the Eocene period we have not proved more than that this part of the world could possibly support a vegetation which required a much milder climate. To us it is more important to ascertain how the vegetation of a continent, situated at our very antipodes, could find its way hither. It is comparatively easy to account for the spreading of the plants of an adjacent milder climate to our northern zone, or to comprehend how the plants of a northern subtropical region came to us; but the occurrence of representatives of the southern hemisphere in the northern certainly demands a very peculiar set of conditions.

If not able to solve this geographical problem, I will, at all events, endeavour to advance its solution by studying geography, prehistoric geography though it be, by the assistance of botany. About a year ago I endeavoured to deal with a similar problem. It was necessary to explain how it came to pass that at a time when lignite was formed (*i. e.* in the Molasse or Miocene period, more recent than the one now spoken of) the plants agreed in such a striking manner with those of the southern parts of North America. An examination of this singular phenomenon showed that it can only be explained by assuming a direct connection of two continents now widely separated. Sufficient help was derived from geology to make this assumed connection probable, and, curiously enough, an ancient tradition about the sinking of the island of Atlantis came to our aid.*

But how does the case stand with respect to the connection of Europe and New Holland, at a period long previous to that of the Miocene? Has any continental connection between these two quarters of the globe been possible or probable? Are there any proofs similar to those by which we supported the former connection between Europe and America? None whatever; moreover, geological investigations respecting this point are still so unsatisfactory that we gain no support from them in this instance. We are here in the same predicament as in that question; to explain a contemporaneous and homologous vegetation in two such extensive corners of the globe nothing remains but to assume the existence of several centres of creation, or the transmission from one locality to the other of the greater part of these

* 'The Sunken Island of Atlantis,' Journ. of Bot. 1865, p. 12. I must here draw attention to an important historical paper bearing on the subject, "Amerikas Entdeckung im Alterthum," in Krüger's 'Nordische Blätter,' 1858, pp. 213–263.

plants over land and sea. By adopting the first alternative we have to assume that, at the same geological period, New Holland as well as Europe produced the germs of identical, or very nearly identical plants. An identity of climate, which, under any circumstances, must be granted, would seem to settle the question by the adoption of this hypothesis in the most simple manner. And why should not similar, or even perfectly identical plants originate in two or several parts of the globe, provided external circumstances are favourable? Theoretically speaking, there is, indeed, nothing to oppose to this, provided that the origin of species is brought about exclusively by external circumstances. But we are led to quite an opposite view by what we know of the distribution of existing plants. We know that every species—as a collection of countless individuals related by their mutual descent—was originally more or less confined to a circumscribed space, whence it spread centrifugally. However extensive the range of certain plants may be, it has always a well-defined limit, beyond which the species seldom ventures in isolated patches. Wherever we do meet with such exceptional cases, similar to those of the enclaves in the distribution of languages, we have no difficulty in recognizing in them intruders, or as parts cut off from the principal stock, and geology has already, in some respects, accounted for the cause of this dismemberment. But not a single species has as yet been found occupying two distinct territories which are evidently the result of two centres of creation. These facts justify us in rejecting the proposition of a contemporaneous origin of identical or nearly identical species, in two countries most widely separated from each other, and that of a common origin of the floras of Europe and New Holland. Nothing remains but to assume that either the New Holland plants emigrated to Europe, or (what is less probable) the former European plants which had an Australian character passed from Europe to New Holland.

Wandering is the destiny of mortals. If man or beast are compelled to leave their native place, their organization and the nature of surrounding circumstances easily supply us with an intelligible reason for the act. But it is more difficult to account for the migration of plants, intimately connected as they are with the soil; and if, nevertheless, we find them effecting a migration from one continent to the other, it can only be the result of a tendency belonging less to the individual than to the whole species, desirous to preserve its existence. If it be inter-

esting to trace the migrations of different races of men and animals, it is not the less so to watch the distribution of plants. I need scarcely quote, as a curious fact, that at present a considerable number of European plants grow in New Holland, and that many of them existed there even before it was discovered by us. If these could find their way thither across the equator, we can easily understand how New Holland plants could pass to us before vessels began to navigate between the two continents. What currents, winds, and migratory animals can effect in this respect has been substantiated by superabundant evidence. Long ago, nature established a telegraphic intercourse over the globe, by means of which she not only makes known her decrees, but effects her necessary postal communications; and if amongst the cosmopolitan plants there are so many lower Cryptogams propagated by minute light spores, we cannot long remain in doubt about the agents that lent a helping hand to these colonists. But even this, as everything else in this world, has its limit; and it would be unwise to think that by these means alone we could explain the whole distribution of plants. Oceans and larger basins of water offer, indeed, great obstacles to the spreading of terrestrial plants, though they may be instrumental in carrying fruits and seeds. But experience has taught us that the transportation effected by waves and currents is, at best, confined to only a limited number of plants which can bear the ill effect of water without losing their vitality, and which, on their arrival on foreign shores, meet with such conditions as are essential to their existence. It is evident that amongst the numerous species composing the flora of a country, there can only be a very few which are able to overleap the boundaries of their natural range.

But all this does not explain how the peculiarities of a whole flora can reappear in far distant countries. If, therefore, we find in the Eocene flora of Europe principally plants bearing the characters of those of Australia and Polynesia, we can hardly believe that the whole of them could have passed uninjured across Torres Strait to New Guinea, the Moluccas, etc., to Asia, and thence to Europe. On the contrary, to render this singular fact somewhat intelligible, we shall be compelled by the above-quoted observations, not only to assume a closer connection of the different Polynesian islands with Australia, but also a continental connection of them with Asia by way of the Moluccas. It is, therefore, not by means of the strait between the

coral reefs, but by means of a continental highway that existed in the same place, that the *Araucarias*, *Proteaceæ*, *Santaleæ*, and numerous other arboreous and herbaceous plants still undetermined, reached our continent, where, after myriads of years, they are still preserved as fossils. The continental connection of Australia and Europe during the Eocene period is consequently a necessary assumption. But supposing that the highway indicated had been sufficiently practicable to permit masses of emigrants, to whom their native land in the south had become too limited, to reach Europe, the problem still remains, how did it come to pass that they could make so difficult a journey, extending over thousands of years, without obtaining on foreign Asiatic soil conditions favourable to their existence? Unfortunately, the geological investigations of that continent do, as yet, not enable us to make even a surmise, but it is certain the ranks of these Australian emigrants were increased in Asia by a number of species which continued with them their onward march to Europe,—at that time, it should be remembered, not a cold country. In order to make my meaning clearer, I must state an important fact. It would be erroneous to believe that the Eocene beds contain only plants having an Australian character. Though such predominate, they are accompanied by species which must have originated in a country far distant from Australia. We are forced to this conclusion from finding the genera and species allied to them only in Asia. Amongst such plants as are as characteristic of the latter continent, as Gum-trees, Araucarias, *Proteaceæ*, etc., are of New Holland, I instance the widely-diffused species of *Glyptostrobus* (*G. Europæus*, Brongn., and *G. Œningensis*, A. Braun), both of which but slightly differ from the species indigenous to Southern China (*G. heterophyllus*, Endl.). Of decidedly Asiatic origin are the species of *Ailanthus*, occurring in the Eocene beds of Europe, of which two have been found (*A. Confucii*, Ung., in Radoboj, and *A. Gigas*, Ung., in Sotka), whilst at present only four species exist, all of which (*A. excelsa*, Roxb., *Malabarica*, DC., *Moluccana*, DC., and *glandulosa*, Desf.) are natives of Asia. *Planeria Ungeri*, Ett., widely diffused in the Eocene and even in more recent beds, must also be regarded of Asiatic origin; and we have further to add several Figs, Oaks, Laurels, *Leguminosæ*, and others. This shows incontrovertibly what I have already maintained, that the highway by which the New Holland plants passed to Europe led through Asia, and that

they found in that continent, probably then little developed, additions to their numbers.

But Europe of the Eocene period received the plants which spread over its mountains and plains, valleys and river-banks, neither exclusively from the south nor from the east. The west also furnished additions, and if these were at that period rather meagre, they show, at all events, that the bridge was already building, which, at a later period, was to facilitate communication between the two continents in such a remarkable manner. At that time some plants of the western continent began to reach Europe by means of the island of Atlantis, then probably just rising above the ocean. The numerous Hickories, Maples, Oaks, Poplars, *Nyssaceæ* and *Papilionaceæ*, etc., can have reached us only from a western centre of creation. Europe thus became in all probability the furthest limit attained by the outposts and colonists of three great centres of creation, situated at about equal distances from each other, and the place where they met and amalgamated with each other. Europe, without being a centre of creation, thus received the impress of the peculiarities of three great continents. In returning now to my original theme, "New Holland in Europe," it will be evident with what show of reason I could speak of a conquest of Europe by the army of a continent so distant. But, with equal justice, the same may be said of Asia and America; they, too, have visited Europe, have made themselves at home there, and impressed upon it their characteristics, though their occupation, strictly speaking, took place only after the Australian had ceased. The former conquest, besides the interest attaching to its being the first, is remarkable and venerable also by its being effected by organisms which had made their first appearances in the world, and which in comparison to their predecessors were more highly developed,—for the vegetation of New Holland, as mentioned, belongs to the great modern geological period.

But, however it was that the whole of Australia gained its influence and extended it so far north, it has a deep significance for New Holland, now cut off from all continental connection, than is generally supposed. Australia, on account of its isolated geographical position, strange productions, curious physical character, and the low degree of development attained by its flora and fauna, must not be regarded as a new, hardly-born island, but as a country in its senility, which from time immemorial has endeavoured to retain its character unchanged. New

Holland may be likened to an old man, rather than to a child; it does not begin to breathe and to live; on the contrary, it has lived and toiled, and is tottering towards the grave. This is indicated, not only in its flora and fauna, but also in the geological peculiarities of the country. None of the newer formations, so widely diffused over Europe, cover its extensive primitive rocks; and its older deposits, principally consisting of layers of carboniferous sandstone and porphyry, are horizontal and undisturbed. No revolutions have swept over its surface since it rose from the ocean; and for that reason the greater portion of the country still looks most like the bottom of the sea.* On the other hand, there is a phenomenon plainly indicating that the country has done playing its part, and must now prepare for vast changes. The whole of New Holland is surrounded by coral reefs, those buildings of sinister Naiades, which slowly but surely drag their victims to their watery habitation. It is known that these reef-building corals grow only in considerable masses where the ground is gradually sinking. If there were no other sign, these coral-banks surrounding the continent and islands would point to changes in the level; and, from what the smaller Polynesian islands already have undergone, the future of New Holland, viz. a dissolution of the continent into groups of islands, might be predicted. But the entire condition of the country, the desert-like character of the interior, the great number of salt-lakes, the rivers terminating in swamps, etc., indicate an approaching geological change, which, however—let the settlers take comfort—may not take place for some thousands of years. However, this much is certain—New Holland has played out its part in the physical history of the world.

How at one time it acted in Europe, covered and fertilized the soil, prepared it for further development, and brought as it were that newly-born continent into the society of the others, and thus commenced its history, would be points worth considering if the necessary data

* Ch. Sturt's 'Two Expeditions into the Interior of Southern Australia,' etc., vol. i. p. 80, describing the country about Darling, says:—"The central space forms a large basin, in which there are stunted Pines and Eucalyptus shrub, amid huge fragments of rocks. It rises like an island from the midst of the ocean, and as I looked upon it from the plains below, I could, without any stretch of the imagination, picture to myself that it really was such. Bold and precipitous, it only wanted the sea to lave its base; and I cannot but think that such must at no very remote period have been the case, and that the immense flat we have been traversing is of comparatively recent formation."

were not almost entirely wanting. Unfortunately, we poor mortals did not arrive at the world's stage until the last cosmic act, and as all the lights have been put out we can only grope about in the dark. And yet to man there is nothing more attractive than to speculate on his own fate, the history of the planet to which he belongs, and the soil of which he seems to be part and parcel. Nearly every nation preserves amongst its religious teachings a kind of genesis and theogony, to which it clings with all the tenacity of which human nature is capable. Geology, as a science, has also this problem at heart, and for its solution has impressed all other sciences into its service. The object is a grand, comprehensive, and profound one, worthy of the human intellect. Even my short reflections on the cosmic position of New Holland belong to this category. Investigations on a more extended scale are, however, needed to decide which of them are sound, and I content myself with submitting them merely as an attempt.

APPENDIX I.—*List of all those plants hitherto* (1861) *discovered in the Eocene formation having analogous species in New Holland or any other part of the southern hemisphere.*

In publishing, for completeness' sake, this list, I do not endorse the whole of the species enumerated; on the contrary, I hold at least one-half of them to be unsound, and it is to be regretted that the merest fragments are now so confidently referred to established genera. This is one of the great drawbacks of palæontology, and somewhat justifies botanists in turning away from a young science destined to play such an important part in elucidating the genesis of plants. It is impossible to say what discoveries may yet be made to complete the *disjecta membra* of some genera, or how far human acuteness may provide the means of clearing up the obscurities by which the subject is surrounded.

Fossil Species, and Localities in which they are found.	*Analogous Living Species and their Native Country.*
FILICES.	
Blechnum Braunii, Ett.; Monte Promina.	*Blechnum strictum*, R. Br.; N. Holland.
NAIADEÆ.	
Sphenophora crassa, Mass.; Monte Pastelio, Verona.	
S. gracilis, Mass. (*S. Ettingshauseni*, Mass.; *Flabellaria raphifolia*, Ett.)	
S. lacisioides, Mass.	

MISSOURI BOTANICAL

Caulinites rhizoma, Mass.; Monte Pastelio, Verona.
C. Catuli, Mass.
C. Loipopytis, Mass.
C. articulatus, Ett.; Häring.

PANDANEÆ.

Palæokeura Pellegriniana, Mass.; Verona.

CONIFERÆ.

Araucarites Sternbergi, Göpp.; Sotzka, Häring.
Podocarpus eocenica, Ung.; Sotzka, Wetterau, Kumi, Novale, Switzerland.
P. oceanica, Ett.; Häring.
P. Taxites, Ung.; Sotzka, Häring, Rhenish Browncoal.
P. Hæringiana, Ett.; Häring.
P. Apollinis, Ett.; Häring.

Araucaria excelsa, R. Br.; Norfolk Island.
Podocarpus nubigena, Lindl.; Chili (Cordilleras).

P. spicata, R. Br. (*P. ferruginea*, Don); New Zealand.

PODOSTEMEÆ.

Podostemon Europæum, Ung.; M. Bolea.

Podostemon sp.; Madagascar.

CASUARINEÆ.

Casuarina Haidingeri, Ett.; Häring.*

Casuarina sp.; N. Holland.

CUPULIFERÆ.

Fagus pygmæa, Ung.; Kumi.
F. Chamæphegos, Ung.; Kumi.
Quercus Palæolobium, Ung. (*Palæolobium grandifolium*, Ung.); Häring.

Fagus obliqua, Mirb.; Chili.
F. Cunninghamii, Hook.; Tasmania.
Quercus induta, Blume; Java.

NYCTAGINEÆ.

Pisonia eocenica, Ett.; Häring, Sotzka, Sagor, Monte Promina.

Pisonia Brunoniana, L.; Norfolk Island.
P. aculeata, Linn.; Tropical America.

MONIMIACEÆ.

Monimia anceps, Ett.; Häring.
M. Hæringiana, Ett.; Häring.
Laurelia rediviva, Ung.; Radoboj.

Monimia ovalifolia, Ett.; N. Holland.
Laurelia Chilensis, Pöpp.; Chili, New Zealand.

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* *Casuarina tertiaria*, Heer = *Liquidambar Europæum*.

SANTALACEÆ.

Santalum osyrinum, Ett.;* Häring, Sotzka, Monte Promina.	*Santalum lanceolatum*, R. Br.; N. Holland. *Osyris* sp.
S. salicinum, Ett.; Häring, Sotzka, Sagor, Monte Promina.	*Santalum obtusifolium*, R. Br.; N. Holland. *S. Preissianum*, Miq.
S. acheronticum, Ett. (*Vaccinium acheronticum*, Ung.); Sotzka, Häring, Sagor, Monte Promina, Parschlug, Radoboj, Erdöbénye.	*Osyris arborea*, Wall.; E. Indies.
S. microphyllum, Ett.; Häring.	*Santalum* sp.; N. Holland.
Leptomeria distans, Ett.; Häring.	*Leptomeria acida*, R. Br.; N. Holland.
L. gracilis, Ett.; Häring.	
L. flexuosa, Ett.; Häring.	*L. squarrulosa*, R. Br.; N. Holland. *L.* n. sp.
L. Œningensis, Heer; Oeningen.	
L. divaricata, Wess and Webb.; Rhenish Braunkohle (Rott).	None of the existing species.
Perhaps not a distinct species.	

ANTHOBOLEÆ.

Exocarpus Radobojanus, Ung.; Radoboj.	*Exocarpus cupressiformis*, Labill.; N. Holland (Fremantle).

PROTEACEÆ (Nucamentaceæ).

Petrophiloides oviformis, Bowerb.; Sheppey.	*Petrophila*, sp.; *Isopogon*, sp.
P. Richardsoni, Bowb.; Sheppey, Monte Promina.	
P. cylindricus, Bowb. (*P. conoideus*, *P. ellipticus*, *P. cellularis*, Bowb.); Sheppey.	
P. imbricatus, Bowb.; Sheppey, Sotzka.	
Protea lingulata, Heer; Switzerland.	*Protea mellifera*, R. Br. (*P. conifera*, *P. saligna*); N. Holland.
P. linguæfolia, Web.; Rhen. Braunkohle (Rott).	*P. lepidocarpa*, N. Holland. (*P. melifera.*)
Conospermum Sotzkianum, Ett.; Sotzka.	*Conospermum longifolium*, Smith.
Cenarrhenes Haueri, Ett.; Sagor.	*Cenarrhenes nitida*, R. Br.; New Zealand.

* An Banksia?

Persoonia Radobojana, Ung.; Radoboj, Hauenstein (Styria).	*Persoonia*, n. sp.; N. Holland (Swan River.)
P. Myrtillus, Ett.; Sagor, Häring.	*P. myrtilloides*, Sieb.; N. Holland.
P. Daphnes, Ett.; Haring, Pochlowitz (Bohemia).	*P.* sp.; N. Holland.
P. cuspidata, Ett.; Sagor.	*P.* sp.
P. fima, Heer; Switzerland.	*P. daphnoides*, A. Cunn.; N. Holland.
P. laurina, Heer; Switzerland.	*P. daphnoides*, A. Cunn.; N. Holland.
P. incerta, Mass.; Salcedo (Vincent).	
P. Veneta, Mass.; Salcedo.	
P. deperdita, Mass.; Salcedo.	

PROTEACEÆ (Folliculares).

Grevillea macrophylla, Heer (*Conospermum macrophyllum*, Ett.); Sotzka, Sagor.	*Conospermum longifolium*, Sm.; N. Holland.
G. lancifolia, Heer; Switzerland.	*Grevillea oleoides*, Sieb.; N. Holland.
G. Hæringiana, Ett.; Häring, Switzerland (Rallingen), Kumi.	*G. planifolia*, R. Br.; N. Holland.
G. Jaccardi, Heer; Switzerland (Locle).	*G. oleoides*, Sieb.; N. Holland.
G. Reussii, Ett. (*Salicites angustus*, Reuss); Bohemia (Kreideform).	*G. oleoides*, Sieb.; *G. planifolia*, R. Br.; *G. linearis*, R. Br.; N. Holland.
G. grandis, Ett. (*Dryandroides grandis*, Ung.); Sotzka, Kumi.	*G. longifolia*, R. Br.; N. Holland.
Hakea Germari, Ett.; Borustedt, near Eisleben.	*Hakea saligna*, Kn. et Sal.; N. Holland.
	H. ceratophylla, R. Br.
H. exulata, Heer; Switzerland.	*H. florida*, R. Br.; N. Holland.
H. Gaudini, Heer; Switzerland.	*H. florida*, R. Br.; N. Holland.
H. pseudonitida, Ett.; Vienna.	*H. florida*, R. Br.; *H. nitida*, R. Br.; N. Holland.
	H. oleifolia, R. Br.; N. Holland.
H. stenocarpifolia, Ett.; Sagor.	*H. dactyloides*, R. Br.; N. Holland.
	H. elliptica, R. Br.; N. Holland.
H. plurinervia, Ett.; Häring.	*Stenocarpus salignus*, R. Br.; N. Holl.
H. Myrsinites, Ett.; Häring.	*Hakea oleifolia*, R. Br.; N. Holland.
H. lanceolata, Web.; Rott, Orsberg, Kumi.	*H. linearis*, R. Br.; N. Holland.
	H. oleifolia, R. Br.; N. Holland.
H. acanthina, var. *horrida*, Mass.; Chiavon.	
Lambertia extincta, Ett.; Sagor.	*Lambertia uniflora*, R. Br.; N. Holland.
Rhopala anemeifolia, Heer; Switzerland (Monod).	

Helicia Sotzkiana, Ett.; Sotzka.	*Helicia robusta*, Wall.; E. Indies, Oceanic Islands, Java, Amboina, Philippine Islands. *H. obovata*, R. Br. *H. Moluccana*, Blum.
Knightia Nimrodis, Ett. (*Quercus Nimrodis*, Ung.); Sotzka.	*Knightia*, sp.; N. Holland.
Embothrites borealis, Ung.; Sotzka. *E. leptospermus*, Ett.; Häring. *E. macropterus*, Ett.; Sagor. *Embothrium salicinum*, Hr. (*Sapotacites lanceolatus*, Ett.; *Santalum salicinium*, Ett.; *Andromeda tristis*, Ung.); Sotzka, Häring, Oeningen, Kumi. *E. stenopterum*, Heer; Switzerland (Locle).	*Embothrium*, sp.; N. Holland. *E. salignum*, R. Br.; N. Holland.
E. stenopterum, Heer; Switzerland (Locle).	
Lomatia Græca, Ung.; Kumi.	*Lomatia linearis*, R. Br.; N. Holland. *Hakea ceratophylla*, *H. linearis*, R. B.
L. oceanica, Ett.	*Lomatia polymorpha*, R. Br.; N. Holland.
L. Pseudoilex, Ung.; Sotzka. *L. synaphæfolia*, Ung.; Sotzka. *L. Swanteviti*, Ung.; Sotzka, Kumi. *L. fraxinifolia*, Heer; Switzerland. *L. reticulata*, Ett.; Häring.	*L.* sp.; N. Holland. *Synaphæa*, sp.; N. Holland. *S.* sp.; N. Holland. *S.* sp.; N. Holland.
L. Bolcensis, Ung.; Monte Bolca. *Banksia Ungeri*, Ett. (*Myrica Banksiæfolia*, Ung.; *M. speciosa*, Ung.); Häring. *B. longifolia*, Ett. (*Myrica longifolia*, Ung.; *M. Ophir*, Ung.); Sotzka, Häring, Sagor, Monte Promina, Fohnsdorf, Switzerland (Lausanne, Rallingen), Rhine (Orsberg, Rott), Kumi.	*L. tinctoria*, R. Br.; N. Holland. *Banksia oblongifolia*, Cav.; N. Holland. *B. littoralis*, R. Br. *B. spinulosa*, Smth; N. Holland. Gregariously on dry hills and arid heaths, on the eastern coast.
B. Morloti, Heer; Switzerland (Monod.) *B. cuneifolia*, Heer; Switzerland (Rivaz). *B. Deikeana*, Heer; Switzerland (St. Gallen). *B. Helvetica*, Heer (? *Santalum osyrinum*, Ett.); Switzerland (St. Gallen, Rallingen, Rochette).	*B. integrifolia*, Linn. fil.; N. Holland. *B. integrifolia*, B. Br.; N. Holland. ? ?

B. Valdensis, Heer; Switzerland (Monod).

B. Laharpii, Heer; Switzerland (Monod.)

B. Hæringiana, Ett. (*Myrica Hæringiana*, Ung.); Häring, Sotzka, Sagor.

B. prototypos, Ett.; Nieder-Schöna near Freib. in Saxony.

B. parvifolia, Ett.; Parschlug, Radoboj.

B. basaltica, Ett.; Bilin (Bohemia).

B. dillenioides, Ett.; Monte Promina, Häring.

B. Græffiana, Heer; Switzerland.

B. Orsbergensis, Wess. and Web. (related to *B. longifolia*); Orsberg (Rhen. Br.).

B. Solonis, Ung.; Kumi.

Dryandra macroloba, Wess. and Web.; Orsberg (Rhen.).

D. panacifolia, Vis.; Monte Promina.

D. antiqua, Ett. (*Comptonites antiquus*, Nills.); Sweden (Greensand)

D. pteroides, Ett.; Comen, near Trieste (Chalk).

D. Vindobonensis, Ett. (*Myrica Vindobonensis*, Heer); Inzersdorf, near Vienna.

D. Bilinica, Ett.; Bilin.

D. Schrankii, Heer (*Aspleniopteris Schrankii*, Stbg.; *Comptonia dryandræfolia*, Brong.; *C. brevifolia*, Brong.); Häring, Switzerland, Eperies, Monte Promina, Armissan, Gergovia (near Clermont), Orsberg (Rhine).

D. Brongniarti, Ett.; Bilin, Fohnsdorf, Komotau, Brix, Oberleitersdorf.

D. acutiloba, Ett. (*Comptonia acutiloba*, Brong.)

D. Meneghinii, Ett. (*Comptonia Meneghinii*, Ung.); Monte Bolca.

B. attenuata, R. Br.; N. Holland.

B. collina, R. Br.; N. Holland.

B. attenuata, R. Br.; N. Holland.

B. marginata, R. Br.; N. Holland.

B. latifolia, R. Br.; N. Holland.

B. serrata, Linn.; N. Holland.

B. dillenifolia, Kn. et Salis.; N. Holland.

B. spinulosa, Smth.; N. Holland.

B. serrata, R. Br.; N. Holland.

B. sp.; N. Holland.

Dryandra Brownii, Meiss.; N. Holland.

D. floribunda, R. Br.; N. Holland.

D. quercifolia, R. Br.; N. Holland.

D. formosa, R. Br.; N. Holland.

Banksia speciosa, R. Br.; N. Holland.

Dryandra Braxteri, R. B.; N. Holland.

D. nervosa, R. Br.; N. Holland.

D. obtusa, R. Br.; N. Holland.

D. plumosa, R. Br.; N. Holland.

D. Œningensis, Ett. (*Comptonia Œningensis*, Ung.; *Myrica Œningensis*, Heer); Oeningen, Parschlug.	*D. floribunda*, R. Br.; N. Holland. *D. cuneata*, R. Br.; N. Holland.
D. Ungeri, Ett. (*Comptonia dryandroides*, Ung.; *Myrica Ungeri*, Heer); Sotzka.	*D. armata*, R. Br.; N. Holland.
D. Sagoriana, Ett.; Sagor.	*D. longifolia*, R. Br.; N. Holland.
D. aventica, Heer; Switzerland (Avenches).	
D. Rolliana, Heer; Eibiswald (Styria).	
D. scutellata, Ung. (*Quercus scutellata*, Wess.); Lower Rhine.	
D. Gaudini, Heer; Switzerland.	
D. Chironis Massal., Heer (*Comptonia Chironis*, Mass.*); Novale (Vicentin.).	
Dryandroides concinna, Heer; Switzerland (Locle).	
D. undulata, Heer; Switzerland (Locle).	
D. lepida, Heer; Switzerland (Locle).	
D. brevifolius, Ett.; Häring.	*Cenarrhenus nitida*, R. Br.; N. Holl. *Brabejum stellatifolium*, Linn. *Grevillea longifolia*, R. Br. *Hakea nitida*, R. Br.
D. acuminata, Ett. (*Myrica acuminata*, Ung.); Häring, Sotzka, Switzerland.	
D. lignitum, Ett. (*Quercus lignitum*, Ung.); Parschlug, Oeningen, Switzerland, Kumi, Monte Pastelio (near Verona).	*Dryandra* sp.; N. Holland. *Lomatia longifolia*, R. Br.; N. Holl. *Banksia integrifolia*, L.; N. Holl.
D. serotina, Heer; Switzerland (Locle), Oeningen.	
D. Banksiæfolia, Heer (*Myrica Banksiæfolia*, Ung.; *M. speciosa*, Ung.; *Dryandroides angustifolia*, Ung.; *Banksia Ungeri*, Ett.); Sotzka, Häring, Sagor, Switzerland, Rott, Kumi, Pastelio (Verona).	*B. oblongifolia*, Cav.; N. Holland. *B. littoralis*, R. Br.; N. Holland.
D. hakeæfolia, Ung.; Sotzka, Switzerland (Rivaz, Rochette, Upper Rhone, Rüfi), Häring.	*Hakea ceratifolia*, R. Br.; N. Holl. *Lomatia longifolia*, R. Br.; N. Holl. *Banksia littoralis*, R. Br.; N. Holl.

* Belongs to *Juglans stygia*, Vis. and Mass. = *Rhus stygia*, Mass.

	B. attenuata, R. Br.; N. Holland.
D. laciniatus, Ett. (*Comptonia laciniata*, Ung.); Parschlug, Radoboj.	*B.*, or *Dryandra* sp.; N. Holland.
D. elegans, Ett.; Sagor.	*B.*, or *Dryandra* sp.; N. Holland.
D. grandifolius, Ett. (*Comptonia grandifolia*, Ung.); Radoboj.	*B. grandis*, Willd.; N. Holland.
D. lævigata, Heer; Switzerland (Monod, Rochette).	
D. arguta, Heer; Switzerland (St. Gallen).	
D. linearis, Heer (*Salicites stenophyllus*, Ett.); Switzerland (Rivaz).	

EPACRIDEÆ.

Epacris Sesostris, Ung.; Radoboj.	*Epacris Gunnii*, H. F.; New Zealand.

ARALIACÆ.

Panax longissimum, Ung.; Sotzka, Häring.	*Panax simplex*, Forst. [*longissimum*, Hook. fil.]; New Zealand.

SAXIFRAGEÆ.

Weinmannia microphylla, Ett.; Häring.	*Weinmannia glabra*, DC.
W. paradisiaca, Häring.	*W. sylvicola*, New Zealand.
Centropetalum Hæringianum, Ett.; Häring.	*Centropetalum gummiferum*, Sav; N. Holland.
	C. arbutifolium, *C. apetalum*.
Callicoma Pannonica, Ung.; Eperies.	*Callicoma serratifolia*, R. Br.; N. Holland.
Cunonia Europæa, Ung.; Radoboj.	*Cunonia Capensis*, Thunb.; Cape of Good Hope.

STERCULIACEÆ.

Sterculia Labrusca, Ung.; Sotzka, Sagor, Monte Promina, Bilin, Sinigaglia, Monte Bolca.	*Sterculia diversifolia*, G. Don; N. Holland.

PITTOSPOREÆ.

Pittosporum Putterlicki, Ung. (*Proteoides Radobojanus*, Ett.); Kumi, Radoboj.	*Pittosporum Neelgherense*, Wight and Arnott; E. Indies.
P. Fenzli, Ett.; Häring, Sagor, Sotzka.	*P. eugenioides*, Cunn.; New Zealand.
P. ligustrinum, Ung.; Kumi.	*P.* pl. sp.; N. Holland, E. Indies.
	P. ligustrifolium, Al. Cunn.; N. Holland.
P. tenerrimum, Ett.; Häring.	*P. tenuifolium*, Banks; New Zealand.
	P. crenatum, Putt.; New Zealand.

MYRTACEÆ.

Eucalyptus Radobojana, Ett.; Radoboj.	*Eucalyptus*, pl. sp.; N. Holland.
E. Ægea, Ung.; Kumi.	
E. Hæringiana, Ett.; Häring.	
E. oceanica, Ung.; Sotzka, Häring, Sagor, Monod, Thalheim, Sinigaglia, Salcedo, Chiavon, Novale, Pastelio (Verona).	*E.* pl. sp.; N. Holland.
Myrtus oceanica, Ett.; Häring.	
Eugenia Apollinis, Ung.; Häring, Sotzka, Sagor, Monte Promina.	*Eugenia Sinensis;* Asia, N. Holland.
Metrosideros Calophyllum, Ett.; Häring.	
M. extincta, Ett.; Häring.	
Callistemophyllum melaleucæforme, Ett.; Häring, Sotzka, Sagor, Monte Promina.	*Callistemon glaucum*, DC.; N. Holland.
C. diosmoides, Ett.; Häring, Sotzka, Monte Promina.	*C. salignum*, DC.; N. Holland.
	Melaleuca and *Callistemon* sp.; N. Holland.

PAPILIONACEÆ (Dalbergieæ).

Dalbergia primæva, Ung.; Sotzka, Sagor, Monte Promina.	*Mezoneurum Cummingianum*, Fenzl; Philippine Islands.
D. Hæringiana, Ett.; Häring.	
Pterocarpus Italicus, Ung.; Bologna.	
Centrolobium giganteum, Göpp., sp. Silesia.	*Centrolobium*, sp.; Brazil.
Drepanocarpus Bolcensis, Ung. (*D. Dacampii*, Mass.); Monte Bolca.	
Cassia Berenices, Ung.; Sotzka.	*Cassia corymbosa*, Lam.; S. America.
C. Phaseolites, Ung.; Sotzka, Häring.	*C. macranthera*, DC.; Brazil.

PAPILIONACEÆ (Cæsalpinieæ).

Cæsalpinia eocenica, Ung.; Monte Bolca.	
Copaifera Radobojana, Ung.; Radoboj, Kumi.	
Bauhinia destructa, Ung.; Radoboj.	

MIMOSEÆ.

Entada Polyphemi, Ung.; Sotzka.	*Entada* sp.
Acacia microphylla, Ung.; Sotzka.	*Acacia fruticosa*, Mart.; Brazil.
A. Sotzkiana, Ung.; Sotzka.	*A. fallax*, E. Mey.; Southern Africa.
A. bisperma, Ung.; Radoboj.	

Inga Novalensis, Ung. (*Juglans Novalensis*, Mass. and Vis.; Novale near Vicenza.
Inga spec.; Tahiti.
Mimosites Browniana, Bow.; Sheppey.
M. borealis, Bow.; Sheppey.
M. Palæogæa, Ung.; Haring.

APPENDIX II.—*Descriptions of a few new or little-known fossil plants, the nearest allies of which inhabit New Holland or other parts of the southern hemisphere.* (The fossil species are represented in woodcuts, the analogous living types in nature-printing.)



Fig. 1.

Fagus pygmæa, Ung. (Fig. 1).—E. foliis minutis ovato-ellipticis in petiolum attenuatis, argute serratis nervis secundariis crebris simplicibus parallelis craspedodromis.—In formatione Eocenica ad Kymme Eubœæ.

At first sight this leaf is recognized as that of a shrub or tree belonging to *Juliferæ*, and shows a singular analogy to that of the now existing *Fagus obliqua*, Mirb., shown in the accompanying illustrations, Figs. 2 and 4, taken from two plants collected by Lechler at Valdivia, and Fig. 3 from specimens at the Paris Herbarium, also collected in Chili. Though the woodcut may seem to represent a widely different species, the original fossil can hardly be distinguished, by its more acute teeth, from the small-leaved Chilian form of *F. obliqua*.



Fig. 2.



Fig. 3. Fig. 4.

F. Chamæphegos, Ung. (Fig. 5).—F. foliis minutis ovatis argute serratis breviter petiolatis nervis secundariis crebris simplicibus parallelis craspedodromis.—In formatione Eocenica ad Kymme Eubœae.

Whether this small leaf, collected by me with the preceding in Kumi, belongs to *F. pygmæa*, or to a distinct species, is doubtful, as the existing species analogous to them vary much in size and form. For the present it may pass as a distinct species. Figs. 6



Fig. 5. Fig. 6. Fig. 7.



Fig. 8, *c*.



Fig. 8, *a*.



Fig. 8, *b*.



Fig. 9, *b*.

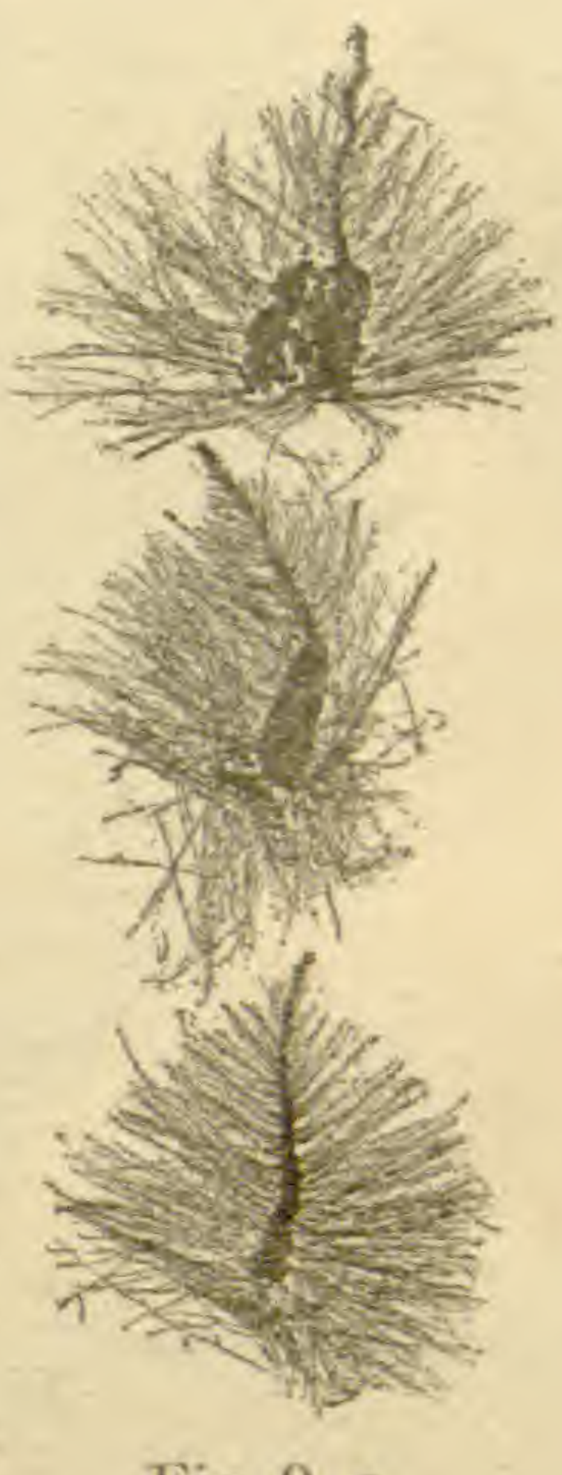


Fig. 9, *c*.

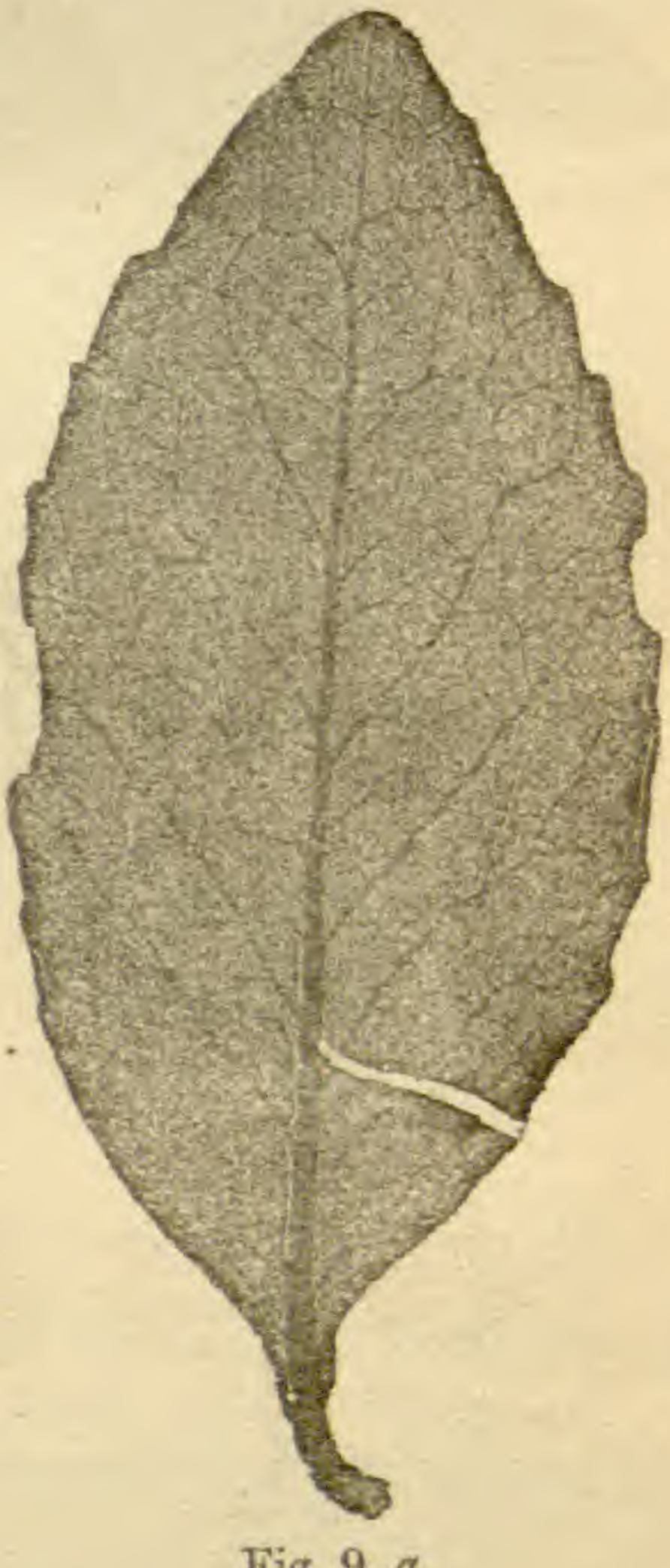


Fig. 9, *a*.

and 7 represent, without doubt, the nearest allies of this fossil species, *Fagus betuloides*, Mirb., from the Straits of Magellan, and *F. Cunninghami*, Hook., from Tasmania.

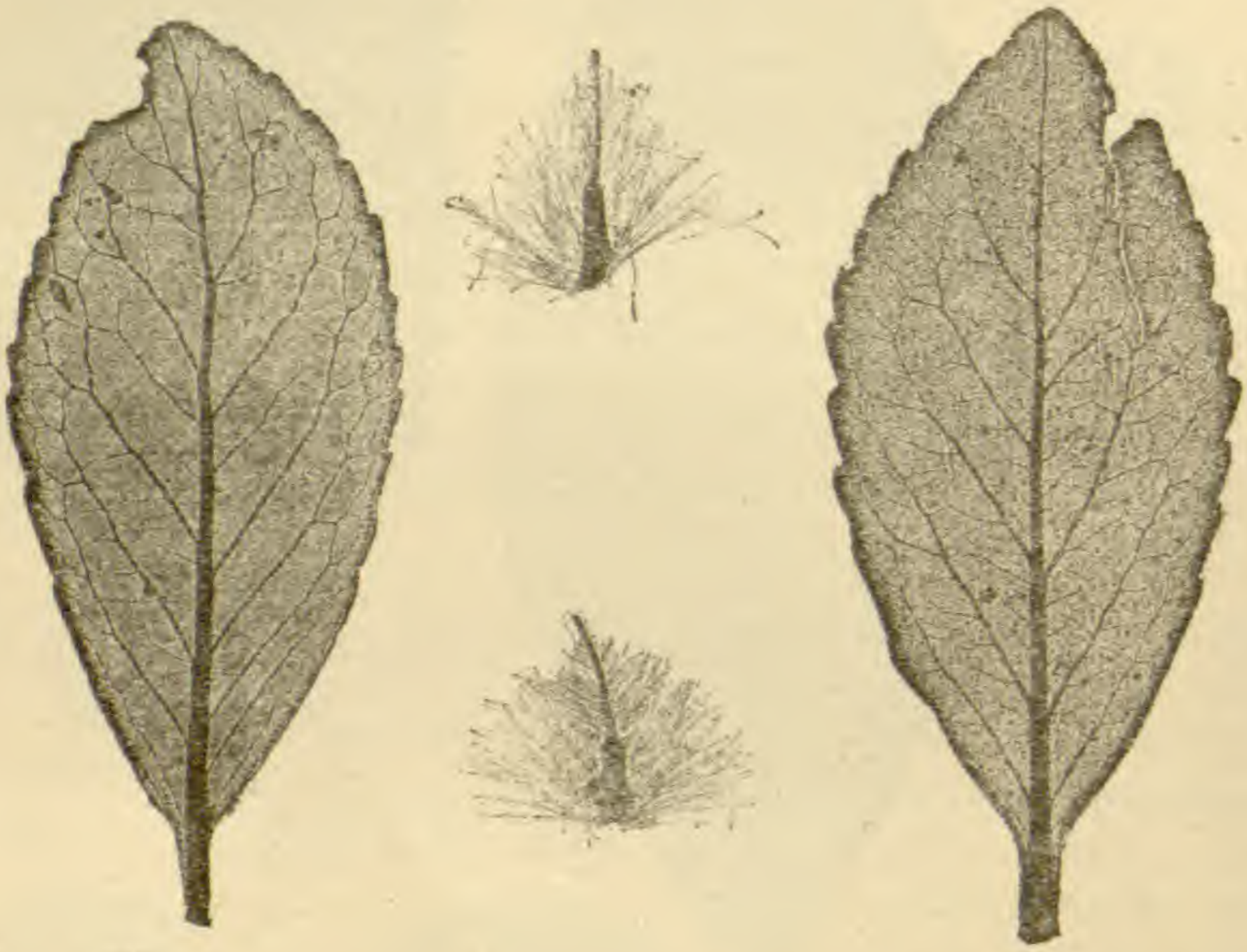


Fig. 10.

Fig. 11.

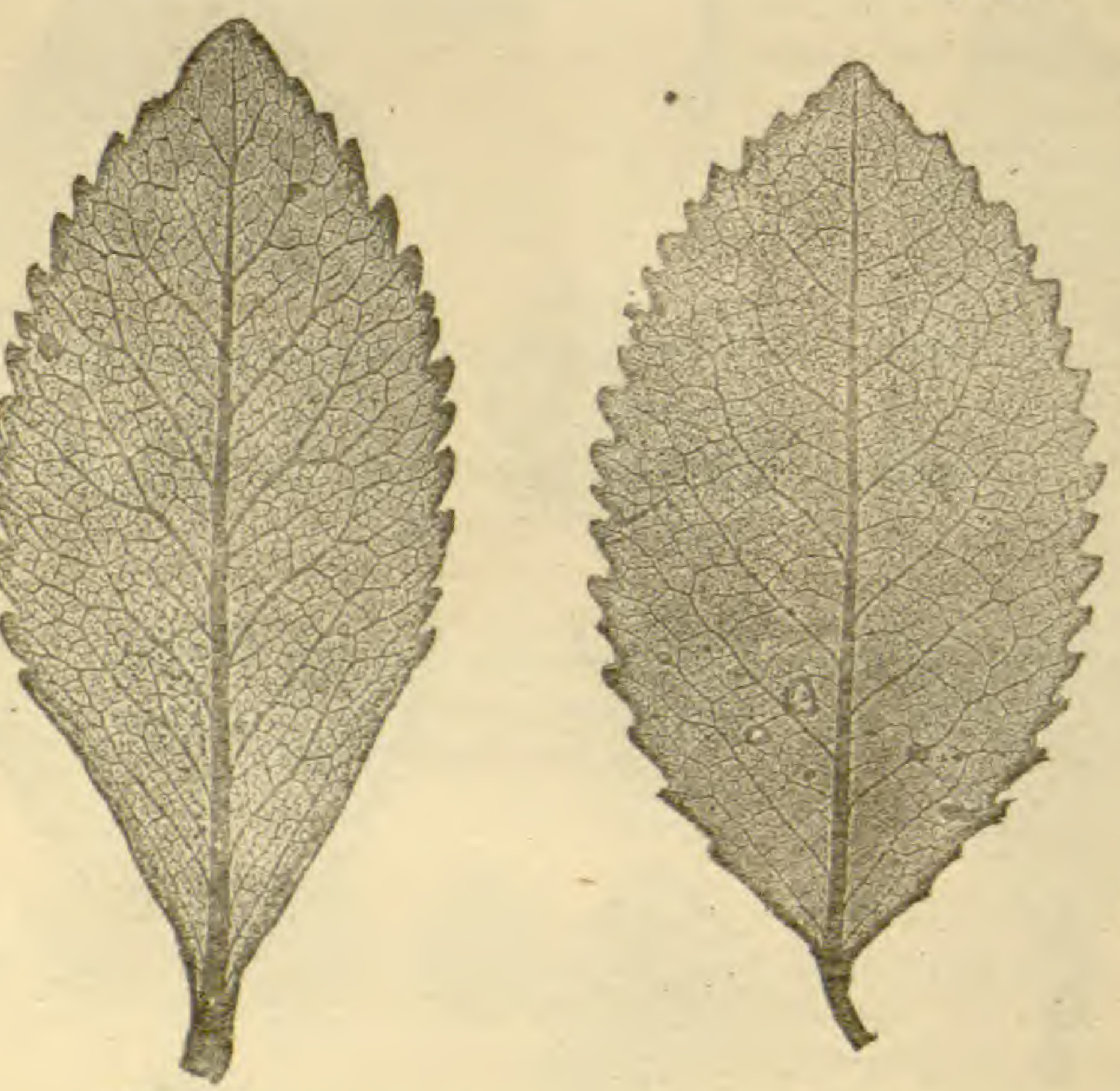


Fig. 12.

Fig. 13.

Laurelia rediviva, Ung. (Fig. 8–10).—L. nuculis oblongis minimis stylo filiformi persistente apice incurvato plumoso caudatis, foliis obovatis utrinque attenuatis petiolatis serrato-dentatis nervis secundariis subsimplicibus passim inter se conjunctis.—*Samida tenera*, Ung. Gen. et Sp. Pl. Foss. p. 444 (folia). *Platanus grandifolia*, Ung. Chlor. Protog. p. 136, t. 45, f. 2–5 (fructus).—In formatione Eocenica ad Radobojum Croatiæ.

The leaves, as well as the very remarkable fruits of this plant, from Radoboj, in Croatia, have long been known to me, but I had neither determined them correctly, nor suspected them to belong to one species of plant. The leaf *b* of Fig. 8 appeared to me to resemble that of *Samyda*, and the fruits I compared to those of *Platanus*. My friend Fenzl pointed out my mistake, by showing me the accompanying *Laurelia aromatica*, Sprengel, from Valdivia, and the close resemblance of the fossil fruits (Fig. 8, *c*) with the fruits of this *Laurelia*



Fig. 14.

(*Pavonia*, Ruiz). The leaves belonging here were also soon found, and they are as common as the fruits. Allied to this species is a still unfigured leaf (Fig. 8, *b*) ; and several other, large and small leaves preserved at the Geological

Reichsanstalt of Vienna, and the Johanneum of Grätz, where even a terminal branchlet with several young leaves is kept. At present I can give of all these a woodcut of only the best preserved and rarest form (Fig. 8, *a*). To show the resemblances and differences between the fossil and living species of *Laurelia*, I have given nature-printed illustrations of several. True, the fruits of these species did not print well, but the leaves turned out all the better. *Laurelia Chilensis*, Juss. (Fig. 10), and *L. serrata*, Bert. (Fig. 11), both from Chili, must be regarded as the nearest allies of *L. aromatica*, Sprengl. But a still closer approach to the fossil *L. rediviva*, especially as regards the shape and venation of the leaves, is presented by the Chilian *L. sempervirens*, R. et Pav. (*L. crenata*, Pöpp. (Fig. 12), and *L. Novæ-Zelandiæ*, All. Cunn. (Fig. 13), from New Zealand. But not only in the genus *Laurelia*, but also in other allied Monimiaceous genera, do we find similar and even more closely corresponding leaves. For comparison's sake I will add two leaves of *Atherosperma Sassafras*, A. Cunn. (*Doryphora Sassafras*, Endl.), of New Holland, one of which (Fig. 14, *a*) shows by far the greatest resemblance as regards shape, crenation of the margin, and particularly the venation, the lateral veins being less divided before they reach the edge than is the case in *Laurelia*. Thus, in all instances where we succeed in finding the proper material for comparing the fossil with the existing vegetation, we see that the two never quite agree, but that the fossil species seem to stand not only between the existing species but also the existing genera. It is to be hoped that this surmise may be corroborated by future investigations. But even at this stage of the inquiry I may be allowed to ask, "Could it be otherwise?" and do we not recognize in it an indication of the first and most important law of development.



Fig. 15. Fig. 16.

Exocarpus Radobojana, Ung. (Fig. 15).—E. ramo fructifero gracili teretiusculo stricto, foliis raris denticuliformibus minutis, pedunculis bilinearibus erectis fructu longioribus, nucula ovoidea (pressione apice difræta) tubo perigonii carnoso-incrassato insidente. —In schisto margaceo ad Radobojum Croatiæ.

One of the most remarkable fossils found at Radoboj, preserved at the Geological Reichsanstalt of Vienna. Without closer comparison and examination, one is apt to take it for a raceme with flowers having an inferior ovary. However, as the tubular perigonium does not quite agree with the elliptical ovary, it would seem to be much nearer the truth to regard the one as a nut squeezed at the point, and the swelling below as a fleshy swollen peduncle or perigonium. A singular resemblance is observable in the Australian genus *Exocarpus*, of which De Candolle describes 18 arboreous or shrubby species, diffused over New Holland, Tasmania, New Guinea,

New Zealand, the Moluccas, and the Polynesian islands. An undetermined, shrubby species of the Herbarium, probably *E. cupressiformis*, Labill., collected by Hügel about Fremantle, W. Australia, agrees so well with our fossil, that I have given (Fig. 16) a woodcut of it. Whether the petiole bore at the point only one or a few flowers, as in the fossil, the fruiting specimens did not allow me to make out with certainty, although that occurs in *E. humifusa*, R. Brown.

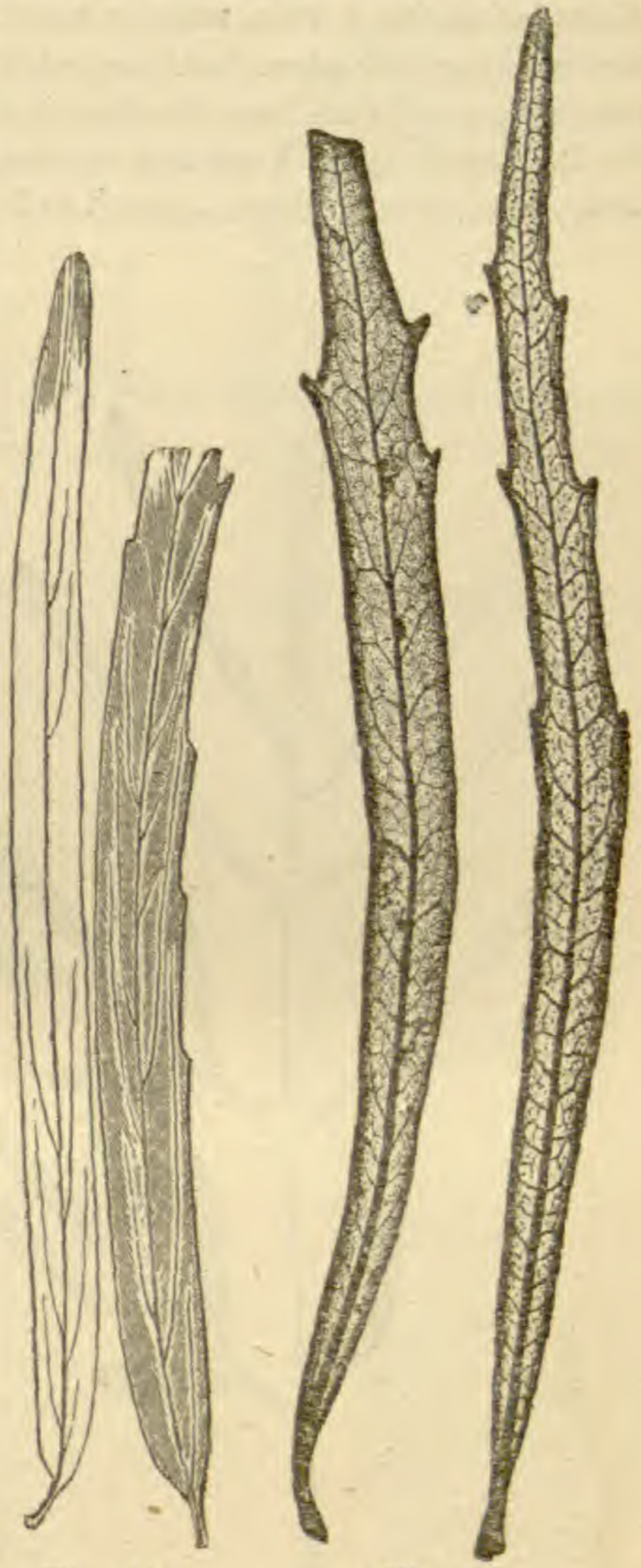


Fig. 17. Fig. 18.

Grevillea Kymmeana, Ung. (Fig. 17). —G. foliis linearibus utrinque attenuatis apice obtusiusculis integerrimis vel sparse dentatis breviter petiolatis, nervo primario gracili, nervis secundariis angulo acuto e primario egredientibus simplicibus elongatis.—In formatione Eocenica ad Kymme Eubœæ.

Judging from their shape and venation, the two leaves represented in Fig. 17 belong, without doubt, to *Proteaceæ;* and whilst the size, form, and edge agree with *Lomatia linearis*, R. Br. (Fig. 18), the venation is more that of *Grevillea*, for instance *G. oleoides*, Sieb. Hitherto only two species of *Grevillea* have been described, with which the Greek species does not agree, although it is rather close to *G. Jaccardi*, Heer.

Embothrium salicinum, Heer (Fig. 19).—F. seminibus 4½ lin. longis, ala dorso recurvo tenera, nervis destituta.—In formatione Eocenica ad Kymme Eubœæ.



Fig. 19.

I do not venture to add to this winged seed the figure of an analogous one of *Embothrium* in nature-printing, as those made of the much more delicate fruits of *Laurelia* did not turn out satisfactorily. Seeds of this species are common in the same formation of central Europe, and have been found in several parts of Switzerland and Austria. It is not difficult to distinguish them from the winged Pine-seeds, so frequent in the same localities.

Lomatia Bolcensis, Ung. (Fig. 20).—L. folio longe-petiolato bipinnatifido, segmentis linearibus acutis elongatis.—In formatione Eocenica montis Bolca Italiæ.

On paying some years ago a visit to the fine collection of fossils of Count Gazola, in Verona, my attention was drawn to a well-preserved leaf from Monte Bolca, of which I then made a drawing in my pocket-book (Fig. 20). I carried it a long time about with me, without finding anything that resembled it, or obtaining a solution from the descriptions and figures of fossil plants published by D. Massalongo. I am now inclined to believe that this leaf also belongs to *Proteaceæ*, and should compare it to *Lomatia tinctoria* (*Embothrium tinctorium*,

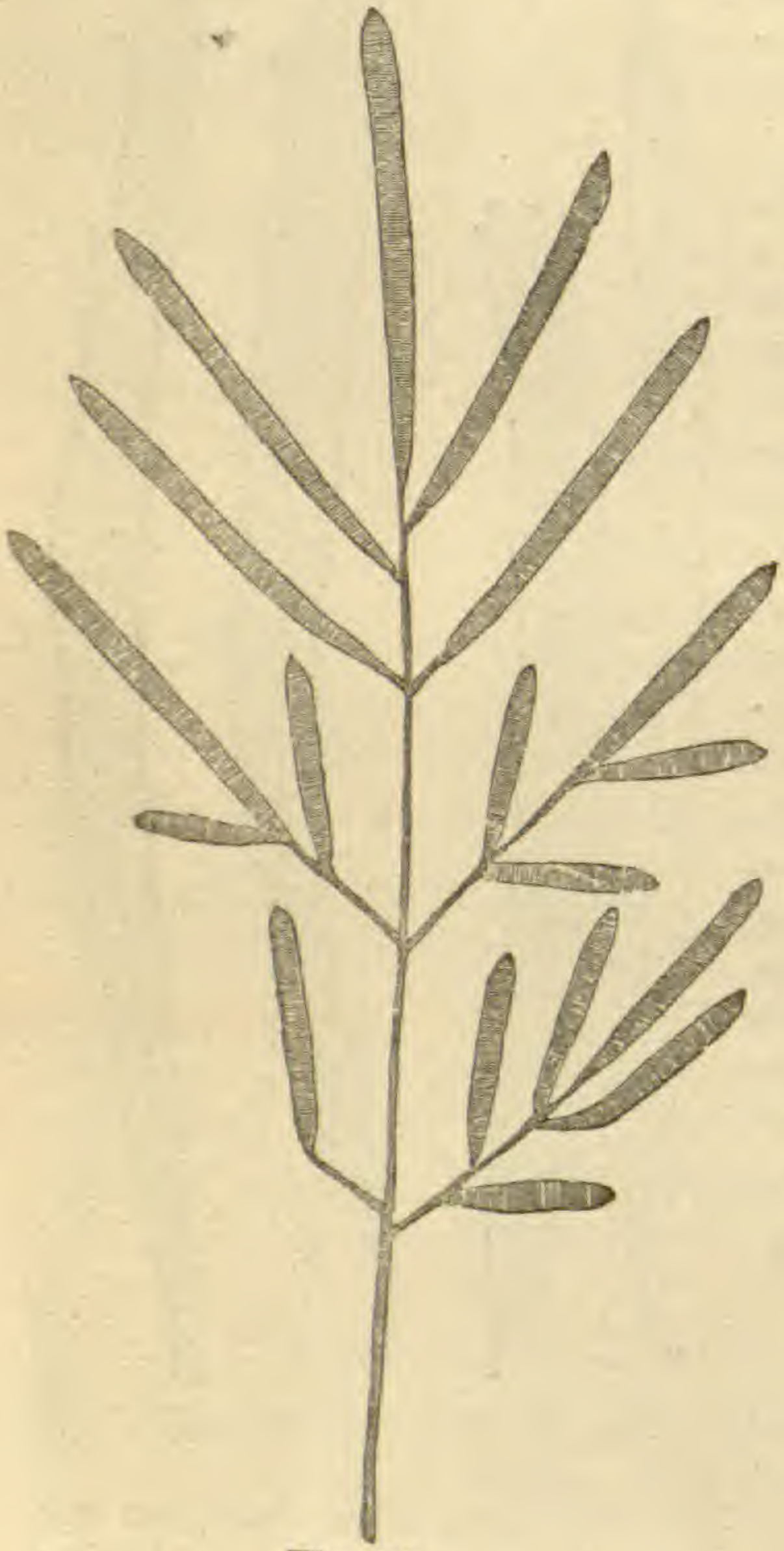


Fig. 20.



Fig. 21.

Labill.) of New Holland (Fig. 21). The leaf of that plant, like that of the fossil, is pinnatifid, with a tendency to become bipinnatifid. Both have long-linear segments, pointed at the ends. The difference between the two consists solely in the segments of the living plant being very slightly attenuated towards the base and making the rhachis appear winged, whilst in the fossil both are so much reduced that the leaf appears to be pinnate rather than pinnatifid. Unfortunately my rough sketch does not show the venation of the fossil, but that can scarcely differ very much from that of the leaves with which it has been compared.

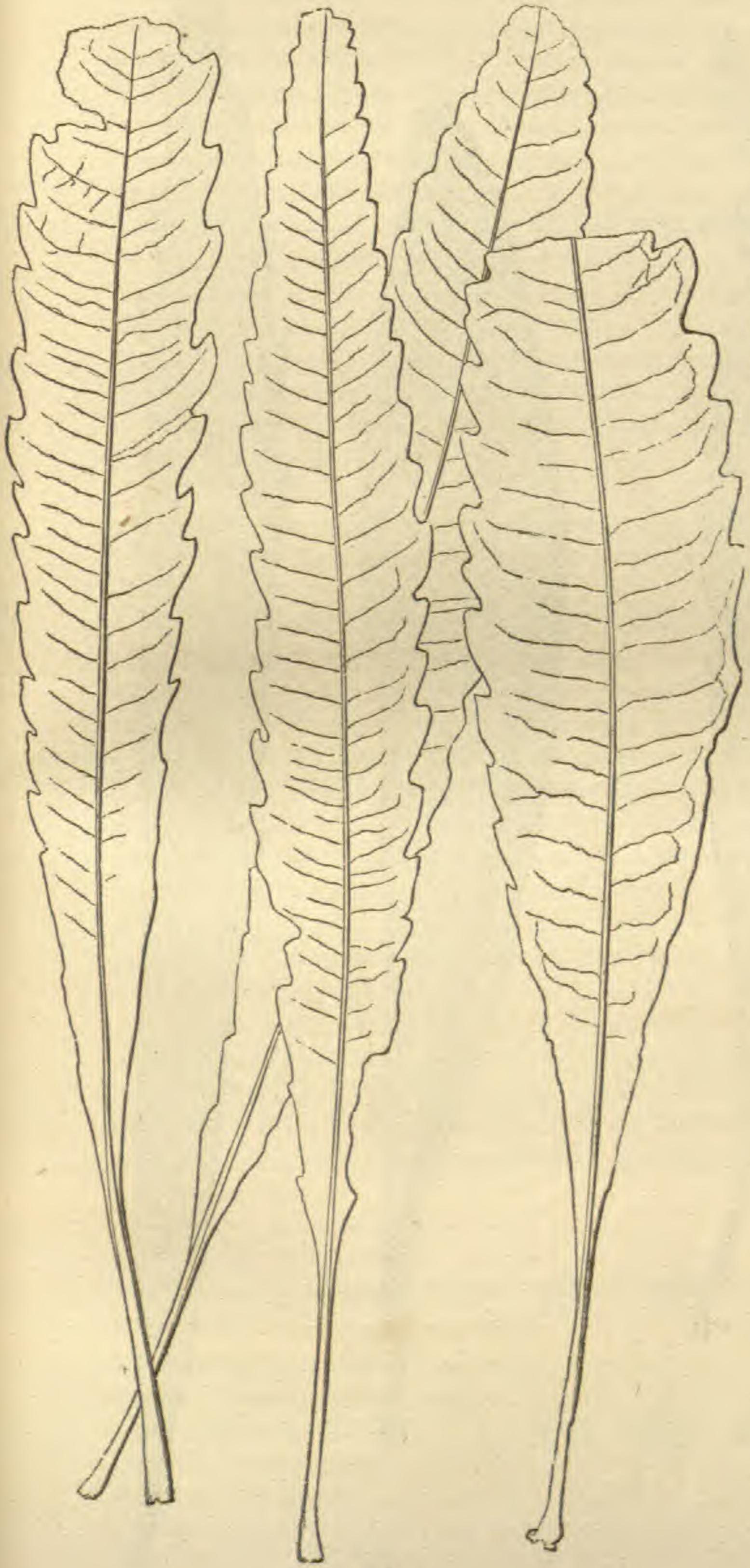


Fig. 22.

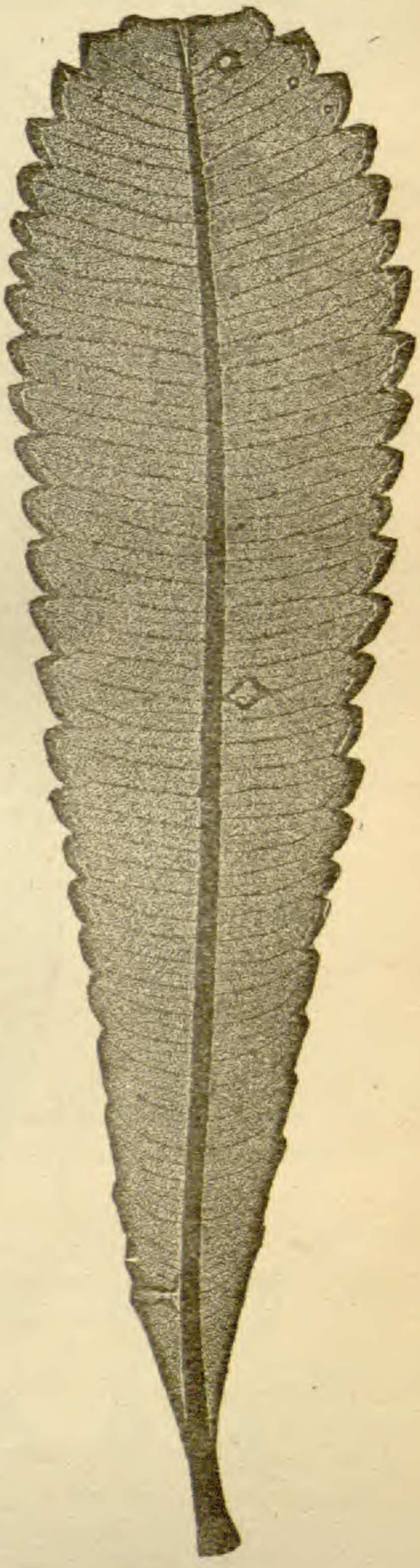


Fig. 23.

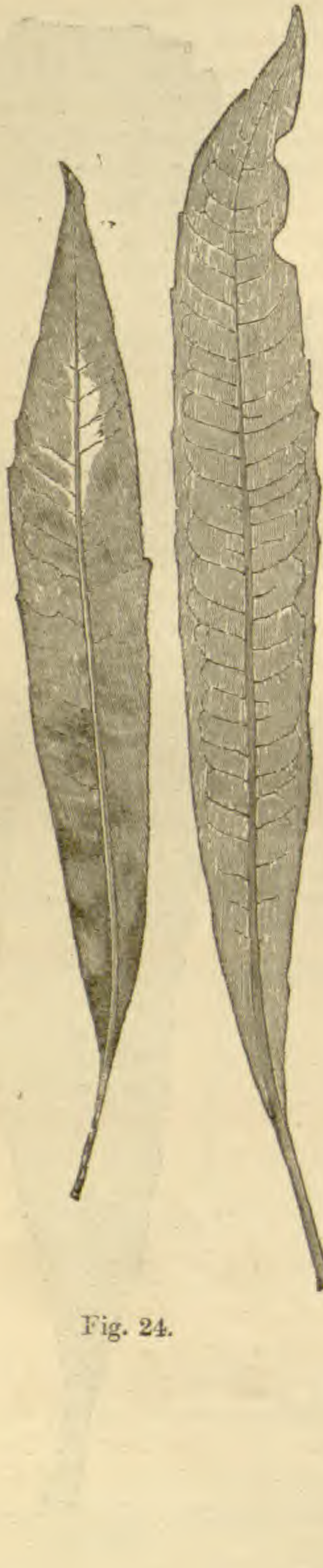


Fig. 24.



Fig. 25.

Banksia Solonis, Ung. (Fig. 22).—B. foliis lanceolatis v. ovato-lanceolatis utrinque attenuatis longe-petiolatis semipedalibus grosse dentatis coriaceis, nervo primario valido, nervis secundariis angulo subrecto e primario egredientibus simplicibus crebris.—In formatione Eocenica ad Kymme Eubœæ.

These fine, large, and well-preserved leaves are amongst the most common fossils of Eubœa, where I collected them. Their shape and texture (the leaves must have been of a robust nature) and their very distinct venation show they belong to *Banksia*, close to *B. serrata* (Fig. 23). But the differences between the two, apart from their size, are as great as their resemblance. Passing over the costa, which, though drawn much too faint in the fossil, is still very different from that of the living *B. serrata*, I would point out the petiole, which in *B. Solonis* attains a length such as is never found in any *Banksia* and other Proteaceous leaves of the present creation. This character assigns to the fossil a distinct place, which I cannot better indicate than by an allusion to the great Greek philosopher.

Dryandroides lignitum, Ett. (Fig. 24).—D. foliis coriaceis lanceolatis utrinque attenuatis petiolatis denticulatis integerrimisque, nervo medio valido, nervis secundariis tenuibus camptodromis.—In formatione Eocenica ad Kymme Eubœæ.

This fossil, which was formerly named by me *Quercus lignitum*, is also widely diffused in Central Europe, and is one of the most common at Kumi. Fig. 24 shows two of its leaves. Formerly these leaves I held to be related to those of *Myrica Pennsylvanica*, Lam., but at present I think that those of *Lomatia longifolia*, R. Br., which are either quite entire or toothed, offer a better analogy. The venation does not quite agree with any of them, as far as it can be recognized. The leaves of this as well as those of the preceding plant are amongst the most common fossils at Kumi, and by their abundance give a character to the flora of that locality. I may add that they are also amongst the most common at Parschlug, showing that the species to which they belong formed the principal part of the woods both in Greece and Styria. But as the flora of Parschlug is more recent than that of Kumi, we have a proof of the longevity of this species, which passed through all the phases of the Tertiary period. In plate 15 of my 'Iconographia' I have figured the leaves of this as well as those of a closely allied species, and pronounced both to be Oaks. Apart from that mistake, I now think that the difference between the two is too insignificant to allow them to be regarded as distinct species. The plants from Kumi are decidedly intermediate forms.

Epacris Sesostris, Ung. (Fig. 26).—E. foliis minutis cordato-acuminatis integerrimis breviter petiolatis, petiolo crasso, nervo medio solo conspicuo.—In schisto margaceo ad Radobojum Croatiæ.



Fig. 26.



Fig. 28.

Fig. 29.

Fig. 27.

Only one specimen has as yet been found of the leaf shown in Fig. 26, which is of doubtful affinity, and in venturing to compare it with the leaves of *Epacrideæ*, I have the sanction of eminent botanists. But it is difficult to be quite sure in this instance. The leaf must certainly have been stiff and leathery. Nothing remains of the veins except an indication of the central costa. The short, thick petiole is very singular. This and the want of secondary veins permit a comparison with the leaves of *Epacris Gunni*, Hook. (Fig. 27), and *E. cardiophylla*, F. Muell. (Fig. 28), the more so as the leaves of those species have a short, thick petiole (the nature-printing has not allowed of these points being made sufficiently clear), and the venation (in the fresh leaves by no means so distinct as in our figure) shows some resemblance to that of the fossil. The difference in size is of little importance; even *E. cardiophylla* has leaves as large again as those of Fig. 28. The accompanying *E. pulchella* (Fig. 29) illustrates the shape of the petiole and the evanescent condition of the venation.



Fig. 30.

Pittosporum ligustrinum, Ung. (Fig. 30).—P. foliis alternis linearibus longe petiolatis subcoriaceis, nervo medio solo conspicuo.—In formatione Eocenica ad Kymme Eubœæ.

This interesting specimen I found when collecting in Kumi. Two linear leaves, broken at the points, are attached to a thin branchlet, with buds in the axils of the leaves. The resemblance of these leaves, and their attachment to the branchlet, to those of starved specimens of *P. ligustrinum*, A. Cunn., is evident. On a future occasion I shall add specimens of that plant from Swan River in nature-printing, and at the same time publish a complete Flora of Kumi.*

POTAMOGETON NITENS IN SCOTLAND AND *P. TRICHOIDES* IN ENGLAND.

Mr. G. E. Hunt announced on November 28, at the meeting of the Literary and Philosophical Society of Manchester, that he had discovered *Potamogeton nitens*, Weber, figured in Plate XXIII. of our Journal, in Loch Ascog, Rothsay.

Dr. Caspary, of Königsberg, communicated to the Linnean Society a note on the occurrence of *P. trichoides*, Cham., in England. But this species has long been known to British botanists, and admitted by Babington in his 'Manual' as found about Bixley.

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* This latter intention the author has carried out in his 'Wissenschaftliche Ergebnisse einer Reise in Griechenland und den Jonischen Inseln.' Wien, 1862. Noticed in Journ. of Botany, 1864, p. 390.

BOTANICAL NEWS.

Though having exceeded our ordinary space by eight pages, we are compelled to defer our notices of new publications, and several important communications from Messrs. Baker, Babington, Clarke, and Miss Gifford.

'Hardwicke's Science-Gossip' is the title of a new "monthly medium of interchange and gossip for lovers and students of nature" on animals and plants. The first number, published on the 1st of January, contains several original popular notices, and clippings of various periodicals and books, illustrated by woodcuts. The object of this new publication is to encourage and develope the taste for natural history in general which undoubtedly exists amongst a considerable body of men, to whom our strictly scientific periodicals or high-class popular journals are almost unintelligible, and who are frightened and perplexed on being too suddenly admitted to a full view of all the difficulties with which those have to grapple who are really working at the advancement of true science. Scientific men ought to feel grateful to the editor for endeavouring to draw votaries to science.

We learn, with deep regret, the death of Dr. W. B. Baikie, R.N., who went out to the West Coast of Africa about nine years ago as the accredited envoy of H. M. Government to open up the trade of the Niger, an expedition to which the late Mr. Barter was attached as botanist. He was recalled at his urgent request, and, having suffered many privations during his prolonged stay in one of the most unhealthy parts of the world, he succumbed to a short attack of fever and dysentery, at Sierra Leone, on the 30th of November, 1864. His official dispatches and communications to learned societies show his industry and power of observation.

From a correspondence lately made known, we learn that upwards of 200 names are subscribed to the Lindley testimonial. This enabled the promoters to order a handsome piece of plate, value about 200 guineas, which borrowed some of the details of its ornamentation from the Orchids and other plants to which Dr. Lindley's studies have been more especially directed. The delicate attention shown in the design has been duly appreciated by Dr. Lindley, who, prevented by ill-health from receiving the deputation that were to present the testimonial, has written a letter to Mr. Bateman, begging him to convey his thanks to the subscribers for their kindness.

Mr. Richard Buxton died at Manchester, on the 2nd of January, in the 81st year of his age. It is now nearly twenty years since he wrote his 'Botanical Guide to the Flowering Plants, Ferns, Mosses, and Algæ found indigenous within eighteen miles of Manchester.' This book was favourably received, and the memoir of the author's life prefixed to it shows the power of a poor man to educate himself under adverse circumstances. At page 4 he says:—"When about twelve years of age I went to James Heap's, in Port Street, to learn the trade of a bat-maker,—that is, a maker of children's small leathern shoes. With him I continued about a year and a half, and then went and worked with one James Hyde for several years. At this time I had forgotten what little I had previously learned at the Sunday School, and was quite unable to read; this caused me much regret. I therefore got a spelling-book to teach myself. I soon became master of it, and I then

proceeded to the New Testament. Although I could make out the words tolerably well, I did not know how to pronounce them correctly or to understand their meaning, so I procured Jones's 'Pronouncing Dictionary,' and went steadily through it." His enthusiastic love of nature was only equalled by his marvellous memory. His own memoir clearly describes the amiable manners and simple character of the man. At page 12 he says :—"Much as I have rambled over the country, and many as are the people with whom I have become acquainted, I have been very fixed in my place of residence. Being a single man, I have never had a house of my own, but lodge with an elder sister of mine. I am well aware that the narrative of the life of a poor man like myself, who has had the greatest difficulty in procuring the necessaries of life in a worn-out trade, like that of a child's leather-shoe maker, and in delivering a few newspapers on a Saturday, is anything but interesting. Had I been allowed to have my own way, neither this sketch of my life, nor the book to which it is appended, would ever have made their appearance. But at the request of friends who, in my opinion, think more favourably of my attainments than they in strict justice probably ought to do, and who state that my book and history may possibly do some little good to my fellow-workmen, by showing them that the poor can enjoy the pleasures of studying science as well as the rich, I am induced to come out from my obscurity. Originally of anything but a strong constitution, I have now reached the age of 62 years; and, although by no means robust, I can yet make a ramble of thirty miles a day, and enjoy the beauties of nature with as much zest as ever I did in my life. True, the pursuit of botany has not yielded me much money, but what, in my opinion, is far better, it has preserved my health, if not my life, and afforded me a fair share of happiness." Mr. Buxton was a good British botanist, so far as flowering-plants are concerned, though he did not merit the extravagant praises lavished upon him by his friends in the local newspapers, or the tributes paid to his memory at the expense of his Lancashire fellow-workers. His quiet and retiring disposition, and humble opinion of his own powers, gave few people, except some of his own friends, any idea of the thinker living among them, for his knowledge was not confined to botany. His manners and actions bespoke him one of nature's gentlemen, and his pure and correct pronunciation of scientific terms have caused many who heard him to believe that he was an accomplished classical scholar. He has quietly closed a long and honourable life, devoted in a great part to the unostentatious pursuit, and under the most adverse circumstances, of science for its own sake, and during which he had accumulated much useful knowledge. He had been resident in Manchester for seventy-eight years, and his early recollections of what the present city then was were most entertaining.

The following four naturalists have recently been elected Members of the Imperial German Academy Naturæ Curiosorum, and received, according to an ancient usage still upheld, the annexed cognomina :—Mr. J. J. Bennett, of the British Museum (Rumphius), Dr. J. E. Gray, of the same Institution, (Bonpland II.), Dr. J. Haast (Leopold von Buch), and Mr. Clements R. Markham (Chinchon).

The first Part of Seemann's 'Flora Vitiensis' (*Ranunculaceæ* to *Celastrineæ*) has been published.



W. Fitch del. et lith.

Vincent Brooks Imp.

REVISION OF THE NATURAL ORDER *HEDERACEÆ*.

By Berthold Seemann, Ph.D., F.L.S.

(*Continued from Vol. II., p.* 309.)

(Plate XXVII.)

In giving the literary history of the *Hederaceæ* (p. 235), I omitted to state that it was Röper ('Botanische Zeitung,' 1848, p. 225), who, in his able paper on *Araliaceæ*, first pointed out several characters of these plants that had been entirely overlooked by systematic botanists, viz. the articulation of the pedicels, the calyculus, and the æstivation; to the latter he drew attention some years previously (1834). But Decaisne and Planchon first applied these characters in circumscribing the genera. It should have also been mentioned that Miquel has published a memoir on *Araliaceæ* in his 'Annales Musei Botanici Lugduno-Batavi,' 1863, vol. i., where he proposes four new genera, viz. *Osmoxylon*, *Textoria*, *Kalopanax*, and *Botryopanax*; the last genus would be a section of my genus *Grotefendia*; and *Textoria* is identical with *Dendropanax*.

III. On Sciadopanax, a New African Genus.

By the courtesy of Sir W. J. Hooker, I am able to give an illustration of a new East African genus of *Hederaceæ*, discovered by M. Boivin, at Nossibé, Madagascar, which I propose to name *Sciadopanax*. It shares with the American genus *Didymopanax* the peculiarity of having *vittæ*, but it differs from all the other genera I have examined by its very singular four-lobed seeds. When I first saw it at the Kew Herbarium, I fancied it might possibly be the obscurely known *Maralia Madagascariensis*, and to make quite sure I forwarded a proof of my plate to my friend Señor Triana, to compare it with the authentic specimens of *Maralia* existing at the Paris Herbarium. Señor Triana communicated on the subject with M. Decaisne, to whom we are indebted for one of the ablest papers on *Hederaceæ*, and the latter very kindly took the trouble to compare my plate with the plant in question. The subjoined extract from his letter informs me of the result:—

"I have examined plate xxvii. of the 'Journal of Botany' and compared it with *Maralia Madagascariensis* of Petit Thouars' herbarium

(*Panax Maralia*, Dcne. et Planch.). The plant figured is not our *Panax Maralia*, but a distinct species, collected at Nossibé by Boivin, and named *Panax Boivini*, Dcne. mss. in Herb. Par. According to Boivin, it was met with on the seashore at Ampambilava, August, 1851, and forms a tree 30–40 feet high, with few and slightly divided branches, and the leaves crowded at their extremities. I enclose a leaflet and a few fruits of *Panax Boivini*, so that the identity may be well established. The true *Maralia Madagascariensis* = *Panax Maralia* has coriaceous leaflets, very similar to those of certain *Jasmineæ;* the umbellules are composed of 3–5 flowers, and the fruit has from 3–5 styles. I regret that I cannot send more than a single leaflet for comparison."

Sciadopanax seems to occupy the same position towards *Maralia* as does *Nothopanax* towards *Polyscias* (*Eupteron*); it belongs to the dicarpous series, *Maralia* to the pentacarpous, whilst both have pinnated leaves, a similar inflorescence, and the same native country. It would be desirable to have a good figure and description of *Maralia*, which anybody living at Paris might easily furnish. Good flowering-specimens of *Sciadopanax* are also a great desideratum.

XVII. SCIADOPANAX, Seem. (nov. gen.) Pedicelli articulati. Flores ecalyculati. Calyx tubo ovato, limbo obscure 5-dentato. Petala . . . Stamina . . . Ovarium inferum, 2-loculare, loculis 1-ovulatis. Ovula pendula. Stigmata 2, stylopodio conico imposita. Drupa ovato-cylindrica, exsucca, 10-costata, 8-vittata, 2-sperma. Semina cruciatim 4-loba. Albumen æquabile.—Arbor Madagascariensis, 30–40-pedalis, glaber, sparsim ramosus, ramis teretibus, foliis alternis exstipulatis imparipinnatis, foliolis sessilibus v. breviter petiolulatis, ovatis acuminatis v. ellipticis integerrimis, umbellulis racemoso-paniculatis. Species unica :—

1. *S. Boivini*, Seem. mss. (Tab. nostr. XXVII.).—*Panax Boivini*, Decne. mss. in Herb. Par.—Nossibé, Madagascar (Boivin !, in Herb. Kew. et Par.).

IV. ON THE GENERA WITH SESSILE STIGMAS.

The *Hederaceæ* having stigmas not placed on stylopodia, but immediately on the top of the ovary, belong to two Asiatic genera, one recently founded by Miquel (*Osmoxylon*), the other many years ago by Gærtner (*Heptapleurum*). *Osmoxylon* is but imperfectly known.

CONSPECTUS GENERUM HEDERACEARUM STIGMATIBUS SESSILIBUS.

18. *Osmoxylon*. Flores capitulati. Stigma semiglobosum, omnino indivisum, papilloso-puber.—Arbor Indiæ orientalis, foliis simplicibus.

19. *Heptapleurum*. Flores umbellati. Stigmata distincta, ovario immersa, punctiformia.—Arbusculæ epiphytæ Asiæ et Australiæ tropicæ, foliis duplicato- v. simpliciter digitatis, v. rarissime 1-foliolatis.

XVIII. Osmoxylon, Miq. Flores capitulati. Calyx tubo subcylindrico, limbo dilatato integerrimo. Petala . . . Stamina . . . Discus epigynus, centro elevatus, stigmate semigloboso omnino indiviso papilloso pubere. Ovarium 8–10-loculare. Drupa calycis margine detruncato disco stigmatifero tecta, pericarpio carnuloso, ovoidea, 8–10-pyrena. Albumen . . .—Arbor inermis Amboinensis, resinifera, foliis longe petiolatis lanceolatis acuminatis rariter serratis, floribus capitulatis, capitulis umbellatis.—*Osmoxylon*, Miq. Ann. Lugd. Bat. i. p. 5. *Hederæ*, *Araliæ* et *Gastoniæ*, sp. auct.

1. *O. Amboynense*, Miq. Ann. Lugd. Bat. i. p. 5.—*Aralia umbellifera*, Lam. Dict. i. p. 225. *Hedera umbellifera*, De Cand. Prodr. iv. p. 262. *Gastonia simplicifolia*, Zippel, mss. *G. sauruoides*, Roxb. Fl. Ind. i. p. 408? *Pseudo-Sandalum Amboinense*, Rumph. Amb. ii. p. 54, t. 12.

The gum resin exuded by this tree is called "Saruru" by the Amboynese. Is Roxburgh's name *Gastonia sauruoides* derived from this??

XIX. Heptapleurum, Gærtn. Pedicelli inarticulati. Flores ecalyculati, hermaphroditi. Calyx tubo obconico, limbo brevissimo truncato v. rarius obscure repando. Petala 5–7, ovato-triangularia libera v. calyptratim cohærentia. Stamina petalorum numero, filamentis subulatis v. filiformibus, antheris oblongis. Stigmata parva, loculorum numero, papillæformia, in disci vertice circulariter disposita. Drupa disco glanduloso coronata, sulcato-angulata, matura subsicca, 4–7-pyrena. Albumen æquabile.—Arbusculæ epiphytæ Asiæ et Australiæ tropicæ, glabræ v. pilosæ, foliis duplicato- v. simpliciter digitatis, rarissime 1-foliolatis, foliolis integerrimis v. dentatis, umbellulis racemoso-paniculatis, petalis viridibus v. sæpe purpureis v. sanguineis.—*Heptapleurum*, Gærtn. Fruct. ii. p. 472, t. 178, fig. 3. *Paratropia*, De Cand. Prodr. iv. p. 265, excl. sp. *Actinomorphe*, Miq. Comm. Phytogr. p. 102.

Hasskarl (Flora Beibl. 1842, p. 30) was the first who pointed out

the propriety of restoring the genus *Heptapleurum*, quite overlooked by De Candolle when he established *Paratropia*, a genus in every respect identical with *Heptapleurum*, if we adopt the definition which he himself gives in the 'Prodromus,' and which excludes one of the species (*P. nodosa*) incorporated with it at that place, but belonging to the older genus *Polyscias*, Forst. The genus *Actinomorphe*, according to Miquel's own showing (Ann. Lugd. Bat.), is identical with *Heptapleurum*. But I cannot admit *Parapanax*, Miq. which I have shown to belong, at least in part, to *Brassaia*, Endl. *Paratropia*, being absorbed by *Agalma*, *Heptapleurum*, *Polyscias*, *Brassaia*, and other genera, has no longer any existence, and in finally dissolving it, I shall show how the different species have been disposed of, viz. :—

Paratropia acutissima, Miq.=*Heptapleurum acutissimum*, Seem.
P. apiculata, Miq.=*Heptapleurum apiculatum*, Seem.
P. aromatica, Miq.=*Agalma aromaticum*, Seem.
P. avenis, Miq.=*Heptapleurum avene*, Seem.
P. brachybotrya, Miq.=*Heptapleurum scandens*, Seem.
P. calophylla, Miq.=*Heptapleurum heterophyllum*, Seem.
P. Cantoniensis, Hook. et Arn.=*Agalma octophyllum*, Seem.
P. capitata, W. et Arn.=*Heptapleurum capitatum*, Seem.
P. confinis, Miq.=*Heptapleurum confine*, Seem.
P. Coronæ-sylvæ, Miq.=*Heptapleurum Coronæ-sylvæ*, Seem.
P. Cumingiana, Presl=*Nothopanax Cumingianum*, Seem.
P. divaricata, Miq.=*Heptapleurum divaricatum*, Seem.
P. elata, Hook. fil.=*Astropanax elatum*, Seem.
P. elliptica, Miq.=*Heptapleurum ellipticum*, Seem.
P. eurhyncha, Miq.=*Heptapleurum eurhynchum*, Seem.
P. farininifera, Hort. Lind. (sp. indescript.)=
P. fastigiata, Miq.=*Heptapleurum fastigiatum*, Seem.
P. gracilis, Miq.=*Heptapleurum gracile*, Seem.
P. heterophylla, Presl=*Arthrophyllum*.
P. Horsfieldii, Miq.=*Agalma Horsfieldii*, Seem.
P. Junghuhniana, Miq.=*Heptapleurum Junghuhnianum*, Seem.
P. longifolia, De Cand.=*Heptapleurum longifolium*, Seem.
P. lucescens, Miq.=*Agalma lucescens*, Seem.
P. lucida, Miq.=*Heptapleurum rigidum*, Seem. var.
P. macrostachya, Miq.=*Brassaia macrostachya*, Seem.

P. Mannii, Hook. fil.=*Astropanax Manni*, Seem.
P. micrantha, Miq.=*Heptapleurum micranthum*, Seem.
P.? multijuga, A. Gray=*Nothopanax multijugum*, Seem.
P. nodosa, De Cand.=*Polyscias nodosa*, Seem.
P. oxyphylla, Miq.=*Heptapleurum oxyphyllum*, Seem.
P. parasitica, Miq.=*Heptapleurum parasiticum*, Seem.
P. pergamacea, De Cand.=*Heptapleurum pergamaceum*, Hassk.
P. petiolosa, Miq.=*Heptapleurum petiolosum*, Seem.
P. polita, Miq.=*Heptapleurum politum*, Seem.
P. polyphylla, Miq.=*Heptapleurum polyphyllum*, Seem.
P. polybotrya, Miq.=*Heptapleurum polybotryum*, Seem.
P. pulchra, Dcne. et Pl. (sp. indescript.)=
P. pubigera, Brongn. (sp. indescript.)=
P. rigida, De Cand.=*Heptapleurum rigidum*, Seem. non Hassk.
P. rostrata, Wight=*Agalma rostratum*, Seem.
P. Samoensis, A. Gray=*Cheirodendron ?*
P. scandens, Miq.=*Heptapleurum scandens*, Seem.
P. serrata, Miq.=*Heptapleurum serratum*, Seem.
P. Singalense, Miq.=*Heptapleurum Singalangense*, Seem.
P. subulata, Miq.=*Heptapleurum subulatum*, Seem.
P. terebinthacea, Arn.=*Heptapleurum stellatum*, Gærtn.
P. Teijsmanniana, Hort. Lind. (sp. indescript.)=
P. tomentosa, Miq.=*Heptapleurum tomentosum*, Hassk.
P. venulosa, Wight et Arn.=*Heptapleurum venulosum*, Seem.
P. Wallichiana, C. Koch=*Agalma tomentosum*, Seem.
P. Wallichiana, Wight et Arn.=*Heptapleurum Wallichianum*, Seem.

* *Folia duplicato- (3-v.-5-nata)digitata.*

1. *H. heterophyllum*, Seem.—*Hedera heterophylla*, Wall. Cat. n. 4919; G. Don, Gen. Syst. iii. p. 394; Walp. Rep. ii. p. 432. *Paratropia calophylla*, Miq. in Bonplandia, 1856, p. 138; Fl. Nederl. Ind. vol. i. pars 1, p. 758.—Pulo Penang (Wallich! n. 4919); Java (Horsfield! in Mus. Brit.).

2. *H. Junghuhnianum*, Seem.—*Paratropia Junghuhniana*, Miq. in Bonplandia, 1856, p. 138; Fl. Nederl. Ind. l. c. p. 758.—Java (Horsfield! in Mus. Brit.).

** *Folia simpliciter digitata, rarissime* 1*-foliolata.*

3. *H. tomentosum*, Hassk. in Flora (B. Z.) Beibl. 1842, p. 30.—

Sciadophyllum tomentosum, Blum. Bijdr., p. 877; De Cand. Prodr. iv. p. 260. *Paratropia tomentosa*, Miq. in Bonplandia, 1856, p. 138, et Fl. Nederl. Ind. vol. i. pars 1, p. 753.—Java (Herb. Hook. communicav. cl. Miq.)

Var. *β. farinosum*, Hassk. l. c.—*Actinophyllum farinosum*, Blum. Cat. Buitenzorg, p. 43. *Sciadophyllum farinosum*, Blum. Bijdr. p. 860. —Java.

4. *H. divaricatum*, Seem.—*Paratropia divaricata*, Miq. in Bonpl. 1856; Fl. Ned. Ind. l. c. *Sciadophyllum divaricatum*, Bl. Bijdr. p. 876.—Java (Junghuhn! in Herb. Hook.).

5. *H. gracile*, Blume, mss.—*Paratropia gracilis*, Miq. Ann. Lugd. Bat. i. p. 22.—Borneo (Henrici; Motley ?, in Herb. Hook.).

6. *H. subulatum*, Seem.—*Paratropia subulata*, Miq. Ann. Lugd. Bat. i. p. 22.—Western Sumatra (Korthals).

7. *H. politum*, Seem.—*Paratropia polita*, Miq. Ann. Lugd. Bat. i. p. 22.—Southern Borneo (Korthals).

8. *H. Singalangense*, Seem.—*Paratropia Singalense* (*sic !*), Miq. Ann. Lugd. Bat. i. p. 23.—Singalang, Western Sumatra (Korthals).

9. *H. petiolosum*, Seem.—*Paratropia petiolosa*, Miq. Ann. Lugd. Bat. i. p. 24.—Southern Borneo (Korthals).

10. *H. fastigiatum*, Seem.—*Paratropia fastigiata*, Miq. Ann. Lugd. Bat. i. p. 24.—Java (Waitz).

11. *H. apiculatum*, Seem.—*Paratropia apiculata*, Miq. Ann. Lugd. Bat. i. p. 219.—Island of Halmaheira, Moluccas (Teijsmann).

12. *H. Coronæ-sylvæ*, Seem.—*Paratropia Coronæ-sylvæ*, Miq. in 'Bonplandia,' 1856, p. 138; Fl. Nederl. Ind. l. c. p. 755. *Sciadophyllum subavene*, Blume, ex parte ?—Java (Junghuhn !, in Herb. Hook.).

13. *H. polybotryum*, Seem.—*Paratropia polybotrya*, Miq. in 'Bonplandia,' 1856, p. 138; Fl. Nederl. Ind. l. c. p. 755.—Java (Horsfield !, in Mus. Brit.; Junghuhn !, in Herb. Hook.).

14. *H. micranthum*, Seem.—*Paratropia micrantha*, Miq. Fl. Nederl. Ind. Suppl. i. p. 337.—Sumatra.

15. *H. eurhynchum*, Seem.—*Paratropia eurhyncha*, Miq. Ann. Lugd. Bat. i. p. 21.—Java (Van Hasselt).

16. *H. ellipticum*, Seem.—*Paratropia elliptica*, Miq. in 'Bonplandia,' 1856, p. 138. *Sciadophyllum ellipticum*, Blume, Bijdr. p. 878; De Cand. Prodr. iv. p. 260.—Java (Horsfield !, in Mus. Brit.; Junghuhn !; De Vriese !, in Herb. Hook.); Sumatra; Borneo; Timor.

Var. *β. micrantha*, Miq.; *γ. ovata*, Miq.; *δ. riparia*, Miq.; *ε. verticillata*, Miq. Ann. Lugd. Bat. i. p. 21.

17. *H. pergamaceum*, Hassk. in Flora (B. Z.), 1842, Beibl. p. 31.—*Paratropia pergamacea*, De Cand. Prodr. iv. p. 266. *Aralia pergamacea*, Blume, Bijdr. p. 838.—Java.

18. *H. avene*, Seem.—*Paratropia avenis*, Miq. Ann. Lugd. Bat. i. p. 19. *Sciadophyllum avene*, Korth. Herb.—Western Sumatra (Korthals).

19. *H. parasiticum*, Seem.—*Paratropia parasitica*, Miq. in Bonpl. 1856, p. 138; Fl. Nederl. Ind. l. c. p. 757. *Sciadophyllum parasiticum*, Blume, Bijdr. p. 877. *S. humile*, Blume, l. c.; De Cand. Prodr. iv. p. 259. *Actinomorphe humilis*, Miq. Com. Phytogr. p. 102; Fl. Nederl. Ind. l. c. p. 749.—Java (Horsfield! in Mus. Brit.); Western Sumatra (Korthals).

20. *H. acutissimum*, Seem.—*Paratropia acutissima*, Miq. Ann. Lugd. Bat. i. p. 20.—Southern Borneo (Korthals).

21. *H. scandens*, Seem.—*Paratropia scandens*, Miq. in 'Bonplandia,' 1856, p. 138; Fl. Nederl. Ind. l. c. p. 757. *P. brachybotrya*, Miq. l. c. *Sciadophyllum scandens*, Blume, Bijdr. p. 878.—Java; Sumatra (Korthals).

22. *H. serratum*, Seem.—*Paratropia serrata*, Miq. in 'Bonplandia,' 1856, p. 138; Fl. Nederl. Ind. l. c. p. 757. *Aralia aromatica*, var. *foliolis serratis*, Blume, Bijdr. p. 872? *Unjalla serrata*, Reinw.—Java.

23. *H. confine*, Seem.—*Paratropia confinis*, Miq. in 'Bonplandia,' 1856, p. 138; Fl. Nederl. Ind. l. c. p. 758.—Celebes.

24. *H. longifolium*, Seem.—*Paratropia longifolia*, De Cand. Prodr. iv. p. 266. *Heptapleurum rigidum*, Hassk. in Flor. (B. Z.) 1842, Beibl. p. 30. *Sciadophyllum longifolium*, Blume, Bijdr. p. 876.—Java (Herb. Hook.).

Var. *β. incurvum*, Seem.—*Paratropia longifolia*, var. *incurva*, Miq. Fl. Nederl. Ind. l. c.—Sumatra; Boutan.

25. *H. rigidum*, Seem. (non Hassk.).—*Paratropia rigida*, De Cand. Prodr. iv. p. 266. *Aralia rigida*, Blume, Bijdr. p. 874.—Java.

Var. *β. venosum*, Seem.—*Paratropia rigida*, var. *venosa*, Miq. l. c.

Var. *γ. brevifolium*, Seem.—*Paratropia rigida*, var. *brevifolia*. Miq. Ann. Lugd. Bat. i. p. 25. *Sciadophyllum lucidum*, Blume, Bijdr. p. 877. *Paratropia lucïda*, Miq. in Bonpl. 1856, p. 138.

26. *H. polyphyllum*, Seem.—*Paratropia polyphylla*, Miq. in 'Bon-

plandia,' 1856, p. 139; Fl. Nederl. Ind. l. c. p. 760.—Java (Teijsmann ! in Herb. Hook.).

27. *H. oxyphyllum*, Seem.—*Paratropia oxyphylla*, Miq. Suppl. i. Fl. Nederl. Ind. p. 338.—Western Sumatra.

28. *H. emarginatum*, Seem.—*Hedera emarginata*, Moon, Cat. Ceylon Plants, p. 18; Thwaites, Enum. Ceyl. Plants, p. 132.—Ceylon, up to an elevation of 4000 feet (Thwaites ! in Mus. Brit.).

29. *H. exaltatum*, Seem.—*Hedera exaltata*, Thwaites, Enum. Ceyl. Plants, p. 132.—Ceylon, at an elevation of 6000–8000 feet (Thwaites ! in Mus. Brit.).

30. *H. Wallichianum*. Seem.—*Paratropia Wallichiana*, Wight et Arn. (non C. Koch) Prodr. p. 377; Walp. Rep. ii. p. 433.—Khassia, 5000–6000 feet (Wight ! n. 1217 in Herb. Hook.; Hooker fil. et Thomson ! in Mus. Brit.).

31. *H. venulosum*, Seem. — *Paratropia venulosa*, Wight et Arn. Prodr. Fl. Pens. Orient. p. 377; Walp. Rep. ii. p. 433; Wight, Illustr. t. 118. *Hedera terebinthacea*, Wall. Cat. n. 4920, ex parte. *Panax serratum*, Wall. in De Cand. Prodr. iv. p. 253. *Aralia digitata*, Roxb. Fl. Ind. ii. 107; Rheede, Hort. Mal. vii. t. 28. *A. Moorei*, F. Müll. Fragm. ii. p. 108; iv. p. 121. *Cussonia scandens*, Hamilton, Herb. in Mus. Brit.—Khassia, Nilgherries, and Sikkim (Hooker fil. et Thomson ! in Mus. Brit.; Wallich !); Nepal (Wallich !; Hamilton !; Strachey and Winterbottom ! in Mus. Brit.); Bootan and Assam (Griffith !); E. Indies (Roxburgh ! in Mus. Brit.); Bombay (Dalzel !); Krombh Island (Helfer !); Birma and Malay Peninsula (Griffith !); East coast of trop. New Holland (C. Moore !).

32. *H. stellatum*, Gærtn. de Fruct. ii. p. 472, t. 178, fig. 3.—*Hedera obovata*, Wight, Icon. t. 1011, 1012. *H. Vahlii*, Thwaites, Enum. Ceyl. Plants, p. 132. *H. terebinthacea*, Vahl, Symb. iii. p. 42; De Cand. Prodr. iv. p. 265. *Paratropia terebinthacea*, Arn. Nov. Act. xviii. p. 338. Ittawael; Arbor Zeylanica Itta dicta, resinam *Terebinthinæ* similem fundens, Herm. Zeyl. p. 50. Arbor "Itta" dicta etc.; Burm. Zeyl. p. 28. Ittawael, Linn. Zeyl. p. 234. Maha-ittawæla (*Hedera terebinthacea*), Moon, Cat. Zeyl. Plants, p. 18.—Ceylon (Kœnig !; Thwaites ! n. 1632, in Mus. Brit.).

33. *H. verticillatum*, Seem.—*Sciadophyllum verticillatum*, Spanoghe, in Linnæa, xv. p. 288; Walp. Rep. ii. p. 431.—Timor.

34. *H. insularum*, Seem. n. sp.; foliolis 5–7, ellipticis acuminatis

dentatis; paniculis tomento brevi vestitis; petalis linearibus liberis; stam. 7; ovar. 7-locul.—Philippine Islands (Cuming! n. 814).

35. *H. Cumingii*, Seem. n. sp.; foliolis 5 ellipticis v. ovato-ellipticis longe acuminatis integerrimis 3-plinerviis; paniculis terminalibus pube stellato albido vestitis; drupis obovatis 5-locularibus.—Philippine Islands (Cuming! n. 800 et 1293).

36. *H. capitatum*, Seem.—*Paratropia capitata*, Wight et Arn. Prodr. p. 378; Walp. Rep. ii. p. 433.—Eastern parts of Bengal (Wight); Malacca (Griffith! n. 2708).

At first sight looks like a *Brassaia*, but flowers pedicellate and without a calyculus. Inflorescence covered with stellate hairs. Leaflets in Griffith's specimen 3–4 inches long, having 15–22 veins on each side of the midrib.

EXPLANATION OF PLATE XXVII., representing *Sciadopanax Boivini*, from a specimen preserved in Sir W. J. Hooker's herbarium.—Fig. 1. Part of the inflorescence. 2. Fruit. 3. Longitudinal section of the same. 4. Cross section of the same. Figs. 2, 3, and 4, magnified.

ON *LEPIGONUM RUPESTRE vel RUPICOLA*.

BY C. C. BABINGTON, M.A., F.R.S.

Much discussion has already attended the determination of the true name of one of our *Lepigona*. It was first distinguished, as a species, by Lebel, in the Paris Herbarium, as "*Spergularia rupestris* (*vel rupicola*)," and most succeeding authors have used the former of those alternative names for it. But it was apparently known to Lebel that Cambessèdes described and figured a *Spergularia rupestris* in Saint-Hilaire's "Fl. Brasiliæ Meridionalis" (ii. 175, t. 110), in 1829. That was many years anterior to the first publication of Lebel's name in Kindberg's 'Symbolæ Lepigonorum,' in 1856. Cambessèdes' plant was gathered from rocks near the town of Maldonado, in South Brazil, and if it is a distinct species we cannot call the European plant by the same name. In his 'Monographia Lepigonorum' Kindberg quotes the *S. rupestris* (Cambes.) as a synonym of *L. marinum* (Wahl.), without any mark of doubt, or any information concerning his reason for combining them; unless his quotation of specimens "in America Australi ad

Montevideo" (Gaudichaud in Herb. Berol.; Arsene Isabelle in Herb. Paris.) gives us a clue to his reason. He has seen those specimens and doubtless found them to agree with *L. marinum*, and Montevideo being on the same coast as Maldonado, he believed that he had found Cambessèdes' plant. I conclude, from Kindberg not having noticed it, that there is no specimen of the plant found at Maldonado in the herbarium of the Museum at Paris. If we turn to the plate in the 'Flora Brasil.,' it is difficult to see on what grounds it can be supposed to represent any state of *L. marinum*. Its remarkably long subulate, rather closely placed leaves, and very long triangular stipules, are greatly dissimilar from those parts of *L. marinum*. It probably is a distinct species from any of our European plants. Steudel (Nomencl. 123) combines the plant of Cambessèdes with the *Arenaria Bonariensis*, Gill. (in Hook. Bot. Misc. iii. 148), but the latter plant is stated to have "foliis lineari-filiformibus . . . internodio brevioribus" and "caulibus remote foliosis," and therefore their union is probably erroneous. Steudel also locates the compound species at "Bonaria, New Holland," whereas Cambessèdes' plant is Brasilian, and that of Gillies grew at Buenos Ayres. This conjunction brought about by Steudel has caused some authors to believe that the Brasilian plant has no claim to the name *Lepig.* or *Sperg. rupestris*, but would in future answer to that of *L. Bonariense*. It will have been seen that such is far from being the fact, and that the name *L. rupestre* is its property, and therefore the European plant cannot be so called. Lebel gave the alternative of *rupestris* or *rupicola*; we therefore now take the latter, and call our plant *L. rupicola*. It is unfortunate that Kindberg should have used the inadmissible alternative, for authors of recent date have naturally followed him, and some confusion is thereby introduced. It should be stated that Lebel never described his plant, and that we might therefore have given a totally new name to it, if inclined to aspire to such a questionable honour.

ON *ROSA COLLINA*, *Jacq.*, AS A BRITISH PLANT.

By J. G. Baker, Esq.

At length the true *Rosa collina* of Jacquin may take its place upon our British lists. Mr. T. R. A. Briggs has met with it in considerable

quantity in hedges and thickets in the neighbourhood of Plymouth, and as the stations are upon both sides of Tamar, they are consequently both in Devonshire and Cornwall. The following description is taken entirely from his specimens and notes:—

Rosa (Series CANINÆ—Section HISPIDÆ) *collina*, Jacq. Austr. tab. 197. A shrub, six to ten feet high, with arching shoots and the habit and appearance of *R. canina*. Prickles uniform, uncinate, moderately robust below, measuring about three-eighths of an inch from base to point upon the full-grown stems. Leaves similar in size to those of *R. canina*, firm in texture, full green and quite glabrous above, paler beneath and hairy on the veins, the serrations moderately sharp and open, simple or sometimes a little unequal, the terminal leaflet typically ovate, the petiole hairy and aciculate, but only slightly setose. Stipules naked or very slightly hairy on the back, faintly setoso-ciliated. Peduncles rather thickly beset with strong setæ, the calyx-tube gracefully ovate-urceolate, naked or just setose at the base. Sepals fully pinnate, naked on the back, very slightly setoso-ciliated, reflexed after the whitish petals fall, deciduous before the ovate-urceolate fruit changes colour, which near Plymouth is early in September. Styles glabrous or very nearly so.

The plant appears to be widely diffused over the Continent, as there are records of its occurrence from Piedmont northward to Scandinavia, and from France eastward to the Caucasus. There is an original example from Jacquin in the Linnæan herbarium, which I have examined. This has more hairy styles and a shorter and more prickly calyx-tube than the English specimens. I have seen it from various stations in Savoy, Switzerland, France, and Germany. It is the *collina* of Gmelin, Persoon, Rau, Trattinick, Reichenbach, Allioni, Willdenow, Fries, Boreau, and Déséglise; the *canina*, var. *collina*, of Lindley, Seringe, Koch, Grenier and Godron, Reuter, Rapin, and numerous other authors. M. Déséglise describes his typical plant as furnished with woolly styles, but notes that specimens from Angers have glabrous styles, in combination with leaves a little doubly serrated. Fries assigns to it cernuous mature fruit, but in our plant the peduncles, which in the specimens I have seen vary in number from one to eight in a cluster, are always erect. Déséglise says that the midrib of the leaves beneath is furnished sparingly with glands. This I do not see in our specimens, which have also a less setose petiole than the Continental examples I have seen, including that of Jacquin. I have not seen

Jacquin's figure, and that in the second volume of Redouté's 'Roses' (number 54, counting from the beginning in my edition, but the plates are not numbered), under the name of *R. collina*, is a different plant, belonging to the section *Systylæ*. In Scandinavia it is restricted to the extreme south-west. The plant figured as *R. collina* in 'English Botany' is, as has been already sufficiently made clear, *R. systyla*, but *R. collina*, Woods, in Linnean Transactions, 12, p. 219, is the true plant; it was, however, not known to Woods as British. The *R. collina* of De Candolle's 'Flore Française' is, according to a specimen from Dr. Rapin, exactly the *R. dumetorum* of my fasciculus, but the plant of Seringe in the 'Prodromus' is that of Jacquin.

R. Andevagensis, Bastard, and *R. cæsia*, Smith, connect *R. collina* with the typical *canina*. In all reasonable probability, it is, as regarded by Koch, the original wild stock of the innumerable modifications of the *Rosa alba* of horticulture. 'Certissime,' he writes (Synopsis, 2 edit. p. 252) "varietas est *R. caninæ collinæ* floribus plenis, et pæter hanc notam, ne quidem alia reperitur." This is met with sometimes in Britain, as in France and Germany, as an occasional straggler from cultivation. There is a specimen in Sir J. E. Smith's herbarium, collected by Mr. Winch in a hedge on the south or Durham side of the Tyne, near Gateshead.

ON THE VEGETABLE ORIGIN OF DIAMONDS.

We have already mentioned that Professor Goeppert obtained the prize offered by the Dutch Scientific Society for an Essay on the vegetable origin of Diamonds, and we are now able to give a short abstract of this highly interesting essay.

Since Lavoisier showed that diamonds were composed of pure carbon very different opinions have been entertained about their origin, some believing them to be produced by Plutonic, others by Neptunian agency. Newton inclined toward the latter view, and Brewster agrees with him. In 1842 Liebig pronounced the formation of diamonds to be the result of an uninterrupted process of chemical decomposition. "Imagine this chemical decomposition taking place in a fluid rich in carbon and hydrogen, and you have a combination still richer in carbon, out of

which will issue as a final result of its chemical decomposition, pure carbon, and that in a crystallized form." Indeed a high temperature is adverse to the formation of diamonds, as diamonds become black when subjected to a high degree of temperature, and, according to Despretz's experiments, they are even converted into graphite and coke. The black diamonds, or so-called "carbonates of Bahia," are in part a mixture of uncrystallized carbon and diamonds, as shown by the process of combustion, to which at my desire they were submitted by Professor Löwig. That diamonds originated under Neptunian agency is further proved by the frequent occurrence of crystals in them. I have seen them in hundreds of different specimens, and even small drusy cavities containing them. In my essay I have given ample proof that at one time diamonds were soft bodies. Hitherto only one diamond, in the possession of the Emperor of the Brazils, has been known, on which the impression of a grain of sand was visible. I have before me a rhombic dodecahedron, on the whole surface of which impressions of grains of sand are visible, and a similar crystal of the black diamond on which the same impressions exist. In a third there is a cavity with bent and broken crystals of an unknown kind. Two others, an octahedron and a rhombic dodecahedron, have on their surface deep impressions of crystals which are not those of diamonds. The Neptunian origin of diamonds can therefore no longer be doubted. G. Bischof also thinks that after the discovery of iron pyrites in the diamond any doubt respecting the formation of diamonds in a moist way has been dispelled. In close connection with these observations is the question about the vegetable origin of diamonds, which in a measure was answered by Newton, who regarded them on account of their great power of reflecting light, long before their true chemical condition was ascertained, to be coagulated fatty or oily bodies. Jameson and Wilson endeavoured to prove this theoretically, Petzholdt practically, by the vegetable cells found in the ashes of diamonds. The vegetable origin of coal and anthracite, and their sedimentary formation, having been thoroughly established, I examined, starting from this point, graphite (hitherto regarded as being without structure, but doubtless having a Neptunian origin) and the diamond; and by the experience I have gained from observing for a number of years, chalcedony and amber, I am able to distinguish sufficiently between mechanical formations and formations of a vegetable origin. I have not yet attained any results

with respect to graphite, but in diamonds I have found numerous foreign bodies enclosed, of which if they cannot be said to be evidently and undoubtedly vegetable in their origin, it would on the other hand be difficult to deny their vegetable nature altogether. The careful figures which will accompany my essay, will enable others to judge on this point, and will, if nothing else, open up the way for further researches.

VEGETABLE HYBRIDITY.

M. C. Naudin has recently communicated to the Academy of Sciences of Paris some observations on the hybridity in plants, which place in a striking light the possible variations of which the impregnation of one plant by the pollen of another may be the cause. At the same time they furnish important data in the discussion of questions connected with the origin of species. Thus although hybrid plants, when endowed with sufficient fertility to propagate their kind beyond the second generation, frequently and speedily revert to the type of one or the other of the original species, nothing is more common than to find that certain individuals not only persist in their divergence from both the primary types, but actually depart still more widely from the original parents, and even in some cases present considerable differences from the first generation of hybrids. The elucidation of these curious points has been the object of M. Naudin's experiments, of which the results are contained in the memoir of which we propose to furnish our readers with an abstract.

In 1862, M. Naudin experimented with four species of *Datura*, namely, *D. lævis*, *ferox*, *Stramonium*, and *quercifolia*, all belonging to a subgeneric group which may be divided into two series, in one of which the plants have green stems and white flowers, whilst in the other the stems are more or less tinged with brown and the flowers violet. *D. Stramonium*, *lævis*, and *ferox* belong to the former, and *D. quercifolia*, with some other species, to the latter. The four species are perfectly distinct, and show no tendency to variation.

The intercrossings, made with all necessary precautions, were very successful. They were effected in both directions; that is to say, the

pistils of each species were impregnated with the pollen of the other. From the species *D. lævis* and *ferox* thus doubly crossed, the author obtained in 1863 sixty young plants of *D. lævi-ferox*, and seventy of *D. feroci-lævis*. The whole of these 130 plants grew freely, and were so perfectly similar in appearance that the two sets could not have been distinguished, the entire collection of hybrids being as homogeneous and uniform as if they had been a group of individuals of a fixed species or a pure and distinctly marked race.

On the other hand, to M. Naudin's surprise, these hybrids presented no appearance of being intermediate between the two well-marked species from which they were derived, so that any one ignorant of their origin would not have hesitated to regard them as forming a distinct species: and, curiously enough, whilst both the parents belonged to the section with green stems and white flowers, the hybrids would be referred to the other group, their flowers being violet and their stems brown.

This result was so unexpected and paradoxical that M. Naudin resolved to repeat his experiments, and this year he made a new sowing both of the hybrids and of the parent species. He obtained thirty-six new plants of *D. lævi-ferox* and thirty-nine of *D. feroci-lævis*, which were identical with their predecessors of 1863, having the stems brown, the flowers violet, and the fruit spinose. But the sowing of *D. ferox* furnished an explanation of this curious fact, for the author found that, at the moment of germination, the stem is of a deep violet-purple tint from the root to the cotyledons, and that this coloration persists in its original place throughout the life of the plant, forming a coloured circle round the stem. Thus the tendency to coloration seems to reside in the *D. ferox*, although here it is reduced to a rudimentary state; in the hybrid it becomes enormously increased, pervading all parts of the plant, and especially influencing the flower.

The second generation presented variations of a different and still more remarkable kind. The seeds of the above-mentioned hybrids sown last spring furnished nineteen plants of *D. feroci-lævis* and twenty-six of *D. lævi-ferox*. But in spite of the great similarity of their parents, these plants presented a most astonishing diversity of forms, so that out of the forty-five plants composing the two sets, no two were exactly alike. They differed greatly in size (some being four times as large as others), in general aspect, in form of leaf, in the co-

loration of the stem and flowers, in fertility, and in the size and superiority of the fruits. One plant of the *lævi-ferox* series had completely reverted to the type of *D. lævis*, except that the base of its stem still bore a violet ring; a few showed faint traces of resemblance to *D. ferox*, but the majority were more like *D. Stramonium* and *quercifolia*, with which they had no relationship, than the species from which they were descended. "In fine," says the author, after describing some of their chief differences, "the forty-five plants of the two lots formed, so to speak, as many individual varieties as if, the connection which should have bound them to specific types having been broken, their vegetation had deviated in all directions. This may be called *disordered variation* in opposition to another and very different mode of varying which will be mentioned hereafter."

In 1863, M. Naudin obtained a plant and seed of *Mirabilis longiflora-Jalapa* of the first generation, procured by impregnating the common purple-flowered Marvel of Peru with pollen of *M. longiflora*. The seed was sown, and the two plants grew to a large size, perfectly similar in every respect and intermediate between the parent species. They were moderately fertile, and furnished some hundreds of perfect seeds.

From seeds of the first plants obtained in 1862, M. Naudin raised six other hybrids, of course of the second generation. These did not resemble the hybrids of the first generation either in size or appearance. Two of them were nearly alike: they were vigorous, and flowered abundantly, but were quite barren. A third had almost reverted to the *M. Jalapa*, differing chiefly in the longer tube of the corolla; this was fertile. The remaining three were stunted in their growth, very dissimilar in appearance, and barren,—at least they produced only a few fruits in which the seeds were imperfectly formed. Three new plants of the second generation grown in 1864 presented the same diversities; they resembled neither those of the preceding year nor the first hybrids. One of them, which approached *M. Jalapa* in its characters, was very fertile; the others flowered irregularly and were barren. This second experiment gives further evidence of the disordered variation of the products of a hybrid plant, when they do not revert towards one of the parent species.

It becomes a question whether this tendency of the hybrids to vary continues to the third and following generations. In 1863 and 1864 the author observed the sixth and seventh generations of a hybrid,

Linaria purpureo-vulgaris, which he had preserved for several years. In each case he had several hundred individuals. A good many of the last generation partially or completely reverted to the *L. vulgaris* with yellow flowers, and a few to the *L. purpurea*. A greater number presented no tendency towards either of the parent species, but nevertheless did not resemble the hybrids of the first generation. They presented all the phenomena of disordered variation.

Similar facts occur daily in the practice of gardeners. The two cultivated species of *Petunia* (*P. nyctaginiflora*, with white flowers, and *P. violacea*, with purple flowers) may be intercrossed and produce fertile hybrids. Those of the first generation are all alike; in the second, they become remarkably diversified, and this variation increases until the plants are often monstrous, the changes being assisted by the artificial impregnation of one variety by another. The same conditions of individual variability are exhibited by a host of other cultivated flowers, of which M. Naudin cites especially the *Primulæ* and Roses of our gardens. In like manner, as he indicates, the varieties of our fruit-trees are strictly individual in their nature, it being universally admitted that it is only by grafting or budding that any particular variety can be propagated; hence he concludes they also may be regarded as hybrids between several unknown specific types.

But if hybridity, doubtless often produced by natural causes, such as the visits of insects to flowers of different but nearly allied species, be the cause of so much variation in cultivated plants, it becomes an important question whether the same cause may not give rise to a similar effect in such as remain in the wild state. In some genera, such as the *Salices*, *Potentillæ*, *Rumices*, etc., the intermediate forms between apparently well-marked species are so numerous and so well graduated, that on examination it becomes difficult to limit the species, and these genera have always furnished subjects of dispute among botanists. In these forms the supposition that their numerous varieties may be due to the influence of hybridization is rendered more probable by the fact that they present peculiar favourable conditions for intercrossing. Now if we suppose the crossing of two of these species to give rise to fertile hybrids which do not all revert to the parent types, disordered variability will come into play and produce, in a few generations, a perfect chaos of undecided forms.

The distinction between this disordered variability and the ordinary

variability displayed by many species to a greater or less extent, is that the varieties produced by the latter either disappear with the individual in which they are manifested, or become transmitted without alteration to the following generations, thus, under favourable circumstances, giving rise to a marked race,—whilst in the former the form becomes broken up in successive generations into individual variations without fixity. "Homogeneity and fixity of character are the distinctive sign of true races, as are diversity and want of permanence of the agglomerations of mongrels and hybrids."

The concluding paragraph of M. Naudin's paper indicates the direction in which these researches may be brought to bear upon some of the most important problems of the present day, especially in connection with anthropology. "I am unaware," he says, "whether facts analogous to those which I have just described have been observed in the animal kingdom, but I should not be surprised if it should be some day found that in it also intercrossings between well-marked races are the cause of individual variability, and that they are incapable of creating new races, that is to say, uniform aggregations capable of indefinite duration. It would certainly not be uninteresting to ascertain whether, by alliance with one another, very distinct races fuse into a new mixed but homogeneous race, or whether, as in plants, the effect of intercrossing is to produce an indefinite diversity of physiognomy and temperament."—(*Reader*.)

[At an early opportunity we shall give an abstract of the important researches into hybridity, which Wichura has published in his recent work on Willows.—EDITOR.]

HIERACIUM VILLOSUM.

BY J. G. BAKER, ESQ.

In his 'Monograph of the British Hieracia,' p. 41, my friend James Backhouse, jun., says, with regard to *H. villosum*:—"The species is omitted, under the firm belief that it is not British. The evidence resting upon the specimen in the herbarium of the York Museum, supposed to be collected by the late G. Don, is weak and unsatisfactory. I believe it to be a foreign specimen, and that the plant found by Don

was either *H. calenduliflorum* or *H. eximium* (figured as *H. villosum* in Eng. Bot. 2379). The specimen above referred to is not marked "Lochnagar" exclusively, as though that identical specimen had been found on that mountain, but "Lochnagar and other mountains," making it highly probable that this specimen was one received from the Continent, and erroneously supposed by Don to be British, and identical with the plant which he had collected on Lochnagar and other mountains which had received the incorrect name of *H. villosum*."

Amongst the *Hieracia* of the collection of the late Mr. W. Robertson, of Newcastle-on-Tyne, which are now deposited in the Newcastle Museum, there is a good specimen of what is unquestionably the true plant, and it is marked, in a handwriting which I believe to be that of Drummond, "*H. villosum*, rocks near Loch Callater, north of Clova." As the following notes of character, which I took from this specimen, will show, the plant may be readily distinguished from any of the admitted British species. Stem about a foot and a half high, densely hairy throughout, with long flexuose silky hairs; leaves not forming a definite rosette when the plant is in flower, but two from near the base oblanceolate, with a long haft, and five more below the lowest branch, the three upper of which are ovate-acute, and clasp the stem slightly, all densely hairy, and ciliated with long hairs like those of the stem, furnished with only one or two blunt or sharpish teeth on each side. Stem branched from the middle. The branches three in number, and only single-headed; their bracts large and leaf-like, and the main peduncle furnished with three broad shaggy ovate bracts in addition. Heads large and showy, ultimately ventricose; the peduncle and involucre densely villose, the latter slightly floccose, but not at all setose. The phyllaries numerous and unequal, a few of the outer ones rather loose and bluntish, but the inner ones all acuminate. It has a more leafy stem than any of our *Cerinthoidea*, combined with glabrous ligule, and as shaggy an involucre as any of the *Alpina*. The Continental distribution, however, does not seem to lend countenance to the idea of the plant being really British. It is not a Scandinavian species; in France is confined to the south-east, and absent from the Pyrenees, and none of the other members of the same group come any nearer to us.

The same series includes specimens from Drummond of *argenteum*, *calenduliflorum*, *eximium*, *holosericeum*, and *globosum*, and some, at any

rate, of them have been submitted to the inspection of Sir J. E. Smith. *H. argenteum* is marked by Drummond "*H. glaucum*," and Smith has written upon the label, "Whose name is *glaucum?* Surely 'tis not Willdenow's, No. 39. I have nothing like this named or unnamed, but it cannot be described from this specimen." *H. calenduliflorum*, Drummond has marked "No. 33, species nova;" and Smith writes: "*H. pumilum*, Willd., mentioned in E. Fl. vol. iii. p. 366." Some of the specimens are marked by Mr. Robertson as having been received in December, 1824.

HUTCHINSIA ALPINA.

With reference to what the Rev. W. W. Newbould has already placed on record with regard to the possibility of this being an Ingleborough plant, (Journ. of Bot. Vol. I. p. 359,) I may mention that in the collection of the late William Backhouse, of Darlington and Wolsingham, so unfortunately destroyed through being lent to me at the time when my house was burnt, there was a specimen of this under the name of *Lepidium petræum*, marked as having been received from Mr. Caley about the year 1790. (Speaking from memory only, I forget the exact date.) No station was given; but, as in all probability this is the same Mr. Caley who collected plants in the Settle district, a note of the fact seems worth placing by the side of what Mr. Newbould has stated.—J. G. Baker.

NEW PUBLICATIONS.

Fragmenta Phytographiæ Australiæ. Auctore F. Müller, Ph.D. Vol. IV. Fasc. XXVII.–XXIX. Melbourne, 1864.

These three fasciculi are a valuable addition to a work justly appreciated by all systematic botanists, and they contain a great number of new plants, and improved generic and specific characters of old ones. We notice the following new genera:—*Michica (Epacrideæ)*, *Mackinlaya (Araliaceæ)*, *Bulweria (Bignoniaceæ)*, and *Haussmannia (Bignoniaceæ)*. *Mackinlaya* is a very remarkable genus, which was pre-

viously known to us from Cunningham's collection, and which we had marked as new. *Bulweria* does not seem to differ from *Deplanchea*, Vieillard et Bureau in Bull. Soc. Bot. Fran. 1862, from New Caledonia. *Haussmannia* is evidently closely allied to *Campsis*, but may be distinct. Amongst the many new species is a *Musa*, from Mount Elliot (*M. Banksii*). It is not stated whether the fruiting panicles are erect as in *M. Troglodytarum*, or nodding as in *M. Chinensis*. *Hedera Australiana*, with pinnate leaves, seems to us to be the type of a new genus. The ruminate albumen, a feature common to several *Hederaceæ*, is not sufficient to make it a true *Hedera*, which has *simple* leaves, and a *semi-inferior* ovary, whilst *Hedera Australiana* has compound leaves and a completely inferior ovary. *Aralia Moorei*, which Dr. Müller incidentally mentions, belongs to *Heptapleurum*, and is identical, as the author justly suspects, with *Paratropia venulosa*.

British and Garden Botany; consisting of Descriptions of the Flowering Plants, Ferns, and Trees indigenous to Great Britain, with Notices of all Plants commonly cultivated in this country for use and ornament; preceded by an Introduction to Structural and Physiological Botany. By Leo H. Grindon. With numerous illustrations. London: Routledge, 1864. 8vo, 869 pp.

Mr. Grindon is not the only person to whom publishers have applied to write them a book on botany, for which, they assert, there is a constant and daily demand. The popular mind will have it tha there must or ought to be a cheap book, consisting of a single volume and comprising all the indigenous plants of our islands and those most commonly cultivated in our gardens, described in untechnical language, and arranged in such a way that a mere beginner can find out their names by using some cleverly-constructed key. There must be besides plenty of popular matter about the different species; folk-lore must be noticed, and appropriate scraps of poetry must be introduced. All this, and a great deal more, is expected from this wonderful volume; "and if you would only write it," your publisher continues, "it might result in mutual advantages"—which the publisher generally manages to see very clearly, but the author very seldom does. It appears that Mr. Grindon has attempted to supply what the public so urgently demand. How far, in doing so, he has

pleased his patrons, we have slight means of knowing; but we do know that his scientific brethren have censured him most severely for attempting a task from which they prudently abstained. We have read all that has been said against this book—who has not?—and do not think that even the worst is more damaging than what could be said with equal force against some of the leading books, *which Mr. Grindon's does not profess to be.* We have also read the paper war which the author has carried on with his reviewers, and our impression was that in writing this volume he relied too much upon authorities and not enough upon his own observation, and that he was labouring under the mistaken notion that Londoners were not prepared to do full justice to anything that had been done in the provinces. If provincials fail to obtain in London that ready recognition they expect, it is simply owing to their writings not being up to the mark—no other cause.

The volume opens with an Introduction to Structural and Physiological Botany. It is succeeded by an Artificial Key to the different Natural Orders. We have tried this Key, and have found it to answer in many, though not in all instances; but its general utility can only be tested by going through the whole volume carefully. In a popular book, such as the author has attempted to produce, it was absolutely necessary to rely very often upon non-essential characters, such as have no value in the eyes of sound systematic botanists, but which could be readily seen by those for whose special use the Key was constructed. The difficulties of contriving a Key are so great, that to our knowledge the author of one of our leading Floras has been on the point of omitting it altogether in his new edition, and only retained it at the request of his friends. We only pointed out, at page 7 of our second volume, that by none of the Keys affixed to our different Floras could such a common plant as *Hydrocotyle vulgaris* be made out. And we have the same complaint to prefer against this book. In looking for *Hydrocotyle* we stuck fast at page 76, where we have—"Leaves alternate *and stipulate*" (*Hamamelideæ* and *Agrimonia*), and "Leaves alternate *and without stipules*" (*Hederaceæ*, *Umbelliferæ*, etc.). Now, as *Hydrocotyle* has stipules, a person who really looked at the plant would have to seek for it among the *Hamamelideæ* or in the genus *Agrimonia!* The same remark applies to the stipulate genus *Heliosciadium*.

The Key is succeeded by an enumeration of the different families and species; genera are omitted, because "they can only be learned from the contemplation of many species of a genus. A very large number of our British genera contain only one native species each, so that there is nothing for the student to compare and collate. What may be the limits of the genera in some of the largest and most important families, is subject, moreover, to great diversity of opinion, and, while the magnates dispute, the simple student had better wait, and look to families and species." We do not think the author was wise in omitting the genus on this plea. Those who teach any science, however elementary, should never lose sight of the necessity of instilling general principles. One of the reasons why there are so many who have been studying botany all their lives, and never got beyond the alphabet, is owing to their learning nothing but dry and unconnected details. At most they never progress beyond species-botany of their immediate neighbourhood, and the greatest discoveries in our science are received by them with the most perfect indifference. The gulf which separates this evidently large class from the more philosophical botanists, who eagerly follow all that our best minds bring forward, is so great, that those who in any way could help to bridge it over would be doing really good service.

On the whole, Mr. Grindon's book will satisfy the wants of popular readers. He has made many scientific facts accessible to the masses, and will probably see reason to introduce corrections and additions in a subsequent edition.

The Vegetation of the Chatham Islands. Sketched by F. Mueller, Ph.D., etc. By authority. Melbourne: 1864. 8vo, 86 pp.

The Chatham Islands, south of New Zealand, have recently been explored botanically by Mr. Henry Travers, of Canterbury, New Zealand, whose father generously defrayed the expenses of the expedition, an account of which was some weeks ago read before the Linnean Society, of London. In the volume before us, Dr. Mueller has given us an enumeration of the most complete sets of the plants collected on this occasion, together with all that was previously known of the flora, as far as Phanerogams and Ferns are concerned. But we regret that he did not postpone the publication a few weeks, until Dr. Hooker's 'Handbook of the New Zealand Flora' should have reached him, in which

the Chatham Islands plants are taken up; and, as there was no particular hurry, collision would have been avoided.

The collections made by various botanists in the islands comprise 129 species of apparently indigenous plants. We should here observe that this number must be taken *cum grano salis*, as in this volume Dr. Mueller exhibits very advanced views in the definition of species, going far beyond even Dr. Hooker. The author feels this himself, and at page 7 offers some explanation. "The description of a genuine species," he says, "clearly should be so framed, as to admit of its embracing any of the aberrations from the more usual type, to which, under various climatic or geologic circumstances, a species can possibly be subject; and the diagnosis should be so constructed as to include all the cardinal characters of the species, none of these ever admitting of exceptions." Of these 129 species, 42 are Dicotyledons, representing 32 Orders and 37 genera; 20 are Monocotyledons, distributed over 9 Orders and 19 genera; the remaining 67 plants are Acotyledons. There are besides 12 Mosses and 9 Lichens in Mr. Travers's collection. Only 9 phanerogamic plants are peculiar to the Chatham Islands, 8 of which are referable to the genera *Coprosma*, *Gingidium*, *Eurybia*, *Senecio*, *Leptinella*, and *Myrsine*, all represented in New Zealand; whilst only 1 constitutes a genus peculiar to the islands (*Myosotidium nobile*). Seven of these endemic species are figured in Dr. Mueller's book, the *Myosotidium* being already known from the plate in the 'Botanical Magazine.'

On the Sexual Relations of the Three Forms of Lythrum Salicaria. By Charles Darwin, F.R.S. (Reprinted from the Journal of the Linn. Soc. Botany, vol. viii. p. 169.)

No long time has elapsed since physiologists were startled with the results of Mr. Darwin's experiments on dimorphic Primroses; dimorphism had, indeed, been previously noted in many genera, but systematic botanists (herein laying themselves open to such unsparing comments as Professor Schleiden dealt out to them) paid but little attention to the subject. It was reserved for one in high repute as a geologist and as a zoologist, but little known in the world of botany, to unravel in great measure the singular life-history belonging to the *Orchideæ*, the Primroses, the *Linums*, etc. Other observers (such as Mr. J. Scott, Mr. Trimen, and others) soon took up the matter,

and with the general result of confirming and extending Mr. Darwin's observations.

We have now before us, from Mr. Darwin's own pen, the results of his researches into the sexual nature of *Lythrum Salicaria*, and these results are more curious and important than any previously published. The details are numerous and somewhat complicated, hence we propose merely to lay before our readers the main facts of the case, referring them to the original paper for more copious information.

Lythrum Salicaria is, as to its stamens and pistil, trimorphic; three forms of flower are found on different individual plants. These three forms may be grouped as follows:—

1. Long-styled form has six medium stamens and six short stamens.
2. Mid-styled form has six long stamens and six short stamens.
3. Short-styled form has six long stamens and six medium stamens.

In all these instances, the long stamens correspond in length with the long style, the medium stamens with the medium style, and so on. Each individual flower therefore has a style,—long, medium, or short, as the case may be, and two out of the three sets of stamens which are above-mentioned.

In addition to these differences in length, there are other differences in the direction of the styles and stamens, in the size of the stigmas, the colour of the filaments and of the pollen, as well as in the number and weight of the seeds.

Mr. Darwin tells us that all these arrangements have reference to the comparative facility or difficulty experienced by insects in visiting the flowers, and he has endeavoured to work out for himself what nature effects by the agency of bees and other insects. Some idea may be obtained of the labour and patience involved in this undertaking from the fact that it was necessary to bring about eighteen distinct unions, fertilizing more than a dozen flowers on the average in the eighteen different methods; thus the long-styled form (No. 1) had to be fertilized with pollen from its own two distinct kinds of anthers; from the two sorts of anthers in the mid-styled form (No. 2), and from the two in the short-styled form (No. 3); the same process had to be repeated with Nos. 2 and 3. It might have been thought sufficient to have tried on each stigma the pollen from one set of long, or medium, or short stamens, and not from both sets, but the results proved that this would have been insufficient, and that it was neces-

sary to try all six kinds of pollen on each stigma. Into the details of these experiments we cannot go; we can merely say that they are recorded with Mr. Darwin's usual candour, so that the mention of his occasional failures and mishaps does but strengthen our confidence in the general results of his labours. From these results we glean the following more important facts:—First, that as in structure, so in function, there are three female organs; for when all three receive the same pollen, they are acted on most differently, and conversely the same holds good with the three sets of stamens.

Secondly, only the longest stamens fully fertilize the longest pistil, the middle stamens the middle pistil, and the shortest stamens the shortest pistil. These are the results of what Mr. Darwin calls "legitimate unions," of which there are for each pistil two; the other possible unions, "illegitimate unions," of which there are four for each pistil, are less fruitful, and the greater the inequality in length between the pistil and the stamens, the greater the degree of sterility. Now the insects carry the right sort of pollen to the right stigmas by reason of the structural arrangements before alluded to, but while they thus act "as special carriers" of the right kind of pollen, they do also act as "general carriers of pollen," and so the stigmas may become dusted over with different sorts of pollen. But the "illegitimate" pollen is neutralized by the "legitimate" pollen, even if the latter be not applied to the stigma until after the former. Mr. Darwin cites experiments of his own on *Primula* in proof of this, and also refers to Gærtner's experiments on the pre-potency of legitimate pollen, in support of his opinions.

The mid-styled form, No. 2, appears to be more feminine in its nature than the other two; it produces a larger number of seeds; on the other hand, the potency of the two kinds of pollen in this form is less than that of the corresponding stamens of the other two forms.

Furthermore, the green pollen from the long stamens of No. 3, and that from the precisely similar stamens of No. 2, although identical to all appearance, is nevertheless very different in its action. The same remark applies to the pollen from the short stamens of No. 1, and that from the corresponding ones of No. 2, so that not only does *Lythrum Salicaria* habitually produce three females differing in structure and function, but also five kinds of pollen differing in a marked manner in potency.

Some other species of the genus are briefly commented on, from which it appears that some are monomorphic, some dimorphic, some trimorphic.

Whence and wherefore this diversity in sexual function in one genus?

Why this complexity in a single species?*

We can only just make mention of a few among the many inferences and speculations that arise from a perusal of this paper. One of the most important subjects to be considered with reference to these researches is, of course, the question of species. Sexual distinctions, such as those above mentioned, afford the physiological test of specific distinctness, as well as most plants do that are universally considered as belonging to distinct species. Will any naturalist affirm that we have in this trimorphic *Lythrum* three species and not one?

Again, it may be asked, what relation, if any, exists between these variations in the reproductive organs and those which are commonly met with in the branching of the stem, the length of the bracts, the size of the petals, the arrangement of the leaves, etc. This is a point deserving careful observation; Mr. Darwin seems to think that the offspring of the illegitimate unions present some singular characteristics, but for the present he is silent as to what they may be.

One other point in the history of this plant we must briefly notice, in the hope that some light may be thrown upon it by further researches into its structural peculiarities and habits of life; we allude to the capacity the plant has for living under what appear to be very different conditions. It is found naturally along the margins of ditches and wet places, and yet it thrives luxuriantly, and is quite as fertile in dry garden soil as in its native habitat. In conclusion, we must express our hope, that not only Mr. Darwin, but very many other trustworthy observers, will greatly extend this class of observations, than which none are more promising for the advancement of physiological and structural botany.

We have received the following books and pamphlets for notice:—Max Wichura: Bastardbildung im Pflanzenreich, 4to.—S. O. Lindberg: Om *Sedum dasyphyllum* pa Gotland; Bidrag till Mossornes Synonymi; Utereding af de skandinaviska *Seligeriæ;* Torfmossornas byggnad, utbreding och systematiska

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* See as to this point Professor A. Gray's note on Dimorphism in the Genitalia of Flowers, in this Journal, Vol. I. p. 147.

uppställning; Om de Europeiska *Trichostomeæ;* Om ett nytt slägte, *Epipterygium*, bland mossorna; Om de officinella barkarne; Om en ny art af slägel *Hypnum;* Anmärkningar angaende *Hypnum Vaucheri* och *Eucladium verticillatum* in Bot. Not. 1863; Granskning af mossorna uti Vaillant's 'Botanicon Parisiense;' Ætheriska oljors förekommande i lefvermossor (*Æther oleum Hepaticarum*).—P. T. Cleve: Om de Svenska arterna af släget *Vaucheria*, De Cand.; Bidrag till Kännedomen om Sveriges sötvattensalgar af familjen *Desmidieæ*.—Carl Hartman: Handbok i Skandinaviens Flora.—C. Darwin: On the Sexual Relations of Three Forms of *Lythrum Salicaria*.—Th. Kotschy: Ueber Reisen und Sammlungen; Libanon und seine Alpenflora; Sommerflora des Antilibanon.—F. Parlatore: Studi organografici sui fiori e sui frutti delle Conifere.'—De Candolle: Prodromus, Pars XIV. sectio posterior (sistens *Cupuliferæ, Corylaceæ, Juglandaceæ, Myricaceæ, Platanaceæ*).—F. Unger und Th. Kotschy: Die Insel Cypern.—G. von Jæger: Wirkungen des Arseniks auf Pflanzen.

BOTANICAL NEWS.

Dr. Livingstone is preparing for another expedition to the East Coast of Africa.

The Emperor of the Brazils has nominated one of our most esteemed contributors, Mr. John Miers, F.R.S., a Commendador (or knight of the highest class) of the Order of the Rose, and accompanied the insignia by an autograph letter.

Sieber's Herbarium, consisting of 30,000 species, amongst which are a good many plants named by Linnæus, has become the property of Baron Reichenbach, of Vienna, the writer on Odic Force, and not to be confounded with the two great botanists of that name.

Dr. Hanstein, Curator of the Berlin Herbarium, has been appointed Professor of Botany at Bonn, in the place vacated by the death of Dr. Schacht.

Mr. M. C. Cooke has just published an interesting book on 'Rust, Smut, Mildew, and Mould.'

Dr. Schleiden, who had only recently gone as Professor of Botany and Anthropology to Dorpat, has given in his resignation; the scientific opinions he holds are in that part of the world considered of so advanced a nature, that they have brought him in unpleasant contact with the Church party.

Dr. H. Schott, Director of the Imperial Gardens at Schönbrunn, near Vienna, has been proposed to fill the vacancy caused by the death of Professor Treviranus, of Bonn, in the list of the Foreign Members of the Linnean Society.

One of the botanical events of last month has been the reading of a paper on Climbing Plants, by Mr. Charles Darwin, at the Linnean Society.

It has long been a matter of regret that the writings of Robert Brown, *botanicorum facile princeps*, scattered as they are in various periodicals, transactions of learned societies, and voyages and travels, should not be accessible to English botanists in a collected form, except in the 'Vermischte Schriften' of

Robert Brown, published in German by Nees von Esenbeck. We are therefore glad to announce that Mr. J. J. Bennett has now in the press a complete edition of these valuable writings, to be published by the Ray Society; the letterpress will be in octavo, and the plates be given in a separate Atlas.

We are glad to learn that the projected 'Contributions to a Cybele Hibernica' is making satisfactory progress in the hands of Mr. A. G. More and Dr. D. Moore. They hope to complete and publish it in the present year. A notice has been printed and circulated in the hope of obtaining help from scientific men towards the expense of publication. A subscriber of 10*s*. will receive a copy of a book, or 20*s*. two copies. Subscriptions will be thankfully received by Dr. E. P. Wright, 5, Trinity College, Dublin, and Dr. D. Moore, Glasnevin Botanic Garden, Dublin.

'Analytical Drawings of Australian Mosses,' edited by Ferdinand Mueller, Ph.D., etc. (Melbourne, 1864), is the title of an elegant little volume, dedicated to Sir Charles Nicholson, and, containing twenty engravings of Australian Mosses, with a short description of each species. These Mosses were collected mostly by Dr. F. Mueller, in the southern parts of Australia, and the descriptions have been furnished by Dr. Hampe, of Blankenburg, aided by Dr. Carl Mueller, now of Berlin. The illustrations were drawn in Berlin, and under the editor's supervision, lithographed by Mr. F. Schoenfeld, in Melbourne.

The valuable 'Supplement to English Botany' continues to appear, although at rather long intervals. No. LXXXI., just arrived, contains plates of *Teucrium Botrys*, *Alchemilla conjuncta*, *Ulex Gallii*, and *Poterium muricatum*, and the text to complete former numbers, as well as that belonging to the above-named plants. We need scarcely remind our readers that this Supplement is carefully prepared, and is requisite to complete either the original or second editions of 'English Botany.'

We regret to announce the death of Dr. Hugh Falconer, F.R.S., which took place in London on the 31st of January last. Falconer was born at Forres, Scotland, on the 29th of February, 1808, and received his education at Aberdeen and Edinburgh, afterwards proceeding to the East Indies, where he held for some time the office of Director of the Botanic Gardens at Suharunpore and Calcutta. He was better known as a fossil zoologist than a botanist; yet we owe to him a considerable collection of dried plants, some excellent reports on the cultivation of tea and chinchona, and the preservation of teak forests in India, as well as several valuable botanical papers communicated to the Linnean Society, viz. 'On the Asclepiad Affinities of *Cryptolepis*,' 'On *Aucklandia Costus*,' the Cashmere plant which yields the *Costus* of the ancients, 'On *Narthex Asafœtida*,' which produces the Assafœtida of commerce; and 'On *Athalamia*, a new Genus of *Marchantieæ*.' Falconer was the first who settled the much disputed questions about the plants which produce the *Costus* of the ancients and the Assafœtida of commerce; and before his first departure to India he assisted Dr. Wallich in the distribution of his herbarium.

Miss Gifford, the author of 'Marine Botany,' has published, in the Report of the Cornwall Natural History Society, an able memorial of the late Miss Warren, from which we shall make a few extracts:—The late Miss Warren, of Flush-

ing, near Falmouth, was an ardent botanist; for many years she collected the botanical treasures in her neighbourhood, and the exhibitions of the Cornwall Polytechnic Society were generally enriched by some evidence of her labours. She was a member of this Society from its commencement, and always gave her assistance in the adjudication of natural history prizes. In the investigation of that flora, the growth, not of the land, but of the sea, she displayed much patient research and correct judgment. When her attention was first turned to this branch, there were few works on the subject, and the large number of seaweeds found on the British shores were not discriminated and arranged as they now are. The labours of Mrs. Griffiths, of Torquay, were adding increasingly to the knowledge of these plants; Miss Warren, following her example, explored the shores of her native county, and discovered a fine species in Falmouth harbour, *Kalymenia Dubyi*, until then unknown on our coasts. Her name will survive in connection with the Algæ, in the *Schizosiphon Warreniæ*, a species discovered at Mainporth, near Falmouth, by Dr. Caspary, and named in her honour. Her knowledge and research were equally apparent in other departments of botany. The 'Botanical Chart' which she published for the use of schools contains a great amount of information respecting the useful properties of plants. Recently, a passage from this chart was most unfairly copied without acknowledgment. Miss Warren, with a fund of real knowledge of the local botany of her neighbourhood, did not publish her observations in any form. Her correspondence was a large one with celebrated botanists, and the labours of making and arranging her various collections fully occupied her time when at home. She was always ready to enter upon any new field of inquiry. In 1855 she read a paper of mine on the Botany of West Somerset, in which I referred to the number of new species of the genus *Rubus*. She directly asked me for specimens, and set to work at this difficult subject. The result was that, in 1860, she recounted her success to me in these words:—"I must tell you of a feat of mine, which I deem a *great one for me now*. I sent a collection of *Rubi* to the last Polytechnic Exhibition. They were sixteen distinct species, all from Cornish localities. It was a novelty, and I hope my having brought forward this neglected genus will induce some active young person moving about the county to ascertain how many are really natives of Cornwall out of the kinds headed '*Babingtonianæ*.' The prize awarded may act as a stimulus on any one willing to place themselves in contact with a plant so well armed for *defence* at all points,—more fitted for a cloth coat than a muslin-covered crinoline." To a friend who requested her assistance in naming these plants, she wrote:—"I cannot pronounce your Bramble-leaf to belong to *Rubus corylifolius*, for I do not think it does; but you must not expect me, after having had the honour of a prize from the Cornwall Polytechnic Society, to hazard my *fame* by venturing to give a name from a *single leaf*. It is what none of the bigwigs in *Bramble lore* would venture to do. No, no! all the fully-developed characters are required, and I beg that you will be more considerately reasonable in future. With only the early works of the *best authorities*, it is travelling in the dark." The various tribes of Lichens, Mosses, etc., engaged her attention; and latterly she endeavoured to render her collections of these plants

as complete as possible. Last year (1863) she exhibited at the Polytechnic Society a collection of British Freshwater Algæ, which received the first Bronze Medal. Before another meeting was held, she had passed to her eternal rest! This mournful event took place on the 5th May, 1863, at Flushing, near Falmouth. Cornwall lost in her an accomplished botanist, and all who were honoured with her friendship mourn a true and firm friend. It is to be regretted that Miss Warren did not make any disposition in her will of her collections. It is to be hoped that eventually they will be secured to some Institution in Cornwall or elsewhere, where they will be properly preserved and appreciated.

Botanical Society of Edinburgh.—*November* 10.—Professor Balfour, the President, delivered an opening address, in which he said:—I have much pleasure in congratulating the members on the continued prosperity of this Society. Uniting as it does advanced botanists and junior students of science, it has acted most beneficially in promoting the cause of botany. The volume of Transactions which is now put into your hands shows the good work done during the past session. In the department of structure and morphology, I call attention to the paper by Dr. Alexander Dickson on diplostemonous flowers, in which he points out the mode of the development of the staminal whorls in several Natural Orders, especially the *Malvaceæ*. The paper has been reprinted by Baillon. Mr. Jenner's paper on the accessory organs of *Selaginella* is also one of interest. In the department of physiology I have to notice a paper on the fertilization of Orchids, by Dr. Rutherford; also, papers on the sexual changes in the inflorescence of *Zea Mays*, and on the sexuality of the higher Cryptogams, by Mr. John Scott, who has gone to India under the auspices of Mr. Darwin. On the subject of Canadian Ferns and filicoid plants, a paper has been contributed by Dr. George Lawson, at present Professor of Chemistry in Dalhousie College, Halifax, Nova Scotia. In economical botany, we are much indebted to Professor Archer. The cultivation of tea, chinchona, and cotton is attracting much attention nowadays. Our Indian possessions are well fitted for the production of these important articles; and the reports of Dr. Thomas Anderson, Mr. Wm. Jameson, aud Dr. Alexander Hunter, have been most satisfactory. I have sent to India, within the last few years, five or six gardeners, brought up chiefly under the direction of Mr. M'Nab, the able superintendent of the Botanic Garden. These men are doing credit to our garden as a school of horticulture as well as of botany. We have had the pleasure of welcoming back our friend Dr. Kirk, who accompanied Livingstone, and has given us an account of the products of Zambesi and of Southern Africa. We may record the addition made to our flora in the finding of *Goodyera repens* at Dalmeny, by M. Claudio L. Serra, a Portuguese student, who thus discovers a new plant in a district so well examined. The same may be said of the discovery of *Asplenium viride*, near Cramond, by Dr. Carruthers. We are adding to our flora year after year. This year two new localities have been found for *Corallorhiza*—one by Dr. Dickson, and the other by Mr. Sandilands. Two ladies, Mrs. and Miss M'Inroy, have contributed useful notices relative to the Mosses of Perthshire. Fossil botany has also occupied a share of our atten-

tion. Saporta's papers on the Tertiary flora of France have been translated. During the past year 13 ordinary members have been added to our list, and 1 foreign member. The total number of ordinary members is 335 ; of honorary members, 23 ; of foreign members, 81 ; of life members (ladies), 11 ; associates, 25 : in all, 475. Dr. Balfour proceeded to the consideration of what had recently been done in the way of completing our colonial floras, particularly noticing the floras of India, Australia, New Zealand, Cape of Good Hope, West Indian Islands, Ceylon, and Hongkong. The following communications were read :—On the position of the Carpellary Groups in *Malope* and *Kitaibelia*. By Alexander Dickson, M.D. The author finds that the development of the androecium, as regards the evolution of the staminal lobes, is essentially the same in both genera.—On the Discovery of *Trichomanes radicans* in Arran. By Walter Galt, Esq. The author doubts that this Fern is native in Arran, and tries to show that in all probablity the Fern has been planted.—Note on the Discovery of *Asplenium viride*, near Edinburgh. By Mr. John Sadler. This Fern grows abundantly near that place. It was first found by Dr. Carruthers there in 1862.

December 8.—Dr. Alexander Dickson, President, in the chair. The following communications were read :—Description of New Species of Diatoms from the South Pacific. By R. K. Greville, LL.D. Part III., viz. *Campylodiscus humilis*, *Melosira nobilis*, *Auliscus Australiensis*, *Rhizosolenia striata*, *Cymbella Lindsayana*, *Navicula Robertsiana*, *N. sulcata*, *Stauroneis decora*, *S. obesa*, *Mastogloia Macdonaldii*.—Report on the Cultivation of the Quiniferous Chinchonas at Darjeeling. By Dr. Thomas Anderson, Calcutta. The following was the number of plants in cultivation there on 15th July, 1864 :—*Chinchona succirubra*, 4904 : *C. Calisaya*, 172 ; *C. officinalis*, 10,460 ; *C. micrantha*, 1705 ; *C. Pahúdiana*, 2275. The spot on which the open-air cultivation of Chinchona is carried on by Government is on the south-eastern slopes of a long spur from Sinchal, 3743 feet above the level of the sea. Private individuals are also cultivating the Chinchona at Darjeeling.—Report on the Chinchona Operations in the Neilgherries. By Mr. W. G. M'Ivor. The cultivation of Chinchona at Ootacamoond, on the Neilgherries, is as follows :—*Chinchona succiruba*, red bark, 102,344 plants ; *C. Calisaya*, yellow bark, 2137 ; *C. officinalis*, var. *Condaminea*, original Loxa bark, 4494 ; *C. officinalis*, var. *Bonplandiana* (*C. Chahuarguera*), select crown bark, 232,980 ; *C. Crespilla*, 1927 ; *C. lancifolia*, Pitay bark, 12 ; *C. nitida*, 8426 ; *Chinchona*, sp., 2769 ; *C. micrantha*, 11,561 ; *C. Peruviana*, 3176 ; *C. Pahudiana*, 425. Mr. M'Ivor also gives an account of the price of the bark of each in the London market, and of the comparative growth of the plants, as well as of the mode in which they have been distributed.—Account of a Trip to Travancore, Coonoor, etc. By Dr. Alexander Hunter, Madras.—Report on the Government Tea Factories and Plantations in the North-Western Provinces during 1863–64. By William Jameson, Esq., Surgeon-Major. Describes the manner in which Government tea plantations and factories in the Kohistan and Doons of the North-Western Provinces have been worked during the year ending May, 1864. The total yield of tea in Dehra Doon, Kumaon, and Kangra has been 66,252 lb.

Tab. 28.



Fig. 10.



Fig. 11.



Fig. 12.



Fig. 9.



Fig. 2.



Fig. 1.



Fig. 3.



Fig. 5.



Fig. 4.



Fig. 6.



Fig. 7.



Fig. 8.

M.T. Masters, & W.G. Smith, del.

Vincent Brooks, Imp.

ON THE CORONA OF *NARCISSUS*.

By M. T. Masters, M.D., F.L.S.

(Plate XXVIII., Fig. 1–8.)

The morphological nature of the "corona" of *Narcissus* has long been a matter of dispute among botanists. The late M. Gay devoted considerable attention to this subject, and in his papers in the 'Bulletin de la Société Botanique de France,' vol. vi. pp. 9 et 131, vol. vii. p. 309, will be found an account, not only of his own researches, but numerous references to the opinions and writings of others. In this place it is only necessary to give a short summary of the views held by the naturalists cited by M. Gay, and refer the reader for fuller detail to the above-mentioned memoirs.

A. de Saint-Hilaire and Germain de Saint-Pierre considered the corona as due to a process of multiplication of the perianthial segments; to this M. Gay objects that the lobes of the corona are not placed opposite to the outer or calycine segments of the perianth, as they ought to be, according to the law of alternation. Link, Gay (*olim*), Schleiden, and others, consider the corona as a mere appendage to the perianth, playing the part of internal ligules or stipules to the segments of that organ.

Cagnat traces the origin of the corona to a "*dédoublement*" of the six leaflets of the perigone.

Henfrey, on the other hand,* from an examination of the double Daffodil, where there are forty or fifty petaloid organs, each with a more or less perfect lobe at the junction of the claw and limb, considers that there is no chorisis, causing the separate development of the coronal lobes.

Baillon,† on organogenic grounds, asserts that the corona is a mere expansion of the receptacle of the flower—a disk—formed subsequently to the perianth and stamens.

Lindley considered the corona as a modified staminal whorl.

Gay's latest researches convinced him that the corona is due to an assemblage of the dilated connectives of three metamorphosed anthers;

* Morphol. of *Balsamineæ*, Journ. Linn. Soc. Bot. iii. p. 161.

† Recueil d'Observ. Bot. 1860, pp. 90–96 and 97–103.

he, moreover, from an examination of a double flower of *Narcissus poeticus*, in which there were three coronal whorls within the sepals, and no true petals or stamens, arrived at the strange conclusion that even in the normal state the three inner segments of the perianth (petals) were to be considered as metamorphosed anthers!

No one, so far as I know, has looked upon the corona as resulting from a combination of *two* rows of modified anthers; that there are reasons for so doing I shall now endeavour to show. First as to the staminal or antheral nature of the organ in question. This is, I think, established—first, by the arguments of Lindley and Gay, by the analogies with *Pancratium*, *Vellozia*, *Brodiæa*, etc. etc.;* secondly, by the transitional forms observed by Gay and also by myself in various species. Among those described by M. Gay is one to which I have already alluded, and to which I must now refer in greater detail. In this flower (fig. 1) there were twelve segments arranged in four ternary verticils. The three outer sepaline segments were devoid of corona, while the other nine, detached one from the other, bore on their inner surface the coronal segments. The three organs occupying the situation of the petals are sessile on the summit of the floral tube, but the six inner pieces are narrowed into a stalk immediately below the attachment of the coronal ligule; the stalk, free above, is below fused with the tube of the flower, exactly as is the case with the stamens in the normal flower. Clearly, then, these six inner pieces are equivalent to stamens, the three outer ones to petals. M. Gay then puts this question—Is the limb of the staminal corona equivalent to the connective, and the coronal appendage to the pollen-sacs, or is the coronal appendage comparable to the notched base of the normal anther? In reply, M. Gay says that the coronal appendage is not only frequently bilobed or bipartite, like the lobes of an anther (fig. 2), but it is sometimes wanting, and it is then replaced by the two rudimentary pollen-sacs, adnate to the lower borders of the petaloid leaf (fig. 3). Hence the petaloid appendage represents the connective, while the coronal appendage is the equivalent of the two pollen-sacs. M. Gay's figures bear out this opinion, as also do certain specimens observed by myself in partially double flowers of *Narcissus poeticus* and *N. incomparabilis*. In the first-named plant I have met with flowers in which the perianth and corona were exactly in their normal condition; but

* See also Vol. I. of this Journal, Dec. 1863, p. 340, adnot. to § 55.

within the latter organ, evidently replacing the stamens, were six segments, stalked below, and fused to the tube of the perianth. At the upper end of each stalk were two lobes, one in front of the other, the outer one petaloid, the inner one smaller and exactly like the corona in miniature, so that these specimens resembled M. Gay's closely,—only, in his flower, the outermost coronal whorl was split up into its three constituent pieces (dialyphyllous), while in mine it was in its ordinary gamophyllous state (fig. 4, 5). In *N. incomparabilis* and also in *N. poeticus* I have frequently seen modified stamens, which throw great light on the structure of the corona; thus, I have seen a two-lobed anther, one of whose lobes was prolonged at the base into a little knob having exactly the appearance of a portion of the corona. In these same anthers there was projecting from the summit and side a large white petaline segment (fig. 6, 7). Here then, clearly, we have one portion of the staminal leaf developing two pollen-sacs, the base of one of which latter, being only imperfectly differentiated, forms a corona-like knob; while another portion of the same leaf is expanded into a petaloid segment. Another specimen yet more conclusive showed a filament bearing on its summit half a perfect anther, the other half being represented by a corona-like knob, while rising behind these, and attached to them, was a petaloid segment (fig. 8).

In *Narcissus montanus*, as I have elsewhere stated, I have frequently seen the corona split into segments, each segment bearing a perfect unmodified anther on the top, somewhat as in the *tubus stamineus* of *Melia*. Moquin mentions the presence of anthers on the rays of *Passiflora*, in some species of which—*e. g. Passiflora Murucuja*—the rays are combined into a cup like that of *Narcissus*. So, too, the staminodia of *Sauvagesia* and *Lavradia* are combined together into a cup. Even among Willows we have the stamens blending into a tube like that of *Ruscus*.*

But it is unnecessary to cite any more instances in support of the staminal nature of the corona.

That it consists intrinsically of two rows of stamens is more difficult of proof, yet if the *six*-lobed cup of *N. incomparabilis*, *N. lobularis*, and others be observed, it will be seen that there are some grounds for such a supposition. In the species with lobed cups, three of the lobes are opposite to the sepals and alternate with the petals, and these

* Andersson, Journ. Linn. Soc. Bot. iv. p. 55. *Salix calyculata.*

three in æstivation decidedly overlap the three inner lobes, which are opposite to the petals and alternate with the outer row of stamens. Moreover, I have met with double flowers of *Narcissus poeticus*, in which there have been three sepals, three petals, three outer coronal segments distinct from each other, three inner coronal segments alternate with the former, and placed on a lower level in the flower, just as the inner row of stamens in the *Polyanthus Narcissus* are, and within these coronal segments there were the six ordinary stamens in two rows, but the pistil was merely rudimentary.

In conclusion, then, we cannot but think that Dr. Lindley's views on the nature of the corona are nearest to the truth. M. Baillon's opinion, that it is a mere production from the thalamus, does not affect the question; for are not the stamens and all the other parts of the flower productions from the thalamus? Neither does the order of development invalidate the notion above given. One sepal or one stamen lags behind another in its development often, and yet it is not the less considered a sepal or a stamen because its fellows are developed first.

As to M. Gay's conclusion, that the inner three segments of the perianth in the normal flower are merely modified stamens,—an inference which he draws from one of the specimens alluded to previously, in which there were three coronal whorls and no true petals,—we would merely ask whether a much more reasonable explanation of this flower may not be found in the supposition, that in this particular flower the petals were replaced by modified stamens in the guise of coronal segments?

Postscript.—Since writing the above remarks, I have perused a paper of M. Ch. Morren's in the 20th vol. of the Bull. de l'Acad. Roy. de Belgique, part ii. p. 264, which had previously escaped my notice, as it must also have done that of M. Gay. M. Morren comes to precisely the same conclusions as myself, as to the nature of the corona of *Narcissus*, viz. that it consists of a double row of modified stamens. He draws this inference from a variety of *N. major* cultivated in gardens and affected with median prolification or diaphysis. The anthers in these flowers show transitions between their ordinary form and that of the lobes of the corona, similar to those already alluded to in *N. incomparabilis* and *N. poeticus*.

The apparent alternation of the segments of the corona with those

of the perianth, as seen in single flowers of *N. major* and other species, is accounted for by the fact that, in such cases, the segments of the corona are two-lobed, each lobe corresponding to the half of an anther, while the notch separating the two lobes of a single segment is deeper than the cleft between two contiguous segments.

Explanation of Plate XXVIII.

Fig. 1. Diagram of semi-double flower of *N. poeticus*, after Gay. 2. Modified stamen of semi-double flower of *N. poeticus;* the lower and inner portion is bilobed and corona-like, the upper and outer segment is white like the segments of the perianth (M. T. M.). 3. Petaloid connective, with a small anther-lobe on each margin; all traces of true corona have disappeared. *N. poeticus* (after Gay). 4. Upper part of flower of *N. poeticus*, showing six perianthial segments, a corona, and within the latter six modified stamens like that shown at fig. 2 (M. T. M.). 5. Diagram of the same flower. 6. Anther, prolonged at the base into a lobe of coronal structure and appearance, and above into a petaloid segment; *N. incomparabilis* (M. T. M.). 7. Back of the same stamen (M. T. M.). 8. Back of stamen from double flower *N. incomparabilis*, showing one perfect anther-lobe, one in the form of a coronal appendage, while the connective (represented as turned down) is prolonged as a yellow segment, like those of the perianth. (M. T. M.)

REMARKS ON SOME MALFORMED FLOWERS OBSERVED BY MR. W. G. SMITH.

By M. T. Masters, M.D., F.L.S.

(Plate XXVIII., Fig. 9–12.)

I am indebted to Mr. W. G. Smith for the examination of some beautiful drawings illustrative of various malformed flowers observed by that gentleman. Amongst them is a series representing various changes of an interesting nature in the flowers of *Campanula Medium* (Fig. 9, 10, 11). In most of them the calyx is unchanged, and consists of five, green, erect, ovate-lanceolate segments, between each pair of which hang down those tongue-shaped lobes or appendages, which give so peculiar an appearance to the calyx of this plant. The two sides of the reflected lobe belong to two different sepals, so that the lobe is a compound organ resulting from the union of the auricles of two adjoining sepals. This view is supported by one of Mr. Smith's specimens, wherein some of the erect calyx-lobes are deficient, while the auricular appendages are divided into their constituent pieces.

In the same flower two of these appendages, in place of being bent downwards, stand erect, and thus supply the place of the absent sepal.

The corolla, under ordinary circumstances, is bell-shaped, with a five-parted, slightly reflected limb, each lobe of which is traversed by a well-marked central rib. In the specimens in question the corolla seems to be wholly wanting, its place being supplied by an additional row of five stamens. These supernumerary stamens not only occupy the position usually filled by the corolla, but they are likewise intermediate in form between the corolla and the anthers. Sometimes the filaments cohere, sometimes the anthers; in the latter case, one of the anther-lobes assumes a petaloid aspect, and is united with the similarly changed half of the adjacent stamen. The connective corresponds in position precisely with the centre of each lobe of the normal corolla, —in other words, with the median nerve that has been mentioned as existing in that situation. The second row of stamens, when present, alternates with the first, and thus represents the ordinary staminal whorl. The pistil does not seem to have undergone any material change.

Mr. Smith has also detected an instance wherein there has apparently been a fusion of the stalks supporting two spadices in *Arum maculatum* (Fig. 12). Instances are on record of the presence of two spathes to a single spadix in many Arads, but, in this instance, the spadix also is repeated and partially united to its fellow.

WELWITSCHII ITER ANGOLENSE.

(*Continued from p.* 35.)

IV. — LEMNACEARUM A CL. FR. WELWITSCH IN AFRICÆ ÆQUINOCTIALIS TERRITORIO ANGOLENSI COLLECTARUM DESCRIPTIO, AUCTORE F. HEGELMAIER.

(Plate XXIX.)

Lemnacearum genera, secundum dispositionem a cl. M. J. Schleiden propositam (Linnæa, xiii. 385), characteribus optimis ceterum haud æqualis momenti definiuntur. Cl. Schleiden, præter ovulorum semi-

numque numerum et structuram et directionem, solerter summoque jure partium vegetativarum rationem habuit in *Lemnaceis* distribuendis, ita ut genus suum *Spirodelam*, ob vasa spiralia in tota planta conspicua et persistentia frondesque novellas stipulis binis basilaribus auctas *Lemnaceis* ceteris omnibus, inclusis *Wolffiis*, opposuerit. Fugisse autem videntur illum, verisimiliter quia occasio defuit copiam satis magnam specierum comparandi, res duæ : primum, innovationis modo et ramificatione (quæ non prorsus neglexit) ita discrepare *Wolffias* a ceteris *Lemnaceis*, id est *Lemna*, *Telmatophace*, *Spirodela*, hac ratione omnino inter se congruentibus, ut vix possint non ab his separari, quæ res quin si radicularum in *Wolffiis* defectum adjeceris summi momenti sit vix dubitari potest ; deinde, antherarum structuram, licet in *Spirodela* hucusque non accuratius examinata sit, certe in *Lemna* et *Telmatophace* ab ea quæ in *Wolffiis* est longe differre ita ut cl. Weddell (Ann. d. Sc. Nat. 3 sér. t. xii. 155) primus, quod ego sciam, antherarum discrimine usus sit ad genus *Wolffiam* definiendum, quas etsi non prorsus exacte uniloculares dixit tamen singularis inter *Lemnaceas* structuræ esse haud dubie intellexit. Quibus momentis omnibus comparatis non dubito, quin genus *Wolffia* non modo tam longe a *Lemna* distet ut nunquam porro cum hoc genere rejungi possit, sed ut si genera *Spirodelam* et *Telmatophacen* a cl. Schleiden proposita conservanda habueris, id quod nunc in medio relinquo, genus *Wolffia* propriam *Lemnacearum* tribum sistere debeat.

Lemnacearum species hucusque cognitæ notis tam gravibus a se invicem discernuntur, quam vix in multis plantarum phanerogamarum generibus vel ordinibus reperientur ita ut de specierum limitibus rarius in hac familia agi posse videatur. *Lemnaceæ* a cl. Welwitsch ex Africa æquinoctiali relatæ ad quinque species pertinent, quarum duæ, altera jam dudum nota altera nova, generi *Lemnæ* sensu strictiore (exclusa *Telmatophace* et *Spirodela*), tres, et quidem duæ novæ, generi *Wolffiæ* adnumerandæ sunt.

Gen. LEMNA, Linn. emend. Frondes e rimis binis lateralibus innovantes, monorrhizæ. Inflorescentiæ ex iisdem rimis lateralibus oriundæ, trifloræ, spatha tenui membranacea fultæ. Flores masculi 2, monandri, anthera profunde biloba quadrilocularis rimis binis dehiscens. Flos femineus : ovarium 1, urceolatum, uniloculare, uniovulatum, ovulum erectum hemianatropum vel atropum integumentis binis. Fructus utriculus monospermus indehiscens. Semen horizontale aut

erectum, membrana duplici, albumine carnoso; embryo centralis radicula superiore aut vaga.—In charactere generis statuendo ovuli seminisque in *L. Angolensi* infra descripta formam respicere oportebat.

1. *L. minor*, Linn. Frondes ovatæ vel ovato-subrotundæ leviter convexæ crassiusculæ sessiles apice obtusiusculæ. Ovulum et semen *erectum hemianatropum*. Specimina florifera sub No. 207, 208, communicata cum Europæis omnibus notis congruunt. Præterea plantas steriles sub No. 205 *Wolffiæ* repandæ intermixtas reperi.—Hab. in lacubus ad dextram fluminis "Loge," inter Ambriz et Quizembo regni Congo; c. flor. Nov. 1853. In stagnis profundissimis nunquam exsiccantibus ad ostia fluminis "Giraûl" agri Mossamedensis; c. fl. Jul. 1859. In stagnis profundis agri Loandensis prope Bemposta.

2. *L. Angolensis*, Welw. Frondes ovato-ellipticæ (pæne dimidio angustiores et breviores quam in *L. minore*) per 3 aut 4 conjugatæ carnosulæ superne longitudinaliter obtuse carinatæ basi pedicello tenui brevi cum fronde materna cohærentes apice *corniculatæ*, corniculo in superiore frondis facie prominente. Ovulum erectum *atropum*. Semen erectum, radicula embryonis superiore. *L. Angolensis*, Welw. in lit. ad Hook. Apr. 1859. Welw. It. Angol. No. 206.—Notis commemoratis optime a *L. minore* ac trisulca diversa sed vix ita ut generis proprii typum sistere possit.—Hab. non infrequens in stagnis profundioribus post pluvies denso agmine fere totam superficiem obtegens prope Loanda. Cum floribus et fructibus 10 Jan. 1858.

Gen. WOLFFIA, Horkel. Frondes e rima una *basilari* innovantes arrhizæ. Inflorescentiæ in *pagina* frondum *superiore* e fovea una vel binis symmetrica positis prodeuntes, nudæ, bifloræ. Flos masculus 1, stamen unicum, filamentum brevissimum, anthera subglobosa vel breviter reniformis *bilocularis*, sutura *una* transversa dehiscens. Flos fem. 1, ovarium 1, urceolatum uniloculare uniovulatum. Ovulum erectum atropum integumentis binis. Fructus utriculus ovoideus vel subsphæricus indehiscens monospermus. Semen rotundato-ellipsoideum, membrana duplici, albumine carnoso; embryo centralis radicula supera.

Descriptio antheræ a cl. Weddell qui eam in *W. Brasiliensi*, Wedd., examinavit proposita dubito num omnino cum natura congruat. In *Wolffia* enim *arrhiza* antheris longitudinaliter et transverse ad suturæ directionem dissectis edoctus sum, septum existere, quo cavitas antheræ in loculos duos separatur, suturæ parallelum et quod ante dehis-

centiam antheræ ab apice ejus avellitur et marcescit; nec, quum septum idem a cl. Weddell in *Wolffia Brasiliensi* ante maturitatem antheræ inventum et egregie depictum sit (l. c. fig. 12) intelligo, cur nihilo minus antheram tanquam unilocularem descripserit.

1. *W. arrhiza*, Wimmer, Flora v. Schles. 3. Aufl. 1857. Frondes *ellipticæ vel subrotundæ subtus globoso-convexæ* superne leniter convexæ rima basilari *inappendiculata* hiantes. Inflorescentia singula in dorso frondis e fossa profunda lævi erumpens marginem fossæ paululum superans. Flores ut in *Wolffia*. Fructum tantummodo semimaturum inveni. *Lemna arrhiza*, L. Mant. 294. *Wolffia Michelii*, Schleid. *W. arrhiza*, Wimm. *Bruniera vivipara*, Franchet, Billotia 1864, p. 25.—Plantulam in Europa austro-occidentali, ut videtur, satis vulgatam, in media rariorem, sed quæ hucusque tantummodo sterilis nota fuit, cl. Welwitsch in lacu magno dicto "Lagôa de Quilunda" prope *Prata* in districto Icolo e Bengo florentem invenit 14 Sept. 1854, et sub No. 211 benevole communicavit. Specimina Africana (imprimis sterilia) cum Europæis exacte congruunt forma frondum, ratione innovationis, structura epidermidis, stomatum dispositione ita ut, quin eadem planta sit, dubitari non possit; ceterum æque ut Europæa aliquantum variat longitudine frondum, quæ in aliis speciminibus latitudinem paululo in aliis plus quam dimidio superat (cf. egregiam descriptionem a cl. Hoffmann conceptam Annal. d. Sc. Nat. 2 sér. t. 14, p. 226). Præterea plantulam sterilem a cl. Welwitsch, "in stagnis limpidissimis inter petras in montibus districti de Libongo ad septentrionem regni Angolæ," Sept. 1858, lectam et sub No. 212 communicatam a *W. arrhiza* notis constantibus discernere nequeo examini accurato subjectam; specimina enim subrotunda et breviter vel oblonge elliptica permixta nec ceteris quidem characteribus a planta nostra abhorrentia inveni; superficies frondum superior, ut in hac, stomatibus numerosis conspersa reperitur.

2. *W. repanda* (sp. nov.). Frondes ambitu ovatæ ad margines *repandodentatæ* superne subtusque convexiusculæ. Rimæ basilaris labium inferum *longissime productum* processum sistit fronde ipsa bis terve longiorem, tenuem, hyalinum radiculamque complanatam simulat. Flores fructusque ut in *Wolffia*. *Wolffiæ hyalinæ*, Del. (*W. Delilei*, Schleid.), affinis similisque labii inferioris rimæ basilaris forma, sed frondibus repandis (ceterum fere duplo minoribus) optime distincta.—Hab. Frequens in stagnis profundis agri Loandensis prope Bemposta, ubi cl. Welwitsch c. floribus et fructibus Martio 1854 legit. Speciminibus

a cl. detectore sub No. 205 liberaliter communicatis immixta est magna copia *Lemnæ minoris* sterilis.

3. *W. Welwitschii* (sp. nov.). Frondes circuitu ovatæ basi modice truncatæ apice rotundatæ *tenuissime membranaceæ pellucidæ* flaccidulæ, pro more *Lemnacearum* sat magnæ (magnitudine, quod latitudinem et longitudinem pæne cum *Lemna polyrrhiza* comparandæ) et ut in ceteris *Wolffiis arrhizæ* (id est, radicalis destitutæ) innovationesque e rima basilari emittentes. Superficies superior et inferior frondum punctis fuscis quæ singulis cellulis materiam quandam badiam continentibus efficiuntur, conspersæ. Inflorescentiæ e foveolis *binis* dorsalibus oblongo-ovalibus symmetrice positis erumpentes : flores minimi, ceterum ut in *Wolffia* conformati. Fructus non inveni.—Stirps, quam nomine cl. detectoris ornavi, maxime singularis et nulli hucusque notæ comparanda sed ex notis relatis haud dubie *Wolffiis* adnumeranda est. Glandulæ illæ unicellulares quas commemoravi in epidermide sitæ cum iis quas cl. Weddell in *Wolffia* sua *Brasiliensi* (l. c.) descripsit et pulchre depinxit conveniunt, et mirum est, quod speciosissima minimaque generis species æque iis notatur, dum ceteris desunt. Stomata in ceteris *Wolffiis* faciem frondum superiorem tenentia in hac non inveni. —Hab. Socialis cum aliis *Lemnaceis* et *Nymphæis* in lacubus prope Quizembo in Congo austro-occidentali, ubi cl. Welwitsch Nov. 1853 florentem legit et sub No. 209 communicavit.

Singularem et parvam *Lemnacearum* gentem unius igitur peregrinatoris diligentissimi opera tribus speciebus insignibus auctam et præterea alia quæ maximi ad harum plantularum morphologiam inquirendam momenti sunt collata videmus, qua de causa non possum non suspicari stirpes nonnullas adhuc superesse non accuratius cognitas, quæ vel in herbariis lateant vel ulterioribus regionum tropicarum pervestigationibus invenienda remaneant. Quicunque posthac aliqua re, quæ vel ad morphologiæ vel ad geographicæ distributionis *Lemnacearum* cognitionem contribuere posse videatur, benevole me adjuturus sit, ei maximas gratias habebo mutuumque, quantum polleo, officium libenter offero.

TAB. XXIX. EXPLICATIO.—*Wolffia arrhiza*, Wimm. (Figuræ omnes a planta Welwitschiana No. 211 desumptæ sunt.) Fig. 1, 2. Frondes adultæ steriles proliferæ, altera oblonga, altera subrotunda. 3. Frons florifera desuper visa ; *a*, anthera ; *st*, stigma. 4. Frons antecedens a latere visa, in qua antheræ lineamenta ope kali caustici, quod frondem pellucidam reddidit, perspiciuntur. 5. Frons eadem ad perpendiculum dissecta ; *g*, germen ; *f*, frons

novella. 6. Anthera a parte anteriore visa. 7. Anthera ad perpendiculum dissecta; *s*, septum; *d*, cellulæ colore rufo-fusco distinctæ quæ dehiscentiæ lineam significant. 8. Anthera evacuata valvulis retractis resupinatisque. 9. Granula pollinis. 10. Pistillum; *o*, ovulum. 11. Stigma cum superiore germinis parte. 12. Ovulum; *n*, nucleus; *ii*, integumentum internum; *ie*, integumentum externum. 13. Fructus non omnino maturus; *st*, stigmatis rudimentum; *s*, semen; *ch*, chalaza; *o*, operculum (ex integumenti interni apice ortum); *m*, micropyle.

THIRSK BOTANICAL EXCHANGE CLUB.

(CURATOR'S REPORT FOR 1864.)

By J. G. Baker, Esq., and William Foggitt, Esq.

As in previous years, we propose to give a brief notice of the more interesting plants that have come before us the past year, restricting such notice, as will be seen, almost totally to species of which specimens have passed through our hands, notable either on the score of critical interest, or as having been found in tracts whence they are not registered in the 'Cybele Britannica' and its Supplement.

Thalictrum flexuosum, Bernh. Mr. A. G. More sends, from the banks of Lough Conn, county Mayo, specimens which agree well with this plant as found in the north of England.

Ranunculus pseudo-fluitans, Newbould. In the new edition of 'English Botany,' Mr. Syme (who places it under *R. peltatus* along with *R. floribundus*, Bab.) says of this:—"It is a very remarkable plant, and may be a distinct subspecies, as the Rev. W. W. Newbould inclines to think. Professor Babington unites it with *R. heterophyllus*, with which it agrees in the weak collapsing leaves; but in other respects it approaches *R. peltatus*, or rather *R. floribundus*, and is very possibly only a state of that plant, induced by growing in running water. In habit it closely resembles *R. fluitans*, but has the segments of the leaves shorter, much less rigid, and less parallel, the stamens longer than the head of pistils, and the receptacle hispid." Mr. A. G. More sends us a supply of specimens from the neighbourhood of Dublin, and writes:—"The plant seems as well marked by distinctive characters as any other of the British Batrachian *Ranunculi*, except *fluitans*, *circinatus*, *tripartitus*, *hederaceus*, and *cænosus*. To the general habit and appearance of *R. fluitans*, it joins the floating leaves of *R. peltatus*.

Its submerged leaves are long and very flaccid, whip-like, and much coarser than in any of the others except *fluitans*. In the streams of Ireland it appears to be not unfrequent, and to take the place which *R. fluitans* occupies in England."

Alyssum calycinum, L. Sent by Mr. W. Richardson from near Warkworth railway station, near Morpeth, Northumberland. New to the Tyne province.

Viola intermediate between *hirta* and *odorata*. Mr. T. R. A. Briggs has sent from limestone in the neighbourhood of Plympton Maurice, in Devonshire, both living and dried examples of a Violet with the following characters :—Habit of growth resembling that of *V. odorata*, the rootstock wide creeping (in one of the specimens a foot long), and, when luxuriant, sending out stolons which bear tufts of leaves and flowers. Petioles covered throughout with short, stiff, deflexed hairs, at the flowering time some of them four or five inches long, which is longer than the peduncles. Leaves dull-green and hairy all over above, paler and similarly hairy all over beneath, the largest so much cordate that there is only a narrow sinus left between the basal lobes, measuring at the flowering time about $1\frac{1}{2}$ in. broad by $1\frac{3}{4}$ long, in the autumn $1\frac{3}{4}$ by $2\frac{1}{4}$, including the lobes; the point blunt, the crenations more than twice as broad as deep, and densely ciliated. Stipules lanceolate, their ciliations few and very short. Peduncles weak, slender, 2 to 4 in. long when the plant is in flower, the upper part with only a few scattered hairs, the lower part more densely hairy; the bracts linear and slightly gland-ciliated, placed generally below the middle of the peduncles. Sepals oblong, blunt, ciliated along the lower third of their edge. Petals purplish-blue (less purple and more blue than in *odorata*), the base of the flower white, the upper and lateral pair about equal, a quarter of an inch across, the lateral pair each furnished above the base with a tuft of white hairs, the lowest one three-eighths of an inch across, obovate, narrowing gradually downwards, distinctly emarginate, marked within with eight or ten branched purple lines; the spur mauve-purple, slightly hooked, conspicuously exceeding the densely ciliated calycine appendages. Anther-spur curved, blunt, four to six times as long as broad. Ovary rather pointed, furnished with a few spreading hairs. At different times Mr. Briggs has found the flowers scentless or very nearly so, and rather strongly scented. At Thirsk even when the living specimens were first opened out in the basket in

which they had been sent from Plymouth, we could not detect any scent at all. Mr. Briggs says, "The calcareous district in which the plant occurs produces both *odorata* and *hirta* plentifully." We have not been able to identify it precisely with any of the numerous intermediate French forms described by Jordan and Boreau.

Viola Curtisii, Forster, and *V. subalosa*, Boreau. Specimens ranging here have come before us this year from coast sandhills at Southport, Lancashire (J. E. Whalley); Malahide, County Dublin (A. G. More); the Kerry coast (Dr. D. Moore); Newcastle, County Down, and the shore of Lough Neagh, near Shane's Castle, County Antrim (Rev. W. M. Hind). Mr. More considers the Malahide plant, which has sometimes all purple and sometimes all yellow flowers, "a mere form of *V. tricolor*." It seems quite clearly shown now that both the purple- and yellow-flowered plant have the terminal lobe of the stipules sometimes toothed, as is also the case with the montane *V. lutea*. Such being the case, we do not see that there is any important character to rely upon to separate these perennial-rooted coast-sandhill Pansies from one another, and would consider them to form an intermediate link connecting the typical *tricolor* and typical *lutea*.

Stellaria uliginosa, Murr. Mr. J. T. Boswell Syme sends a series of this plant, to show the change which takes place in the leaves as the year advances. The specimens have been gathered upon Hampstead Heath, Middlesex, and are in sets of three, gathered in July, September, and October respectively. Whilst in the July examples the leaves are sessile and barely narrowed below, in the October ones the upper leaves are distinctly spathulate, and in some of the lower ones the haft becomes a distinct petiole. It would be well for those who receive Professor Van Heurch's fasciculi to compare these with the stalked form of the plant which has been there given.

Spergularia, Pers. With regard to this genus, Mr. More writes:—"The usually-received names will again have to be changed. In a recent monograph, Dr. Kindberg has identified his *L. neglectum* with the *Spergularia salina* of Presl's 'Flora Cechica.' As this is the oldest name, our commonest seaside form will have to be thus called, whilst the *L. salinum* of Fries and Kindberg is to receive the new name of *L. leiospermum*, Kindberg. Again, the name *L. rupestre* will have to be assigned to its oldest claimant, a Brazilian plant; and thus we are led to adopt Lebel's manuscript name of *rupicola* for ours.

The two species have been recently described for 'English Botany Supplement' in accordance with these views."

Hypericum lineolatum, Ford. This has been met with by Mr. More in Ireland, in County Mayo. There is a supply of characteristic examples for distribution, gathered by ourselves near Thirsk; but we do not consider it more than a mere form of *perforatum*.

Sanguisorba officinalis, L., has been found by Mr. More in some plenty on the banks of Lakes Cullin and Conn, in Mayo. It is new to the west of Ireland, having been known previously only in one Irish station, viz. by the Bann, in Antrim.

Circæa intermedia, Ehrh. Mr. Whittaker sends specimens from the neighbourhood of Matlock, in Derbyshire, all of which have thin cordate leaves and conspicuously-winged petioles, but only some of them the setaceous bracteoles which are regarded as characteristic of *C. alpina*. It is not recorded as a plant of the Trent province.

Polycarpum tetraphyllum, L. This, though now considered as confined to the Channel Islands and the south-west of England, is recorded on old authority from the neighbourhood of Hull. In the collection of the late Mr. Hailstone, of Bradford, a portion of which is now in the possession of Mr. Baker, there is a specimen of the true plant, labelled as being from this locality, with a ticket in the handwriting of Mr. W. Brunton.

Sison Amomum, L. This is admitted by Prof. Babington as a Scotch plant, but rejected by Messrs. Watson and Syme. A specimen in Mr. Winche's collection at Newcastle, from "a field near the Hirsel Loch, Berwickshire," is the true plant.

Viburnum Lantana, L. Noted by Mr. J. G. Baker last May in a station where it is not unlikely to be truly wild, a hedgebank near Leven Bridge, in Cleveland, North Yorkshire. This is the only station in the county with which we are acquainted where it seems more likely to be indigenous than introduced. It has been found by the Rev. A. M. Norman in Durham, in a hedge near Sedgefield; but he considers that it has most likely been planted there.

Lactuca virosa, L. Sent by Mr. T. R. A. Briggs, from a wall at Beer Ferris, Devonshire. New to the Peninsula province.

Gnaphalium dioicum, L. Sent by Mr. T. R. A. Briggs, from Roborough Down, an extensive common between Plymouth and Tavistock. New to Devonshire, but known before in Cornwall.

Pyrola minor, L. Sent by Mr. J. E. Whalley, from a fir wood on Chat Moss, Lancashire. It is not given for the Mersey province in Suppl. Cybele.

Verbascum nigro-pulverulentum, Smith. Mr. Whittaker sends, from Smith's original station of Hellesdon, Norfolk, examples of this plant, gathered by the Rev. Kirby Trimmer. The following description is made partly from these, and one or two points are taken from the English Flora. Stem about two feet high, panicled above with erecto-patent branches, bluntly angular, thinly cottony throughout, the ground-work shining purplish-brown. Leaves soft in texture, blunt at the point, bluntly and irregularly crenate, the upper surface dull-grey with a thin covering of down, the lower surface rather thickly covered with down and the veins conspicuous; the lower leaves large stalked, not more than broadly ovate, the upper ones cordate, sessile or even a little clasping. Spike interruptedly panicled below, long, loose, both pedicel and calyx densely cottony. Corolla bright yellow, measuring nearly half an inch across when fully expanded; stamens densely hairy, with violet-coloured hairs, shorter than the slightly-hairy, club-shaped stigma. Pedicel at least twice as long as the calyx. Most like *V. floccosum*, from which it differs by its less woolly stems, pedicels, and calyces, less woolly and crenate leaves, longer pedicels, and by the colour of the hairs of the stamens, which are white in *V. floccosum*. There seems to be no question that our plant is identical with one that is well known and widely diffused upon the Continent, the *V. Schottianum* of Schrader, the *V. nigro-floccosum* of Koch, the *V. mixtum* of Ramond in De Candolle's 'Flore Française.' The Norfolk specimens agree well with the plant of Wirtgen's Fasciculus, No. 43. It is probable that the *V. thapso-nigrum* of Withering is *V. collinum*, Schrader, *V. semi-nigrum*, Fries, in part, and the *V. nigro-lychnitis* of Babington, the *V. Schiedianum* of Koch,—all three being hybrids between *V. nigrum* and the other species.

Gentiana Germanica, Willd. Sent by Mr. A. G. More, from the neighbourhood of Tring, both Bucks and Herts. The result of the examination of a considerable series of specimens from different parts of the Continent, is a conviction that the presence of a stalk to the capsule, which has been regarded as a mark by which this may be distinguished from *G. Amarella*, is valueless as a diagnostic character. It is sometimes present in the small-flowered *G. Amarella*, and in the large-

flowered *G. Germanica* every variation may be traced from a barely-perceptible stalk to one half an inch in length.

Orobanche minor. Sent from Mr. Embleton, from a clover-field near Warkworth, Northumberland, the examples gathered by Mr. John Chrisp. New to the Tyne province.

Plantago Timbali, Jordan. Sent by Mr. H. C. Watson, from Thames Ditton, Surrey, from amongst sown Clover. Probably not uncommon, but very easily passed over as ordinary *P. lanceolata*.

Neotinea intacta, Reich. fil. This is an Orchidaceous plant, which was added to the British flora by Miss F. M. More, who gathered it in May last at Castle Taylor, county Galway. There is an account of it by Professor Reichenbach in the January number of the 'Journal of Botany,' accompanied by a coloured figure. Only some half-dozen specimens have yet been gathered. It is not very closely allied to any previously-known British species, but was formerly referred by Lindley to *Aceras*. It is a plant of Asia Minor, the Canaries, Northern Africa, Greece, Spain, Portugal, Italy, and the South of France, so that its discovery in Ireland is of great geographic interest; and it is very remarkable that, as Mr. More informs us, it is accompanied in Galway by a South European insect, *Anthrocera Minos*.

Potamogeton filiformis, Nolte. Sent by Mr. A. G. More, fom Lough Cullen, County Mayo. New to Ireland, and the true plant apparently quite rare in Scotland.

P. flabellatus, Bab. Sent both by Mr. J. E. Whalley and Mr. G. E. Hunt, from the Bridgewater Canal, near Eccles, Manchester, where it grows along with *P. pectinatus*. New to the Mersey province.

P. nitens, Weber. This also is a species new to Britain, which has been found by Dr. Moore in Ireland, and Mr. G. E. Hunt in Loch Ascog, in Bute. It has been fully described and figured in the 'Journal of Botany,' Plate XXXIII. Of the previously-known British species, it resembles *P. heterophyllus* most, but may be readily known by its clasping and broader-based lower leaves and peduncles scarcely thickened at the apex.

Zostera nana, Roth. Found by Mr. A. G. More, in Dublin Bay. New to Ireland.

Alopecurus bulbosus, L. Sent by Dr. Windsor, from the Mersey side, between Runcorn and Warrington. The specimens gathered by the late Mr. Buxton. Not given by Mr. Watson as a "Mersey" plant.

Festuca sylvatica, Vill. Sent by Mr. A. G. More, from Foxford, county Mayo. New to the west of Ireland.

Polystichum Lonchitis, Roth. Both Mr. Embleton and Mr. Richardson have sent specimens which unquestionably belong to this species, from a station in Northumberland, the exact locality of which it is not thought desirable to print, which is within 100 yards of the sea level. We are not aware of any other English locality which brings the species clearly within Mr. Watson's Midagrarian zone. That in the county of Durham is at least 300 yards higher.

P. angulare, Newm. Mr. Richardson sends also a characteristic example of this, which was not previously known clearly as a plant of the Tyne province, from the Cauledge Woods, near Wooler, Northumberland.

Ophioglossum vulgatum, L. Gathered by Mr. J. G. Baker last summer, on the Hambleton plateau, N.E. Yorkshire, at an elevation of fully 350 yards above sea level, and in the Superagrarian zone.

Equisetum trachyodon, A. Br., var. Mr. A. G. More sends, from the banks of Lough Cullen, Mayo, a specimen of an *Equisetum* which differs from the typical *trachyodon* by its lower sheaths with weak green teeth.

Chara alopecuroides, Delile. Mr. A. G. More sends a supply of this very distinct species. He finds it only in brackish water in the saltworks of Newtown, Isle of Wight. This is also new to Britain, and was described and figured at Plate VII. of the 'Journal of Botany,' but the drawing hardly does justice to the habit of growth of the plant, the spikes being much more bushy than they are represented.

New Gloucestershire Plants. Amongst a collection of Gloucestershire plants gathered by Dr. St. Brody which we have looked through, the following are not given by Mr. Watson for the South Severn subprovince. All the stations are in Gloucestershire.—

Ranunculus heterophyllus.—Near Gloucester.
R. floribundus.—Near Gloucester.
R. trichophyllus.—Near Gloucester.
R. Drouetii.—Pond near Newent Canal.
Delphinium Ajacis.—Fields near Cirencester.
Fumaria pallidiflora.—Fields near Frith Wood.
F. muralis.—Fields near Beachley, a mile and a half from Chepstow.
F. parviflora.—Fields, Leckhampton Hill.
F. Vaillantii.—Fields, Leckhampton Hill.
Viola Reichenbachiana.—Cranham Wood.

Drosera intermedia.—Heath near Micheldean.
Ulex nanus, true.—Heath near Micheldean.
Melilotus arvensis.—Field near Micheldean station.
M. vulgaris.—Field near Micheldean station.
Poterium muricatum.—Pitchcombe Wood. One plant.
Myriophyllum alternifolium.—Pond, Newent Canal.
Callitriche pedunculata.—Pond, Newent Canal.
C. platycarpa.—Marshy ground near Micheldean.
Œnanthe Phellandrium.—Found near Gloucester.
Salix fragilis.—Banks of the Severn.
S. purpurea.—Banks of the Severn.
Cephalanthera rubra.—Pitchcombe Wood. Very fine.
Carex stricta.—Newent Canal.
C. acuta.—Newent Canal.
Lastrea Borreri.—Forest of Dean.
L. collina.—Forest of Dean.

Introductions.—The principal plants which come under this head which we have to notice are *Camelina sativa vera*, fields at Foxford, Mayo (A. G. More); *Trifolium elegans*, roadside at Harton, Durham, and *Centaurea solstitialis*, in a lucerne field at Cleadon, Durham (J. G. Baker); and *Setaria viridis*, field at Kenilworth, Warwickshire (H. Bromwich).

Thirsk, March 7, 1865.

SAXIFRAGA CÆSPITOSA.

Smith figured in 'English Botany' two plants from Twll Ddû, Carnarvonshire: *S. cæspitosa*, t. 794, and *S. palmata*, t. 444. In his 'English Flora' (ii. p. 274) he makes the latter a variety of *S. cæspitosa*, and identifies it with the *S. decipiens* (Ehrh.). He does not record either of the plants as to be found in Scotland. I have not seen Scottish specimens of either, but possess a very small one of *S. cæspitosa*, t. 794, from Twll Ddû, which very accurately resembles the figure given on that plate. This, I think, is the true *S. cæspitosa* of the northern countries. I presume also that this is the *S. cæspitosa* of Syme's Eng. Bot. (iv. p. 78, t. 556), but if so, the calyx-segments are represented incorrectly on the plate, although properly described by Mr. Syme. I have no knowledge of the *S. decipiens*, but now think that it is distinct from *S. cæspitosa*, as believed by Mr. Syme. I never succeeded in

finding either of the plants on the fine range of precipitous rocks extending right and left from the chasm called Twll Ddû; for the sides of the chasm itself are absolutely inaccessible, and I presume that Mr. Griffith (Smith's correspondent) extended the Welsh name to the rocks in the face of which the true "twll ddû" opens. Mr. W. Wilson has remarked that the leaves of *S. decipiens* are sometimes apparently pointed, but "that the point is not cartilaginous, as in *S. hypnoides*, but only a terminal jointed glandular hair, in every respect similar to those found on the margins of the lobes. He also tells us that the common base of the leaves has five ribs in place of three; also, the petals are "3-ribbed [that is, as I understand it, triple-ribbed]; never furnished with lateral veins, as in many of the wild and most of the cultivated states of *S. hypnoides*" (Hook. Brit. Fl. ed. i. p. 196, or the corresponding page of the 2nd and 3rd editions, also in Bot. Miscell. iii. p. 110). I have not the materials for forming an opinion on the petals of the British plants, but have the utmost confidence in Mr. W. Wilson's accuracy of observation. The *S. incurvifolia*, as drawn by J. De C. Sowerby, has triple-veined petals, as also has *S. affinis* (judging from my specimens and the drawing). So also *S. hirta*, although incorrectly represented on the detached petal in 'English Botany.' I cannot combine these plants with *S. hypnoides*, as is done by Mr. Syme, for the above reason, in addition to those which I have formerly given.

C. C. Babington.

A GIGANTIC *EQUISETUM*.

It will be remembered that a few years ago Dr. Spruce had the good fortune to meet, on the eastern slopes of the Andes, with a grove of gigantic Horsetails, some of which were more than 20 feet high, looked somewhat like larches, and forcibly reminded him of the extinct *Calamites* of bygone geological periods. I myself saw an *Equisetum*, about 12 feet high, in even so unfavourable a climate as that between Callao and Lima, and I am therefore somewhat prepared for the interesting discovery which my friend Mr. Ernst has just made in the neighbourhood of Caracas, Venezuela. He has found there an *Equisetum*, which, by actual measurement, proved to be 36 feet high, but scarcely ¾ of

an inch thick. It was growing near a rivulet at the village of Valle, amongst trees and shrubs, from which it obtained support. I look forward with some eagerness to the arrival of specimens of the plant.

B. SEEMANN.

CULTIVATION OF COTTON AND COFFEE IN THE VITI ISLANDS.

[The following extracts from a letter by Mr. J. Storck to Mr. W. T. Pritchard, dated Nukumoto, Viti, May 24, 1864, will be read with interest.—ED.]

I have now about thirty acres planted with cotton, and three with coffee. Since the Rorotoga men have left me I work the whole plantation with Fijians, of whom I have two kinds, monthly men and piecemen. The first class I keep for the steady small-work that is going on about the house and plantation, whilst the others work in parties sometimes from 60 to 100 at a time. The monthly men get 2½ dollars a month, generally in cloth, and their food and a place to sleep in. At present I have ten of them, with whom I have made a greater and more successful experiment than ever missionary accomplished, viz., I have made the naked savages work with spades in the cotton-field, each plant being dug round and hilled up with a radius of about two feet. I have now nearly got through the whole of it. The piecemen I employ in weeding the cotton between the rows. The newly-made plantations are, as the first was, laid out in rectangular rows, of pretty much the same length and dimensions. When I want to have a field weeded, I walk with the chief or spokesman, along the edge of the field, and count the rows, which are on an average 120 yards long and 14 feet wide; then for each row I agree to pay a fathom of 24-inch calico; so that weeding the plantation three or four times a year costs me seventy odd dollars each time. To weed one of the average rows generally takes a fellow two days' steady work. I much prefer women to men; they do it better. I used to keep the cotton pretty clean, but I found that the weeding alone would not do it, which made me try the digging; the trees would not thrive, from want of proper cultivation of the soil. If you recollect, the first two small plantations were treated in the following manner:—when the plants

were about thirteen inches high, I took my hoe, and reaching over the plant, loosened a clod of soil, and, without breaking, turned it over *towards* the centre of the first or seed hill. This process prevented the weeds for a long time from growing immediately around the plants, and the turned-up soil, gradually seasoning and crumbling away, allowed them to make nice roots. Afterwards, however, when I saw native cotton going on well without care or anything being done to it, I thought I made myself unnecessary trouble, and omitted the above mode of cultivation; but since then I have never again raised such trees as the first. This is what made me go to work with the spade. The two small old plantations I cut down to stumps in January last, and they are now all in blossom again. Those same two plantations, about six acres together, brought in a little more than four tons last year, and I dare say that just as much rotted on the trees before it was ripe, which bad result again I believe I can trace back to *want of cultivation*. I am perfectly satisfied that an acre of good land will yield from 2000 to 2500 pounds of cotton in seed. Since I saw that weeding alone would not do, and digging with the kind of labourers we have here is slow work, I have written by Capt. Robinson for two broken-in plough-horses and a set of ploughs, and for a man to drive them. The natives are growing independent, and dissatisfied with the payment they get. The Tokutoku natives try to monopolize all the work going on; they don't care to clear any more land for me, thinking that there is enough already to give them employment, and anybody else they won't suffer to work; and if I go to the consul and complain of their interference, the poor man grows very red in the face, deploring his inability to do anything, and telling you, by way of a wind-up, that he only spent £5. 7*s*. 2$\frac{3}{4}$*d*. Government money last twelvemonth, and that he found paper, ink, and wafers himself out of his own pocket. The loose, black-seeded cotton is in great favour, both with traders and planters, but the credit I take in a great measure to myself. I had some of that same cotton with 1$\frac{1}{2}$ inch (good measurement) length of staple. Mr. Burt, at Naitasiri, is proving himself a very industrious Yankee, and will have off about ten acres, an unusually large crop, at least by all appearances. He had some very fine cotton last year, though only a small quantity, the plantation being too young; he is now clearing more land, and will strive hard to get fifty acres in by degrees.

Land under Cotton, partly only planted this season.—Rewa river, 80 to 90 acres; Kalavu, 150 acres; Mokogai, 30 acres; Wakaia, 8 acres; and about 100 acres more among the islands, of white men's planting. The natives about here and Bega, and in fact all over the islands, are taking it up, *vaka viti;* and the traders expect a profitable season. There are a gin and a windmill going in Mr. Henning's yard, which has turned out last season 37 bales of clean cotton, 300 pounds weight on an average; and there will soon be a windmill going on the river, which Mr. Rebmann, who is setting up a store here, will work. Mr. Henning's gin is the one from Samoa, which works beautifully, and hardly injures the fibre at all.

My Coffee is growing wonderfully well, and next year I shall have from my own seed coffee-plants sufficient to stock all Fiji, if people will only buy and plant them; and if they won't, Nukumoto is big enough for all of them. One tree yielded me last season 4500 berries, which have been sown and will soon come up. I have also about 2500 seedlings, from some Roratonga seed, which Mr. Unshelm sent, but which ought to have yielded 15,000 if the seed had been fresh. Dr. Brower, who had as many pounds weight as I, only raised one dozen. The coffee seedlings from Levuka would not thrive in among the cotton, and so I took them up about a year ago, and planted them among the Ivi trees in the back, where they do well.

Those two Mokka coffee-plants out of your garden are of 5 feet, and full of buds to the ground; your tea-tree is just now in blossom.

About sheep I know no more than that they are generally healthy and well-fed, but do not increase as fast as they are known to do in the Australian colonies. There are over fifty head of cattle on Wakaia now.

CORRESPONDENCE.

Remarks on Tetrathylacium, Cruciferæ, Nelumbium, *and* Villaresia.

Mount Vernon, Hampstead, December 21, 1864.

I have looked at the flower of *Tetrathylacium* again, and believe I now see what is meant in the description given in Bentham and Hooker's 'Genera.' The '*supra bracteas minimas*' refers only to the leaves of the rachis, in the axils of

which the flowers are situated, but whether the writers intend to say the bracts of different flowers are so close as to be almost connate, or whether they intend to say that each flower is subtended by some two, three, or four bracts united together, I cannot tell; if the latter is intended, you will see my opinion differs.

The flower is slightly sunk in the stem, and this naturally raises a kind of edge round it, which looks like rudimentary connate bracts; the writer, however, may not mean this, but only that the bracts of the different flowers are crowded close on each other.

It seems to me certain that the perianth is a calyx, so I suppose those who can make up their minds that it is so, will be able satisfactorily to fix the genus in its proper place. I see you referred it (Bot. Herald, p. 98) to *Samydeæ*, and I now think that it belongs to an apetalous section of *Bixaceæ;* in the position of the raphe it differs from the *Violaceæ* I have examined.

I have written the following description of the flower:—

Tetrathylacium, *Pœpp.*—Flower sessile in the axil of a bract, the margin of which extends round its base, or else the flower is imbedded in a shallow cavity; the margin of the cavity being continuous with the edges of the bract, so that it cannot be seen where one ends and the other begins. Bracts 2, right and left of the axis, very short but nearly meeting before and behind.* Sepals 4, united into a tube, much swollen and indurated at the base; two anterior and posterior relatively to the axis, and two right and left, so that the latter are opposite the two bracts. Stamens 4, alternating with the sepals, inserted into the lower third of the calyx; filaments broad at the base; anthers introrse with a rather thickened connective, which is forked below. Ovary attached by a broad basis, densely covered with short hairs, which extend in a slight degree on to the otherwise smooth calyx, 1-celled with 4 broad parietal placentæ; ovules numerous, anatropal, mostly horizontal or obliquely ascending with the raphe lateral, the upper in part ascending with the raphe next the placenta.

I have seen Baillon's 'Adansonia' (1862–1863), and find he has very clearly figured *Sinapis arvensis*, having ovaries with naked ovaries occupying the place of ovules, and even small fully-formed flowers (pl. xii. figs. 8, 9). I take this as a final proof that my view of the structure of the ovary of *Nelumbium* (Ann. Nat. Hist. 2nd ser. vol. xii. p. 12) is correct, *i. e.* it consists of a compound inflorescence, the disk in which the carpels are immersed being a mass of barren carpels, each producing one flower at its base. Each carpel is therefore a naked flower, and it stands with its back to the axis and its ventral suture directly towards the stamens. I consider the French botanists very clever, and their views as regards the *Cruciferæ* and other families of doubtful structure are, I believe, well worthy of attention.

The flowers of *Nelumbium* are so beautiful that they are seldom cut, which to some extent accounts for the singular structure of the ovary not having attracted attention.

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* If I rightly understand the descriptions given of this genus, these are regarded as a calyx.

Mr. Miers's paper on *Villaresia*, in this Journal, involves important inquiries. From curiosity I examined *Bursinopetalum*, and concluded it to be near *Cornus* and *Marlea*, as it has the turbinate disk of the latter. Mr. Miers says, "we have yet no fact on record" to show that the dorsal raphe occurs in *Cornaceæ;* possibly he may not refer *Aucuba* to *Cornaceæ*. I have figured it Ann. Nat. Hist. 2nd ser. vol. xi. *Ilex*, *Villaresia* and *Phytocrene*, according to my notes, have two ovules, pendulous, with the raphe lateral, *i. e.* the raphes are between the two ovules. He refers to *Villaresia* as having a dorsal raphe; if I could obtain a flower of his 2-celled species, I would re-examine it. My observations on *Rhamnaceæ*, as far as they have gone, agree with his, viz., the raphe is lateral; when the ovules are two, the raphes are between them and in contact.

Yours, etc.,
B. Clarke.

NEW PUBLICATIONS.

Rust, Smut, Mildew, and Mould. An Introduction to the Study of Microscopic Fungi. By M. C. Cooke. With nearly 300 figures by J. E. Sowerby. London: Hardwicke. 1865.

The few British botanists who sufficiently reverence the fathers, and value their labours as occasionally to consult their works, are familiar with the third plate of Dillenius's edition of Ray's 'Synopsis.' It contains the first, and that a most characteristic figure of *Splachnum sphæricum*, Hedw. It has also a good drawing of *Trichomanes radicans*, Sw., the enlarged geographical distribution of which, in the British Isles, we have lately recorded in the pages of the 'Journal' (Vol. I. pp. 238, 293), but Dillenius, in 1724, had published it as "found by Dr. Richardson at Belbank, scarce half a mile from Bingley." Sixty years or so after, Bolton gathered it in the same locality, but since then it has not been again observed there! We may add that, beside the printed evidence of its former existence in this place, Professor Babington has an old specimen gathered there (Babington's 'Manual,' ed. v. p. 429), and Mr. Moore tells us that a specimen, collected by the original discoverer, exists in the Herbarium of the British Museum (Journ. of Bot. Vol. I. p. 238). A ruder drawing of a *Hymenophyllum* is given on the same plate, but in the text it is described as the young state of *Trichomanes*. The remaining figure is that which recalled the plate to our memory. It is a drawing of one of the leaves of the common Wood Anemone, the

under surface of which is covered with a parasitic Fungus (*Puccinia Anemones*), which looks so like the spores of a Fern that it deceived Bobart, in whose herbarium it existed with this inscription, "This capillary was gathered by the Conjurer of Chalgrave," and deceived Dillenius, who figured Bobart's specimen on this third plate, and gave it the accurate descriptive designation, "Filix lobata, globulis pulverulentis undique aspersa." Mr. Cooke gives us the following information on this *Puccinia*:—"This is one of the earliest and commonest species. Go wherever the wood Anemone abounds, and from March to May it will not be difficult to find attenuated sickly-looking leaves, with the under surface covered with the pustules of this brand." And after referring to the notice in Ray, he continues, "When, afterwards, it was better understood, and the spots came to be regarded as true parasitic Fungi, it still for a long time continued to bear the name, not even yet forgotten, of the Conjurer of Chalgrave's Fern. An examination of the spores under a high power will show the two cells to be nearly spherical and deeply constricted. The surface of the spore is minutely and beautifully echinulate." He adds, "It will be fruitless looking for it on the large foliaceous bracts of the flower-stalk, since these may be turned up carefully till the back aches with stooping, ere a solitary pustule will be found; but the true leaves, proceeding from the rhizomes, are certain soon to afford specimens."

It is gratifying to meet with a charming volume of pleasant reading, devoted to a class of plants which few botanists consider as anything else than pests and eyesores, disfiguring the plants they are collecting. Of all the divisions of the Cryptogamia, Fungi have had the fewest students; whilst the larger species, from their peculiar forms, rapid growth, or disagreeable odour, have drawn to them the attention of some, a still fewer number have ever looked at the microscopic forms. We could count on the fingers of one hand, the names of the living British fungologists who have done anything with the smaller forms. But, like every other natural-history pursuit, this only requires a beginning. And it is not too much to hope that with this capital elementary introduction to one set of them—the rusts, smuts, mildews, and moulds—we shall find growing up amongst us a numerous class of fungological students. Of the many microscopes that are everywhere at work, a few might here and there be advantageously directed to these neglected plants. The student would have the satisfaction of knowing that he

was working in a field in which a large proportion of his observations would be positive additions to science.

Mr. Cooke, in this volume, restricts himself to these five Orders—*Æcidiacei*, *Pucciniæi*, *Cæomacei*, *Peronosporei*, and *Erysiphei*. He intersperses his entertaining narrative respecting their localities, appearances, influences on the supporting plant, etc., with details of their structure and classification; and he adds, in an appendix, a systematic classification and description of the species of the various Orders referred to in the volume. This gives a scientific value to what without it would be simply a pleasing popular volume. Some of the species are described here for the first time; the descriptions of many more are only to be found elsewhere in the recent botanical literature of the Continent, much of it inaccessible to the majority of British students; and those that have already been published in England were included in Berkeley's supplementary volume to Smith's 'English Flora.' Since 1836, the date of that volume, nothing systematic has been done with these minute plants. Berkeley's 'Fungology' and Cooke's 'Index Fungorum Britannicorum' are mere indices of the names of these microscopic Fungi. We have here a beginning of somewhat more satisfactory. We trust the volume will meet with the success it deserves, and thus encourage its author to take up the remaining Orders.

Some of the remarkable recent discoveries are discussed at length in the work. One chapter is devoted to an examination of those obscure organs, the spermogones,—and another to the singular alternation of generations in Fungi, which is called dimorphism. We shall conclude this notice by giving an example of dimorphism, somewhat condensed, from Mr. Cooke's pages. The common bean-rust, *Uromyces appendiculata*, Lév., towards the end of summer or beginning of autumn produces oboval brownish spores. When these fall on the moist soil, each gives out a short curved tube that speedily produces three or four reniform sporidia. The sporidium germinates on the epidermis of the bean by penetrating the wall of the cell on which it rests. The germ-tube having gained entrance, draws into itself the contents of the sporidium, and the empty external wall perishes. The germ-tube elongates and branches, becoming a mycelium and penetrating the intercellular spaces of the parenchyma. White spots on the leaf indicate the existence of the parasite beneath. Ere long spermogones in the form of small orange papillæ make their appearance on the surface, and these are

soon followed by larger protuberances, which eventually rupture the epidermis and appear as the little cups of an *Æcidium*. Scattered among the cups, numerous brownish or blackish points appear, which present the characters and fructification of the original bean-rust (*Uromyces*). The stylospores of the *Æcidium*, when sown on the moist surface of a suitable leaf, push out the germ-tube, which seeks its way into the leaf through the nearest stomate. Having obtained entrance, it withdraws the contents of the exposed portion, which then disappears. The mycelium spreads itself through the intercellular spaces, and in time the discoloured epidermis is broken, and little brown pustules appear. These are the stylospores of *Uredo*. Their growth is speedily arrested, and they give place to the true germinating spores. It is difficult to trace the progress of the original germ through spore, sporidium, and stylospore, these giving rise to pro-mycelium and mycelium, and at length developing into perfect plants that belong to the three recognized genera of *Uromyces*, *Æcidium*, and *Uredo*.

On the Cultivation of Quinine in Java and British India. By Dr. J. E. De Vrij. Translated from the Dutch. London: printed for her Majesty's Stationery Office. 1865. 8vo, pp. 27.

Dr. De Vrij, the author of this pamphlet, written in 1864, was connected with the Chinchona plantations in Java for several years, as Inspector commissioned to conduct the chemical researches. He afterwards visited the Neilgherry hills; and his testimony to the superiority of the method of Chinchona cultivation there adopted by Mr. M'Ivor, over that pursued by the late Dr. Junghuhn in Java, is of the highest importance. Dr. De Vrij has also made a satisfactory analysis of Chinchona bark grown on the Neilgherry hills, and strongly advocates the adoption of Mr. M'Ivor's system in Java. The concluding remarks of the great Dutch chemist will be read with interest:—

"There will be no difficulty in answering the question started some time ago, as to whether the cultivation of quinine trees should not be made over to private enterprise. As the quinine trees in Java must, according to the present mode of cultivation adopted in that island, be several (at least thirty) years old before they are fully capable of yielding a good quality of bark, I very much doubt whether any capitalists would be found willing to employ their capital in that way for so long a period, and I feel bound, therefore, to answer that question in the negative. The English system, on the other hand, which admits of good interest on capital within at the most four years, and which con-

tinues regularly progressing in that respect, is certainly one which prepares the way for the transfer, in due course of time, of the cultivation under consideration to private industry; and, in fact, that principle has been already acted on in part, for at the end of December, 1863, not less than 7532 quinine plants were delivered to private individuals at Ootacamund on payment of the stipulated price of 30 cents each plant.

"Should our enlightened Government, therefore, abandon—as I hope will be the case—the present mode of cultivation in Java, and replace it by the English one, not only will new prospects be opened for private enterprise, but another result will ensue, one to which I may be allowed to direct special attention *in a few concluding words. It is to be regretted that the summits of many* high mountains in Java have been so completely stripped of trees, that the Governor-General, Mr. Duymaer Van Twist, was induced some time ago to entrust to Mr. Junghuhn the task of superintending the then remaining forests. As it is necessary to plant the quinine trees at a great elevation, at least at a higher one than the coffee plantations, the English mode of cultivation would afford the means of covering those naked summits again with woods, even if it were only with a low growth of timber. The cost of planting would be amply recovered by the produce of the quinine bark thereby obtained, and the trees, when stripped of the bark, would supply the fuel now so scarce in that country."

Flora Vitiensis: A Description of the Plants of the Viti or Fiji Islands, with an Account of their History, Uses, and Properties. By Berthold Seemann, Ph.D., F.L.S., F.R.G.S., etc. With 100 coloured plates, by W. Fitch, F.L.S. 4to. Part I. London: Reeve and Co. 1865.

It may not be deemed out of place if we give a brief account of the contents of the first part of this work, though anything like criticism is, of course, out of the question. The work owes its origin to the Government Mission to Viti, to which, at Sir W. J. Hooker's suggestion, the author was attached, for the purpose of exploring the islands The 'Flora Vitiensis' will be completed in ten parts, and comprise, when finished, 400 pages of letterpress and 100 coloured plates, illustrating the vegetation of the Viti, Fiji, or Cannibal islands. More than 20 per cent. of the Flora are entirely new to science. The first part embraces 27 Natural Orders, from *Ranunculaceæ* to *Celastrineæ;* among them are two new genera, *Pimia* (*Sterculiaceæ*) and *Græffia* (*Tiliaceæ*), and 18 new species—*Polyalthia Vitiensis*, *Alsodeia Storckii*, *Garcinia pseudoguttifera*, *Calysaccion tinctorium*, *Ternstræmia Vitiensis*, *Hibiscus Storckii*, *Gossypium tomentosum*, *Sterculia Vitiensis*, *Elæocar-*

pus Storckii, Græffei, and *Milnei, Brucea quercifolia, Vavæa Harveyi* and *Vitiensis, Melia elegans, Aglaia multijuga, Chailletia Vitiensis,* and *Stemonurus Vitiensis.* The geographical distribution of all the species in Polynesia is invariably noted, for which all the older materials, which have found their way to this country since Captain Cook's time, have been used. A good many new or obscure Polynesian species, not indigenous to Viti, are described in footnotes, where also manuscript descriptions, by Solander and others, are given, viz. *Xylosma Hawaiense, Portulaca lutea,* Sol., *Garcinia pedicellata* (*Clusia,* Forst.), *Sida biloba, Abutilon Menziesii, Gossypium drynarioides* and *G. religiosum, Sterculia Forsteri* (*S. Balanghas* Forsteri nec alior.), *Micromelum minutum, Picrasma Denhami,* etc.

The preface and introduction to this work will be issued with the last part. The system followed is, with some modifications, that of Bentham and Hooker's 'Genera Plantarum,' and other leading works by the same authors. The plates have all been executed in Mr. Fitch's best style; and the whole work has been got up by Messrs. Reeve and Co. in a very superior manner.

Shakspere's Garden. By Sidney Beisly. Sm. 8vo. London, 1864: Longman and Co. Pp. 172.

It is by narrowing the field of inquiry that we have the best chance of attaining accurate results in literary as in physical studies; and the author of this little book has judiciously confined himself strictly to an identification of the plants mentioned in Shakspeare's plays. Unfortunately, he was not well qualified for the task, being, as is evident in every page, entirely ignorant of botany. Thus, he tells us that the Apricot is *Prunus armeria* [*sic*], the Sweet Potato (*Batatas edulis,* Chois.), a Skirret, *Sisarum;* and in two different places, that the Garden Marigold (*Calendula officinalis,* Linn.) is a *Chrysanthemum.* Nevertheless he has brought together the result of very extensive reading in books little known to the public generally, and with all its faults, there is much in his work that is interesting. If, therefore, we point out a few of its inaccuracies, it is not in a carping or fault-finding spirit that we do so.

Page 42. "Cuckoo-buds of yellow hue." These he takes to be those of the lesser Celandine, *Ranunculus Ficaria,* L., because "its flower ap-

pears earlier in the spring" than that of the Crowfoots. But it certainly contributes very little to "paint the meadow with delight;" for it is found in damp hedgebanks and dark corners, and its buds are of a dismal greenish hue. We hold with Miller that the poet meant *R. acris*, Linn., and *bulbosus*, Linn.

The carelessness with which he quotes is astonishing. As one among many instances of it, we find him, at p. 54, represent Hotspur as making upon the King the remarks that he makes upon Owen Glendower, in the speech :—

"I cannot choose: sometimes he angers me."

Page 81. He tells us that the "Pale Primrose" [*Primula vulgaris*, Linn.] has a sweeter fragrance than the yellow, and that "its leaves are of a darker green." Some of our minor artists exhibit every year a countless number of birds' nests, lying among Primroses that are painted pea-green, but as they grow in the hedges, they are everywhere of the same "pale Primrose" colour.

Page 93. "Spear-grass," he tells us, is the Sneezewort, *Achillæa Ptarmica*, and this the same as the "Yarrow or Nosebleed" of Gerarde, Lyte, and other herbalists. He has confused together two different plants. It is the *A. Millefolium*, Linn., that those writers call "Yarrow." By "Spear-grass" we believe that Shakspeare meant the common Reed [*Phragmites communis*, Linn.].

Page 101. He says that the *Acorus Calamus* was probably the plant used under the name of "Rush" to strew floors. There is no reason to think so. It was never sufficiently common, and it was never called "Rush." Indeed the author himself quotes from Dr. Bulleyn the remark, that "Rushes that grow upon dry grounds be good to strew in halls, chambers, and galleries, to walke upon." The *Acorus Calamus* never grows but in wet ground, in stagnant water, or by the sides of rivers. It may have been used in exceptional cases, but is not the plant to which the herbalists refer.

Page 126. He confuses the acorn of the English Oak with the sweet fruit of the *Quercus Ballota*, L., which Strabo and Pliny represent as having been the food of man in Spain. No human being could have lived on the mast of *Q. Robur*.

Page 137. He speaks of the Harebell, *Hyacinthus non-scriptus*, as blooming "with the Primrose" in May and June. We think he will

find very few Primroses so late in the season. The ridiculous lines quoted on the same page, from a certain John Davors, might, with adtage to the book, have been omitted:—

"Among the Daisies and the Violets blue,
Red Hyacinth, and yellow Daffodils,
Purple Narcissus, like the morning rays,
Pale Gander-grass, and azure Culverkeys."

This cockney rhymer never gathered his blue Daisies, red Hyacinths, purple Narcissi, or azure Culverkeys on English fields.

Page 143, "Harlocks" he assumes to be Charlock (*Sinapis arvensis*, Linn.). This is not very likely. The word is spelt in the old editions "Hardocks," and the Hardock would seem to have been the Burdock [*Arctium*, sp.], for *harde* and *bourre* are equivalent terms.

Page 148. "Parmacety" he takes to be the Shepherd's-purse (*Capsella Bursa-pastoris*, De Cand.). It was surely common spermaceti-ointment, which Hotspur says that the courtier recommended him.

Page 164. He tells us that the locusts eaten by St. John the Baptist were the fruit of the Carob-tree (*Ceratonia Siliqua*, Linn.). We refer him to the word used in the Greek text, ἀκριδες, which leaves no doubt that the insect so called was meant. Locusts are a very common food of the desert Arabs.

But beside these faults of commission, we find an extraordinary number of plants ejected from the "Garden;" not only those that are named in the Sonnets and other poems of Shakspeare, but many which occur in passages familiar to every reader of his plays. We will name but a few of these:—

Apple.	Cherry.	Holly.	Pea.	Pink.	Rye.
Ash.	Codling.	Laurel.	Peach.	Plum.	Turnip.
Barley.	Crab.	Mallow.	Pear.	Prune.	Vetches.
Bean.	Currant.	Myrtle.	Pepper.	Radish.	
Cabbage.	Damson.	Oat.	Pine.	Raisin.	

To conclude our remarks, we wish the author, who, up to a certain point, seems to be a very painstaking man, would revise his work thoroughly, and replace it with an edition that may do him and his publishers more credit.

BOTANICAL NEWS.

Bentham's illustrated 'Handbook of the British Flora' is completed.

M. Beccari, of Florence, who is now staying in London, is preparing himself for a botanical exploration of the island of Borneo.

Dr. Garcke has been appointed Keeper of the Berlin Herbarium, a place successively occupied by Chamisso, Klotzsch, and Hanstein. Dr. Ascherson has been appointed assistant at the Herbarium.

The species of Chinchona which is found in the neighbourhood of Pitayo, in New Granada, is one which yields a large percentage of quinine, and at the same time is very hardy. Mr. Markham has, therefore, made unceasing endeavours to add it to the number of valuable species that are now cultivated in British India. In 1863 he obtained a grant for this purpose, and employed Mr. Cross to obtain a collection of seeds of the Pitayo Chinchona. That indefatigable traveller accordingly set out from the place of his residence, at the foot of Mount Chimborazo, made a most difficult and hazardous journey by way of Pasto and Popayan, explored the Pitayo forests, and formed a valuable collection of seeds. He then crossed the formidable *paramo* of Guanacas, and went down the valley of the Magdalena to Bogotá. Unfortunately he did not transmit the seeds direct from Bogotá to England, but returned with them to Quito and Guayaquil. Owing to this long detention, they lost their germinating powers, and none came up. Mr. Cross has written an interesting report of his journey, which will shortly be printed. Mr. Markham has succeeded in obtaining a further grant for the purpose of procuring seeds of this valuable quinine-yielding species; and that it is his intention to employ Mr. Cross again on the important duty of collecting them.

We can seldom conclude our monthly chronicle of news without having the painful task of registering the death of one or more well-known botanists. This time we have to announce that of Sir Robert Schomburgk and Dr. Henry Schott. Sir Robert died on the 11th of March at Berlin, where he had passed the winter confined to his bed. It will be remembered that after his famous explorations in British Guiana, by which botany was largely benefited, Sir Robert went to the West Indies, and in September, 1846, we met him at Barbadoes busily engaged in collecting materials for his history of the island. Afterwards he became British Consul at St. Domingo, and Consul General in Siam. Last year he returned to Europe, so much shattered in health by his long residence in tropical climates that he never rallied again. At the invitation of Dr. N. Barth, the African traveller, as President of the Berlin Geographical Society, his funeral was attended by a great number of scientific and distinguished men. He leaves behind him a solid reputation. The same mail brings us the news of the death of Dr. H. Schott, Director of the Imperial Gardens at Schönbrunn, one of our most esteemed contributors, and one of the greatest systematic botanists of the day. His last botanical paper appeared in this Journal on the 1st of February.

Fig. 3

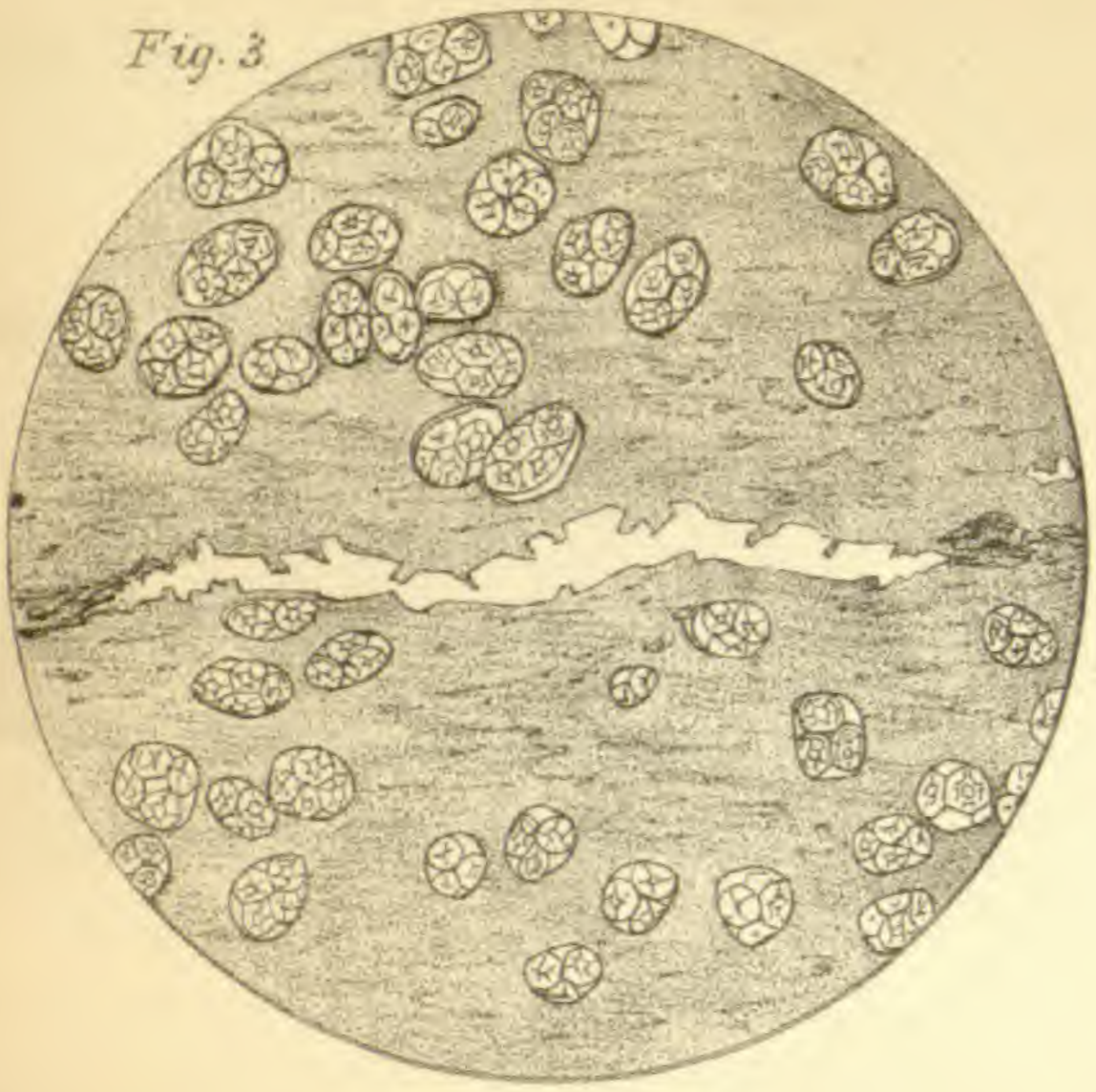


Fig. 1.



Fig. 2.



Fig. 4.

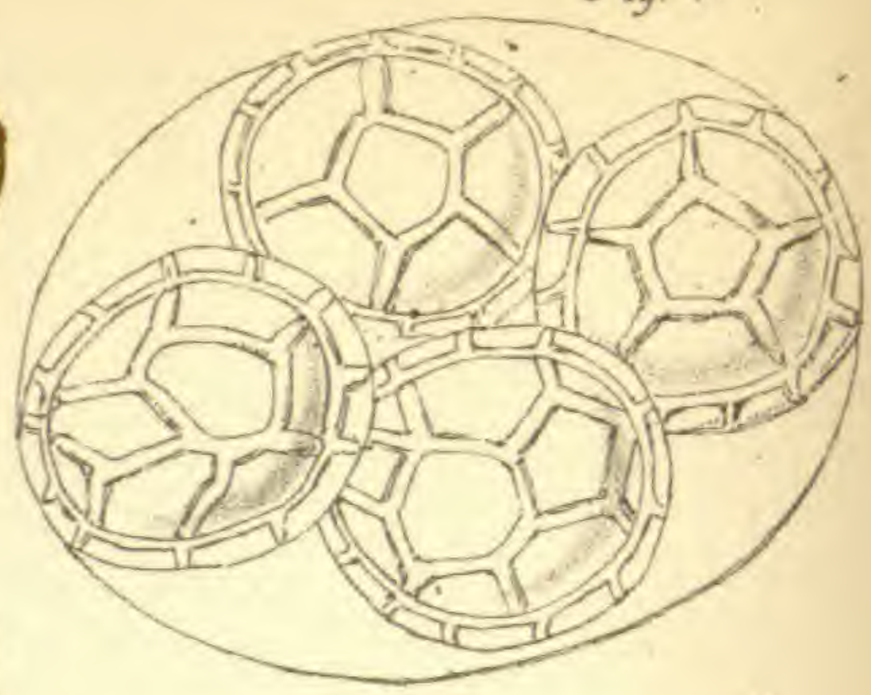




Fig. 5.

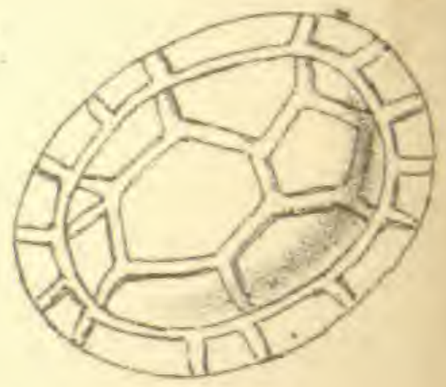


Fig. 6.

W.G.SMITH. LITH

Fig. 7.

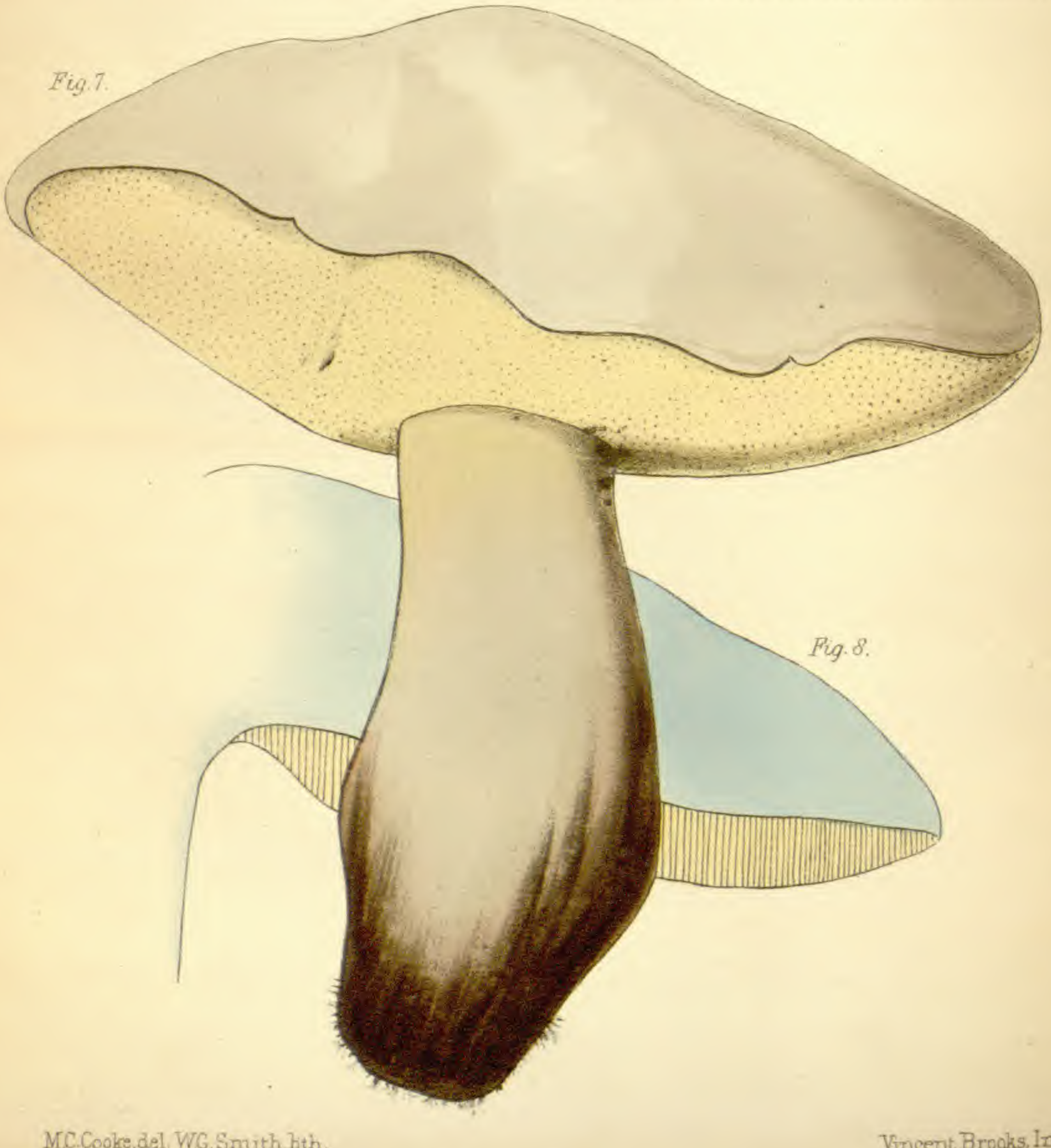


Fig. 8.

M.C.Cooke, del. W.G. Smith, lith.

Vincent Brooks, Imp

TUBER EXCAVATUM, *Vitt.*, AND THE OTHER BRITISH TRUFFLES.

By M. C. Cooke, Esq.

(Plate XXX. Fig. 1–6.)

Having been solicited to furnish the letterpress for the Plate on which has been figured *Tuber excavatum*, Vitt., for the discovery of which as a British plant we are indebted to Mr. W. G. Smith, I have taken advantage of the opportunity to collect together descriptions of all the species of the genus *Tuber* hitherto found in this country. This has been done under the conviction that every attempt at concentrating the characters of the species, in the different genera and families of British Fungi, will be welcomed by those who have neither time nor opportunity to search for them in the numerous works through which they are scattered. Moreover, I would hope that the removal of some of the acknowledged difficulties will tend to increase the number of workers in a field where plenty of work still remains to be done.

Sect. A.—*Episporæ alveolatæ.*

1. *Tuber æstivum*, Vitt. From one to three inches in diameter, irregularly globose. The warts on the surface of the peridium large, four- to six-sided, longitudinally and irregularly sulcate, the apex pierced or excavated and traversed chiefly about the crown with shallow parallel striæ. Sporidia ellipsoid, pallid tawny-yellow; epispore faveolo-plicate.—*Tuber æstivum*, Vitt. Mon. Tub. p. 38; Tul. Fung. Hyp. t. 7. f. 3; Corda, Icon. vi. t. 18. f. 129; Berk. Out. pp. 376. t. 23. f. 2; Cooke's Brit. Fungi, t. 23. f. 1. *Tuber cibarium*, Sow. Eng. Fung. 309; Hussey, Illus. t. 11; Sibth. Fl. Oxon. 398. *T. Bohemicum*, Corda, Ic. Fung. vi. *T. Blotii*, End. Desl. *T. nigrum*, Allioni, Fl. Ped. *T. albidum*, Fr. Sys. Myc.—The common Truffle of the markets.

2. *Tuber macrosporum*, Vitt. Roundish, from the size of a hazel-nut to that of a walnut. Peridium clad with minute tubercles, covered with ferruginous spots and fissures. Flesh compact. Veins scattered, numerous and interrupted, and mixed with obscure lines. Asci with long pedicels, 1–3-spored. Sporidia elliptic, very large, brownish; epispore alveolo-reticulate, reticulations small. The odour of the fresh

Tuber is said to be strongly alliaceous.—*Tuber macrosporum*, Vitt. Mon. Tub. t. i. f. 5; Tul. Fung. Hyp. t. 17. f. 8; Berk. and Br. Ann. Nat. Hist. No. 580; Berk. Outl. p. 376.

3. *Tuber bituminatum*, B. and Br. Tuber black, globose or ovate and regular. Warts small and polyhedral, with a deep hole excavated at the base of the tuber. Veins loosely coherent, for the most part originating from the margin of the basal hollow. Asci oval, with long pedicels. Sporidia tawny, ovate, loosely cellulose. Odour strong of pitch and Horseradish. "Closely allied to *T. æstivum*, Vitt., but easily distinguished by the odour; it differs also in the general form, being much more regular and the warts smaller, and in the existence of a basal cavity prolonged into the substance of the fungus, which is thus very light compared with *T. æstivum*. The veins cohere very loosely, so that it is difficult to cut the plant in half without breaking it into frustules. It shrinks very much in drying. The sporangia have much longer stalks than in *T. æstivum*. The sporidia closely resemble those of that species, but are slightly longer compared with their width, and have somewhat shallower cells. It ranges from the size of a walnut to that of a hen's egg." (Berk. and Br. Ann. Nat. Hist. No. 581.)

4. *Tuber scleroneuron*, B. and Br. Tuber red-brown, cartilaginous, globose, lobate; minutely warted, nearly smooth, rimose. Veins irregular, broken, springing from the cracks in the peridium. Cinereous towards the centre, red-brown at the circumference. Sporidia red-brown, ovate, minutely cellulose. Odour faintly aromatic. "This species differs from *T. rufum*, Vitt., in its firmer cartilaginous texture, deep red-brown colour, in the form of its sporidia, which are ovate, not elliptic-elongate, and in its faint aromatic odour. The venation also is more broken and interrupted. *Tuber rufum*, Vitt., appears to be its nearest ally. When dried, *T. scleroneuron* becomes as hard as a piece of wood." (Berk. and Br. Ann. Nat. Hist. No. 582.)—Bowood, Wilts, October, 1857.

5. *Tuber excavatum* (Tab. XXX. Fig. 1–6), Vitt. Subglobose, about an inch in diameter. Peridium discrete, ochraceous, minutely verrucose firm. Flesh horny, cinereous-red, liver-coloured or tawny. Veins pallid-ochraceous. The substance falls away in the centre, so as to leave a cavity, which has an opening at the base of the tuber. Asci numerous, ellipsoid, 1–4-spored. Sporidia ellipsoid, yellowish or pallid-tawny; epispore largely faveolo-plicate.—*Tuber excavatum*, Vittadini,

Monog. Tub. t. 1. f. 7; Tul. Fung. Hyp. t. 6. f. 1; t. 17. f. 5; Smith, in Seem. Journ. Bot. iii. p. 11. *Tuber fuscum*, Corda, Icon. i. t. 7. f. 298. *Aschion fuscum*, Wallr. Fl. Germ. ii. 866. *Tuber Montagnei*, Lesp. *Vittadinion Montagnei*, Zobel in Corda Ic. vi. t. 20. f. 142.

The discovery of this plant as a British species by Mr. W. G. Smith was announced in the January number of this volume. Mr. Smith obtained his specimens from the truffle districts of Somersetshire last autumn, and the illustrations accompanying our paper were taken from them. It may possibly grow in other parts of the British Isles, and our Plate may help to find it.

Sect. B.—*Epispore echinulate.*

6. *Tuber brumale*, Mich.—Tubers more or less regularly globose, black, rough with polygonal warts, at length smooth and naked. The mature flesh blackish-grey, marbled with white veins. Asci numerous, with 4–6 spores. Sporidia oblong-elliptic and echinulate, with rigid spines.—Vitt. Mon. Tub. t. 1. f. 6; Berk. and Br. Ann. Nat. Hist. xviii. p. 80; Berk. Outl. Br. Fung. 376. *Tuber brumale pulpa obscura odora*, Mich. Nov. Gen. p. 221. t. 102.—This species appears to be esculent.

7. *Tuber rufum*, Pico.—Subglobose or irregular, from a quarter of an inch to an inch in diameter. Peridium thick, subcartilaginous, rimose, minutely verrucose, tawny-ferruginous. Flesh at first soft and whitish, at length reddish and firm or horny. Veins from whitish becoming livid, mixed with others that are tawny. Asci obversely egg-shaped, 1–4-spored (generally 3). Sporidia ellipsoid, tawny, studded with sharp points.—*Tuber rufum*, Pico, Meleth. p. 80; Vitt. Mon. Tub. t. 1. f. 1; Tul. Fung. Hyp. t. 6. f. 2; t. 18. f. 2; Berk. and Br. Ann. Nat. Hist. No. 322; Berk. Outl. p. 376. *Tuber suillum*, Bornholz, Colt. de' Tart. *Tuber cinereum*, Tul. Giorn. Bot. Ital. ii. p. 62. *Ooogaster rufus*, Corda, Icon. vi. t. f. 16. 123.—Rudloe, Wilts (C. E. Broome, Esq.); Audley End, Essex (Rev. J. E. Leefe).

Vittadini states that the odour of this *Tuber* is strong and nauseous.

8. *Tuber nitidum*, Vitt. Globose or depressed. Peridium thick, hard, smooth, shining, and pallid. Flesh at first whitish, at length reddish-brown, hard. Veins whitish, rather numerous, principally diverging from a whitish spot at the base. Asci egg-shaped, contain-

ing from 1–4 spores. Sporidia ellipsoid, reddish-yellow, densely echinulate. Odour, when recent, nauseous. "In the young plant the asci are precisely of the form of those in *Cheiromyces meandriformis*, but with age they enlarge, and are at last obovate as in *T. æstivum*. Distinguished from *T. rufum* by its smooth pale peridium, and the veins springing from a distinct, generally single, basal point."—Berk. and Br. Ann. N. H. 321. *Tuber nitidum*, Vitt. Mon. Tub. t. 2. f. 10; Tul. Fun. Hyp. p. 142. *Oogaster nitidus*, Corda Icon. vi. t. 15, f. 117; Berk. and Br. Ann. Nat. Hist. No. 321; Berk. Outl. Br. Fung. p. 376.—Hartham, Rudloe, Spye Park, Wilts (C. E. Broome, Esq.).

9. *Tuber puberulum*, B. and Br.—Gregarious; irregularly sublobate, clothed with short erect down, which gives it to the naked eye a peculiar pearly appearance. The white spots are very visible, even in dried specimens. Peridium very thin and delicate, so that the pinky-brown colour of the flesh is apparent through it, often cracked. Veins white from a radiating base, in some individuals very few. Sporidia nearly spherical, reticulato-echinulate. Odour of the radish.—Abundant in the neighbourhood of Hanham, near Bristol; Chudleigh; Aspley near Woburn, in sandy districts.—Berk. et Br. Ann. Nat. Hist. Aug. 1846; Berk. Outl. p. 376.

10. *Tuber dryophilum*, Tul.—Gregarious, with little odour, rounded usually about the size of a nutmeg, nearly smooth, white, marked here and there with darker patches. The peridium is thick, hard, and tough, easily parting from the flesh, which is firm, reddish-brown, with white interstices, which are given off from different points of the surface. Sporidia elliptic and coarsely reticulato-echinulate.—Berk. and Br. Ann. Nat. Hist.; Aug. 1846; Berk. Outl. p. 376. King's Cliffe, Chudleigh, Bristol, etc.

Explanation of Plate XXX.

Fig. 1. *Tuber excavatum, natural size.* 2. Section of same. 3. Portion *magnified*, with imbedded asci. 4. Ascus and sporidia, *further magnified.* 5 and 6. Sporidia, *magnified.*

BOLETUS CYANESCENS, Bull.

By M. C. Cooke, Esq.

(Plate XXX., Figs. 7 and 8.)

Pileus convexo-expanded, closely tomentose or floccoso-squamose, opaque, tan-coloured, becoming brownish; flesh compact, white, dark-blue when broken; stem stuffed, then hollow, ventricose, villoso-pruinose, of the same colour, constricted above, even, white; tubes free, minute, round, white, then yellow (Bull. t. 369). In woods. Not found since the time of Sibthorp (Berk. Outl. 236).

This is the description given by the Rev. M. J. Berkeley, on the authority of Bulliard. In the 'English Flora,' vol. v. p. 154, he adds, "Pileus 2–5 inches broad, rigid, pale, straw-coloured, subfuliginous, the margin acute; flesh white, when broken changing instantly to the most beautiful azure blue, and when squeezed distilling a blue juice; tubes short, when young scarcely a line long, white or lemon-coloured; stem distinct from the pileus, the apex contracted, brittle, never reticulated, but villoso-pruinose; sporules white (Fries, Syst. Myc. i. 395).

Towards the close of September, 1864, I found three specimens of this *Boletus* in the neighbourhood of the village of Neatishead, in Norfolk, growing by the roadside at the bottom of a hedgebank. As they grew, I believed them to be only specimens of *Agaricus campestris*, so much did they resemble in size and form the uncultivated variety of the Mushroom, common in the same localities at that period of the year. I had, in fact, passed them as such, but a lingering doubt whether I might not be mistaken caused me to return, for nothing but the top of the pilei were visible amongst the herbage, and, on gathering them, I immediately became convinced of my error. On this occasion, two were collected from the same spot, the other was found alone, at the distance of a quarter of a mile, and a day or two afterwards.

I do not remember having seen any other figures of this plant than Bulliard's (pl. 369), and that in Roques' 'Histoire des Champignons,' pl. 8, fig. 1. The latter certainly does not much resemble the figure which accompanies this account, and the former differs in some points to which I will briefly refer hereafter, having first given a detailed description of the features presented by my specimens. I am induced to do so at greater length than would otherwise have been necessary

had the species been less rare. The pileus was at first globose, afterwards convex, and somewhat of a dirty cream-colour, becoming darker with age. The cuticle was to the touch like the softest French kid leather. The flesh was compact, brittle, and of a very pure white when first broken, becoming gradually blue, at first cærulean, deepening into full "cobalt," at length leaving a carbonaceous stain where it had been of the deepest blue. The change was not so rapid as in some other species, but the blue was brighter and more brilliant. The stem in all the specimens was of a somewhat loose texture, and brittle, not in the least fibrous, snapping readily, but hollow in *none*. The only apparent tendency was in the most mature specimen, here figured, in which the centre of the stem was more spongy than in the others. In all there was a diminution of diameter, upwards and downwards, so as to be truly ventricose. The colour was nearly the same as that of the pileus in the upper portion, with a slight lemon-coloured tint near the top, but dark-brown at the base, melting into each other without any distinct line of separation. The tubes were perfectly free from the stem, short, round, and of a pallid primrose tint. The spores were undoubtedly colourless, twice as long as broad, and sometimes longer, and narrowed towards each extremity.

Although agreeing in the most important features with Bulliard's description, my specimens had certainly not an abrupt termination to the dark colour of the lower portion of the stem, as shown in the figures of Bulliard and Roques, neither was the pileus of so deep a colour. I do not find that Bulliard characterizes the stem as hollow, though Fries (Epicr. p. 426) states, "Stipite medulla spongiosa farcto excavatoque," therefore, with him alone we must join issue. It is worthy of note, that the district in which my specimens were found was eminently gravelly, and that Sibthorp's were collected on Magdalen College Walks, during the month of September (Fl. Oxon. 1055). It is quite possible that this species is not so rare as we have hitherto regarded it. There are but a comparatively few localities in which any one resides who takes an interest in, or can determine from description, the different species of British Fungi. Our figure may aid, in combination with the above particulars, any who may have "the will" without hitherto knowing "the way."

EXPLANATION OF PLATE XXX.

Fig. 7. *Boletus cyanescens.* 8. Section of pileus :—*both natural size.*

PLANTS USED MEDICINALLY AT CARACAS, VENEZUELA, SOUTH AMERICA, AND THEIR VERNACULAR NAMES.

By A. Ernst, Esq., of Caracas.

In Venezuela a comparatively small number of plants have vernacular names,—the useful, poisonous, or in other respects remarkable species, forming but a small fraction of the whole vegetation of the country. Most of our plants are therefore called "monte," a collective name, corresponding nearly to the English slang term "bush." As the indigenous names are not without interest, I have made a list of them, and I should like to have added some philological remarks on the Indian ones, but the total want of any grammars or vocabularies has rendered this, for the present, out of the question. The Spaniards, wherever they carried their victorious arms, invariably suppressed the languages of the natives. Thus, nobody had an interest in learning what was considered only as barbarous articulations condemned to extermination. True, grammars and vocabularies were composed for the use of the friars going to the mission stations of the interior; but most of them became a prey to moisture, insects, or carelessness. In Venezuela a plant often bears very different vernacular names. I remember meeting with three different names for *Melia sempervirens*, within a radius of thirty miles. The names of my list are generally collected in the neighbourhood of Caracas; when this is not the case, I have added the locality in which the name is current. The names I have collected are either of Indian or Spanish origin. At Caracas the Indian names are generally so corrupted, that their original form could be traced only by a good Indian scholar, whilst in the interior, where the Spanish influence was less felt, many uncorrupted Indian names are still in use. The Spanish names may be divided in three classes:—1. Names introduced with the plants from Europe, as "Agenjo," "Albahaca," "Ajo." 2. Names of European plants transferred to American ones, which in habit or use bore some resemblance to them, as, for instance, "Escorzonera" (*Crassiolaria annua*, Jacq.), "Reseda" (*Lawsonia inermis*, L.), "Apio" (*Arracacha esculenta*, DC.). 3. Names newly invented and not used for any plant before, sometimes having an intelligible meaning, but in most cases so far-fetched that one is at a

loss to find out a *nexus rerum*. The American Spanish language has a number of obscene expressions, and in great many instances these names are of that nature. As a considerable number of names are genuine Spanish, I have adopted throughout the Spanish way of spelling. And I may here observe that the great work of Humboldt, Bonpland, and Kunth, as well as the 'Synopsis,' contains many orthographical errors,—more than two-thirds of their vernacular names being incorrectly rendered.

Acedera (*Rumex Acetosa*, L.). Sometimes cultivated for the sake of its edible leaves, which are also used as an antiseptic and laxative.

Acelga (*Spinacia oleracea*, L.). Cultivated. The expressed juice of the root sniffed up, is said to give relief in catarrh. In Spain the name Acelga is applied to a different plant.

Achote, Onoto (*Bixa Orellana*, L.). Both words are derived from the Aztec Achiotl, whence also the English corruption "Arnotto." The leaves cure headache, and the country-people generally put them in their hats before they go to work in the hot sun. An intelligent planter assures me that no other tree gives such a refreshing shade as the Onoto, although it does not grow either very high, nor has so thick a foliage as, for instance, the Mango. The red arillus is put into soups or sauces, but principally into a national dish, called "Mondongo," to which it imparts a saffron-like colour, and a rather peculiar flavour.

Agenjo (*Artemisia Absinthium*, L.). Well known for its aromatic properties, and sometimes cultivated. A decoction is used as a vermifuge, and taken in doses of two or three spoonfuls before breakfast; said to be efficacious even against *tænia*.

Aguacato (*Persea gratissima*, Gærtn.), derived from the Aztec word 'Ahuatcatl.' Cultivated and valued as a dessert-fruit. The astringent kernel, cut in pieces, roasted, and reduced to powder, is recommended in diarrhœa and dysentery; ten or twelve grains of it, mixed with a decoction of Chilca (*Eupatorium Chilca*, H. B. K.?), and Llanten (*Plantago major*, L.), are taken three times a day.

Ajonjol (*Sesamum orientale*, L.). Cultivated. An emulsion prepared from the seeds is efficacious in diseases of the chest and lungs; it is given also to nurses to increase the milk.

Ajo (*Allium sativum*, L.). Garlic is anthelmintic when pounded

and boiled in milk. Country-people mix it with tallow, and use it instead of mustard-poultice, or when the latter is thought too powerful. Ajo forms a most important article of the Creole kitchen. From 100 to 120 of the bulbs (called "cabezas," or heads), tied together in strings, are sold at from four to ten shillings.

Albahaca (*Ocimum Basilicum*, L.) is used for weak eyes, by applying to them a few drops of the juice of the plant.

Alcornoque (*Bowdichia virgilioides*, H. B. K.). A tree entirely different from what in Spain is termed Alcornoque. A decoction of the bark, with vinegar and salt, is taken to counteract the bad effects of heavy falls. At Caracas, when the Alcornoque is rare, a mixture of starch with vinegar and water is prepared on these occasions. These remedies are called "pósima."

Amapola (*Plumiera rubra*, L.). The milky, somewhat gummy sap of the buds is used in poultices for fractures or luxations of the bones. It is also said to cure freckles, and other cutaneous disorders. An infusion of the petals, on account of its demulcent and mucilaginous properties, is recommended for hoarseness.

Amores secos or *Cadillo rosero* (*Bidens leucantha*, and other species). The flowerheads chewed are applied, it is said, with good effect to ulcers.

Angelon (*Angelona salicariæfolia*, H. B. K.). An infusion of the flowers, acting as a powerful sudorific, is an excellent remedy in pectoral diseases of a catarrhal character.

Añil (*Indigofera Anil*, L.). The Spanish word "Añil" is derived from the Arabic "nir" or "nil," and Hernandez calls the Mexican indigo "Anir." The plant was formerly more extensively cultivated than it is at present. All the indigo now produced is used in the country, and none is exported. A pound sells for three to six shillings. The leaves are used for curing the itch, for which purpose they are masticated, mixed with salt, and rubbed over the body. Friction with this composition is to be continued for some time, the bowels being kept well open. The leaves of the Aullama (*Cucurbita maxima*, Duch.) are sometimes employed in the same manner. I think in both cases there is but a mechanical effect, the pustules on the skin being opened by the roughness of the leaves, and the *acari* killed.

Apio (*Arracacha esculenta*, DC.). Four or six spoonfuls of the juice of the root, with a little common salt, are a mild purgative. It is also

used with bread to make small poultices for the swollen breasts of wet-nurses.

Algarrobo (*Hymenæa Courbaril*, L., not as in Spain, *Ceratonia siliqua*, L.). A resinous substance is obtained by making incisions in the bark of the stem or branches. There is also a considerable quantity of it in the pods; and in the interior of the country, these pods are used instead of incense in churches. I witnessed this once myself, and was hardly able to distinguish between the smell of real incense and Algarrobo-pods. The resin is applied internally in diseases of the organs of respiration; the unripe pod is pounded, and, in form of a poultice, applied to fresh fractures, and cures them in a very short time.

Algodon (*Gossypium*, sp.). An infusion of the leaves or of the toasted seeds is taken in rheumatism; the juice of the leaves is said to cure diarrhœa in children. On the Lake of Valencia a somewhat singular medical use is made of cotton. People in those parts frequently suffer from mumps, perhaps in consequence of the abundance of siliceous matter in the water. Health is restored, I have been told, by taking every morning a scruple of the dry powder of burnt cotton-fibres during the waning of the moon. A physician in Maracay, a small town at the western end of the lake, told me that mumps had become less frequent since people have begun to filter the water they they drink.

Aruñagato (*Fagara lentiscifolia*, W. (Griseb. West Ind. Fl. p. 137), *Zanthoxylum Pterota*, H. B. K.). Dr. Seemann ('Botany Herald,' p. 95) observes, "I am not aware that it has previously been found on the continent of America, except in Mexico, by Bates." In the neighbourhood of Caracas it is one of the most common shrubs, but I am not quite sure whether it is indigenous or introduced. It forms in this country the most impenetrable hedges or fences, and is better adapted than any other plant for this purpose. Humboldt spells the popular name "Niaragato." It may be thus pronounced in Cuba, where he met with the plant. At Caracas it is Arañagato or Aruñagato; the latter gives a very good idea of one of the qualities of the bush, Aruñagato meaning "scratching cat." The juice of the leaves, mixed with castor-oil, is employed for ear-ache.

Astroloja (*Aristolochia*, sp.). Poultices are made of the leaves for curing the swelling in dropsy. A short time ago a medical practitioner or "curioso" of the country brought pieces of the stem to a

chemical laboratory. They were those of an *Aristolochia*, and in shape, though not in size, resembled the first Atlantic telegraph cable. He wanted to have made a decoction of them, which he praised as a wonderful medicine, but without divulging in what disease.

Aullama (*Cucurbita maxima*, Duch.). Cooling poultices are made of the unripe fruit. The seeds are used for emulsions in pectoral diseases. Parts of the fruit-bearing peduncle, on a string, are worn by children round the neck, in order to facilitate dentition.

Azahar (*Citrus Aurantium*, L.). "Aqua de Azahar," extracted from the flowers by distillation, is frequently used as a vehicle for repulsive medicines. (Under the name of "Azahar de la India," *Murraya exotica*, L. is very often cultivated in gardens.)

Azucena (*Lilium candidum*, L.). Cultivated. An infusion of the flowers is said to be as efficacious a sudorific as that of Elder or Borage.

Barbasco (*Baillieria Barbasco*, H. B. K.; *Clibadium leiocarpum*, Steetz in Seem. Bot. Herald, pp. 152, 153). This herb bruised is applied in frictions against itch, freckles, and other cutaneous disorders. The root soaked for about twelve hours in white wine, and with some leaves of *Commelyna Cayennensis*, Rich., called "Suelda con Suelda," forms a draught of which a tablespoonful taken on three consecutive mornings, is said to cure colic and chronic diarrhœa.

Batata (*Ipomœa Batatas*, Lam.). The variety generally cultivated is *β. leucorrhiza* (Griseb. Flora of Brit. West India, p. 768). The cooked root is applied in the form of poultice in erysipelas or inflamed skin; in the last case some olive-oil is added.

Batatilla (*Ipomœa fastigiata*, Swt., *α*. Griseb. loc. cit. p. 768). Very common in the "llanos," or large plains of the interior. One drachm of the powdered root, taken in white wine, is a mild laxative.

Bejuco de cadena (*Ipomœa acetosifolia*, R. S.?). A strong decoction of the root, with three spoonfuls of honey, is given in dysentery. By some the plant is believed to be a more efficacious remedy in venereal diseases than Zarzaparilla. Small pieces of the stem are put into cold water, and by drinking the infusion three times a day, every symptom of the disease is said to disappear after nine days or a fortnight. But as Zarzaparilla is very frequent in the mountainous neighbourhood of Caracas, I have always seen that plant used instead of this *Ipomœa*.

Berengena (*Solanum Melongena*, L.). Poultices of the ripe fruit, made with cocoa-oil, are applied on tumours or abscesses.

Berros (*Nasturtium officinale*, L.). Four spoonfuls of the juice of the Watercress in a cold infusion of Guazuma-bark (*Guazuma tomentosa*, Kth.), taken twice or thrice a day with four spoonfuls of good claret, are reputed to be efficacious in liver complaints, so very common among the inhabitants.

Biznaga (*Ammi Visnaga*, Lam.?). An Umbelliferous plant, closely allied to *Daucus*, but from want of sufficient material not satisfactorily made out. An infusion of the umbels is given to strengthen the digestive organs.

Borraja (*Borago officinalis*, L.) plays an important part amongst the popular medicines of Venezuela, but its fame has come to us from Europe with the plant itself.

Brusca (*Cassia occidentalis*, L.). Exceedingly common, but generally growing near houses, together with *Leonurus Sibiricus*, L., and *Acanthospermum humile*, DC. It is much esteemed for its purgative and sudorific qualities. A decoction of the root, reduced to two-thirds of its first quantity, is taken in cases of secondary syphilis. A beverage prepared from the toasted and ground seeds is said to destroy stones in the bladder.

Cacao (*Theobroma Cacao*, L.). The medical properties of Cacao (I write so, and not Cocoa, *conf.* Webster *sub voce* Cocoa) and chocolate are well known. At Caracas we have but few Cacao-trees, the hot coast and the valley of the river Tuy being the regions where it is more frequently cultivated.

Cadillo, Pegapega (*Triumfetta semitriloba*, L.). The first name means Burdock, the second is derived from the verb "pegar," to stick. An infusion of the root or leaves stops diarrhœa.

Cadillo de perro (*Bidens bipinnatus*, L.). Cadillo is the name of several low plants bearing fruits with hooked bristles or prickles, which attach themselves to the legs of men and dogs. This explains the vernacular name. There is a singular story about the medicinal power of this weed. When a person is bitten by a dog, a poultice, made of the leaves and seeds of this *Bidens* with a little salt, is applied to the wound. In a short time the person will be cured, but the dog will get ill and die. A decoction of the same plant is said to cure pulmonary diseases. "If any one should doubt the power of this remedy,

let him put a putrid liver, no matter from what animal, into such a decoction, and in twenty-four hours it will be found fresh and sound." (Pompa, 'Coleccion de Medicamentos indigenas,' 3rd edit., Caracas, 1860.)

Caimito (*Chrysophyllum Cainito*, L., *β. Jamaicense*, Jacq., Griseb. loc. cit. 398). A decoction of the bark or the leaves is used like *Species pectorales* in Europe. The fruit is astringent, and stops diarrhœa.

Calabaza (*Luffa acutangula*, Ser.). Several times I have seen the *arrieros*, or donkey-drivers of the interior, rubbing the skin of their beasts with the leaves of this plant, to keep off the flies. A paste is made of the seeds, of which an ounce and a half is taken before breakfast, followed by a glass of linseed tea, and two hours after by two ounces of castor-oil. This is said to expel tape-worm.

Calahuala (*Goniophlebium attenuatum*, Presl). A decoction of the caudex is diuretic, and with a little salt enters into the composition of a cooling draught, taken by the lower classes after heavy falls, blows, or contusions. (See "Alcornoque.")

Camasa (*Crescentia Cujete*, L.). The pulpy substance of the fruit is frequently used for poultices in inflammation of the skin. (See also "Totumo.")

Cambure (*Musa sapientum*, L.). The *Musa Paradisiaca*, L. (*Platano*) does not produce ripe fruit at Caracas, the temperature being too low. The Cambure is cultivated to a height of nearly 6000 feet above the sea. In Los Teques, a small place about fifteen miles from Caracas, but more than 5000 feet above the sea, *M. sapientum* does not produce fruits. The astringent juice of the stem is sometimes applied as an injection in dysentery and ulcerations of the rectum, or as a lotion for external ulcers. The juice of the unripe fruit produces indelible stains on linen. The ripe fruit is considered by some as aphrodisiac. Roasted with almond-oil it is an excellent external remedy for sore-throat; this I can affirm from personal experience.

Cancanapire (*Croton hirtus*, L'Hér. and other sp.). An infusion of the bark or leaves is used as a tonic in nervous attacks.

Caña amarga (*Gynerium saccharoides*, H. B. K.), and—

Caña de Malojo (*Zea Mais*, L.). A decoction of the young stems is taken in urinary complaints.

Caña de Malojillo (*Andropogon citratum*, DC.). From the aromatic

root a very agreeable tonic infusion is made. It is likewise used for cleaning the teeth. The plant is not wild but cultivated with us.

Caña de la India (*Dieffenbachia Seguine*, Schott). A decoction made from the stem, thickened with gum-arabic, is taken twice a day in gonorrhœa, sometimes with a decoction of the roots of *Solanum hirtum*, Vahl (which is called "Huevo de gato"). This is considered as an excellent remedy for purifying the blood.

(To be continued.)

ON THE SYSTEMATIC POSITION OF THE NATURAL ORDER *TROCHODENDREÆ*.

By Dr. A. W. Eichler.

(*From the Ratisbon 'Flora,' Jan.* 1865.)

A few weeks after I sent my paper "On the Structure of the Wood of *Drimys* and *Trochodendron*, and the Systematic Position of the latter Genus" to the editor of the 'Flora,' but before the paper was printed, (Sept. 17, 1864,) there appeared in the August number of the second volume of the 'Journal of Botany, British and Foreign,' the first part of Dr. B. Seemann's "Revision of the Natural Order *Hederaceæ*." In this paper that author dwells, amongst other things, on the systematic position of *Trochodendron* (p. 237, *seq.*), a genus which Bentham and Hooker fil. had referred to *Araliaceæ*. Dr. Seemann controverts their view, places *Trochodendron* once more near *Winteraceæ*, allies it with *Euptelia*, Sieb. et Zucc., and is inclined to regard both genera as "the first known members" of a new Natural Order, that of *Trochodendreæ*. Dr. Seemann has thus partly anticipated me, as, in the paper alluded to, I had also advocated the propriety of "leaving *Trochodendron* near *Winteraceæ*, but separated from them, until further discoveries should bring to light either connecting links or forms which might vindicate the independence of a group of plants of equal importance with the last-named (*Winteraceæ*)." That both of us should have arrived, independently, at the same conclusions is a source of satisfaction to me, and may be regarded as a certain proof of their correctness. It was impossible for me to

know, when writing my paper, that such a discovery, enabling Dr. Seemann to advocate the establishment of the Natural Order *Trochodendreæ*, had actually come to light in the carpological structure of *Euptelia*. This genus, established by Zuccarini upon a Japanese species discovered by Siebold, ('Flora Japonica,' p. 133, t. 72,) was referred by its author to *Ulmaceæ*, in accordance with its then known anthological characters; but, on account of its numerous disconnected carpels, it occupied in that Order an isolated position. A second species in ripe fruit was afterwards discovered by Griffith in Assam. At first sight this was not identified with *Euptelia*, and strangely enough, in the preliminary arrangement of the specimens, was also referred to *Ulmaceæ*, where it remained till recently more carefully examined by the celebrated authors of the 'Flora Indica,' Drs. Hooker and Thomson. It was found that Zuccarini was wrong in placing *Euptelia*, with its large quantity of albumen and minute embryo, in *Ulmaceæ*, and that its true relationship had to be sought for in the neighbourhood of *Winteraceæ*. Hooker and Thomson's article "On the Genus *Euptelia*" was published in No. 28 of the 'Journal of the Proceedings of the Linnean Society,' which, though appearing early in 1864, did not reach Munich till the autumn, so that when writing my paper I could have no knowledge of it.

As already mentioned, Dr. Seemann declares *Euptelia* to be closely allied to *Trochodendron*, and both genera to be the first known members of a new Natural Order. After examining the authentic specimens of both genera existing in our Academical Herbarium, I fully concur in his view; and, as the subject has been mooted, I will briefly refer to the Natural Order constituted by the two genera, and the characters in which they agree and differ. In the first instance, we have in both genera the same habit, an erect shrubby or arborescent growth; alternate, simple, penninerved, exstipulate leaves, with a serration, the points of which are glandulose (a peculiarity which Zuccarini overlooked in *Trochodendron*); leaf and flower-buds are covered with protecting scales; there is an indeterminate (racemose or cymose) inflorescence, and scaly bracts. With regard to the structure of flowers and fruit, both agree in the total absence of a perigonium, in the indefinite number of stamens and their structure, and in the indefinite number of the carpels, and also in the circumstance that they are arranged around the very short floral axis in a single whorl. They

have further in common the anatropous ovule, affixed on the ventral suture, with a downwards-bent raphe ("*ovulum epitropum*," Agardh); and, finally, the same relative size of testa, albumen, and embryo. On the other hand, their differences are such that we can easily find analogues in allied Natural Orders. The polygamous, or rather monoicious nature of *Euptelia*, as contrasted with the hermaphrodite one of *Trochodendron*, we have in a similar manner in the genus *Drimys*, the section *Tasmannia* of which agrees in this respect with *Euptelia*. The separation of the carpels in *Euptelia*, whilst they are connate in the ovary of *Trochodendron*, is a common occurrence in all allied Orders. The development of the points of the carpels in a wing, and the indehiscence of the fruit in *Euptelia*, have their analogy in *Liriodendron*, whilst *Trochodendron* would agree with those species of *Talauma* where a septicidal separation of the different carpels is accompanied by a splitting of the ventral suture. The polyspermous condition of *Trochodendron* agrees with *Drimys*, whilst *Euptelia*, with one or a few ovules, reminds us of *Illicium*, the nearest ally of *Drimys*. Other important differences have not been observed. All this leaves no doubt that the two genera in question are indeed more closely related to each other than they are to any allied Order, and that they possess that degree of affinity which justifies us in regarding them as belonging to one and the same Natural Order.

Under these circumstances, the establishment of the independent Natural Order *Trochodendreæ*, to be ranged with the other *Polycarpeæ*, appears to be perfectly justified, and as, in comparing them with the other *Polycarpeæ*, we have merely to keep in mind the *Magnoliaceæ*, *Winteraceæ*, and *Schizandreæ*, we obtain absolute differential characters, and a distinct habit. We may be allowed to lay considerable stress upon the want of floral envelopes, this character being constant also in *Euptelia*. We must also attach importance to the epitropous nature of the ovules (to which Agardh justly assigns great systematic value), meeting with it in *Trochodendreæ*, and not finding it in the three Orders with which we have compared them. If we add to these the differences which they respectively present, as, for instance, the want of stipules as contrasted with *Magnoliaceæ* (quite apart from the spathe-like development, the lower and higher leaf-formation of this Natural Order), and the want of oil-cells, so widely diffused in the *Winteraceæ* and *Schizandreæ*, even in their foliage and bark,—if, finally, we take

nto consideration the distinct habit of the *Trochodendreæ* as expressed by their *serrated leaves*, we shall have good evidence in favour of the above conclusions.

It remains for me to express my thanks to Dr. Seemann, for kindly reminding me to examine the structure of the wood of *Euptelia*, with the view of ascertaining how far it agreed with that of *Trochodendron* described in my paper. In complying with his wish, I found that *Euptelia* had the usual structure of deciduous woods,—a close dotted prosenchyma, traversed by numerous net-like vessels without any observable peculiarities, and without any special characteristics agreeing with those of *Trochodendron*. We have here the same evident differences of anatomical structure as in the allied *Winteraceæ* between *Illicium* and *Drimys*, and an additional proof that botanical affinities and internal structure do not always go together.

ON THE NATIVE COUNTRY OF *ARUM CANARIENSE*, *Webb et Berth.*

By Charles Bolle, M.D.

Arum Canariense, Webb et Berth.; foliis divaricatim hastato-sagittatis, auriculis patentissimis apice obtusis, folio ipso subacuto angustioribus brevioribusque, immaculatis; spatha angusta acuminata e luteo-virescente (10″ longa); spadice recto, spathæ dimidium æquante vel excedente. Floret m. Aprili. Habitat in locis pinguibus archipelagi Canariensis, raro; hucusque inventum in insulis Teneriffa, Palma, Gomera, Fuertaventura.

In an early number of the 'Journal of Botany' (Vol. I. p. 25) was published a paper on *Arum Canariense*, its introduction and successful cultivation as a starch-yielding plant in the Channel Islands, which was of special interest to one who, for many years, has made the vegetation of the Canary Islands his study. I may be allowed to supplement that paper by a few remarks on the supposed native country of the plant. I say emphatically *supposed*, as the only station recorded by Webb and Berthelot ('Phytographia Canariensis,' iii. p. 294) was calculated to raise some doubts respecting it.

Webb and Berthelot first gathered *Arum Canariense* in the island of

Palma. However, they did not pay much attention to it, for when working up their materials, it was found in their herbarium without specified locality. Bourgeau succeeded in finding the plant again, but instead of recognizing it as a new species, he took it for *Arum Italicum*, Mill. It was growing in Teneriffe, in a cultivated spot, the courtyard of the Academy of Lagune, one of those *patios* which, according to Spanish fashion, are a combination of garden and yard, and in this instance full of foreign plants, with hardly a trace of indigenous vegetation. In 1852, two years after it had been published, I met with the plant in a similar locality, the courtyard of the country house of Don Cristobal M. de Lara at La Oliva, situated not in the Laurel region of Teneriffe, but the littoral district of the much warmer island of Fuertaventura. It flowered in April, and here also grew surrounded by exotics.

These circumstances would render it likely that the plant had been introduced, and become naturalized in the rich soil in which it was found; but in 1856, I had the good fortune to collect it in two other localities, which leaves no doubt that it is truly indigenous. The season being far advanced, I could collect leaves only, but these proved sufficient for the identification of the species. The two localities were—1, roadsides, close to the town of Villa de la Orotava, Teneriffe, in stony soil; 2, banks of rivulets in the valley of Hermigua, island of Gomera, between the village and the forest, growing in great abundance in company of *Commelyna agraria*, Kth., and being to all appearances perfectly wild.

The fact is, *Arum Canariense* enjoys but a limited range, is one of the rarer plants of the Canary Islands, and is partial to good soil such as is generally found in the above-mentioned *patios*. Many additional spots where the plant is truly wild, remain doubtless to be discovered. That it has not been introduced from abroad is rendered certain by the fact that it bears not a Spanish, but Guanche popular name (Tagaragunche).

I know nothing about the occurrence of the plant in Madeira, referred to by Dr. Schott. Perhaps the Rev. R. Lowe, who knows the flora of that island better than any other botanist, might be induced to give us some information on that head. In a manuscript list of Madeira plants, made by Professor O. Heer, I find *Arum Italicum* mentioned as growing amongst vineyards, and flowering about the end of March. Can this be *Arum Canariense?*

As yet the Tagaragunche is not cultivated in the Canaries for the sake of its starch, and figures in gardens as a weed merely. But if such profitable results could be obtained from growing it in the Channel Islands, it might be worth trying in its native country. The only *Aroidea* now cultivated on a large scale is *Colocasia nymphæfolia*, the Iñame of the natives, the corms of which are boiled in water, and generally eaten with honey. *Arisarum subexsertum*, Webb et Berth., is not cultivated, but grows wild near the limit of the forest region, and is used for fattening pigs.

ŒNANTHE FLUVIATILIS.

By C. C. Babington, M.A., F.R.S.

It is manifest, from the recent remark of an excellent botanist, that the idea is still prevalent that those plants which usually inhabit swiftly flowing streams, derive their drawn-out form from the action of the water. I long since fully convinced myself, and published the fact, that the Batrachian Ranunculi do not derive their form from that cause. It is now stated by implication that *Œnanthe fluviatilis* does not grow naturally in stagnant water; but in the neighbourhood of Cambridge it may often be found in such places. Indeed, it is rarely seen in flower, and very rarely (if ever) produces seed, except in the still water.

I cannot as positively say that I have seen *Œ. Phellandrium* in running water, and it may be doubted if it could stand up against the action of a stream of much rapidity. Those who have noticed the loose manner in which it stands upon, rather than in the mud, will not expect it to resist a flow of water.

But whatever may be thought on this subject, it seems to me scarcely possible that any botanist who has seen the submersed leaves of the two plants can believe in their specific identity.

Another eminent botanist tells us, that the differences observed in the tubers of the roots, and the radical leaves of *Œ. pimpinelloides*, *Œ. Lachenalii*, and *Œ. silaifolia*, "have been shown to depend only on soil and situation." It is much to be wished that he had informed us when and where it has been shown that such is the case. For however

much we may be inclined to submit to the dictum of a master in science, I am forced to doubt its correctness in this case. I have never had reason to believe that any one of the observant field-botanists of Europe has seen any proof of the structure in question resulting from soil and situation, and must be allowed to disbelieve it until proof is adduced.

BRIZOPYRUM SICULUM, FOUND IN IRELAND.

I wish it to be put on record that *Brizopyrum Siculum*, Link, was found growing in some quantity "by roadsides in Co. Kerry" some years ago, but not identified until lately. Mrs. Hill, who found it, sent specimens to Mr. Isaac Carroll, of Cork, who at once, knowing it to be alien to the British and Irish floras, sent specimens to me; and she also sent it to Professor Babington, of Cambridge.

The latter gentleman ascertained that it was the *Brizopyrum Siculum*, and Colonel Munro, who is so great an authority on Grasses, has also favoured me with his opinion; and observes, that "the stipitate ovarium, glabrous at the apex, separates it from any genus of *Hordeaceæ*;" and further, he considers "the glandular hairs at the base of the lower palea, a very good character in *Brizopyrum*."

It is very closely allied to our old *Triticum loliaceum*, Smith, *Catapodium loliaceum*, Link, who at one time placed it in the latter genus.

I am unable to offer an opinion whether it occurred accidentally, or whether it grew naturally where Mrs. Hill found it. I shall, however, observe, that its geographical range in Europe is something similar to that of the little Orchid *Neotinea intacta*, Reich., which was discovered in the South of Ireland last year; consequently, it is just possible it may be an extreme outlyer from the principal stock, which we know to be the case with other plants in the southern parts of this country.

D. Moore.

[The name of *Brizopyrum* was given to the genus by Link, in his Hortus Regius Botan. Berolin., vol. i. p. 159, in 1827; but in 1822 Dumortier gave the name of *Demazeria* to the same genus, in his 'Observations Botaniques,' p. 26. It is clear, therefore, that Mrs. Hill's plant must bear the name of *Demazeria Sicula*, Dum., which Willkomm and Lange have followed him in using in their valuable Prodromus Fl. Hispanicæ, vol. i. p. 112.—C. C. Babington.]

EPACRIS IMPRESSA, Labill., fl. pleno.

Mr. W. Hemsley, of Kew, has kindly directed my attention to wild specimens of this *Epacris*, existing in the Hookerian herbarium, and supplied by Dr. F. Müller. It is the first instance of a genuine Australian plant with double flowers.

B. Seemann.

HYPERICUM UNDULATUM.

Mr. T. P. Lucas sends me a specimen of *H. undulatum*, gathered near Launceston, Cornwall. He and his father, the Rev. S. Lucas, have known it there ever since 1859 or 1860, but had not determined its name before the notice of the plant in this Journal.

C. C. Babington.

March 20, 1865.

POA BALFOURII.

A Grass collected by N. Lund "in montibus ad Varanger, in Finmarkia orientali, 1842," is *Poa Balfourii*, Parn. He named it *P. cæsia*, Sm., *var.*, which I am convinced that it is not. If not a distinct species, it must be joined to *P. nemoralis*. Nevertheless, Anderson says, "*P. Balfourii* . . . vix a formis admodum vegetis subalpinis *P. cæsiæ* distinguenda est." If he refers to such specimens as these of Lund for *P. cæsia*, that opinion is correct, otherwise it seems erroneous. It is probable that Ledebour means *P. Balfourii* by his *P. cæsia*, for he gives to it "spiculis lanugine copiosa," and most of the characters distinguishing *P. Balfourii* from *P. cæsia*, Sm.

C. C. Babington.

CHARAS FROM CARACAS.

Professor Alexander Braun, in acknowledging the receipt of some *Charas* which M. Ernst, of Caracas, Venezuela, forwarded to him through us, writes:—"The neighbourhood of Caracas is very rich in *Charas*, as you know, from the synopsis I have given in the Proceedings of the Berlin Academy for 1858. Of those sent by M. Ernst,

the grey, fragile one is *Chara* (*polyphylla*) *Berteroi*, mihi; the green, *Nitella cernua*, mihi; but the latter does not quite agree, and I should like to see more specimens, which should be prepared by placing them upon white paper under water."

TASMANIAN TREE-FERNS COVERED WITH SNOW.

[Mr. Morris, on forwarding an excellent photograph of Tasmanian Tree-ferns covered with snow, encloses a letter referring to them from the gentleman who took the photograph. English horticulturists might take a hint from these Tree-ferns growing in a climate where they are covered with snow in the winter; and might find it worth trying to grow them in the milder parts of England.—Ed.]

Dear Sir,—I beg to inform you that the large photograph of the Ferns was taken at a place called Fern-tree Bower, about six miles from town, and a short distance from the New Hewn Road; it is the extreme end of the water-works on the edge of Brown's River, but about four miles from that township, and about one mile from the huts at the springs of Mount Wellington, by following the course of the river or stream. The probable height of the Fern-tree Bower above the sea is from 1500 to 2000 feet.

The Tree-fern grows as high as eighteen or twenty feet, with fronds hanging down as much as nine feet in the winter season. They grow only in shaded, damp places, generally gullies, where the sun rarely penetrates. There is a skittle ground in town where Tree-ferns (with the roots cut off, were placed to stop the balls) at once commenced growing; they were watered every morning, and are now in splendid condition. It is about three years since they were planted.

Fern gullies, as perhaps you are aware, are numerous all round the foot of Mount Wellington, and in some instances within two miles of Hobart Town. The Ferns are generally associated with the beautiful Sassafras-trees, and grow large and close together. The number of different Ferns in these gullies, particularly the Brown's River one, is astonishing. Our present Governor, returning from the Hewn, stopped for luncheon at the Bower, though there is an inn close by.

Yours, etc.

S. Clifford.

Hobart Town, September 16, 1864.

CORRESPONDENCE.

Shakspere's Garden.

In a review of a book called 'Shakspere's Garden' in the 'Journal of Botany,' it is suggested that the plant called by the poet "Speargrass" may be the common Reed (*Phragmites communis*, L.). Is there any ground for this supposition? Why may it not have been the plant still known in Suffolk as Speargrass, viz. *Agrostis alba* (the name being given as well to one or two other species of *Agrostis*)? I have not Dr. Prior's work ('Popular Names of British Plants') at hand, but I believe he offers no suggestion as to the derivation of Speargrass. Allow me to observe that it is not at all uncommon here in Yorkshire to see Primroses (*Primula vulgaris*) and Bluebells (*Hyacinthus nonscriptus*) plentiful at the same time—early May. By the way, should not the trivial name *Hare*bell be confined to the *Campanula rotundifolia*, and the commoner name *Blue*bell to the *Hyacinthus nonscriptus*? "Parmacety" is undoubtedly *Spermaceti* (not spermaceti-ointment), which is still considered "good for an inward bruise."

Yours, etc.,

Wakefield, April 7, 1865. T. W. Gissing.

Under the Snow.

Mrs. Somerville tells us that closed cases are as old as the Creation. She says, that any one travelling in the Alps in early spring on the borders of eternal snows, cannot fail to have observed with admiration *Leucojum vernum* and other spring flowers flourishing in little closed cases of snow, often capped with ice, under cover of which the flowers retain their beauty for a long period. A case of mine, outside one of my bedroom windows, is a case in point, save that the plants are surrounded with glass instead of snow and ice; the temperature during this winter, as tested by a self-registering thermometer, has not exceeded two degrees of that in the open air, but the immunity arising from the perfectly quiet and pure state of the atmosphere is most striking. In such a condition of the atmosphere Arctic voyagers tell us that man can bear any amount of cold with impunity, but if wind arises, even with an increase of temperature, he must get under cover. The following are the contents of the case:—1. Double-flowered *Camellia*, enclosed two years and a half, flowering most freely the last two winters. 2. Red-flowered variety of *Cyclamen;* the first flower opened in the second week of January, and is only now fading. 3. A young plant of *Chamærops Fortuni*, quite untouched by the cold. A young plant of this, of the same size, planted in the most sheltered nook of my little garden, soon perished. Eight or ten beautiful varieties of *Crocus*, *Narcissus*, *Hyacinthus*, etc. etc., with the *Primula Helvetica* and the double White Primrose, have been "beautiful exceedingly." For the last dozen years I have not once been disappointed in the results.

Having been honoured by the Society of Apothecaries with the superintendence of the renovation of their Chelsea garden (of wide-world celebrity), I have erected a house, fifty feet long by about seventeen or eighteen feet in width, for the reception of a vast number of most interesting plants (whose name is legion) that merely require simple protection from disturbed and smoky atmospheres. This large case has now stood the test of two winters with complete success. If you wish for any further particulars I shall be most happy to furnish them.

Yours, etc.,

The Ferns, Clapham, April 13, 1865. N. B. Ward.

MEMORANDA.

Fibrous Plants of Victoria.—The *Cyperus vaginatus*, a Sedge of extreme abundance in some of the humid depressions of the colony of Victoria, produces a remarkably tenacious fibre, which by the aboriginal population was once largely employed for cordage and for making their fish-nets. This plant is certainly deserving introduction into other countries. The Australian Flax (*Linum marginale*) seems to have no claims to be introduced elsewhere in preference to that species which has been cultivated for ages, unless for its perennial duration. Two fibrous plants introduced here appear to hold out the greatest prospect for lucrative introduction into several other regions of the globe, viz. the New Zealand Flax, *Phormium tenax*, which could be cultivated without any protection in the southern parts of Britain, and which may be grown in inundated places not readily available for other cultivation; and, secondly, the Rhea, *Bœhmeria nivea*, from which the Chinese grass-cloth is made. The latter plant has proved quite hardy and luxuriant in Victoria. Both are most easily grown and multiplied, and ought to be naturalized in all tropical and temperate latitudes. The fibres of *Sida pulchella*, *Brachychiton populneum*, *Pimelea axiflora*, several Stipa-grasses, although not without value to us here on the spot, are apparently not of sufficient importance to entitle their respective plants to an introduction into other countries.—*Papers of Victorian Acclimatization Society*.

Medicinal Plants of Victoria.—As far as known, the only plant restricted to these parts of Australia, and not merely used as a substitute for other species in the Materia Medica, is the Sassafras-tree of Victoria and Tasmania (*Atherosperma moschatum*). Its bark is a powerful tonic, of which the efficiency seems mainly to rest in a peculiar alkaloid; it yields also a volatile oil, of which the especial therapeutic properties have to a great extent as yet to be ascertained. The tree can, however, only be naturalized in deep, springy, forest ravines, of countries with a climate analogous to that of Tasmania and of the southern parts of Victoria. It is, however, not to be overlooked that several *Acaciæ*, especially *A. pycnantha* and *A. mollissima* yield a copious supply of gum similar to that of gum arabic; and as both trees are of extremely easy growth, they might even on that ground deserve the attention of culti-

vators abroad. The native Cypress Pine (*Callitris verrucosa*), a tree easily and rapidly growing in sandy soil, yields a kind of Sandarach resin. The myrtaceous trees and shrubs are all more or less rich in ethereal oil, which in many instances greatly resembles the medicinal Cajuput oil. *Eucalyptus amygdalina* has yielded nearly 4 lb. of oil from 100 lb. of fresh leaves; several other species yield also a large return of oil, which has proved most useful for admixture with other essential oils in the manufacture of soaps. *Melaleuca linearifolia* has furnished $1\frac{3}{4}$ lb. from 100 lb. of leaves and branchlets. These oils have attracted attention as not only medicinally valuable, but also as solvents for various kinds of superior varnish resin, and for illuminating power (*vide* Jurors' Report of the Victorian Exhibition of 1861). As medicinal products the astringent gum-resins of various *Eucalypti* likewise deserve attention, all species exuding more or less of this substance. There are plants in this country yielding excellent substitutes for the following drugs: Gratiola, Mezereum, Winter's Bark, Mint, Gentian, Lobelia, Althæa, etc.—*Papers of Victorian Acclimatization Society.*

Culinary Vegetables, Fruit, and Forage Plants indigenous to Victoria.—There are three kinds of Spinach. One of these, *Tetragonia implexicoma* is a littoral plant, and for practical purposes similar to the well-known New Zealand Spinach. It is perennial, expanding and climbing to a wide extent, and might be advantageously transferred to every sandy and rocky seashore of the globe, wherever it will prove hardy. Seeds are very seldom obtained, and hence the plant has to be exported in a living state. The second is identical with the New Zealand Spinach, *Tetragonia expansa;* it belongs not only to the Victorian sandy coast, but also to the desert. By means of seeds it can without difficulty be introduced, as is well known, into other countries; it occurs wild also on the subtropical east coast of Australia, and therefore might be introduced into hot climates. The third kind of Spinach alluded to is that of *Chenopodium auricomum*. This plant is still more valuable than the *Tetragoniæ*, being more palatable and nutritive; it grows also in tropical Australia, and will thus endure the climate of many warm parts of the globe. Of fruit plants we have scarcely any deserving introduction elsewhere, unless perhaps the Quandang, *Santalum acuminatum;* for although it is far inferior to the ordinary fruits commonly under cultivation, the fact of its being a desert plant, not becoming parched by Sirocco-like winds, entitles it to consideration. Of forage plants we have some excellent grasses, well deserving of introduction abroad; thus for countries of warm climate the perennial Kangaroo-grass, *Anthistiria Australis*, would be eligible, as well as *Panicum decompositum*, and several other grasses, chiefly belonging to the genera *Panicum*, *Danthonia*, and *Agrostis*, of which seeds can be obtained with ease. An excellent tender Swamp Grass is *Danthonia nervosa*, and a splendid Forest Grass the recently discovered *Festuca dives*. For countries with a colder climate three of our taller and yet tender-leaved Alpine Grasses might advantageously be selected, viz. *Festuca Hookeriana*, *Danthonia robusta*, and *Hierochloe antarctica.*—*Papers of the Acclimzatiation Society of Victoria.*

New Year's Eve, or Hogmanay.—The *Hogmanay*, as the ceremonies and

customs of the New Year's Eve are termed in Scotland, has puzzled antiquaries. The most probable derivation is perhaps this, from the words *au gui menez* (to the mistletoe go), or *au gui l'an neuf* (to the mistletoe this new year), being an allusion to the ancient Druidical ceremony of gathering the plant. In the *patois* of Touraine, in France, the word used is *Aguilannsu;* in Lower Normandy and in Guernsey, poor persons and children used to solicit a contribution under the title 'Hogninenno,' or 'Oguinano.' *Guisers*, or *Guizards* (that is, masquers, or mummers) is a part of Scotch New Year's Eve proceedings. Sir Walter Scott had invariably a set of *guisers* to perform on New Year's Eve, before his family and friends at Ashestiel and Abbotsford."—*Chambers's* '*Book of Days*,' vol. ii. p. 788.

NEW PUBLICATIONS.

L'Amérique Centrale, Recherches sur sa Flore et sa Géographie physique; résultats d'un Voyage dans les États de Costa-Rica et de Nicaragua, exécuté pendant les Années 1846–48. Par A.-S. Örsted. Copenhague: 1863. Folio. Part I.

This is the first part of a work on Central American botany, a subject with which Professor Örsted's name has been for a long time honourably connected; and we believe that, in consequence of the Dano-German war, the second part has not yet been published. Scientific men belonging to the nations whose language is not spoken by more than a million or a couple of millions find themselves in an unpleasant position, since Latin is going more and more out of use, and the feeling of nationality is growing stronger every day. If they write in any other but the vernacular, their countrymen accuse them of being unpatriotic; and if they wish to avoid such an accusation, and publish in a language understood only by an infinitesimal portion of mankind, the result of their labours is, to a great extent, lost; for, at the utmost, the scientific public as a body is not acquainted with more than the five leading European languages, and more can hardly be expected from them. It may answer any other purposes, but certainly not those of science, if scientific men continue to bow down to popular prejudice by writing in languages of the most limited geographical range. We are therefore glad that Professor Örsted, by writing in French instead of Danish, has made an important concession to the catholicity of science at a time when nationality of feeling ran unusually high amongst his countrymen.

The first part of Örsted's work contains introductory matter and eighteen well-executed plates, unaccompanied, as yet, by descriptions, and representing the following plants:—1. *Evodianthus angustifolius*, Ör. (*Cyclantheæ*). 2. *Sarcinanthus utilis*, Ör. (*Cyclantheæ*). 3. *Eleutheropetalum Sartori* and *Ernesti-Augusti*, Ör. (*Palmæ*). 4. *Stachyophorbe pygmæa*, Ör. (*Palmæ*). 5. *Chamædorea geonomæformis*, Wendl. (*Palmæ*). 6. *Dasystachys Deckeriana*, Ör. (*Palmæ*). 7. *Stephanostachys Casperiana*, Kl., *Wendlandiana*, Ör., *Tepejolote*, Ör., and *Spethoscaphe Arenbergiana*, Ör. (*Palmæ*). 8. *Bactris (Trichobactris) glandulosa*, Ör., *B. (Eubactris) fusca*, Ör. (*Palmæ*). 9. *Augustinea balanoidea*, Ör., *A. ovata*, Ör., *A. major*, Ör., *Bactris acuminata*, Ör., *B. Mexicana*, Lieb., and *B. horrida*, Ör., *Guilielma utilis*, Ör. (*Palmæ*). 10. *Liquidambar macrophylla*, Ör. 11. *L. styraciflua*, var. *Mexicana*, Ör. (*Balsamifluæ*). 12. *Warszewiczia pulcherrima*, Kl., *W. coccinea*, Ör. (*Rubiaceæ*). 13. *Pogonopus exsertus*, Ör. (*Rubiaceæ*). 14. *Mapouriæ specierum figuræ analyticæ*. 15. *Rosenbergia gracilis*, Ör. (*Polemoniaceæ*). 16. *Thyrsacanthus flagellum*, Ör. (*Acanthaceæ*). 17. *Ceratosepalum micranthum*, Ör. (*Perrifloreæ*); and 18. *Gunnera (Pankea) insignis*, Ör. (*Gunneraceæ*).

We shall be glad to see the second part of this beautifully-illustrated and important work.

Studi Organografici sui Fiori e sui Frutti delle Conifere. By F. Parlatore. Florence: 1864. With Three Plates.

M. Parlatore, now working up the *Coniferæ* for De Candolle's 'Prodromus,' will have the advantage of promulgating his opinions on the vexed question of the structure of the floral organs of those plants in the most widely diffused botanical work of the day. M. Parlatore distinguishes in the cones of *Coniferæ* three different parts, the bracts, the scaly organ, and the female flower. He agrees with Schleiden in considering the scaly organ an axillary bud, separated from its mother-bud in the Firs, united with it in the Cypresses, etc. In the bud he believes it possible to distinguish the axis from the bracteolæ it bears, and which last generally appear as ridges or teeth, and in *Taxineæ*, *Gnetaceæ*, etc., form the involucres round the flowers. The greater part of the paper is taken up with describing the different appearance of these parts as they occur in the various genera, with a degree of accu-

racy that might perhaps have been more intelligible, had the author laid aside a phraseology derived from certain theories on the structure of the floral organs, which doubtless were of great service when De Candolle first advocated them in the beginning of this century, but seem now to be antiquated. Thus he speaks not only of bracteolæ *united* together, of buds united to their bracts, but of leaves united to the stem from which they are borne, and of different branches united together, etc. As regards the flower, properly speaking, M. Parlatore inclines to consider it in the same light as Baillon and others, that is, as formed of a dicarpellous ovary, with an ovulum reduced to its nucellus,—thus rejecting R. Brown's notion of the naked ovulum (a notion which, by the bye, was first brought forward by the Florentine botanist, Ottaviano Targioni, as early as 1809, in an almost forgotten paper on *Coniferæ*, published in the 'Annali del Museo di Firenze').

Although there is nothing absolutely new in the views entertained by M. Parlatore on the structure of the cone of *Coniferæ*, yet the many proofs he brings forward in their support show his extensive knowledge of the Order, and will be serviceable to botanists, whatever may be the ultimate opinion they may adopt. What appears to be entirely new in the present paper is the view taken of the structure of the male flowers, botanists having hitherto agreed in considering each scale of the catkins as a simple stamen, bearing numerous anthers, while M. Parlatore considers the scales bracts, bearing in their axil several stamina united to the bract, and borne on its upper surface or else shifted to its under surface.

BOTANICAL NEWS.

The Committee appointed by the Horticultural Society to adjudicate on the botanical collections sent in for competition in reference to the Society's offer last year (see 'Journal of Botany,' Vol. II. pp. 96, 191), has awarded a silver medal to twenty-six competitors for the best collection from their respective counties, a bronze medal to eleven competitors for the second and third best collection, and a gold medal to Dr. St. Brody, of Cheltenham, Mr. Joshua Clarke, of Saffron Walden, and Miss Lydia E. Barker, of Accrington, for the best of the collections out of all the several county herbariums. Mr. Joshua Clarke also received a gold medal for a new species of plant found growing in the United Kingdom (*Erucastrum inodorum*); and Mr. W. G. Smith an extra gold medal

for two volumes of beautifully executed drawings of Fungi and Phanerogamous Plants.

Professor Alexander Braun has laid before the Berlin Academy a paper of De Bary's, "On the Uredineæ," which has a special agricultural as well as a more general botanical interest, showing, as it does, the belief of our farmers (mentioned by Mrs. Lankester in Syme's 'English Botany') that Barberry bushes are injurious to cornfields to rest upon a scientific basis, and, at the same time, supplying the first instance of the existence of a heterœcious alternating generation in the vegetable kingdom, as it had been previously observed to exist in tapeworms and Trematodes in the animal kingdom.

The Cryptogamic Exploring Association alluded to some months ago (the results of which any person may share by paying twelve shillings annually to Professor Buchinger, of Strasburg), has succeeded in engaging the services of Professor Schimper, the eminent bryologist, for this year's examination of Wales, Scotland, and Ireland. Professor Schimper will start on his journey towards the end of May, and much good may result from botanists putting themselves in communication with him when he visits their neighbourhood.

Amongst the fifty-three candidates who have this year presented themselves for admission into the Royal Society, fifteen of whom are eligible for election, there is but one botanist, Dr. Thwaites, Director of the Botanic Gardens at Peradenia, Ceylon, whose work on the island, in which he resides, has lately been completed. The name of Mr. Lovell Reeve, the enterprising publisher of great botanical works, and author of the largest conchological work ever brought out, is also in the list.

It has long been known that Professor C. C. Babington contemplated the publication of a full account of the species, or supposed species of British *Rubi*. We now learn that his manuscript is complete, but that its publication is delayed, owing to a liberal offer of the Syndics of the Cambridge University Press to undertake a very large part of the expense of the work if illustrations are added. We are glad to state that Professor Babington has made arrangements with Mr. J. W. Salter, F.G.S., for the preparation, in the course of next summer, of coloured quarto plates of nearly all the Brambles described by him, and that, when they have been engraved, the book will appear in a form resembling that of the quarto publications of the Ray Society.

The following is the list of candidates for the place of Correspondent in the Botanical Section of the French Academy:—In the first rank, Hofmeister; in the second, De Bary, Asa Gray, J. Hooker, Parlatore, and Pringsheim. Hofmeister was elected by 32 out of 44 votes; J. Hooker obtained 9, and Parlatore 3 votes.

Professor Reichenbach fil. has paid a short visit to London.

Efforts are now making in London to raise a fund for the archæological, topographical, geological, zoological, and botanical exploration of Palestine, each branch of research to be conducted by competent persons. The annual cost of each investigator, including remuneration and expenses, is set down at about £800. We have many scattered papers on the botany of Palestine, but they are not up to the mark, having been written either by second-rate men or

by competent botanists who paid but flying visits to the country. A man of sound observation and a ready pen might yet help to produce a report "which might be accepted by all parties as a trustworthy and thoroughly satisfactory document."

'The Botanists' Chronicle,' a penny serial, edited by Mr. Irvine, the publication of which we announced last year, has been discontinued.

The Italian Scientific Congress will take place at Naples, on the 24th of September, instead of the 7th of May, as previously announced.

In a highly suggestive paper, lately published in the 'Nova Acta Academiæ Cæsareæ Naturæ Curiosorum,' Dr. Stieber controverts the hypothesis that planets and comets revolve around the sun in ellipses. He thinks that the motion of the sun having been demonstrated, planets and comets would be left behind if revolving in that manner, and that, unless the exploded motion of the sun being a fixed star be resumed, there is no escaping the conclusion that the celestial bodies move in elliptico-spiral or infinite, instead of elliptical or finite lines. All this, of course, is matter for astronomers to consider; what interests us particularly is that the laws first brought to light by the physiological study of plants and animals should have led the way to this important astronomical discussion. The merit of first directing attention to this subject is due to Dr. Carus, who entered into it in his 'System of Physiology' (8vo, Leipzig, 1838). Dr. Carus himself gives Thienemann the credit of suggesting the spiral motion of the celestial bodies; but Dr. Stieber shows that Thienemann (Oken's 'Isis,' 1834, p. 8[illegible]7), on discussing the spiral tendency of plants, as first demonstrated by Martius and Schimper, does so only in a vague manner, and that the venerable Carus must bear the honour of a discovery which with too much modesty he disclaims. "The law of spiral motion," says Dr. Stieber, "does not seem to prevail merely amongst the celestial bodies, but throughout nature. That it finds an expression in the spiral vessels and other parts (leaves, bracts, etc.) of plants, has long been acknowledged. In the animal kingdom it is in force in most shells, the horns of many Mammals, etc.; even in inorganic bodies traces of this law are perceptible (Airy's Spirals; see Jentzsch's Theory of Quartz); and the Earl of Rosse—interesting to relate—discovered, by means of his large telescope, that many nebulæ had a spiral form."

The first part of the 'Flore de la Chaîne Jurassique,' comprising the Dialypétales, by Ch. Grenier, has just reached us. In many respects it seems to answer the purpose of a supplement to Grenier and Godron's 'Flore de France,' and likely to be useful to students of European plants.

The late M. Gay's Herbarium is for sale.

Botanical Society of Edinburgh, *December 8th.*—Report on the Government Tea Plantations in North-Western India, by W. Jameson, Esq. The plantations have yielded upwards of 85 tons of seeds. The teas at Dehra Doon and Almorah are classified under souchong, pouchong, bohea, hyson-skin, and young hyson. It is calculated that the produce of seeds in the Kohistan of the North-Western Provinces last year was 2361 maunds, and that each maund contains 24,000 seeds. Supposing that 4000 seedlings were required for an acre, Mr. Jameson calculates that he might have upwards of 42

millions of seedlings, which would supply upwards of 10,000 acres. In thirty or forty years the Kohistan of the Punjaub and of the North-Western Provinces might produce tea equal in quantity to the whole export trade of China. With good cultivation and good land, 300 lbs. of tea per acre might be easily obtained.—Extracts from Botanical Correspondence. Communicated by Mr. John Sadler.—The following office-bearers for 1864–65 were elected:—President: Alexander Dickson, M.D. Vice-Presidents: Professor Allman; Humphrey Graham, W.S.; Walter Elliot; Professor Balfour. Council: F. Naylor; Findlay Anderson; John Kirk, M.D.; William Seller, M.D.; James M'Nab; Charles Jenner; Andrew Inglis, M.D.; F. B. W. White, M.D.; S. C. Mackenzie, M.D.; William Gorrie. Honorary Secretary: Robert Kaye Greville, LL.D. Honorary Curator: The Professor of Botany. Foreign Secretary: Professor Maclagan. Auditor: William Brand, W.S. Treasurer: Patrick Neill Fraser. Artist: Neil Stewart. Vice-Secretary and Curator: John Sadler.

January 12*th*.—The following communications were read:—1. Account of Excursions to the Mountains at the head of Loch Lomond, to Ben Lawers and the Sow of Athole, in August and September, 1864. By Professor Balfour. Among the more interesting plants noticed were: *Sagina nivalis*, on Binnain, along with *Draba rupestris*, *Carex vaginata*, and *Polypodium alpestre;* on Ben Voirlich all the ordinary alpine species were collected. On August 20th Dr. Balfour visited the mountain called the Sow of Athole and gathered on it *Phyllodoce cærulea*, *Azalea procumbens*, *Lycopodium annotinum*, *Cornus suecica*, and other alpine plants. On 25th August he made an excursion to Ben Lawers, and found abundance of *Sagina nivalis* on the spot where he had gathered the plant in 1847. He also picked *Saxifraga cernua*, *Draba rupestris*, and numerous other alpine species.—2. Notice of *Dilivaria ilicifolia*, Juss., sent from Old Calabar by Mr. Hewan, and now flowering in the Edinburgh Botanic Garden. By Professor Balfour. Dr. Balfour agreed with Dr. Anderson in thinking that it cannot be separated from Acanthus.—3. Notice of *Rosa alpina*, Déséglise, found naturalized near Perth. By F. B. W. White, M.D. Dr. White gathered this Rose in the depth of the woods, on Kinnoul Hill, near Perth, where it seems to have fairly established itself. The plant is not uncommon on the Continent.

February 9*th*.—Professor Balfour, V.P., in the chair. The following communications were read:—1. Contributions to the Flora of Otago, New Zealand. By W. Lauder Lindsay, M.D., F.R.S.E., F.L.S. The author gave an account of the collections of plants made by him in the settled districts between Dunedin, the capital of the province of Otago, and the Clutha river. He mentioned five new species:—*Viscum Lindsayi*, *Celmisia Lindsayi*, *Poa Lindsayi*, *Aciphylla Colensoi*, *Crepis Novo-Zelandica*, and exhibited drawings of them. There were also five species which had not been previously found in Otago.—2. Remarks on some Seedling *Coniferæ*, raised from Seeds ripened in Britain. By Mr. M'Nab. Professor Balfour called attention to the observations of Mohl and others, relative to the self-fertilization of the flowers of *Oxalis*, *Viola*, *Specularia*, *Impatiens*, *Fumaria*, etc. In these cases fertilization takes place

in the flower-bud. The flowers remain small and closed, and the ovary is fertilized in this condition. In some of these cases the petals are not developed, and are so minute as scarcely to be recognized. The first indications of the floral functions having been accomplished is in the appearance of the impregnated ovary. In these closed flowers the pollen-grains send out tubes without contact with the stigma.

March 9th.—Dr. Alexander Dickson, President, in the chair. The following communications were read:—1. Notice of rare Plants collected in the South-West of England. By F. Naylor, Esq.—2. Notice of Esparto. By the Right Hon. the Lord Provost, who communicated the following letter from Mr. Hardy Hislop, of Lisbon:—"I have made the inquiry you wished relative to the 'Esparto,' and find there are thousands of tons annually shipped from Alicante and Carthagena. In Alicante I found three large vessels loading the goods for England, and discovered that last year 4000 tons were shipped to the following countries:—England, France, Belgium, and Sweden. Its use is for the manufacture of paper. The fibres are used in the Scotch carpet trade, Kidderminster and Brussels. The grass is grown in a dry soil. It is not grown from seed; when planted, it spreads rapidly. It is not cut, but torn up by the roots—a very easy process when ripe. The fibre makes a paper with a fine surface, and strong. A process is employed for extracting the glue-like matter in it, leaving the fibre clean and fit for use after drying." The Lord Provost suggested that the plant might perhaps be cultivated in some of the milder parts of this country. Dr. Balfour remarked that the plant was *Macrochloa tenacissima*, and grew on sandy shores like bent. The common name of the grass is derived from the Latin *spartum*, the appellation given to a plant from which the ancients made bands to tie vines and ropes for ships. In some of the Latin dictionaries it is said to be a kind of broom, but this is a mistake.—3. On the discovery of *Neotinea intacta* (Reich.), in Ireland. By A. G. More, F.L.S. In the same field with the plant occurred a rare species of Hawk-moth, *Anthrocera minos*. It is remarkable that in Killarney *Arbutus Unedo* is associated with two local species of insects, *Notodonta bicolora* and *Hydralia Banksiana*. A Mollusk, *Geomalacus maculosus*, is also peculiar to the Killarney district. Dr. White stated that *Anthrocera minos* had also been met with in Argyleshire —4. Summary of some of the more interesting Botanical Papers published in France since July, 1864. By G. M. Lowe, Esq. The author alluded to the remarks of Boussingault on vegetation in darkness; to the chemical researches on vegetation by M. Corinwender; to M. Chatin's observations on *Balanophoraceæ*; M. Jodin on Chlorophyll and its connection with light; M. Godron on the morphology of *Cruciferæ* and of *Fumariaceæ*; M. Bazin on the spores of *Achorion Schœnleinii*; M. Halst on the Chemistry of *Cotyledon Umbilicus*, and M. Gaston de Saporta on Plants with deciduous leaves in the gypsum of Aix.—5. Report on Vegetation in the Open Air. By Mr. M'Nab.



Fitch, del et lith.

Vincent Brooks, Imp.

ERUCASTRUM POLLICHII, *Schimp. and Spenn.*, AS A BRITISH PLANT.

By William Carruthers, Esq., F.L.S.

(Plate XXXI.)

The Royal Horticultural Society has given to Mr. Joshua Clarke, F.L.S., of Saffron Walden, a gold medal for the exhibition of *Erucastrum Pollichii*, Schimp. and Spenn. (*E. inodorum*, Rchb.), as a new British plant. The circumstances under which it was found are given in the following letter, published in the Proceedings of the Royal Horticultural Society, vol. v. p. 53 :—

Fairy Croft, Saffron Walden,
November 16, 1864.

In reference to the locality in which the plant I sent you—*Erucastrum inodorum*—was found, between this town and Walden a chalk hill has been cut through for constructing a railroad (about sixty feet cutting). The hill was found to contain a large quantity of sand. On a large heap grew a fine plant of *Erucastrum inodorum*, and hundreds of plants of *Erysimum cheiranthoides*. From the manner in which it grew on the sand, I cannot see the least probability of *its being introduced*. I have never seen it in any cultivated ground in the neighbourhood, and I am not aware of its ever having been found in any other part of the kingdom. It is one of those plants which I have no doubt will establish themselves.

I am, dear Sir, yours very truly,

A. Murray, Esq., F.L.S. Joshua Clarke.

There can be little doubt that this is one of the plants that have been introduced from the Continent by commercial intercommunication, like those found on the ballast-heaps on the coasts of Northumberland, or in the fields around the large distillery at Wandsworth. It will probably turn up in other places, now that by means of this notice and the accompanying plate the attention of botanists is drawn to it. We think, however, that the Council of the Horticultural Society would have done better if they had taken into account the probability of this plant having been brought over with the grain used by the horses working in the cutting, and the unlikelihood of a truly indigenous plant making its appearance as a single specimen in a railway cutting. It would be possible to present for competition scores of such plants,

but it must be obvious that they have no real claim to be considered as true British plants. They are very different from such *bonâ fide* additions to our flora as *Viola arenaria*, DC., found in Teesdale by Mr. Backhouse, or *Chara alopecuroides*, DC., discovered by Mr. A. G. More in the Isle of Wight, or *Neotinea intacta*, Rchb. f., found by his sister in Galway, or several others which have been for the first time figured and described in the 'Journal of Botany.'

The genus *Erucastrum* was established by Schimper and Spenner, in Spenner's 'Flora of Freiburg.' It belongs to the section of the long-podded *Cruciferæ*, in which the cotyledons are conduplicate, and the radicle is dorsal, lying within the fold of the cotyledons. It is distinguished from *Diplotaxis* in having its seeds in a single row in a somewhat cylindrical silique, and from *Brassica* and *Sinapis* in having oval or oblong, slightly compressed seeds, and in the valve of the silique having only one well-marked rib running along it. It differs from all the three British genera of this section in the calyx being gibbous at the base.

The species *E. Pollichii*, Schimp. and Spenn., is very generally distributed throughout Europe. It is found in sandy fields and on rubbish heaps all over France. It is distinguished from the allied species by its pale-yellow flowers, erect calyx, ascending siliques, and deeply pinnatifid leaves.

The following generic and specific characters are framed with special reference to the allied British plants.

ERUCASTRUM, Schimp. and Spenn. Sepals almost erect or spreading, the lateral pair gibbous at the base. Silique linear subcylindrical, the valves with a single longitudinal rib, the beak short. Seeds oval or oblong, somewhat compressed, in a single series.

E. Pollichii, Schimp. and Spenn., *E. inodorum*, Rchb., *Diplotaxis bracteata*, Gren. and Godr. Leaves not auricled at the base, deeply pinnatifid, the lobes obtuse and unequally dentate, and the separating sinuses roundish. The lower peduncles of the raceme furnished with pinnatipartite bracts, which extend more or less up the axis. Sepals greenish, erect, loose, about the length of the peduncle. The long stamens closely adpressed to the pistil. Pod terminating in a short cylindrical beak without seeds. The erect herbaceous stem is from six to sixteen inches high, and more or less hairy, especially at the base. The flowers are pale-yellow. The plant is an annual.

We are indebted to Mr. Clarke for the use of his specimen, and from it the drawing has been made.

EXPLANATION OF PLATE XXXI.—*Erucastrum Pollichii*, from the specimen collected by Mr. Joshua Clarke. Fig. 1, a flower; 2, a petal; 3, the stamen and pistil; 4, the pistil; 5, ripe fruit; 6, seed; 7, the embryo; 8, transverse section of a seed.

NOTES ON *DESMARESTIA PINNATINERVIA*, *Montagne*.

BY J. E. GRAY, F.R.S., F.L.S.

I have lately received from the coast of Cornwall a specimen of an olive seaweed that was found growing from the root of a specimen of *Desmarestia ligulata*, near the Lizard. It is, without doubt, the Alga figured and described from an imperfect specimen received from Port San Sebastian, in Spain, by M. Montagne (Ann. Sc. Nat. ser. 2, vol. xviii. t. 7, f. 2), under the name of *Desmarestia pinnatinervia*; and very probably the same as the *Desmarestia Dresnayi*, described and figured by M. Lamouroux (Dict. d'Hist. Nat. v. 438), from a specimen obtained on the coast of France, and is certainly the same as the *Desmarestia Dresnayi*, var. *simplex*, described by Crouan, in his Alg. Mar. Finisterre, No. 95.

Dr. Harvey, in the Appendix to his 'Synopsis of British Algæ,' p. 206, mentions *Desmarestia Dresnayi*, Lamouroux, as a new British species, "if it is not merely a broad variety of *D. ligulata*." In the appendix to Mrs. Gatty's 'British Seaweeds,' (which is a re-issue of the reduced copies of Dr. Harvey's figure, made by Mr. Reeve to illustrate the 'Synopsis,' and published in the Atlas of that work, with a new text by Mrs. Gatty), *Desmarestia Dresnayi* is introduced as a British species, and the habitat given is Molville Bay, Co. Donegal, 1853, Mr. William Sawers; it is added, "specimen in Trinity College herbarium, Dublin, 10 inches long by 2 wide, but Sawers describes others as 18 inches long, breadth 3." By Agardh, and also by Dr. Harvey, this plant is considered as only an extravagantly wide form of *D. ligulata;* Harvey adds, but no one who has not seen intermediate specimens can easily believe this. Kützing, 'Species Algarum,' regards *D. Dresnayi* and *D. pinnatinervia* as distinct species. The younger Agardh, in his 'Species, Genera et Ordines Fucoidearum,' p. 170, places *D. pinnatinervia* as a

species to be inquired about; but in his note to *D. ligulata*, he states that he believes *D. pinnatinervia* and *D. Dresnayi* are a broad form of the European *D. ligulata*.

The Cornish specimen justified, and, I think, goes far to establish the validity of this theory; for the specimens were found growing from the same root as the typical English form of *Desmarestia ligulata*, and if the frond is compared with the thin young state of that plant, and especially with the broad membranous variety of it found in Cornwall, and on the west coast of France and Spain, there is no structural difference to separate them,—the only real difference being that the frond is much wider, and, for its size, comparatively thinner and more membranaceous, and, in those which I have seen, like that figured by Montagne and described by Crouan, the frond was simple, not proliferous on the edge, looking very like a frond of *Punctaria latifolia*, with a dentated edge, and a very slender midrib, with opposite veins.

I am not inclined to regard it as a variety of *D. ligulata*, but as a particular development of some of the fronds of that species, for I am informed that it absolutely grows from the same root-disk, and that many of the roots have one or more such fronds developed along with the usual narrow state of that plant.

This broad and simple form of the frond, from the foregoing observations, seems to have been observed on the coast of Spain, France, Ireland, and Cornwall. It is very desirable that some collectors on the coast of Cornwall or Ireland should study the development of these fronds, and the circumstances under which they are developed; for it must be admitted that growing apparently from the same root is not an infallible sign of plants being the same, without we are prepared to admit that *Desmarestia ligulata* and *Desmarestia viridis* are the different states of the same plant, for in Wales I have more than once found these two plants growing apparently from the same root-disk, unless I have mistaken what Mr. Turner calls a variety of *D. ligulata* for *D. viridis*, for as Dr. Harvey observes, "In other states the fronds are so narrow, that, as Mr. Turner well observes, such individuals may at first sight be mistaken for luxuriant fronds of *D. viridis*, whose numerous varieties are as delicate as the finest *Conferv*æ."

Notwithstanding the observation with which Dr. Harvey commences his account of *D. viridis*, that "there are no British Algæ with which

this can well be confounded," did Mr. Turner confound them because they grew from the same root? or is *D. viridis* or *D. ligulata* different state or sexes of the same plant?

Dr. Greville and the younger Agardh consider *D. viridis* as a different genus, and the latter author characterizes the genus *Dichloria* from *Desmarestia*, because it has an ecostate frond without any central canal; but this is a mistake, for Dr. Harvey, in his 'Phycologia Britannica,' t. 312, f. 2 and 3, figures the midrib and the central canal as *Desmarestia viridis*.

Desmarestia viridis looks very like a gigantic representation of the byssoid fibres that are developed on the margin of the frond of *D. aculeata* and *D. ligulata*, when they are in a perfect state, and it chiefly differs from *Desmarestia* in not having such fibres developed on it at any period of its life. Can it be a gigantic development of this part from the root of the plant?

REVISION OF THE NATURAL ORDER *HEDERACEÆ*.

By Berthold Seemann, Ph.D., F.L.S.

(*Continued from p.* 81.)

VI. On the Polypetalous Genera with several Distinct Styles.

Under this heading are provisionally grouped together all those genera which, when the fruit is ripe, have several distinct, generally recurved styles. *Gastonia*, *Grotefendia*, and *Nesopanax* would have been inserted here, if I had not already treated of them under a previous heading. I exclude *Sciadodendron* and *Toricellia*, which, according to my definition, do not belong to *Hederaceæ*.

CONSPECTUS GENERUM HEDERACEARUM POLYPETALARUM STYLIS PLURIMIS (3–∞) DISTINCTIS.

XX. *Gilibertia*. Pedicelli inarticulati. Flores ecalyculati, hermaphroditi. Petala 5–9, libera. Stamina 5–9. Drupa baccata, 5–7-pyrena. Albumen . . .—Arbores inermes Americæ australis tropicæ, foliis exstipulatis simplicibus, umbellis compositis.

XXI. *Schefflera*. Pedicelli inarticulati. Flores ecalyculati, polygami. Petala 5, libera. Stamina 5. Drupa baccata, 5–10-pyrena. Albumen æquabile.—Arbores v. frutices inermes Polynesiæ tropicæ v. subtropicæ, foliis stipulatis digitatim compositis, umbellis racemoso-paniculatis.

XXII. *Fatsia*. Pedicelli inarticulati. Flores ecalyculati, hermaphroditi. Petala 5, libera. Stamina 5. Drupa baccata, 5-pyrena. Albumen . . .—Frutex inermis Japoniæ, foliis stipulatis simplicibus palmatim lobatis, umbellis paniculatis.

XXIII. *Astropanax*. Pedicelli inarticulati. Flores ecalyculati, hermaphroditi. Petala 5, libera v. calyptratim cohærentia. Drupa exsucca, 4–8-pyrena. Albumen æquabile.—Arbores inermes Africæ tropicæ, foliis stipulatis digitatim compositis, umbellis v. capitulis racemosis.

XXIV. *Pseudopanax*. Pedicelli articulati. Flores ecalyculati hermaphroditi. Petala 5, libera. Stamina 5. Drupa baccata, 3–5-pyrena. Albumen æquabile.—Arbores Novæ Zelandiæ, foliis exstipulatis digitatim compositis, umbellis paniculatis.

XXV. *Oligoscias*. Pedicelli articulati. Flores calyculati, hermaphroditi. Petala 5, libera. Stamina 5. Drupa baccata, 5-pyrena. Albumen ruminatum.—Frutex Madagascariensis, foliis exstipulatis imparipinnatis, umbellis simplicibus v. compositis.

XXVI. *Polyscias*. Pedicelli articulati. Flores calyculati, hermaphroditi. Petala 5–8. Stamina 5–8. Drupa baccata, 5-pyrena. Albumen . . .—Frutices v. arbusculæ inermes Asiæ et Polynesiæ tropicæ, foliis exstipulatis imparipinnatis, umbellis v. capitulis paniculatis.

XX. GILIBERTIA, Ruiz et Pavon. Pedicelli inarticulati. Flores ecalyculati, hermaphroditi. Calyx tubo obconico, limbo truncato v. obscure 5–9-denticulato. Petala triangularia 5–9, 1-nervia, libera, æstivatione valvata. Stamina 5–9. Styli 5–7, conniventes, demum recurvi (subpatentes, De Cand.). Ovarium 5–7-loculare, loculis 1-ovulatis. Drupa baccata, 5–7-angulata, 5–7-pyrena. Albumen . . .—Arbores Peruvianæ et Brasilienses, foliis exstipulatis simplicibus integerrimis v. denticulatis, umbellis terminalibus compositis.—*Gilibertia*, Ruiz et Pav. Fl. Peruv. Prodr. p. 50, t. 8; Fl. Peruv. iii. p. 75, t. 312; De Cand. Prodr. iv. p. 256, exclud. sp. 2, 3, 4, 5, et 6.

1. *G. umbellata*, Ruiz et Pav. Fl. Peruv. iii. p. 75, t. 312; De Cand. Prodr. iv. p. 256.—*Wangenheimia umbellata*, Dietr. . . . *Ginnania umbellata*, Dietr. . . . *Aralia umbellata*, Pav. Herb. *Dendropanax umbellatum*, Dcne. et Planch. in Rev. Hortic. 1854, p. 107.—Forests of Muña, Peru (Pavon! in Mus. Brit.).

2. *G. Brasiliensis*, Seem. (sp. nov.); glabra; foliis longe petiolatis ovatis v. ovato-oblongis breviter acuminatis v. acutis integerrimis coriaceis, venis pinnatis parallelis, inferioribus haud crassioribus, umbellis terminalibus brevipedunculatis compositis paucifloris, calycis limbo truncato obscure 5–6-denticulato, petalis triangularibus 5–6, 1-nerviis, staminibus 5–6, stylis 5–6 conniventibus, demum recurvis, drupa baccata 5–6-augulata, 5–6-pyrena.—Ilhenos, Brazil (Moricand! n. 2095.)

This may possibly be the second species of *Gilibertia*, indicated, but not described nor even named by Decaisne and Planchon as having been collected by Blanchet in Brazil, whose specimens I have not seen. *G. Brasiliensis* is in every respect a smaller species than *G. umbellata*. Petioles 2–2½ inches long, blade 3–3½ inches long, 1–1½ inches broad. Pedicels ½ inch long.

Species exclusæ:

G. Naluga, De Cand. = *Leea staphylea*, Roxb.
G. palmata, De Cand. = *Trevesia palmata*, Visian.
G. paniculata, De Cand. = *Grotefendia paniculata*, Seem.
G. repanda, De Cand. = *Grotefendia repanda*, Seem.
G. sauruoides, De Cand. = (?) *Osmoxylon Amboynense*, Miq.

XXI. SCHEFFLERA, Forst. *Pedicelli* inarticulati. *Flores* ecalyculati, polygami. *Calyx* tubo obconico limbo minute 5-dentato. *Petala* 5, ovato-triangularia, 1-nervia, æstivatione valvata. *Stamina* 5; *antheræ* oblongæ. *Ovarium* 5–10-loculare, loculis 1-ovulatis. *Styli* 5–10, basi coadunati distincti. *Drupa* baccata, globosa, 5–10-pyrena. *Albumen* æquabile.—Arbores vel frutices Novæ-Zelandiæ et insularum Vitiensium, inermes, glabræ, foliis alternis stipulatis digitatim 7–9-foliolatis, foliolis longe petiolulatis oblongis v. ellipticis serrulatis, umbellis racemoso-paniculatis.—*Schefflera*, Forst. Gen. p. et t. 23 (1776). *Araliæ* sp. auct.

Schefflera (not *Schæfflera*, as authors incorrectly write) contains two species, viz.

Styli 8–10	*S. digitata.*
Styli 5	*S. Vitiensis.*

1. *S. digitata*, Forst. Char. Gen. t. 20, Prodr. n. 146; Icon. (ined.) t. 94; Lam. Ill. Gen. t. 221.—*Aralia Schefflera*, Spr. Pug. Plant. pl. i. p. 28; De Cand. Prodr. iv. p. 258; Hook. fil. Fl. New Zealand, i. p. 95, t. 22; A. Gray, Bot. Wilkes, p. 715; A. Rich. Fl. N. Zel. p. 283. *Aralia polygama*, Banks et Sol. mss.; Parkinson's Icones Plant. Nov. Zel. t. 105 et 106 (ined.).—New Zealand, throughout the islands, abundant (Banks and Solander! Forster! in Herb. Mus. Brit.).

2. *S. Vitiensis*, Seem. — *Aralia (Schefflera) Vitiensis*, A. Gray, Bot. Wilkes, p. 715, t. 89.—Viti Islands (Seemann! n. 203, Harvey! United States Expl. Exped.).

XXII. Fatsia, Dcne. et Planch. *Pedicelli* inarticulati. *Flores* ecalyculati, hermaphroditi (vel polygami?). *Calyx* tubo obovato, 10-nervio, limbo subtruncato. *Petala* 5, ovata, acuta, 3-nervia, reflexa, libera, *æstivatione* valvata. *Stamina* 5; *filamenta* elongata; *antheræ* oblongæ-ellipticæ. *Ovarium* 5-loculare, loculis 1-ovulatis. *Styli* 5, omnino liberi, divergentes. *Stigmata* punctiformia. *Drupa* obovato-globosa, 10-nervia, 5-pyrena. *Albumen* . . .—Frutex inermis Japonicus, foliis stipulatis petiolatis palmato-5–7-lobis versus apicem serratis, 7–9-nerviis, coriaceis lanatis demum glabris; umbellis in paniculas terminales dispositis.—*Fatsia*, Dcne. et Planch. in 'Revue Horticole,' 1854, p. 105; Miquel in Ann. Lugd. Bat. i. p. 11. *Araliæ* sp. auct.

1. *F. Japonica*, Dcne. et Planch. l. c. sine descript.—*Aralia Japonica*, Thunb. Fl. Japon. p. 128; De Cand. Prod. iv. p. 258; Banks, Icon. Select. Kæmpf. t. 10; Regel, Gartenflora, 1863, t. 420.—Japan, in woods (Kæmpfer! Thunberg! in Herb. Mus. Brit., Alcock! Wright! Oldham!)

Species exclusa:

Fatsia Mitsde, de Vris. (*Aralia Mitsde*, Siebold in Hort. Lugdun. Bat. Plant. Rar. 1854; Walp. Ann. p. 83; Linnæa, xxvi. p. 89. *Textoria Japonica*, Miq. in Ann. Lugd. Bat. i. p. 12. *Oreopanax Brownei*, Witte in Fl. de Jard. de Pays. Bat. 1861; Koch, Wochensch. iv. p. 223; Regel, Gartenfl. 1863, p. 146, t. 399.)=*Dendropanax Japonicum*, Seem.

XXIII. Astropanax, Seem. gen. nov. Pedicelli inarticulati. Flores ecalyculati, hermaphroditi. Calyx limbo subtruncato. Petala 5, libera v. calyptratim cohærentia. Stamina 5; antheræ oblongæ v.

subglobosæ. Ovarium 4–8-loculare, loculis 1-ovulatis. Styli 4–8, liberi, demum recurvi. Drupa exsucca, 4–8-costata, 4–8-pyrena, pyrenis 1-spermis. Albumen æquabile.—Arbores Africæ tropicæ, foliis stipulatis alternis longe petiolatis digitatim compositis, foliolis obsolete denticulatis v. integerrimis, umbellis v. capitulis in racemos terminales dispositis.—*Araliæ* sp. auct.

This genus differs from *Sciadophyllum*, to which Steudel referred the Abyssinian species, by having a polypetalous, not a monopetalous corolla, from *Fatsia* by its strongly-ribbed fruit, and from *Heptapleurum* (*Paratropia*, ex parte) and *Agalma* (*Paratropia*, ex parte), by its several free styles.

* *Flores umbellati.*

1. *A. Abyssinicum*, Seem.—*Aralia Abyssinica*, Hochst. mss. in Schimp. Pl. Abyss. ed. i. n. 283; Rich. Tent. Fl. Abyss. i. 336; Walp. Ann. ii. p. 724. *Sciadophyllum Abyssinicum*, Steudl. Nomencl. Bot. p. 537; Miq. Ann. Lugd. Bat. i. p. 26. *Adoa, Abyssinia* (Hochstetter!).

2. *A. elatum*, Seem.—*Paratropia elata*, Hook. fil. in Journ. Linn. Soc. vii. p. 196.—Cameroon Mountains, 7500 feet above the sea (Mann!).

This species is very close to *A. Abyssinicum*, but appears to be sufficiently distinct.

3. *A. Barteri*, Seem. (sp. nov.).—Glabrum; foliolis 5 longe petiolatis ovato- v. obovato-oblongis acuminatis basi rotundatis integerrimis coriaceis supra lucidis; umbellis racemosis 7–12-floris, bracteis ovatis acuminatis; drupis subglobosis 8-pyrenis.—Sugar Loaf Mountains, Niger (Barter! n. 2027). "A small tree," Barter.

4. *A. Baikiei*, Seem. (sp. nov.).—Glabrum; foliolis 5 (?) longe petiolatis elliptico-oblongis acuminatis in petiolum attenuatis integerrimis submembranaceis, umbellis racemosis 4–5-floris, bracteis lanceolatis; drupis ovatis 4–6-pyreneis (albis) acute angulatis.—Niger (Barter!).—"Twenty feet hight, fruit white when ripe," Barter. I have named this species in commemoration of the late Dr. Baikie, the indefatigable explorer of the Niger, to whose expedition the late Mr. Barter was attached as botanist. The leaflets are larger than those of the preceding species, less coriaceous, and different in shape.

** *Flores capitati.*

5. *A. Manni*, Seem.—*Paratropia Manni*, Hook. fil.; Journ. Linn. Soc. vi. p. 10.—Fernando Po. 5000 feet above the sea (Mann!).

XXIV. PSEUDOPANAX, C. Koch, 'Wochenschrift,' 1859, p. 336. *Pedicelli* articulati, apice incrassati. *Flores* ecalyculati, polygami. *Calyx* tubo obconico, limbo obsolete denticulato. *Petala* 5, ovato-triangularia, 1-nervia, æstivatione valvata. *Stamina* 5; antheræ ovato-oblongæ. *Ovarium* 5-loculare, loculis 1-ovulatis. *Styli* 5, basi co-adunati, apice liberi. *Drupa* baccata, globosa, 5-pyrena. *Albumen* æquabile. *Frutices* v. arbusculæ Novæ-Zelandiæ, foliis alternis ex-stipulatis, simplicibus vel digitato-3–5-foliolatis, foliolis crassis coria-ceis oblongis vel linearibus, sinuato-dentatis, umbellis racemosis v. paniculatis, terminalibus.—*Xylophylla*, Banks et Sol. mss. *Araliæ*, *Cussoniæ* et *Panacis* sp. Auct.

This genus is closely allied to *Cheirodendron*, Nutt., the relationship having been suggested by De Candolle; but in *Pseudopanax* the calyx is not calyculate, though the pedicel is swollen at the articulation, and the stigmas are not seated on a stylopodium but on five long styles, more or less free above the base.

C. Koch thought that *Panax simplex*, *anomalum*, *Gaudichaudii*, *pla-typhyllum*, *arborum*, *lineare*, *Edgerleyi*, and *Colensoi* might possibly belong to *Pseudopanax*. But if *P. crassifolium* be regarded as the type of the genus, those species, not being pentacarpous or having distinct styles, are inadmissible.

1. *P. crassifolium*, C. Koch, Wochenschrift, 1859, p. 366.—*Aralia crassifolia*, Banks et Sol. mss.; Parkinson's Drawings of New Zealand Plants, tab. 101, 102 (ined.); Hook. Icon. Plant. t. 583, 584; Hook. fil. Fl. New Zeal. i. p. 96. *Panax coriaceum*, Regel, Gartenflora, 1859, p. 45. *P. longissimum*, Hook. f. Handbook Fl. New Zealand, i. p. 102. —New Zealand (Banks and Solander; Forster! in Herb. Mus. Brit.).

This is a very variable plant. Parkinson, who accompanied Captain Cook in one of his voyages, has left drawings of two varieties which he gathered in New Zealand, the one having crimson, the other purple petioles. In recent years, Continental nurserymen have raised as many as twenty varieties, chiefly differing in the division, shape, and colour of the leaves. One of the oldest inmates of our gardens has been described as a separate species by Regel (1859) under the name of *Panax coriaceum*, and by Hooker f. (1863) under that of *P. longissi-*.

mum. It has a simple stem and a dark-green bark striped with brown; all the leaves are quite simple. Regel enumerates two varieties of *P. coriaceum*, viz. *α. latifolium* (leaves $\frac{1}{2}$—$\frac{3}{4}$ of an inch broad, the older ones with rather larger teeth, *Aralia latifolia*, Hort.,) and *β. angustifolium* (*Aralia integrifolia*, Hort., leaves $\frac{1}{3}$ of an inch broad, with very small teeth). *Panax pentadactylon*, Dcne. et Planch. Hort. Donat. p. 10 (*Aralia pentaphylla* et *A. quinquevulnera*, Hort.), and *P. tridactylon*, Dcne. et Planch. l. c. (*Aralia triphylla* and *A. trifoliata*, Hort.), and *Aralia heteromorpha* are also garden varieties of this variable species.

2. *P. Lessoni*, C. Koch, Wochenschrift, 1859, p. 366.—*Panax (?) Lessoni*, De Cand. Prod. iv. p. 253. *Cussonia Lessoni*, A. Rich. Fl. N. Zel. p. 285, t. 32. *Aralia trifolia*, Banks et Sol. mss.; Parkinson's Drawings N. Zeal. Plants, t. 103, 104 (ined.). *Aralia Lessoni*, Hook. fil. Fl. N. Zel. i. p. 96.—New Zealand, in woods. (Banks and Solander! in Mus. Brit.)

XXV. Oligoscias, Seem. (gen. nov.)—Pedicelli articulati. Flores calyculati, hermaphroditi. Calyx tubo turbinato, limbo 5-dentato. Petala 5, ovato-triangularia, 1-nervia, libera. Stamina 5, filamentis brevibus, antheris oblongis. Ovarium inferum, 4–5-loculare, loculis 1-ovulatis. Styli 4–5, erecti, omnino liberi, stigmatibus 2-fidis. Drupa baccata, subglobosa, 4–5-pyrena. Albumen ruminatum.—Frutex Madagascariensis, inermis, foliis exstipulatis pinnatis 2–3-jugis cum impari, petiolis supra canaliculatis, foliolis lateralibus sessilibus, terminali petiolulato, infimis subrotundatis substipulæformibus, supremis ovatis basi acutis v. acuminatis, 3–5-setaceo-dentatis; umbellis 5–8-floris, simplicibus v. compositis; pedicellis filiformibus (6–8 lin. long.); floribus drupisque albis. Species unica :—

1. *O. Madagascariensis*, Seem. (sp. nov.)—Madagascar, Betroun, Tamatave and Antananarivo, on clay hills, 2000–3000 feet above the sea. (Meller! Lyall! n. 232, and others.)

A transverse section of the albumen presents almost the same cross-shaped figure as that of *Sciadopanax*, though not quite so regular as in that genus.

XXVI. Polyscias, Forst. *Pedicelli* articulati. *Flores* calyculati, hermaphroditi. *Calyx* tubo turbinato v. hemisphærico, limbo minute 5–8-dentato. *Petala* 5–8, vulgo 5, ovato-triangularia, 1-nervia, libera, æstivatione valvata. *Stamina* 5–8, vulgo 5, antheris oblongis.

Ovarium 5–8, vulgo 5-loculare, loculis 1-ovulatis. *Styli* 5–8, erecti, angulati, demum recurvi. *Drupa* baccata, subglobosa, 5-angulata, 5–8-pyrena. Albumen . . .—*Frutices* v. arbusculæ Asiæ et Polynesiæ tropicæ, inermes, glabræ, caule simplici v. parum ramoso, foliis exstipulatis imparipinnatis, foliolis ovato-oblongis v. subrotundatis subintegerrimis v. crenatis, floribus umbellatis v. subcapitatis, in paniculas amplas dispositis.—*Polyscias*, Forst. Gen. p. 63. t. 33 (1766); De Cand. Prod. vi. p. 257. *Eupteron*, Miq. in Bonplandia, 1856, p. 139. *Hederæ*, *Panacis*, et *Nothopanacis* sp. Auct.

In the specimen of *P. pinnata* figured and described by Forster, there was an excess of petals and stamens, and this, together with the imperfect way in which the whole genus has been characterized, probably accounts for Miquel's failing to recognize it, establishing the genus *Eupteron* (absolutely identical with Forster's *Polyscias*), and, mistaking Forster's species for a *Nothopanax*, describing it as *Nothopanax tricochleatum* in his 'Supplement of the Dutch East Indian Flora.' Miquel, on that occasion, proposed to enlarge the generic character of *Nothopanax*, so that it includes 5-merous species, and those who follow him would have to call all *Nothopanacia* species of *Polyscias*, *Polyscias* being the older name. But by combining dimerous and pentamerous ovaries in the same genus, we should once more return to the chaos from which the *Hederaceæ* are just emerging. De Candolle regarded *Polyscias nodosa* as a species of *Paratropia*, but it differs from the other species he associated it with by its pinnate leaves and long recurved styles. The above generic character has been worked out from Forster's original specimens and drawings preserved at the British Museum.

* *Flores pedicellati.*

1. *P. pinnata*, Forst. Gen. p. 64. t. 32; Prod. n. 518; Icon. (ined.) t. 298; De Cand. Prod. iv. p. 257.—*Polyscias umbellata*, Spreng. ex Steud. Nom. Bot. p. 546. *Panax (?) Hayneanum*, Wall. Cat. n. 4927, et. G. Don, Gen. Syst. iii. p. 383; Walp. Rep. ii. p. 429. *Panax Forsteri*, Dcne. et Planch. Rev. Hort. 1854, p. 105. *Nothopanax tricochleatum*, Miq. Fl. Ned. Ind. Suppl. i. p. 340. *Aralia Polyscias*, Spreng. in Erschein.—Tana (Forster! Anderson! in Mus. Brit.), Sumatra (Wallich! n. 4927, et in Herb. Soc. Linn. Lond., Teijsmann! Diepenhorst! in Herb. Hook.).

The leaflets being very apt to drop off in drying, have been described by G. Don as simple leaves.

2. *P. Papuana*, Seem.—*Gastonia Papuana*, Miq. Ann. Lugd. Bat. i. 5. New Guinea (Zippelius). Has generally 8 styles, but sometimes 12 by excess.

3. *P. acuminata*, Seem. mss.—*Hedera acuminata*, Wight, Icon. t. 1062. *Eupteron acuminatum*, Miq. in Bonplandia, 1856, p. 139; Fl. Ned. Ind. i. pars i. p. 762.—Nilgherries (Wight), Ceylon (Thwaites! Ceylon Plants, n. 4.).

Wight thinks *Hedera Jackiana*, Don, may possibly be identical with *Polyscias acuminata*, but that species belongs to *Arthrophyllum*; and Thwaites refers *Hedera parasitica*, Don, to *P. acuminata* as a synonym, but from Don's authentic specimen it proves to be a species of *Pentapanax* (*P. parasiticum*, Seem.).

** *Flores sessiles.*

4. *P. nodosa*, Seem. mss.—*Aralia nodosa*, Blum. Bijdr. p. 873. *Paratropia nodosa*, De Cand. Prod. iv. p. 265. *Hedera nodosa*, Hassk. Tijdr. Nat. Gesch. x. p. 131. *Aralia umbraculifera*, Roxb. Fl. Ind. ii. 108. *Papaja sylvestris*, Rumph. Amb. i. p. 149. t. 53, fig. 1. *Eupteron nodosum*, Miq. in Bonplandia, 1856, p. 139.—Java and Moluccas (Blume), Philippine Islands (Cuming! n. 504 et 1053 in Mus. Brit.).

According to Roxburgh about twelve feet, according to Blume thirty feet high. Rumphius's figure is referred by De Candolle to *Bergera Kœnigii*, a plant which has a very different inflorescence, whilst Roxburgh and Miquel referred it to this species. By some misprint, however, the latter author quoted plate 13, which represents a Palm.

OFFICIAL REPORT ON THE BOTANICAL DEPARTMENT OF THE BRITISH MUSEUM.

By J. J. Bennett, Esq., F.R.S.

The principal business of the department during the year 1864 has consisted—

In the naming, arranging, and laying into the General Herbarium of a large collection of plants of New Holland, formed by Dr. Ferdinand Mueller; of a collection of plants of New Caledonia, formed by

Mr. M'Gillivray; of extensive collections of West African plants, formed by Perrottet, Le Prieur, Heudelot, and others; of plants of Madagascar, collected by Forbes, Hilsenberg, and Boivin; of further portions of the American Herbarium of the late Professor Nuttall, and of the Philippine collection of Mr. Cuming; of numerous specimens of *Leguminosæ* and *Piperaceæ*, from various quarters; of Ceylon Ferns, from Dr. Thwaites, Bornean Ferns, from Mr. Wallace, and Cuban Ferns, from Mr. Charles Wright; of a continuation of M. Billot's 'Flora Galliæ et Germaniæ Exsiccata;' of M. Rossmässler's collection of Spanish plants; of the Oaks of M. Kotschy's Eastern collection; of Anderson's Scandinavian Willows, Schultz's *Hieracia* and Wirtgen's *Menthæ*.

In the rearrangement of the families of *Palmæ*, *Balanophoreæ*, *Menispermeæ*, *Araliaceæ*, *Laurineæ*, *Begoniaceæ*, *Aristolochieæ*, and of the Ferns with naked sori, with numerous additions to each, and also of a portion of the collections in the large outer room.

In the examination and partial arrangement of the extensive collections of European plants lately received from Messrs. Bourgeau, Reichenbach, and Rabenhorst, of M. Forcade's plants of the Pyrenees, of Zollinger's plants of Java, and of Ralph's plants of New Zealand.

In the selection of an extensive set of plants of Panama from the collections of Mr. Sutton Hayes, and of Californian plants from the herbarium of Mr. Gruber.

In the rearrangement of the British *Fungi*, with large additions, and in adding to the British Herbarium Mr. Wood's collection of Roses, an extensive series of *Hieracia*, and numerous other critical plants from various localities, a large number of Cryptogamous plants from the collections of Forster, Borrer, and Carrington, and of Phænogamous plants presented by the Rev. W. W. Newbould.

And in the continued examination of the volumes of the Sloanean Herbarium.

The principal additions which have been made to the department during the same period consist of—

Upwards of 2000 specimens of Mosses, from various localities, chiefly British, forming the herbarium of Mr. A. O. Black.

450 species of British Fungi, from the collection of Mr. Cooke.

270 species of Cryptogamous plants, chiefly Irish, from the collection of Mr. Carrington.

216 species of British and foreign Fungi, presented by C. E. Broome, Esq.

17 species of plants from Jersey, presented by W. Griffiths, Esq.

3000 species, forming 64 livraisons of Desmazières' 'Plantes Cryptogames de France.'

100 species from the French Maritime Alps, collected by M. E. Bourgeau.

672 species of plants of the Pyrenees, collected by M. Forcade.

303 species of plants of Spain, collected by M. E. Bourgeau.

79 species of plants of Spain and Algeria, collected by M. E. Bourgeau.

665 specimens of Lichens, collected in the neighbourhood of Duomo d'Ossola, presented by Professor Gagliardi.

500 species of plants, forming livraisons 12–22 of the 'Erbario Crittogamico Italiano.'

100 species of plants, forming two fasciculi of Van Heurck's 'Plants of Belgium.'

500 species of plants, forming five centuries of Reichenbach's 'Flora Germaniæ Exsiccata.'

200 species of plants of the Tyrol.

178 species of plants of various parts of Europe, collected by M. E. Bourgeau.

20 species of *Hepaticæ*, forming parts 29, 30, of Rabenhorst's 'Hepaticæ Europææ.'

50 species of *Characeæ*, forming parts 1, 2, of Rabenhorst's 'Characeæ Europeæ.'

70 species of *Algæ*, forming parts 159–165 of Rabenhorst's 'Algæ Europæi.'

75 species of Lichens, forming parts 24–26 of Rabenhorst's 'Lichenes Europæi.'

550 species of plants of Palestine, collected by Mr. Lowne.

129 species of plants of Syria and Armenia, from M. E. Bourgeau.

232 species of plants of Syria and Cyprus, collected by M. Kotschy.

700 species of plants of the Rocky Mountains of North America, collected by Messrs. Hall, Harbour, and Parry.

A set of the Mosses of Columbia, collected by Mr. D. Douglas.

81 species of plants of California, collected by Mr. Gruber.

1102 species of plants of Panama, collected by Mr. Sutton Hayes.

330 species of Ferns and Mosses of Cuba, collected by Mr. Charles Wright.

202 species of Lichens from Cuba, collected by Mr. Charles Wright.

40 species of Australian *Algæ*.

34 microscopic slides *Diatomaceæ*, eight of which were presented by J. Staunton, Esq.

87 sets of Palm fruits and seeds, from various quarters.

A copy of Griffith's 'Palms of British India,' presented by C. W. Downing, Esq.

OFFICIAL REPORT ON THE PROGRESS AND CONDITION OF THE ROYAL GARDENS AT KEW, DURING THE YEAR 1864.

By Sir W. J. Hooker, K.H., LL.D., Director, etc.

[The Official Report on Kew Gardens for 1862 was published at p. 270 of the first volume of our Journal; that for 1863 has not reached us.—Ed.]

Royal Gardens, Kew, W., 1st January, 1865.

The number of visitors to the Royal Gardens during the past year presents an increase of 72,246 over that of 1863; and was distributed as follows:—

Total number on Sundays	218,308
Total number on weekdays	254,999
Greatest monthly attendance (July) . . .	115,575
Smallest monthly attendance (February) .	1,760
Greatest weekday attendance (May 16) . .	16,307
Smallest weekday attendance (March 9) . .	1
Greatest Sunday attendance (July 10) . .	13,958
Smallest Sunday attendance (January 17) .	28
Good Friday (March 25)	8,214
	473,307

1. *Botanic Gardens.*—The most important change which I have to mention in this department, and indeed in many respects the most important that has occurred since 1841, when I was appointed Director, has been the retirement (owing to an affection of the eyes) of our able and highly valued Curator, Mr. John Smith, who, for upwards of

forty years, has superintended all departments of the Royal Gardens, and whose services and fidelity have been recognized by the Treasury in granting him the highest scale of pension. Indeed, previous to my taking office, Mr. Smith's services to the Gardens and to science were mentioned with approbation by the Commissioners, whose report on the condition of the Royal Gardens was presented to Parliament in 1838; and they specially drew attention to the fact, that to Mr. Smith alone was due the credit of having named any of the plants, whether for the interest of science or the instruction of the public. As may well be supposed, it has been found impossible to obtain another curator who combines with the necessary amount of skill as a cultivator, and efficiency as a general manager, that knowledge of rare, curious, and useful plants which our late Curator so eminently possessed. But his successor (also Mr. John Smith), late head-gardener to his Grace the Duke of Northumberland, at Syon House, not only bears the highest testimonials for skill and ability as a horticulturist and as a general manager, but has further long been known to myself and other botanists as having that special fondness for the cultivation of tropical and economic plants, for which the Syon gardens have long been celebrated throughout Europe. I have only to add that Mr. Smith, who entered upon his office on the 16th of May, has proved himself eminently qualified for the Curatorship, and is rapidly acquiring that special knowledge for which his predecessor was distinguished, and which experience alone can bring. No change of any importance has taken place in the general arrangement or disposition of the Garden grounds or houses, but many improvements are being introduced in the plantations, lawns, and walks: the lawns, especially, being devoted to the cultivation of named specimens of rare shrubs and trees, interspersed with clumps of shrubs, or planted for protection amongst them, occupy our men during the winter season. The original Arboretum near the entrance gates, being now worn out, has been replenished with a collection of scarce and ornamental flowering-trees, conifers, etc., amongst which, near the paths, clumps of herbaceous plants will be introduced, together with named aloes, cycads, yuccas, and such other tender green-house and stove plants as will stand exposure to the climate during the summer. Owing to the change of curators, the foreign and colonial correspondence and interchange of plants has been in some degree suspended, but many valuable collections of living plants and

seeds have been received. Of these by far the most considerable is a collection of many hundreds of Cape bulbs, etc., from Wilson Saunders, of Hillfield, Reigate, Esq., F.R.S., imported by a collector sent out principally at that gentleman's expense. This is only one of many valuable gifts made by Mr. Wilson Saunders to the Royal Gardens.

Cases of living plants, bulbs, and seeds, have been also received from—Calcutta, Botanic Garden: Dr. Anderson. Moulmayne: Rev. C. S. P. Parish and Major Benson. Ceylon, Botanic Garden: Dr. G. H. K. Thwaites. Ceylon: — Vickermann, Esq. East Africa and Seychelles: Drs. Livingstone, Kirk, and Meller. Benguela: J. Monteiro, Esq., and Dr. Welwitsch. Natal: W. T. Gerrard, Esq. St. Helena: His Excellency the Governor and Mr. Melliss. Mauritius, Botanic Garden: Mr. Duncan and M. Bouton. Bahia: C. Williams, Esq. Martinique: M. Belanger. Chili: Dr. Leybold. Rio de Janeiro: M. Wittig. Guatemala: Dr. Sclater, F.R.S. Quito: Dr. Jameson. Victoria (Australia), Botanic Gardens: Dr. Mueller. Queensland, Botanic Garden: Mr. Hill. New Zealand: Dr. Hector, W. L. Travers, Esq., and Dr. Haast.

Miscellaneous Plants.—The late Earl of Ilchester; Messrs. I. A. Henry, of Edinburgh; T. V. Wollaston, of Teignmouth; D. Hanbury, of London; Corderoy, of Blewbery; Eastwood, of Halifax; Thompson, of Ipswich; the Edinburgh, Hull, Regent's Park, and Göttingen Botanic Gardens; and the principal London nurserymen, especially Messrs. Low, of Clapton.

About 4000 live plants and 4600 packets of seeds have been distributed. Steps are being taken to introduce the Ipecacuanha into Ceylon and India. Young plants have been received from Mr. C. H. Williams, of Bahia, and are being propagated for transmission. Several young gardeners, who have held responsible charges here, have been appointed to colonial and other Government establishments. Mr. Mann, who spent three years on the west coast of Africa, collecting for the Royal Gardens, and whose collections and return in good health were alluded to in my last year's report, has taken charge of the Chinchona plantations in the Himalaya under Dr. Anderson; Mr. Prestoe, foreman of the Fern department, has succeeded Dr. Crüger as superintendent of the Botanic Garden of Trinidad. At the desire of the Admiralty, I have recommended Mr. Coulon to take charge of the plantations on Ascension Island, whence we continue to receive encou-

raging accounts of the increased fertility and moisture of the island consequent on the extension of the plantations, which we continue to supply with young trees, etc., in Ward's cases. The Cork Oaks, mentioned in my last report as having been sent out at the request of the Government of South Australia, have arrived in excellent condition, and are thriving. Under the direction of George Macleay, Esq., similar cases of live Cork Oaks have been sent to Victoria, Sydney, and Queensland; of these the second alone has failed, and other cases are now preparing to be sent there; those sent to Victoria and Queensland have arrived in good condition. Most flourishing accounts of the Chinchona plantations continue to arrive from India. In the Neilgherries, Sir Wm. Denison informs us that though the country had in April last suffered from 112 days' drought, yet the Chinchona plantations had not been damaged, and that the plants were being propagated at the rate of 30,000 to 40,000 *monthly*. From Ceylon Dr. Thwaites writes, that in September last he had 190,000 plants, the tallest six feet high, that applications had been received for 28,500 plants, of which 9000 had been supplied, and that he expected to issue 20,000 monthly. Jamaica still needs a proper person to superintend a Chinchona plantation. The capability of the island for its growth has been abundantly proved by Mr. Wilson, of the Botanic Garden, who, under every discouragement, has planted out 400 plants in a suitable locality, which, however, being at a great distance from the Botanic Garden require a good resident practical gardener for their superintendence and increase.

2. *Pleasure Grounds.*—The most important work commenced here during the past year has been the revision, etc., of the Arboretum; the pleasure grounds being devoted to the cultivation of a complete named collection of all the trees and shrubs that will stand our climate. During the past twelve years upwards of 3000 species and varieties of these have been planted, arranged in groups according to the natural system, besides many thousand ornamental or interesting specimens for the decoration of the grounds. The time has now arrived for showing how far the choice of plants and their disposal has been satisfactory, and for rearranging, replanting, or giving better soil where necessary; as also for revising the names and renewing the tallies. The condition of the collection is exceedingly unequal. Owing to the summer droughts, the sterility of the sandy and gravelly soil over

large tracts of the grounds, and the injurious effects of the roots of the old trees with which the grounds are in many places encumbered, the actual available amount of good sites for the above mentioned purpose is comparatively small, and we have further proved that to raise vigorous trees at all these should have the protection of clumps of shrubs when young. During the past season about half the collection has been examined, the beds dug over, and copious supplies of leaf-mould and better soil added to every bed and tree which it has been thought advisable to retain in its present position. Upwards of 1500 plants from our own nursery have been planted out, either for ornament or to replace the deficiencies in the collection; many species which prove too tender, or otherwise unsuited for cultivation in our grounds, have been removed, and the remainder have been examined and named. Beds have been made round the Deodars along nearly the whole length of the Pagoda vista, and most of them planted with shrubs to encourage the Deodars, by affording protection to their roots. The side arches of the picturesque ruin near the Richmond road have been opened, and the environs planted with a collection of hardy ferns, named collection of ivies, etc. A small heated pit for raising plants for the Winter Garden has been built in the Nursery, which is being rearranged and greatly improved. Extensive works for the supply of water to the Royal and Crown property at Richmond and Kew are in progress, in connection with the lake, which is still in an unfinished state. The Nursery for the supply of the parks is stocked with young trees, of which 1665 have been supplied to the Deer Park and Richmond Park, and a large stock is about to be sent to the metropolitan parks.

The principal contributors of seeds and plants to the Arboretum and Winter Garden have been—His Grace the Duke of Somerset: Japan seeds. W. Locke Travers, Esq.: Canterbury, New Zealand, and Chatham Island seeds. Dr. Hector: Otago seeds. Prof. Harvey and H. Hutton, Esq.: South African seeds. Dr. Mueller: Victoria, etc., seeds. Mr. Brockman: W. Australian seeds. Messrs. Haage and Schmidt, of Erfurt: coniferous seeds. I. A. Henry, Esq., of Edinburgh: Andean and other plants. Dr. Campbell: Himalaya Rhododendron seeds. Royal Gardens, Edinburgh: various plants.

The usual interchanges have been kept up with nurserymen and others. Thirty-six Ward's cases with Cork Oaks have been sent to

South Australia, Victoria, Sydney, and Queensland, and one to St. Helena. Large packets of seeds of hardy shrubs and trees have been sent to W. Australia, Queensland, the Sandwich Islands, etc.

3. *Museums.*—The arrangement of the collection of woods in museum No. 3, has been proceeded with; the floor has been matted; the wall specimens protected by a hand-rail; a great number of the largest specimens have been repolished, and all reticketed; the Welwitschias enclosed in a glass case; and the central timber trophy rearranged.

Valuable contributions have been received, as follows:—His Excellency the late Duke of Malakoff: a large collection of Algerian woods. Messrs. Piesse and Lubin: vegetable substances used for scenting tea in China. Dr. Welwitsch: a very valuable named collection of Benguela and Angola woods, fruits, etc. Captains Speke and Grant: Central African seeds, etc. His Grace the Duke of Somerset: Japan Pine cones. D. Hanbury, Esq.: manna of Briançon. J. Haast, Esq.: a specimen of the vegetable sheep of the New Zealand Alps. Messrs. Haage and Schmidt, of Erfurt: cones of *Pinus Peuce*, which have enabled us to prove that this rare plant, which in Europe is confined to a single mountain in Turkey, is the same as the Himalaya *P. excelsa*. Dr. Kotschy, of Vienna: a beautiful named collection of oriental Acorns. Right Hon. E. Cardwell, and his Grace the late Duke of Newcastle: cones of Araucaria Bidwillii. Professor Brewer, of California: a magnificent photograph of the Wellingtonia forest. Mrs. Boott: portrait in oils of Michaux, the author of 'The American Sylva;' and a bust of the late Sir J. E. Smith, the founder of the Linnæan Society and formerly possessor of the library and collection of Linnæus.

4. *Herbarium and Library.*—The scientific duties of the Royal Gardens continue to be the most onerous connected with the establishment, owing to the incessant demands for the names of plants in our own and other gardens, and of those collected by travellers and explorers on Government and other expeditions, and for information as to economic plants and vegetable products, in addition to the extensive and ever-increasing colonial and foreign correspondence and publications. The principal works done in this department, or in connection with it, have been—1. The publication of the second volume of the Flora of the Australian Colonies, by G. Bentham, Esq., assisted by Dr. Mueller, of Victoria, who continues to send his own Herbarium for examination, and all the newly-discovered plants as they are re-

ceived by him, with notes and observations, for this work. The third volume is in progress, published under the authority of the several Australian Governments. 2. The Flora of the Cape Colony, British Caffraria, and Natal, by Dr. Harvey, F.R.S., of Dublin, and Dr. Sonder, of Hamburg. The third volume of this will shortly appear, published under the authority of the Cape Government. 3. Dr. Grisebach's West Indian Flora is completed in one thick volume, and was published under the authority of the Secretary of State for the Colonies. 4. Dr. Thwaites's Enumeration of Ceylon plants is completed and published. 5. The first volume of a Handbook of the New Zealand Flora, prepared by Dr. Hooker at the desire of the Government of that colony, is now published; and the second volume is in course of preparation. 6. The 90th annual volume of the Botanical Magazine, being the 24th prepared at Kew, has been published by the Director, with 72 coloured plates of new and rare plants that have flowered in the Royal and other British gardens.

Of other works in preparation the most important are:—7. The Flora of British India, by Dr. Thomson, F.R.S., under the auspices of the Secretary of State for India. 8. The Outlines of the Flora of Tropical Africa, by Professor Oliver and Dr. Hooker. 9. Dr. Mueller, of Geneva, has spent three months at Kew, for the purpose of describing the *Euphorbiaceæ* for M. de Candolle's Prodromus. 10. M. C. de Candolle, of Geneva has described the natural order of Peppers for the same work. 11. Mr. Lowne has named and arranged his large Palestine and Lebanon collections, made during the Rev. Mr. Tristram's expedition. 12. Dr. Kirk has rendered us great service in arranging and naming his own and other East African collections, and the Mauritius ones of the late Dr. Ayres, Judge Blackburn, and others. 13. Dr. Spruce is residing at Kew for the purpose of arranging his Andean, etc., collections. 14. Dr. Triana of Bogotá was for several months engaged on his Flora of New Granada, published for the Government of that Republic. 15. The Japanese and Korean collections of Mr. Oldham, amounting to about 13,000 specimens, have been named and distributed to various public museums. 16. The distribution of the great Herbarium of the East Indian Company has been proceeded with; and that of the Kashmir, Punjab, and Himalayan collections of Dr. Falconer commenced.

The principal contributions to the Herbarium and Library have

been :—1. The collection of specimens, drawings, and MSS. of Carices, of the late Dr. Francis Boott, F.L.S., formerly Treasurer of the Linnæan Society; presented by his widow. It is impossible to overestimate the value of this gift. Dr. Boott devoted the greater part of his life to the study of this particular and very difficult tribe of plants; he formed a complete and beautifully arranged and named collection of the species from all parts of the world; and was for 30 years the standard authority for their nomenclature. At his own expense he caused to be prepared in Paris and London a superb series of folio drawings of all the species, of which upwards of 400 were published, with descriptions in three volumes, and privately distributed, also at his own expense. The entire number of drawings amounts to upwards of 700. 2. The Herbarium and MSS. of the late Dr. P. B. Ayres, colonial surgeon of Mauritius: presented by his widow. Dr. Ayres spent upwards of ten years in the Mauritius, during which time the whole of his leisure was employed in exploring its botany, and describing the plants for a Flora which he intended to publish. This Herbarium, which is a very considerable one, together with the MSS., will prove of great use in the event of a Flora of Mauritius being published, which is in contemplation by the Colonial Government.

The most extensive and valuable of the other contributions have been :—1. *European Plants.*—Spain, M. Bourgeau; Hungary, Colonel Victor de Janlea; Dauphiné, Professor Oliver and Mr. Hanbury; Feroe Islands, Sir W. C. Trevelyan, Bart.; Portugal, Dr. Welwitsch; Spitzbergen, W. W. Wagstaffe, Esq.; Eastern Lapland, Felleman; various, Rev. W. A. Leighton. 2. *Asiatic Plants.*—Syria, Dr. Kotschy, Miss Osburn, Mrs. Wynne, Mr. B. T. Lowne, Professor Ehrenberg (Berlin Herbarium); Peninsula of India, Dr. Wight; Rohilkhund, Dr. J. L. Stewart; Sikkim, Dr. T. Anderson; Ceylon, Dr. Thwaites, Indian Archipelago, Professor Miquel, of Leyden, and Dr. Anderson, of Calcutta; Siam, Sir R. Schomburgk; China, Dr. Hance, Dr. Tate, and Captain Eustace Jacob; Japan and Corea, Mr. Oldham (collector for the Royal Gardens); Dr. Maingay and F. V. Dickins, Esq., R.N. 3. *Australia.*—Sir Daniel Cooper, Bart., Dr. F. Mueller; Tasmania, Miss Cox; New Zealand, Dr. Hector, Mr. Buchanan, Dr. Haast, W. L. Travers, Esq., and Mr. W. Wakefield; Chatham Islands, W. L. Travers, Esq.; New Caledonia, Mr. Vieillard, of Vire, the Herbarium of the Jardin des Plantes, and the Directors of the Colonial Exposition of

Paris; Samoan Island, Rev. T. Powell; Sandwich Islands, Dr. Hillebrand. 4. *Africa.*—Zambesi and Shiri Lakes, and Johanna Island, Dr. Kirk, Dr. C. J. Meller, and Mr. Horace Waller; Benguela and Angola, Dr. Welwitsch; Dahomey, Congo, and Annabon, Consul Burton; Natal, Dr. Sutherland; Dammara Land, etc., Mr. Andersson, and Messrs. Chapman and T. Baines; Mauritius and Rodriguez, the late Dr. Ayres, and Mr. Duncan; Madagascar and Bourbon, Museum of the Jardin des Plantes, Paris; St. Helena, Mr. Melliss, Capt. Haughton; Cape of Good Hope, Dr. Harvey, F.R.S. 5. *North America.*—Canada, J. Macoun, Esq.; British Columbia and Vancouver's Island, Mrs. E. Mills, and Dr. C. B. Wood; Jamaica, Mr. Wilson; Trinidad, the late Dr. Crüger. 6. *South America.*—Chili, Herb. Mus. Paris.; British Guiana, Mr. Appun, Colonial Government Collector.

Miscellaneous collections from various countries have been received from the Royal Herbaria of Berlin and Paris, Professor Agardh, of Lund, Professor Areschoug, of Upsala, etc.

As Director of the Royal Gardens, I have annually to state that we continue to receive the most cordial assistance from Her Majesty's Secretaries of State for India and the Colonies, from the Lords Commissioners of the Admiralty, from most of the Governors of our colonies and foreign possessions, and from many of our consuls; as also that we are under special obligations to the Royal Steam Packet Companies and the Peninsular and Oriental Company for facilities in transmitting packages of seeds and plants free of expense.

HUTCHINSIA ALPINA.

With regard to the specimen of *Hutchinsia alpina*, referred to in my note (Journ. of Bot. Vol. III. p. 92) as having been burnt, I now find to be amongst a few things rescued when my house fell down, by Mr. Foggitt.

J. G. Baker.

Thirsk, May 10, 1865.

CORRESPONDENCE.

Discovery of Cyathea medullaris *and* Aspidium hispidum *in Australia.*

You will be glad to hear that Mr. Wilkinson, of the Geological Survey, has recently found, at Cape Otway, *Cyathea medullaris* and *Aspidium hispidum.* The latter Fern had previously not been met with out of New Zealand, and *Cyathea* is a genus entirely new to the Australian flora.

Yours, etc.,

F. Mueller.

Botanic Gardens, Melbourne, Feb. 10, 1865.

Epacris impressa, *flore pleno.*

It is much to be desired that Mr. Hemsley or yourself should furnish us with some further details respecting the double *Epacris impressa* mentioned in your last number. Flowers become double in so many ways, as pointed out by Mr. Grindon (*supra*, p. 27), that the mere mention of a double flower is, as you are well aware, by no means sufficient for morphological purposes. Apart from the geographical interest attaching to the *Epacris*, it is possible that an examination of it may throw light on the nature of the scales at the base of the ovary, and which are placed opposite to its lobes, and not alternately with them. Whence this deviation from the ordinary rule? In some allied genera there is an hypogynous disk, while in *Pilitis* the scales are two-lobed, and in other genera the scales are replaced by tufts of villi. Again, some of the Epacrids, *e.g. Trochocarpa*, have a ten-celled ovary, surrounded at the base by five scales; and in *Oligarrhena* there are only two stamens, four hypogynous scales, and a two-celled ovary. These illustrations will suffice to show that we stand in need of additional information to enable us to bind into a consistent whole these isolated structural diversities; and as the double *Epacris* may by chance prove useful in this way, I trust we may be favoured with an account of the structure and arrangement of its parts. I may here allude to the importance of paying more attention than has hitherto been done to the venation of double flowers, as this often gives a clue to the true nature of the additional parts.

Yours, etc.,

Maxwell T. Masters.

May 3, 1865.

Mr. Milne's Botanical Explorations on the West Coast of Africa.

I have just returned from a long and interesting cruise. Mr. Latta, an enterprising young man, was kind enough to give me a passage. We were in the district of Fernan Vas. We had occasion to pass through some miles of creeks which formed a complete network. We entered those creeks at Cape Lopez and came out at Fernan Vas. There is what is called the Bamboo

Palm, the petiole of which is used for building houses; the plant does not send out one direct stem, rather a mass of shoots, and capable of bearing fruit when not more than six feet high; while the foliage reaches the astonishing height of ninety feet. Nothing can be more graceful than to see their tops overhanging almost every other species. It differs greatly from what is called the Bamboo at Old Calabar, but both belonging to the genus *Raphia* [*R. longifolia* and *Hookeri* are probably meant. Ed.]. There are two species of *Pandanus* very plentiful along the margin of those creeks. As we approached Fernan Vas I saw several species of aquatic *Amaryllids*, also along the sides of the creeks great patches of Papyrus, resembling the *Papyrus antiquorum*. The stems are used by children for making baskets; it is not used otherwise. The *Clerodendron Tomsonii*, Balf., is very plentiful at Fernan Vas, more so than at Calabar. It is also to be found at the head of the Rembo river, bordering on the Backina country. A large species of *Juncus* is plentiful on the Rembo. I saw the same species of aquatic plants which I found at Calabar, with the exception of one which was new to me. I also saw two species of very small Water-lilies (*Nymphæaceæ*); one is yellow, which I would say is a *Nuphar*, and the other a *Nymphæa*; independent of the two in question there is a third, the widely-diffused large white one. There is a number of fine grasses and many of which I saw for the first time at Brooklyn Island, Fernan Vas. Mr. Latta called my attention to a fine Liliaceous plant covering the bushes, with splendid flowers. Fortunately a number were in flower, which enabled me to obtain plenty of specimens.

The fauna and flora of the Rembo river resembles that of Calabar. Such is not the case at the Gaboon. The Beetles of the Rembo, if not the same species, at least belong to the same genera. The Butterflies are almost the same, and so on with other genera. I have seen here at the Gaboon fruit of a Fan Palm [probably *Borassus Æthiopum*, Mart. Ed.] which was brought by Robert Kirkwood, Esq., from Point Pearo, about 2° 7′ south. Mr. Kirkwood kindly gave me one of the fruit as a specimen. It measures 9½ inches in circumference and about 9 inches in length; it is nearly round.

When leaving Viti, I thought I had for ever left the land of cannibalism and barbarism. Such has not been the case. On our return from Fernan Vas we halted for a night at Cape Lopez. On the following morning I saw a party of people coming along the beach, beating drums, and in the midst was a woman, her body all painted over and her hair ornamented with feathers. I soon found that she was about to go through the ordeal of drinking poison for witchcraft, and followed the party to a freshwater stream. By order she sat down upon a bank. At this time I went amongst them and used all my influence to save the poor woman. They promised that she should not die; but I had no sooner turned my back than they gave her the poison. It brought on a shivering, and in a few moments she was a corpse. A large fire was now kindled; her legs, arms, and head were severed from the body and burned to ashes. Her body was opened, her heart taken out and held up to public gaze, and the executioner crying out to all parties to look upon the witch. Such is the present state of Africa. Cape Lopez is a notorious

place for slaves. Thousands of slaves are annually exported from there to St. Thomas and Prince's Island. Our commanders on the coast have been told this often enough, still the people of Cape Lopez never see the smoke of an English steamer.

I am, etc.,

GRANT MILNE.

Gaboon, March 22, 1865.

NEW PUBLICATIONS.

Flore de la Chaîne Jurassique. Par M. Ch. Grenier, Professeur à la Faculté des Sciences. 1ère partie, pp. 346. Paris: F. Tary. 1865.

The Jurassic mountains, though belonging politically to three nations, form a tract of country of which the natural features are so thoroughly homogeneous that more than once before this their botany has been separately treated upon. The chain measures one hundred and eighty miles from north to south, and from thirty to fifty miles in breadth at different points. The highest peaks attain nearly six thousand feet in altitude, and occupy very much the same position with regard to the perpetual snow-line as our own higher Highland mountains. The geology is very different to that of our own highest hills, and much more uniform, but as there are zones of climate as we descend corresponding to the lower parts of Britain, and at the base of the mountains a region where Indian-corn and the vine luxuriate, the general range of station is very much greater, and although the area of the chain is not very much larger than that of Yorkshire, the number of species in the flora exceeds that of the whole of Britain in the proportion of about four to three.

Professor Grenier's merits and qualifications as a plant-describer are too well known for him to need any introduction to our readers. Next to the works of Koch and Fries, the 'Flore de France,' of which he is joint author, is no doubt the Continental handbook which is most used by British botanists, and there are not many who will demur to the high appreciation of its value which, in the preface to the last edition of his Manual, Professor Babington expresses. M. Grenier has the credit of grounding his descriptions upon a large measure of personal field-observation, of neither innovating rashly nor servilely following in the track of his predecessors, and upon the whole, in the acknowledging

of species he steers a middle course between extreme views. The present work is mainly made up of descriptions of an extremely similar character to those of the 'Flore de France,' but those and the accompanying critical remarks are of course written with the advantage of later knowledge. The present part is intended to be one of two. It goes down the scale, deviating very slightly from the ordinary classification and the Candollean sequence of Orders, as far as *Loranthaceæ*, the preface and all introductory explanations with regard to the tract of country included, being deferred to the concluding part. With regard to the limitation of species, except on the genus *Rosa*, M. Grenier modifies here very slightly the views expressed in the larger work. The extracts we have marked have been selected as bearing upon British botany, and as calculated to convey to those to whom his previous writings are not familiar an idea of the scope and character of M. Grenier's observations.

Draba verna. "I have not succeeded in testing by cultivation the value of the species formed by the division of *Draba verna*. For a long time I have sown seeds in the spring, and although germination took place, the plants were always destroyed in summer without coming to perfection. I have learnt later that the sowing should take place in autumn; then the seeds germinate before winter, and produce flowers in the spring, so that the plants are, as M. Jordan has well observed, more truly biennial than annual."

Drosera obovata, Koch. *A propos* of the theory of the hybrid origin of this form, answering an objection of Fries, to the effect that no intermediates linking it with its supposed parents had been seen, M. Grenier writes,—"In the year 1850, I found in turf bogs of Portarlier the answer to this objection, for I brought together a series of individuals passing by insensible stages from *D. rotundifolia* to *longifolia*, of which *D. obovata* constituted the mean term. Finally, I obtained the following series, abstraction being made of a crowd of intermediates, viz. 1. *D. rotundifolia*; 2. *D. super-rotundifolio-longifolia*; 3. *D. longifolio-rotundifolia*; 4. *D. super-longifolio-rotundifolia*; 5. *D. longifolia*. The *D. obovata* is then neither a variety of *D. longifolia*, as Koch places it in the second edition of his 'Synopsis,' nor a true species, as he regards it in the first edition, but simply a hybrid, of which all the terms of the series passing from one of the types to the other are now perfectly known."

Sagina ciliata, Fries. Placing as synonyms of this *S. depressa*, C. F. Schultz, and *S. patula*, Jordan, M. Grenier writes,—"It is possible to dispute as long as one cares to do over the descriptions of MM. Fries, Schultz, and Jordan, and to conclude from them either that the plants referred to belong to one species or more than one. This doubtless arises from climatic influences having, in different places, rendered different states of the plants more habitual, and each author having been involuntarily led to exaggerate the value of certain inconstant characters. By taking account of the letter of the text in a manner too absolute, a botanist may easily be led to conclude that a description does not fit a plant he has before his eyes, and then that such a plant constitutes a new species. It is incontestably this that has happened to MM. Schultz and Jordan, when they have refused to see in their plants what Fries has already named. Thus M. Jordan says that Fries attributes to his plant, a nodding capsule, ciliated leaves, and glabrous peduncles, whilst his own possesses contrary characters. To this too absolute argumentation I answer that I have received from Fries (who besides has published his plant in Herb. Norm. part 1, no. 42) examples both with glabrous and glandular peduncles, with ciliated and glabrescent leaves, with nodding and erect capsules. This is not all. I have received from M. Jordan himself examples of his *S. patula* with glabrous and glandular pedicels, and even upon the same branch with ciliated and glabrescent leaves. . . . What to me altogether dispenses with discussion is that I have before me examples from the three authors, and if the specimens were mixed I am convinced that it would be impossible for the authors themselves to recognize their own. The plants of Sweden, the Palatinate, Lyons, and the Jura, are perfectly identical. I have received the same from Constantinople, which shows that its area is really a wide one."

Sedums. "In 1861 I received from MM. Lloyd, Boreau, Chaboisseau, and Callay, living specimens of *S. elegans*. The plants of Nantes, Angers, La Vienne, and the Ardennes had all more or less the glaucous tint; but planted in garden soil I obtained in 1862 plants with only a doubtful glaucous hue, and in 1863 there did not remain a single tuft of *S. elegans* with a truly glaucous tint, for all of them had changed to green, and thus become Wirtgen's *S. aureum*. I had myself brought in 1861, from the neighbourhood of Besançon, splendid specimens of *S. elegans*, of which the brilliant silvery tint was very conspicuous.

Now they have completely lost this character, and taken a dark-green hue, which furnishes a strong contrast to their original tinge. More than this, M. Bavoux, to whom I had communicated my observations, has ascertained a fact not less remarkable than the preceding. This zealous botanist, having met with *S. aureum* in the meadows on the borders of the Ognon, transplanted it to his garden, where the green tint was perfectly preserved; but wishing to rid himself of it he planted it on an old wall, and in this new position the plant changed from green to glaucous, and became *S. elegans*, whilst a portion, accidentally left behind in the garden, still preserved the hue of *aureum*."

Perhaps the weakest part of the whole 'Flore de France' was the genus *Rosa*, for which M. Grenier was responsible. Not only were a large number of clearly-marked forms, which were known as French, passed over without notice, but the difference between stalked and sessile carpels was both difficult of application as employed to distinguish primary groups, and when applied produced unnatural combinations and severances. M. Grenier has now abandoned it, and worked out what seems to us a much better plan of classification, and he recognizes and carefully describes for the Jura alone nearly twice as many species as in 1848 he acknowledges for the whole of France. We may note, also, that abandoning the lead of M. Soyer-Willemet, he now adopts the nomenclature for the yellow-flowered species of *Trifolium*, followed by nearly all our English writers, justifying in a note, which is too long for quotation, the change in his views. There is only a meagre account of the fruticose *Rubi*, but we are promised a fuller one before the work closes. The want of an explanation with regard to the limits of the tract of country embraced, detracts from the value of the book, from the geographical point of view, but doubtless this will be duly attended to in the concluding part.

BOTANICAL NEWS.

The Rev. M. J. Berkeley has been appointed one of the Examiners in Botany in the London University.

A movement has been set on foot in Melbourne for organizing an expedition to search for Leichhardt and his party. It is not thought beyond the range of possibility that some of the lost travellers may still be alive.

The second part of Dr. Seemann's 'Flora Vitiensis' is completed.

We regret to announce the death of Admiral Fitzroy, R.N., F.R.S., who died by his own hand, April 30th. His name survives in Botany in *Fitzroya Patagonica*, a singular Coniferous genus, and as the commander of the expedition of the 'Beagle,' which Mr. Charles Darwin's account has contributed to render famous. The late Admiral had for some time been depressed in spirits, partly caused by anxiety in trying to render the infant science of meteorology, while not yet in proper working order, practically available.

Messrs. E. T. Higgins and W. G. Cutter have left Liverpool, on the 30th ultimo, for the West Indies, where they intend to remain about six or eight months, for the purpose of exploring the flora and fauna of those islands. They will carry with them some newly-constructed dredges for obtaining shells, star-fish, etc., from deep water.

We grieve to announce the death of one of our most esteemed contributors, Mr. Alexander Smith, Curator of the Herbarium at Kew, which took place on the 15th of May, in the thirty-third year of his age. The loss which botany has sustained by his premature death cannot be estimated by the few articles which bear his signature, but rather by the vast amount of knowledge which dies with him. The leading idea of his botanical faith was that our science was something more than an accumulation of dry technicalities, and that the time had come when it had to be made manifest to our practical age that botany had a direct bearing upon the weal and woe of mankind. The uses of plants, economic botany, in its widest sense, deeply engaged his attention, and we may assert, without the fear of contradiction, that there was no one who had a better or sounder knowledge of this subject, or took a keener delight in collecting and verifying every scrap of information bearing upon it, a labour greatly facilitated by his being a good systematic botanist. His object was to publish a comprehensive work on all the useful plants of the world; and had he been able to find a publisher, or received any encouragement, merchants, manufacturers, agriculturists, pharmacologists, and other practical men might now be able to dispense with the wretched compilations brought out by half-educated scribblers. The manuscripts he leaves behind amount to more than thirty closely-written volumes, all the articles being carefully and systematically arranged. There is besides a work on 'Commercial Botany,' which seems to be quite ready for press. Mr. Smith has also been an active contributor to Moore and Lindley's 'Treasury of Botany,' a companion volume to Maunder's 'Treasury of Knowledge,' and about to be published by Messrs. Longman; and he added to Mr. Markham's well-known 'Travels in Peru and India' a valuable treatise 'On the Plants employed in India on account of their real or supposed Febrifugal Virtues.' To this Journal he contributed several articles which bear his signature, and several anonymous notices. At the time of his death he was actively engaged in writing a work on Orchids, a subject he had studied deeply. The outlines of his life may be briefly told. He was born on the 17th of December, 1832, and was the son of Mr. John Smith, the now retired Curator of the Royal Botanic Gardens, at Kew, well known to science as one of the leading pteridologists of the day. At eight years of age Alexander Smith was sent to boarding-school at Richmond, and afterwards to the Isle of Wight, where, in 1846, a nervous

impediment came to his speech, which necessitated his leaving school, and abstaining for a time from study. Shortly after this, the store-rooms of the Kitchen Garden department at Kew were transferred to the Botanic Garden, and it was suggested that they might be converted into a seed room and museum. As a beginning, and for amusement, Mr. Alexander Smith conveyed specimens of cones, fruit, capsules, woods, etc., which his father had from time to time collected, to this building, placing them on some of the fruit-shelves. Sir William Hooker also sent all he had at his house, and this was the beginning of the Kew Museum. In 1847 the centre room of the old building was fitted up. By this time specimens were becoming numerous, and Mr. Alexander Smith continued to arrange them. In June, 1847, he became a paid servant at the rate of a few shillings a week, and his salary was successively raised until, in 1856, it reached £104 per year, and he was appointed Curator. By this time the whole of the old museum began to be overcrowded with specimens, and the building of a new museum (No. 2) became the more necessary by the increase of the collection resulting from the Paris Exhibition,—Mr. Alexander Smith having accompanied Sir William Hooker to Paris, to assist him in making selections and purchases. In the spring of 1857, Mr. Alexander Smith began to arrange the new museum, which was opened in the middle of May. It occupied his time the whole of that summer to merely roughly put the new and also the old museum in order, new specimens constantly arriving. In September of that year he was unfortunately caught in a heavy thunder-storm, in going from his father's house to the new museum, which led to a sudden inflammatory attack on the lungs, necessitated a cessation of his duties for several months, and compelled him to spend the winter at Hastings. He returned in good health, and resumed his duties on the 1st of May, 1858. In July following he caught a cold, which brought on a relapse of his complaint and led to a medical certificate being required, which was to the effect that no hopes could be entertained of his recovery. This was confirmed by an eminent physician, who gave his opinion that he could not live three weeks. Before the expiration of that time he received an official letter from the Secretary of the Board of Works, dated July 29th, 1858, informing him "that in his present state of health he was physically incompetent to continue in the discharge of his duties as Curator of the museum." At that time he was fast recovering, but this letter gave him a great shock, which for the rest of his life preyed on his mind, and made him low-spirited and dull. In due time he became convalescent, and occupied his time greatly in writing, following his favourite pursuit of commercial and economic botany, often spending two or three days a week at the reading room of the British Museum. During the years of his retirement several attempts were made to obtain scientific situations for him, but all failed, until in May, 1864, he was appointed Curator of the Herbarium at Kew, vacant by the retirement of Mr. Black, an office which he continued to fill to the time of his death. His quiet retiring disposition, obliging manners, and amiability, endeared him to a large circle of friends, and many an eye was moistened when his body was laid in the quiet little churchyard at Kew, where, amongst yew-trees and ivy, he sleeps his last sleep.

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ON *HEDERA CANARIENSIS* AS AN IRISH PLANT.

By Berthold Seemann, Ph.D., F.L.S.

(Plate XXXII.)

The existence of *Hedera Canariensis* in Ireland has been so often asserted and denied that most botanists seem to look upon the plant as one of those phantom species which occasionally flit across the botanical forum. Before publishing my revision of the genus *Hedera* * (Journ. of Bot. Vol. II. p. 303) I had made many inquiries about the subject, and looked at every book I could think of; nevertheless I was compelled to state that I had "not been able to examine any specimens of wild Irish Ivy," and "that our British Floras did not afford any information respecting it." With the help of Dr. D. Moore, of Glasnevin, whose kind aid no man of science ever invoked in vain, I am able to clear up much of what formerly appeared doubtful.

There is in gardens a very fast-growing, large-leaved plant, commonly called "Irish or Scotch Ivy" (*Hedera Hibernica* v. *Scotica* hortulanorum). This plant, as I understand the species, is one of the many varieties of *H. Helix*. There is, besides, a plant which gardeners call "Sharp-leaved Irish Ivy," and this I hold to be one of the

* The genus *Hedera*, as now circumscribed, is very natural, and easily distinguished from all other *Hederaceæ* by its climbing and rooting branches, simple leaves, five petals and stamens, semi-inferior ovary, single style, and ruminate albumen. Dr. F. Müller recently referred to it an Australian species, which I cannot admit, as it has a completely inferior ovary and compound leaves. I hold it to be the type of a new genus, which may be briefly described as:—*Kissodendron*. Pedicelli inarticulati. Calycis limbus 5-dentatus. Petala . . . Stamina . . . Stylus 1, elongatus. Drupa infera, baccata, 3–5-pyrena. Albumen ruminatum. Arbor glabra Novæ Hollandiæ, inermis, foliis pinnatis plurijugis, foliolis integerrimis ovatis v. lanceolato-ovatis brevi-acuminatis, basi obtusa inæquilateris, pedunculis primariis elongatis, secundariis inferioribus oppositis, superioribus aliquot verticillatis, summis umbellatis, umbellulis 8–12-floris. Species unica, *K. Australianum*, Seem.—*Hedera Australiana*, F. Muell. Fragm. iv. p. 120. *Polyscias Australiana*, F. Muell. Coll.—Rocking-ham Bay, E. C. of Australia (Dallachy! comm. cl. F. Muell.). This new genus is allied to *Pentapanax*, Seem. (Journ. of Bot. Vol. II. p. 294), both having pinnated leaves and an arboreous habit, but they differ in the following points:—*Pentapanax*. Pedicelli articulati. Flores ecalyculati. Drupa exsucca. Albumen æquabile. India orient.—*Kissodendron*. Pedicelli inarticulati. Flores ecalyculati. Drupa baccata. Albumen ruminatum. Nov. Holl.

varieties of *H. Canariensis*. It is figured in our Plate, occurs wild in Ireland, and is evidently the plant alluded to by Mackay in his 'Flora Hibernica.' Dr. Moore says of it:—

"The plant known in gardens as the Sharp-leaved Irish Ivy, I do not remember ever seeing myself in a wild state. I, however, saw it lately, growing at West Aston, Co. Wicklow, and Mrs. Acton, mother to the present proprietor, who has resided there during the last sixty years at least, told me, she remembers getting it from the late Mr. Hodgens, of Dunganstown, Co. Wicklow, about forty years ago, as a rarity he found somewhere in the neighbourhood of that place. I consider it to be the plant alluded to by the late Dr. Mackay in 'Flora Hibernica,' p. 135, who compares the leaves to those of *Passiflora cærulea!* and states it was found by Mr. Hodgens, and also on walls near Merrion. The latter place is about four miles from Dublin. I have no doubt plenty of additional information will be obtained concerning the plant, after the figure in the 'Journal of Botany' is published, but the foregoing are the only facts I am able to state at present about it."

A certain confirmation of *H. Canariensis* being an indigenous Irish plant is afforded by its general geographical distribution. Assuming it to belong to the Iberian types of our flora, and acting upon that assumption, I procured, through Dr. Welwitsch's kind offices, specimens of the *Hedera* growing in Portugal; and I was delighted to find it to be *H. Canariensis*, thus furnishing another proof of the correctness of the accepted theory of plant distribution. Specimens from the Rev. Mr. Lowe had already enabled me to pronounce the Madeira Ivy *H. Canariensis;* so that the geographical range is now pretty well ascertained, the species being found in the Canary Islands, Northern Africa, Madeira, Iberian peninsula, and Ireland.

I have not yet concluded my inquiries into the varieties of *H. Helix* and *Canariensis;* and should like to test certain characters more fully before using them for diagnostic purposes. For the present, it is sufficient to say that the characters derived from the stellate hair of the pedicels and calyx (the hair having 8 rays in *H. Helix* and from 13 to 15 in *H. Canariensis*) absolutely distinguish the two species. In *H. Helix* the rays are clearly in a single whorl; but under very high microscopic power it would seem as if in *H. Canariensis* there were two whorls, one placed above the other. But I have not been able to satisfy myself on this point, and if there be two whorls, perhaps some skilful manipulator may succeed in separating them.

Hedera Canariensis; foliis inferioribus cordatis v. 3–5-lobatis, floralibus cordatis v. ovatis acuminatis, integerrimis v. hinc inde grosse dentatis;

umbellis in racemos v. paniculas dispositis, pilis pedicelli et calycis stellato-13–15-radiatis; drupis nigris.—*H. Canariensis*, Willd. in Berl. Mag. ii. p. 170. t. 5. fig. 1; Schult. Syst. v. p. 508. *H. Helix*, var. (?) *Canariensis*, De Cand. Prodr. iv. p. 261. *H. Helix*, Lowe, Fl. Mad. p. 376, non Linn. Sharp-leaved Irish Ivy, hortul.

H. corymbosa, Chois., conjectured to be a synonym, is, according to an authentic specimen obligingly communicated by M. Alph. de Candolle, a *Bixinea*, *Hydnocarpus corymbosus*, Seem.

Explanation of Plate XXXII., representing *Hedera Canariensis*, from garden specimens kindly communicated by Dr. D. Moore.—Fig. 1, a flower-bud; 2, a flower open; 3, a cross section of ovary; 4, the stellate hair found on pedicels and calyx:—*all magnified*. At the back one of the lower leaves.

NOTES ON THE FIRST LEAFING AND FLOWERING OF PLANTS FOUND IN THE NEIGHBOURHOOD OF MARLBOROUGH.

By the Rev. T. A. Preston, M.A.

The following List is arranged according to Babington's Manual; and the dates given, unless specially mentioned to the contrary, are those on which *first* flowers were observed. "By" is inserted when the plant appears to have been in flower a few days before it was observed. An asterisk before the name of a plant indicates that it was a cultivated specimen. All the data were collected this year by members of the Marlborough College Natural History Society. Where no name is appended, I am the observer.

I. *Plants observed during February, March, and April.*

Anemone nemorosa, Apr. 6, *J. Pole*.

*A. Apennina, Apr. 11.

Ranunculus heterophyllus, Apr. 16, *W. R. Carles*.

R. Ficaria, Mar. 6, not fully out till the beginning of April, *W. W. Dayman*.

R. auricomus, by Apr. 20 (with seed), not generally out till a few days later, *J. W. V. Taylor*.

R. bulbosus, Apr. 24, *A. Marshall*.

*R. gramineus, Apr. 27.

Caltha palustris, Apr. 13, *W. W. Dayman*.

*Eranthis hyemalis, by Feb. 9.

Chelidonium majus, Apr. 26.

*Corydalis solida, in bud Apr. 13; nearly over Apr. 19.

Fumaria officinalis, Apr. 20, *H. W. Hockin*.

*Dielytra spectabilis, nearly out April 19.

Barbarea vulgaris, Apr. 30, *A. T. Rickards*.

Cardamine hirsuta, Apr. 8, *R. B. Mainwaring.*
C. pratensis, Apr. 20.
Sisymbrium officinale, in bud Apr. 29.
S. Thalianum, May 2 (with seed), *E. Allfrey.*
Alliaria officinalis, Apr. 25 (buds just bursting), *R. R. P. Hilton.*
Brassica campestris, Apr. 20, *J. W. V. Taylor.*
Sinapis arvensis, Apr. 25, *A. Marshall.*
*Draba aizoides, Apr. 6.
D. verna, Apr. 6, *J. Pole.*
*Armoracia rusticana, in bud Apr. 29, *J. W. V. Taylor.*
Capsella Bursa-pastoris, not generally in flower till about Apr. 18.
Viola odorata, Mar. 23, over by Apr. 26.
V. hirta, nearly over by Apr. 30.
V. sylvatica, still in flower May 1.
V. tricolor, Apr. 5, *P. S. Robinson.*
Polygala vulgaris, Apr. 29, *D. J. Blyth.*
Lychnis diurna, Apr. 16, *R. B. Mainwaring.*
Stellaria media, Mar. 18 (perhaps a little earlier).
S. Holostea, Apr. 24, *A. Marshall.*
Cerastium glomeratum, Apr. 8, *R. B. Mainwaring.*
*Cerastium arvense, Apr. 29.
*Tilia parvifolia(?), first leaf, Apr. 16; full leaf, Apr. 29, *J. W. V. Taylor.*
Acer campestre, full leaf and flower, Apr. 26.
*A. Pseudo-platanus, first leaf, Apr. 17; flower, Apr. 22; *R. H. Brown, Mrs. Blake.*
*Æsculus Hippocastanum, bud, Apr. 6; first leaves, Apr. 11; full leaf, Apr. 22; flower, Apr. 25, *J. W. Parrington.*
Geranium rotundifolium, Apr. 29.
G. molle, Apr. 28, *R. R. P. Hilton.*
G. lucidum, Apr. 27.
G. Robertianum, Apr. 27, *L. S. Lloyd.*
Oxalis Acetosella, Apr. 17, *J. Pole.*
Euonymus Europæus, leaf, Apr. 10, *R. B. Mainwaring.*
Rhamnus catharticus, leaf, Apr. 22, *L. C. Calley.*
Ulex Europæus, Apr. 3, *J. Pole.*
Medicago lupulina, by Apr. 23, *J. Pole.*
Trifolium pratense, Apr. 28, *R. B. Mainwaring.*
Vicia sepium, Apr. 19, *J. G. Crosse.*
Lathyrus macrorrhizus, Apr. 24, *H. A. Evans.*
*Laburnum, leaf, Apr. 19; full leaf, Apr. 28.
Prunus communis, Apr. 16, *A. C. Almack.*
*P. Padus, by Apr. 29, *R. H. Brown.*
P. Avium, Apr. 16, full leaf, Apr. 23, *R. R. P. Hilton.*
*P. Laurocerasus, Apr. 27.
Poterium Sanguisorba, Apr. 30, *T. E. Maclean.*
Alchemilla vulgaris, May 3, *A. Marshall.*
A. arvensis, by Apr. 20.
*Sibbaldia procumbens, Apr. 22.
Potentilla Tormentilla, Apr. 29, *J. Pole.*
P. Fragariastrum, Apr. 7.
Fragaria vesca, Apr. 21, *W. W. Dayman.*
Rubus Idæus, flower-bud, Apr. 30, *J. W. V. Taylor.*
Geum urbanum, Apr. 25, *J. W. V. Taylor.*
G. rivale, Apr. 25.
Cratægus Oxyacantha, leaf-buds, Apr. 7; leaf, Apr. 10; full bud, Apr. 26; first flower, May 7, *C. M. Bevan.*
Pyrus Malus, Apr. 25, *A. Marshall.*
*P. Aucuparia, leaf, Apr. 22; full bud, Apr. 26; not in flower May 1.
P. Aria, leaf, Apr. 30, *A. Marshall.*
*P. Japonica(?), Apr. 8.
*Plum (against wall), Apr. 9.
*Apricot, *Nectarine, } Apr. 10 (earlier in very warm gardens), *A. Armstrong, Esq.*

*Apple, leaf-buds bursting, Apr. 9.
*Sedum Rhodiola, Apr. 27.
*Ribes Grossularia, leaf-buds, Mar. 7; full leaf, Apr. 8, *W. R. Carles.*
*R. rubrum, leaf-buds, Mar. 29; flower, Apr. 13.
*Ribes sanguinea, flower-buds appearing Feb. 28; not in flower till Apr. 15.
Saxifraga tridactylites, Apr. 20.
S. granulata, flower, Apr. 20, at a place four miles from Marlborough; still in bud Apr. 25, at Marlborough; in flower, Apr. 30, *C. J. Cummings.*
*S. spathulata, Apr. 25.
*Syringa, leaf-buds Mar. 13; flower-buds Apr. 30.
Pimpinella Saxifraga, Apr. 23, *J. W. V. Taylor.*
Daucus Carota, flower-bud, Apr. 30, *J. W. V. Taylor.*
Scandix Pecten-Veneris, Apr. 25. *A. Marshall.* I think a specimen was brought about a week earlier.
Anthriscus sylvestris, Apr. 21, *J. W. V. Taylor.*
Adoxa Moschatellina, Apr. 1, *A. C. Almack.*
Cornus sanguinea, leaf, Apr. 21; flower-bud, Apr. 23; flowers not out by May 1. *L. C. Calley.*
Sambucus nigra, young leaves, Feb. 24; flower-buds, Apr. 17; full leaf, Apr. 23; shoots six inches long, Apr. 29; flower, May 8, *J. W. V. Taylor.*
Viburnum Lantana, flower-buds appearing Feb. 24; flower, Apr. 29, *A. Marshall.*
V. Opulus, leaf-buds, Mar. 13; flower-buds, Apr. 22; not in flower, May 1.
*V. Laurustinus, Apr. 5.
Lonicera Periclymenum, leaves by Apr. 3.
*L. Caprifolium, flower-buds, Apr. 28, *R. R. P. Hilton.*
Sherardia arvensis, Apr. 30, *R. R. P. Hilton.*
Asperula odorata, flower-bud, Apr. 21; flowers just opening by Apr. 30.
Galium cruciatum, Apr. 24, *A. Marshall.*
Valerianella olitoria, Apr. 25.
Petasites vulgaris, Apr. 10, *J. Pole.*
Tussilago Farfara, Apr. 1, lasted the whole month, *J. Pole.*
Bellis perennis, Mar. 31, *J. W. V. Taylor.*
Senecio vulgaris, Apr. 4 (was probably much earlier).
Leontodon Taraxacum, Mar. 12, very few flowers in March, *Rev. R. Dell.*
*Inula Helenium, just appearing above ground, Apr. 6.
*Doronicum Pardalianches, Apr. 27.
*Rhododendron sp., Apr. 26.
Ligustrum vulgare, flower-buds, May 1, *J. Pole.*
Fraxinus excelsior, leaf-buds, Apr. 22; flower by Apr. 25; shoots three inches long by May 1.
*Lilac, flower Apr. 29, when shoots were eight inches long.
Vinca minor, Apr. 5, perhaps earlier, *J. W. Mills.*
V. major, Apr. 23, *L. C. Calley.*
*Gentianella, Apr. 18.
*Nemophila (self-sown plants), Apr. 26, *A. Marshall.*
Symphytum officinale, Apr. 30, *J. Pole.*
*Pulmonaria officinalis, by Apr. 15, *W. W. Melville.*
Lithospermum arvense, Apr. 29, *J. W. Parrington.*
Myosotis arvensis, Apr. 30, *A. Marshall.*
M. collina, Apr. 30, *A. T. Rickards and C. Bean.*
Lathræa Squamaria, Apr. 24, *J. W. V. Taylor.*
Veronica Chamædrys, Apr. 27.
V. serpyllifolia, Apr. 24, *R. B. Mainwaring.*
V. agrestis, Apr. 26, *R. R. P. Hilton.*

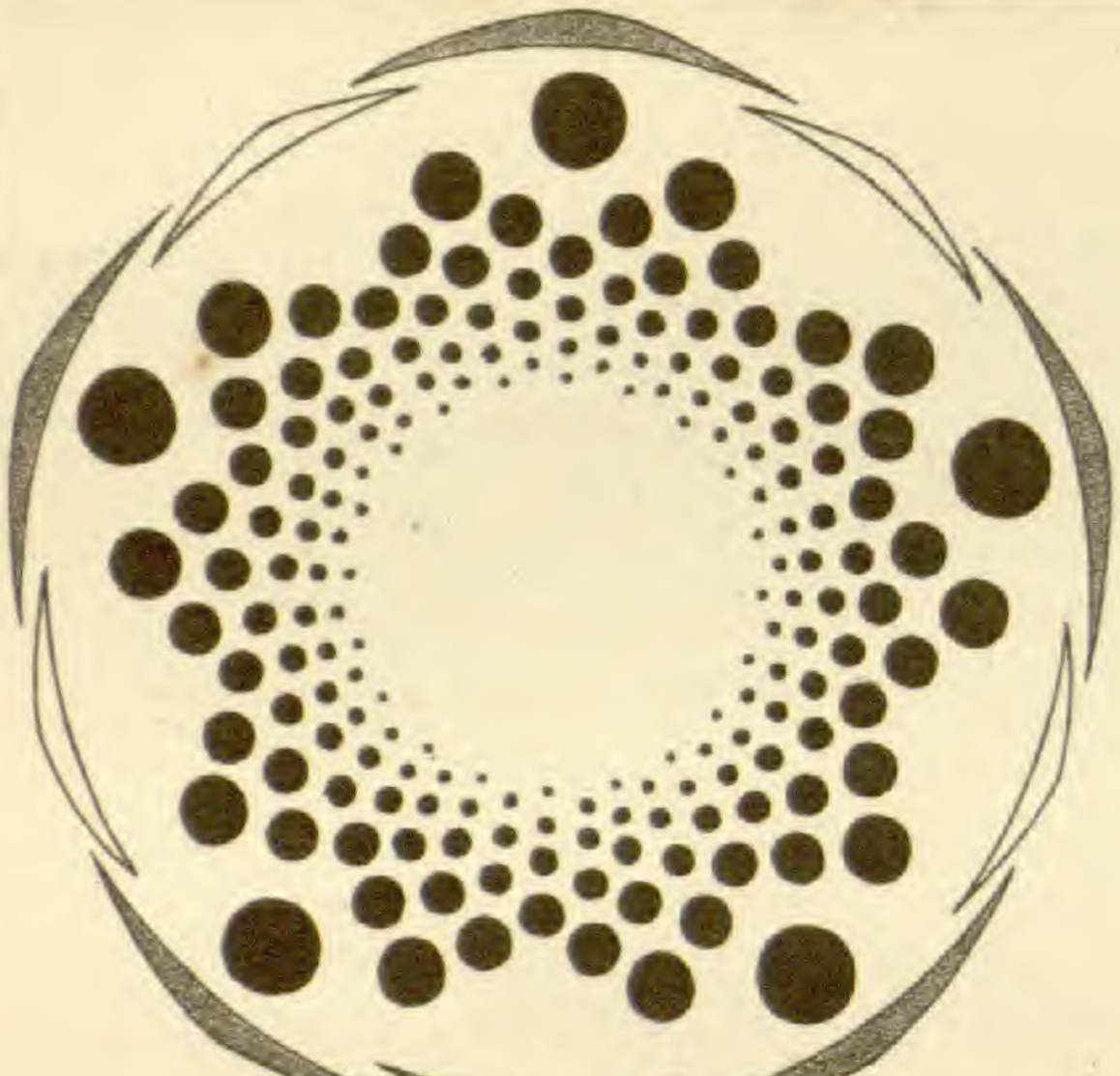
V. polita, March 18 (perhaps earlier).
V. Buxbaumii, Apr. 4, *J. Pole.*
V. hederifolia, Apr. 4 (perhaps earlier), *J. Pole.*
*Salvia verbenaca, nearly out by May 1.
Nepeta Glechoma, Apr. 9, *J. W. Mills.*
Lamium amplexicaule, by Apr. 17.
L. purpureum, Apr. 6 (much earlier), *J. Pole.*
L. album, Apr. 13, *W. W. Dayman.*
L. Galeobdolon, Apr. 25, *Mrs. Blake.*
Ajuga reptans, Apr. 29, *J. W. Whitaker.*
Primula vulgaris. A few flowers were out before Christmas; it was not out regularly till the beginning of April.
P. veris, Apr. 7, *W. H. Lipscombe.*
Plantago lanceolata, Apr. 24, *R. B. Mainwaring.*
P. media, in bud by May 1, *J. Pole.*
Chenopodium Bonus-Henricus, Apr. 27.
Rumex acetosa, Apr. 24, *A. Marshall.*
*Asarum Europæum, Apr. 11.
*Buxus sempervirens, Apr. 29.
Euphorbia Helioscopia, Apr. 20, *J. Pole.*
E. amygdaloides, Apr. 21, *J. W. V. Taylor.*
Mercurialis perennis, March 27.
Ulmus suberosa, flower-buds Feb. 24; not in flower till Apr. 8. First leaves, Apr. 11; full seed, Apr. 24.
Salix Caprea, catkins appearing Mar. 9, not in flower till the end of the month; leaves, Apr. 13.
Populus nigra, by Apr. 18.
Betula glutinosa, Apr. 17, *R. H. Brown.*
Fagus sylvatica, first leaves, Apr. 18; some trees in full leaf, Apr. 22; flower-bud, Apr. 24, *J. W. V. Taylor.*
Castanea vulgaris, leaf-buds Apr. 21, *J. W. V. Taylor.*
Quercus Robur, flower, Apr. 24; leaf, Apr. 26, *J. Pole.*
Corylus Avellana, male catkins, Feb. 24; female flower by March 10; still in flower, Apr. 3; full leaf, Apr. 27.
Carpinus Betulus, Apr. 17, *R. H. Brown.*
Taxus baccata, Apr. 27, *T. E. Maclean.*
Larix Europæa, Apr. 17, *J. Pole.*
*Paris quadrifolia, Apr. 27.
Orchis Morio, Apr. 29, *A. Marshall.*
O. mascula, Apr. 24, *H. A. Evans.*
Listera ovata, in bud but not flower, May 1.
*Crocus, appearing above ground, Feb. 20; a few in bud, Feb. 24; full flower during March and early part of April.
*Leucojum æstivum, Apr. 16.
*Galanthus nivalis, buds hanging down, Jan. 18; in flower, Feb. 20.
*Convallaria majalis, in bud but not flower, May 1.
Polygonatum multiflorum, in bud but not flower, May 1.
*Narcissus poeticus, Apr. 18.
N. Pseudo-narcissus, appearing above ground, Feb. 20; flower-buds, Apr. 1; over by Apr. 20.
*Tulipa sylvestris, Apr. 27.
*Fritillaria Meleagris, by Apr. 16.
*Ornithogalum umbellatum, in bud but not flower, May 1.
*Scilla bifolia, March 21.
*S. Sibirica, Feb. 27.
*Allium molle, Apr. 25.
Endymion nutans, Apr. 16, *W. E. Bolland.*
*Muscari racemosum, Apr. 16.
Luzula pilosa, seed by Apr. 29, *J. W. Whitaker.*
L. campestris, Apr. 14, *W. E. Bolland.*
Arum maculatum, just above ground, Feb. 20; spathes by Apr. 20; spathes open, Apr. 26.
Carex paludosa, Apr. 23 (nearly out), *R. B. Mainwaring.*

C. riparia, Apr. 23 (nearly out), *J. W. V. Taylor.*
Anthoxanthum odoratum, Apr. 22, *J. Pole.*
Alopecurus pratensis, Apr. 22, *J. Pole.*
Poa annua, Apr. 23, *R. B. Mainwaring.*
P. nemoralis, Apr. 30.
Serrafalcus mollis, Apr. 25, *J. Pole.*
Rye, Apr. 29, *J. W. Parrington.*
Equisetum arvense, fertile frond, Apr. 23, *J. W. V. Taylor;* barren frond, Apr. 29, *R. R. P. Hilton.*
Botrychium Lunaria, Apr. 19, *E. Lloyd.*
Ophioglossum vulgatum, May 2, *A. Marshall.*

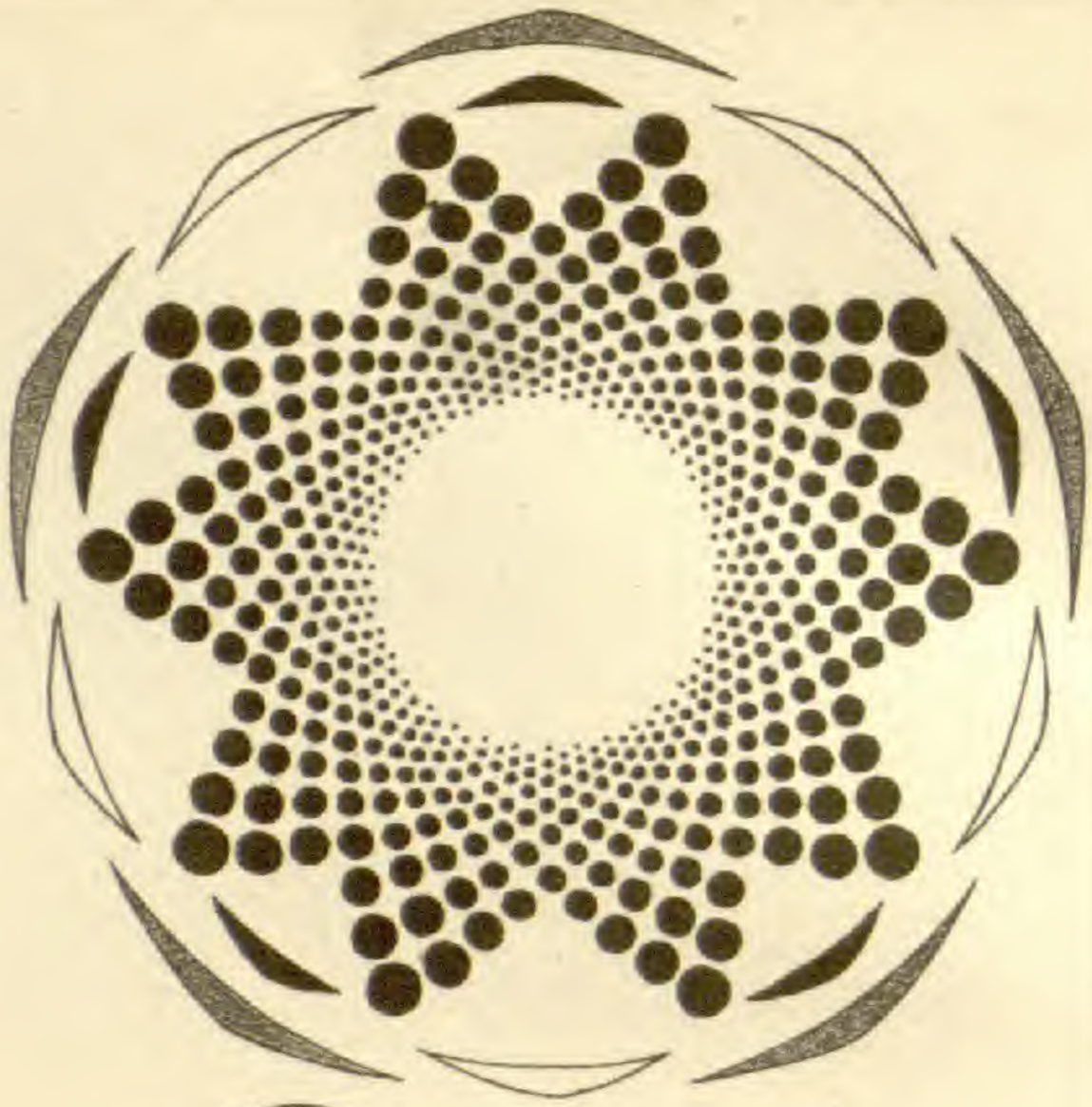
II. *Plants observed during May*, 1865.

*Adonis autumnalis, May 17.
Ranunculus Drouettii, well out by May 25, *E. R. Berkeley.*
R. peltatus, May 13, *H. W. Hockin.*
R. acris, May 8.
R. repens, May 8.
R. arvensis, May 17, *P. S. Robinson.*
R. parviflorus, May 25, a single plant found, may have been earlier.
Papaver Argemone, May 23, *P. S. Robinson.*
P. Rhœas, buds nearly out, May 25, *J. Pole.*
P. dubium, by May 25.
P. Lecoqii, May 25, *G. F. Ruck.*
Sisymbrium officinale, May 4, *H. A. Evans.*
*Armoracia rusticana, by May 11.
Lepidium campestre, flower and seed May 17, *R. R. P. Hilton.*
*Isatis tinctoria, May 18.
Reseda lutea, May 22, *J. W. Whitaker.*
Helianthemum vulgare, May 19, *R. B. Mainwaring and J. Pole.*
Silene inflata, nearly out May 25, *W. W. Melville.*
Lychnis Flos-cuculi, May 23, *J. Pole.*
L. vespertina, May 13, *A. Marshall.*
Sagina procumbens, by May 31, *A. Marshall.*
Arenaria trinervis, May 3, *H. A. Evans.*
A. serpyllifolia, flower and seed June 3, *J. Pole.*
Stellaria graminea, May 23, *P. S. Robinson.*
*Dianthus barbatus, May 31.
Cerastium triviale, May 7, *J. W. V. Taylor.*
Malva sylvestris, May 28, *G. F. Ruck.*
Tilia parvifolia, still in bud, May 31.
*Geranium phæum, May 8.
G. pratense, May 25, *W. W. Melville.*
G. dissectum, May 17, *P. S. Robinson.*
*G. sylvaticum, by May 18.
*G. sanguineum, May 25.
Linum catharticum, May 25, *R. R. P. Hilton.*
Euonymus Europæus, May 16, *J. W. V. Taylor.*
Rhamnus catharticus, May 28, *R. R. P. Hilton.*
Genista Anglica, May 22, *J. Pole* (out some days).
Sarothamnus scoparius, by May 17, *R. R. P. Hilton.*
Trifolium repens, May 13, *E. Eyre and A. Marshall.*
T. minus, by May 25, *H. W. Hockin.*
T. incarnatum, May 8, *R. R. P. Hilton.*
Lotus corniculatus, May 10, *A. Marshall.*
Anthyllis vulneraria, by May 23, *J. Bourdillon*, at Stonehenge; by June 3, at Marlborough, *T. E. Maclean.*
Vicia hirsuta, flower and seed June 3, *J. W. Whitaker and E. W. Estcourt.*

Lathyrus pratensis, May 31, *W. W. Dayman.*
Hippocrepis comosa, May 13, *T. E. Maclean.*
Onobrychis sativa, May 19, *A. Marshall.*
*Acacia, in bud May 26, *J. Pole;* full flower, June 3, *A. Marshall.*
*Laburnum, May 5, *W. W. Dayman.*
Sanguisorba officinalis, May 13, *R. R. P. Hilton.*
Alchemilla vulgaris, May 3, *A. Marshall.*
Potentilla anserina, May 12.
P. reptans, May 24, *R. R. P. Hilton.*
Rubus Idæus, May 25, *R. R. P. Hilton.*
R. cæsius, May 21, *R. R. P. Hilton.*
Rosa canina, May 22, *A. Marshall.*
R. arvensis, May 24, *R. R. P. Hilton.*
Cratægus Oxyacantha, May 7, *C. M. Bevan.*
*Pyrus aucuparia, May 6.
Bryonia dioica, May 26, at a place 16 miles off, *Rev. E. H. Fisher;* not till June near Marlborough.
*Syringa, May 30.
Sanicula Europæa, May 3, *J. Pole.*
*Ægopodium Podagraria, by May 24.
Bunium flexuosum, May 12, *J. H. Lambert.*
*Bupleurum falcatum, nearly out May 1.
Æthusa Cynapium, May 19, *R. R. P. Hilton.*
*Meum Athamanticum, nearly out May 1.
Heracleum Sphondylium, May 3, *R. R. P. Hilton.*
Chærophyllum temulum, May 26.
Sambucus nigra, May 8, *J. W. F. Taylor.*
Viburnum Opulus, barren flowers May 25, *G. F. Ruck;* fertile flowers May 28, *M. O. Alison.*
*Lonicera Caprifolium, May 11, *C. M. Bevan.*
Asperula odorata, May 3, *P. Thursby.*
Galium Aparine, May 3, *T. E. Maclean.*
G. saxatile, May 23, *J. Pole.*
Valeriana dioica, May 10, *W. G. North.*
Anthemis arvensis, May 26.
Achillea Millefolium, May 23, *L. C. Calley.*
Chrysanthemum Leucanthemum, May 12.
Matricaria inodora, May 28, *G. F. Ruck.*
Cineraria campestris, by May 23, at Stonehenge, *H. A. Evans.*
Carduus crispus, May 20, *R. R. P. Hilton.*
C. palustris, May 30, *P. Thursby.*
Hypochæris radicata, May 23, *P. S. Robinson.*
Apargia hispida, May 28, *R. R. P. Hilton.*
Sonchus asper, May 9, *A. Marshall* (a miserable specimen); next flower observed May 28, *G. F. Ruck.*
Crepis virens, May 23, *R. R. P. Hilton.*
Hieracium Pilosella, May 21, *A. Marshall.*
Ilex aquifolium, May 11, *J. W. Parrington.*
Menyanthes trifoliata, well out by May 26, *E. R. Berkeley.*
Convolvulus arvensis, May 28, *G. F. Ruck.*
Cynoglossum officinale, May 13, *H. W. Hockin.*
Borago officinalis, by May 17.
Myosotis versicolor, May 25.
Solanum Dulcamara, May 23, *J. Pole.*
*Atropa Belladonna, May 24.
Linaria Cymbalaria, by May 11.
Melampyrum pratense, May 23, *J. Pole.*
*Antirrhinum, May 31.
Pedicularis sylvatica, May 5, *E. Lloyd.*
Rhinanthus Crista-galli, May 23, *R. C. Davis.*
Veronica Beccabunga, May 13, *W. W. Dayman.*



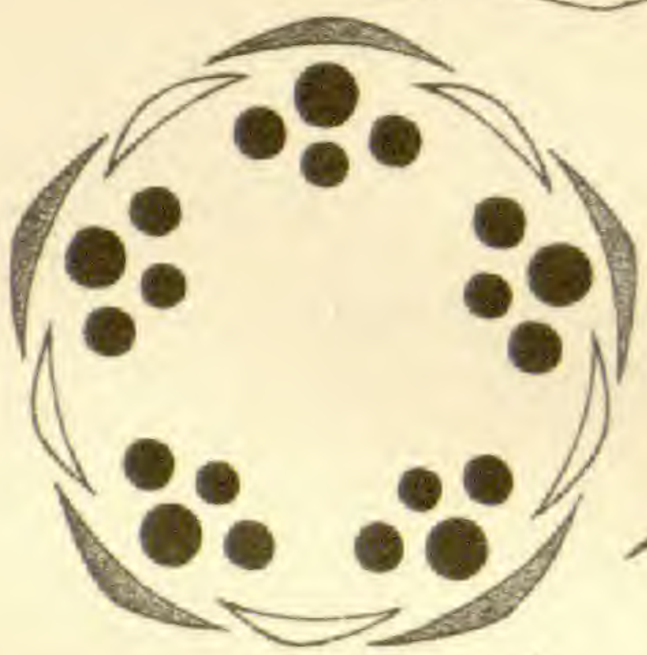
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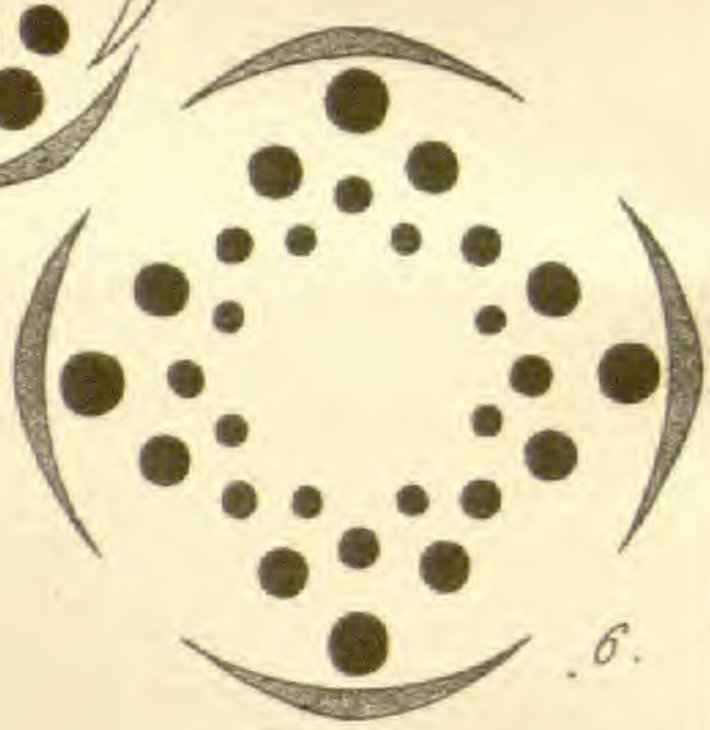
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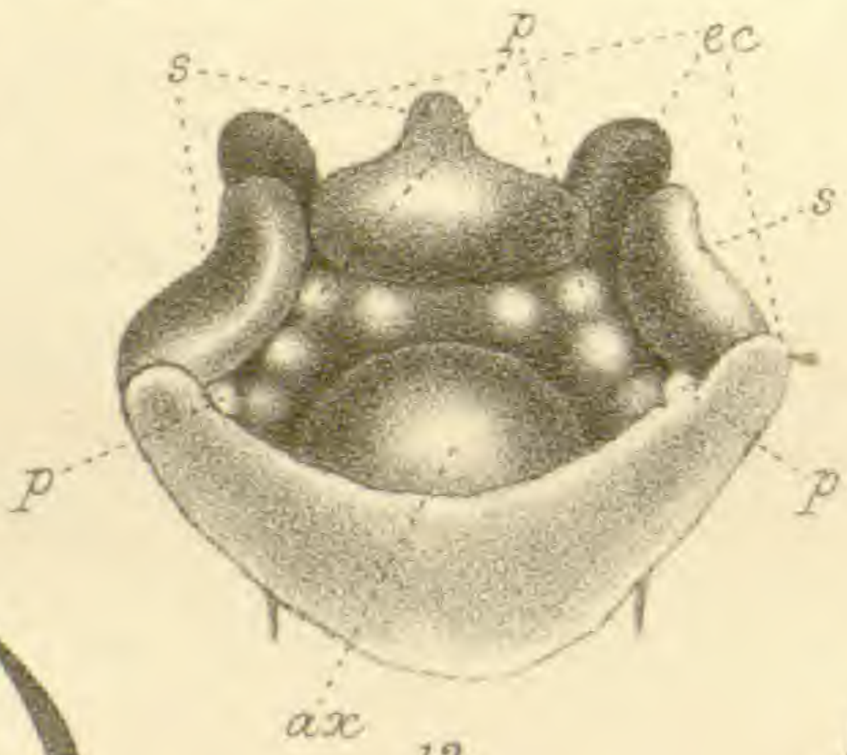
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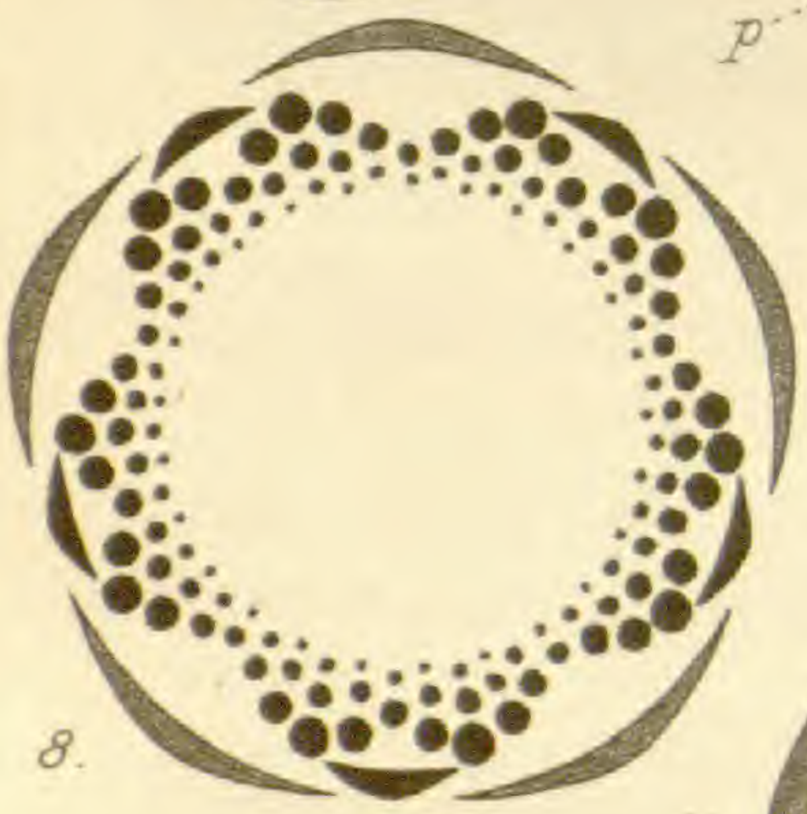
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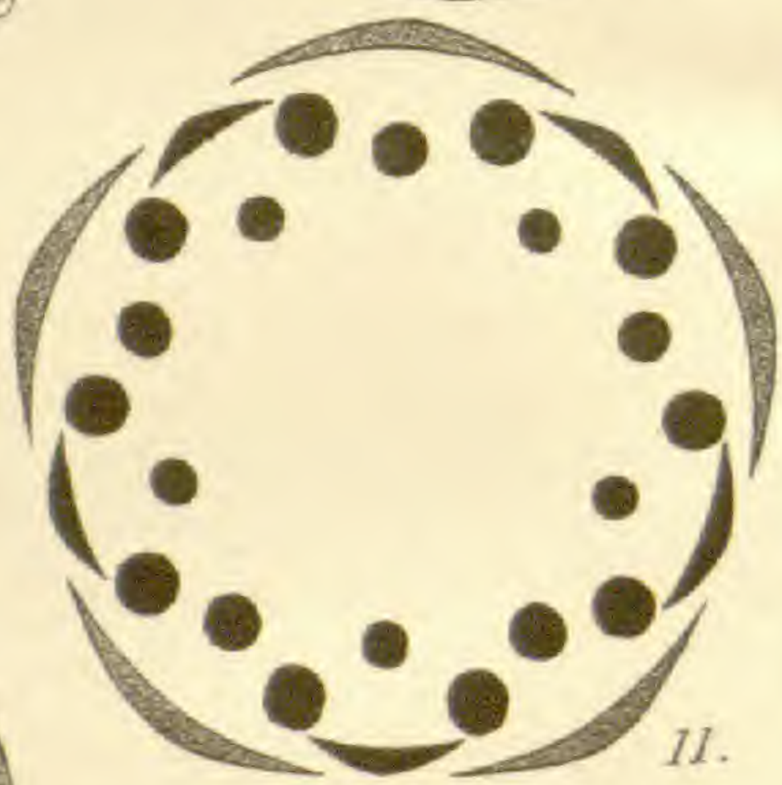
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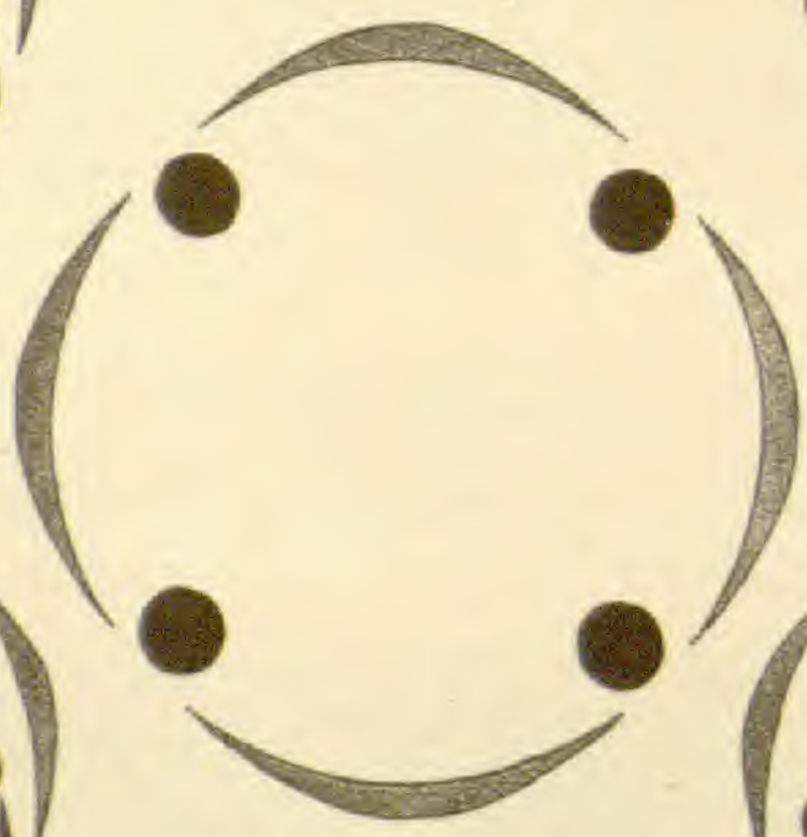
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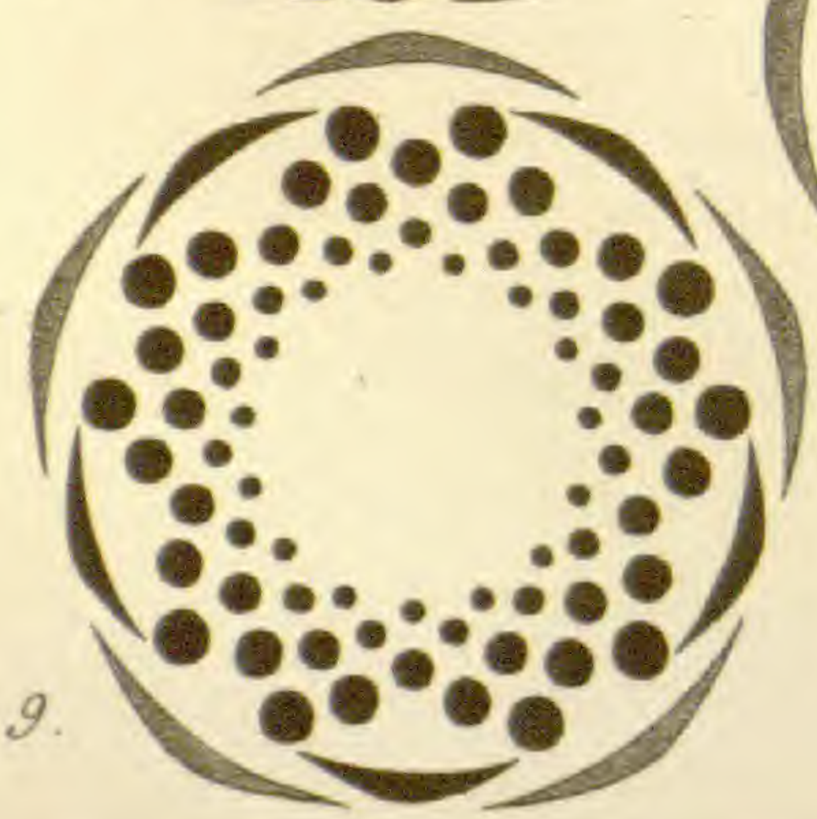
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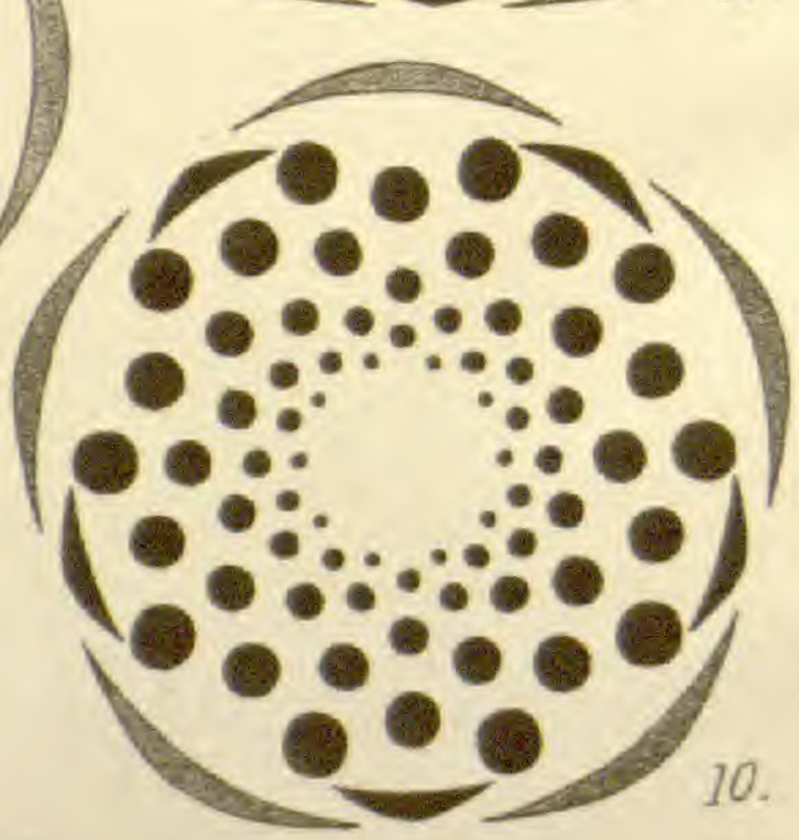
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7.



9.



10.

A. Dickson, M.D. delt.

W.H. Mc Farlane, Lith.r Edin.r

V. arvensis, in seed by May 25, *H. W. Hockin.*
*Salvia Verbenaca, May 14.
Thymus Serpyllum, fully out May 11, *G. T. Spankie* (only in a warm spot; not observed elsewhere before June).
Plantago media, May 23, *J. Pole.*
Rumex Acetosella, by May 25.
Polygonum Bistorta, by May 28, *R. C. Davis.*
Urtica urens, May 13, *W. R. Carles.*
U. dioica, buds as early as May 15, *W. W. Dayman.*
*Juglans regia, by May 4, *A. Marshall.*
*Castanea vulgaris, in bud May 23, *J. Pole.*
Tamus communis, May 28, *P. S. Robinson.*
Orchis ustulata, by May 23, *O. Ilbert.*
O. maculata, May 23, *R. C. Davis.*
O. latifolia, May 25, *W. W. Melville.*
Habenaria chlorantha, buds nearly out May 11, *A. Marshall.*
Listera ovata, May 24, *E. Lloyd.*
Neottia Nidus-avis, May 19, *E. W. Collinson.*
Iris Pseudacorus, May 27, *W. G. North and J. Bourdillon.*
Polygonatum multiflorum, May 13, *W. R. Carles.*
*Ornithogalum umbellatum, May 9.
Allium ursinum, by May 20.
Carex divulsa, by May 20.
C. glauca, May 3, *T. E. Maclean.*
C. sylvatica, by May 31.
Alopecurus agrestis, May 1, *J. W. V. Taylor.*
Milium effusum, May 3, *J. Pole.*
Holcus mollis, by May 25.
Avena pubescens, May 12, *J. W. V. Taylor.*
Arrhenatherum avenaceum, May 29.
Kœleria cristata, May 26.
Melica uniflora, by May 13.
Poa trivialis, by May 25.
P. pratensis, May 7, *R. B. Mainwaring.*
Briza media, May 22, *A. Marshall.*
Dactylis glomerata, May 8, *J. W. V. Taylor.*
Festuca ovina, May 2.
Bromus erectus, May 27, *Mrs. Blake.*
B. sterilis, May 7, *J. W. V. Taylor.*
Serrafalcus racemosus, by May 26.
S. mollis, May 7, *J. W. V. Taylor.*
Lolium perenne, May 8, *R. R. P. Hilton.*
Barley, in ear by May 19, *R. R. P. Hilton.*

ON THE MORPHOLOGICAL CONSTITUTION OF THE ANDRŒCIUM OF *MENTZELIA*, AND ITS ANALOGY WITH THAT OF CERTAIN ROSACEÆ.*

By Alexander Dickson, M.D. Edin.

(Plate XXXIII.)

In his 'Organogénie' Payer has given full details of the floral development in *Mentzelia* and *Bartonia*. He has pointed out the remarkable difference between the development of the andrœcium in these plants, where there is a centripetal evolution of stamens, and that in

* Read before the Botanical Society of Edinburgh, May 11th, 1865.

Cajophora and its allies, where the stamens appear centrifugally on cushions or bosses; stating his conviction that "these two series of genera ought to constitute, if not two distinct Orders, at least two very distinct tribes of the same Order."* In his 'Leçons sur les Fam. Nat. des Plantes,' he has adopted the first of these two alternatives, and broken up the old Order *Loasaceæ* into two Orders, the "*Mentzeliées*" and the "*Loasées*." Summing up the essential characters of the *Mentzeliées*, he expresses himself in the following terms:—"By their *inferior*, *unilocular* ovary, with three *parietal* placentæ; by their *capsular* fruit and *albuminous* seeds; and by their regular quinary flower, the *Mentzeliées* approach the *Loasées*: but are widely separated from them by their stamens, which are disposed in *several* whorls, and not in a single one [of five compound stamens], and the development of which recalls that of the *Rosaceæ*."†

Having been much interested by Payer's description of the development in *Mentzelia* and *Bartonia*, and by the analogy he has pointed out between their andrœcium and that of the *Rosaceæ*, I was induced to examine the development of the flower in *Mentzelia aurea* with considerable attention. I have been able to verify, in every essential, almost all the details given by Payer. My researches, however, although confirmatory of the accuracy of Payer's facts, have led me to adopt a very different interpretation of the morphological constitution of the andrœcium,—my opinion being based, to a great extent, upon observation as to the period at which the carpels appear, a point to which Payer has not adverted.

In the young flower of *Mentzelia aurea*, from about the period when the petals make their appearance, the receptacle becomes concave or cup-shaped; and on the inner surface of this receptacular cup the stamens are developed in the following manner:—In the first place, there appear *five* stamens, alternate with the petals, and near the upper edge of the cup; then, a little lower down, a range of *ten* stamens, so disposed that each of the five primary is accompanied by two secondary stamens, one on either side; later, and still lower down, a third range, consisting of *twenty* stamens arranged so that each of the ten stamens of the second degree is accompanied by two of the third, one on either side; then a fourth range, also of twenty stamens, alternating with

* Payer, 'Organogénie,' p. 390.

† Payer, 'Leçons sur les Fam. Nat. des Plantes,' p. 114.

those of the third degree; and lastly, some five or six still lower ranges, in centripetal succession, each consisting of twenty stamens, or thereabout, which alternate pretty regularly with the members of the range preceding them. It is to be noted, that in such an arrangement of parts, it is in the fourth range that there first appear stamens superposed to the petals, and exactly intermediate between any two stamens of the first degree. This will be sufficiently apparent by reference to the diagram which I have constructed, of the andrœcium of *Mentzelia*, and which represents the arrangement as satisfactorily as the difficulty of projecting, on a plane, points disposed on what approximately is the inner surface of a hollow cylinder, will allow. I have sometimes observed a slightly different arrangement, in which there are *fifteen* instead of twenty stamens in the third range, a single stamen replacing the pair superposed to each petal, so that the first stamens which are exactly intermediate between any two primary stamens are thus in the third instead of the fourth range. I mention this latter arrangement thus particularly, because it is strikingly like that in *Rosa*, to which I shall afterwards refer.*

Almost immediately after the stamens begin to appear, the central portion or bottom of the receptacular cup becomes more markedly and abruptly depressed, forming a narrow funnel-shaped cavity, the rudiment of the inferior ovary, which is distinctly defined at its margin from the outer and upper portion of the receptacle upon which the stamens make their appearance. Around the margin of this central funnel-shaped depression three semilunar elevations are developed. These three processes are the carpels, which afterwards form the style. They are developed at a very early period, the time of their appearance being almost coincident with that of the ovarian cavity itself. I have seen them distinctly present when the stamens of the third degree had just appeared as very faintly marked mammillæ, so that it is almost certain that they are developed before these stamens. Probably they

* Payer gives no figures of *Mentzelia*, but he describes the appearance of the stamens as follows:—'Cinq se montrent d'abord alternes avec les pétales; elles sont bientôt suivies de dix autres placées deux par deux de chaque côté des premières et un peu plus bas, puis de quinze, puis de vingt-cinq, etc., de façon que l'entonnoir floral en est promptement tapissé." As stated above, I have sometimes observed *fifteen* stamens in the third range. I am unable, however, to say whether or not, in this arrangement, there are so many stamens as twenty-five in any of the succeeding ranges; but I should be inclined to doubt that there are so many.

are developed about the time of, or immediately after, the appearance of the stamens of the second degree. Whatever may be the exact moment of the appearance of the carpels, there can be no doubt that they appear long before the staminal evolution is completed.

Payer describes the development of the andrœcium in *Bartonia* as being essentially similar to that in *Mentzelia*, with this exception, that the five primary staminal mammillæ, instead of being developed as stamens, assume a petaloid development,—whence the corolla of *Bartonia* is ordinarily described as consisting of ten petals. The number of stamens, however, is very much greater than in *Mentzelia aurea ;* and it will be seen from the diagram (Fig. 2), which I have constructed in accordance with Payer's figures, that there are no stamens exactly intermediate between the primary ones (the false petals) before the sixth range.

Having thus briefly detailed the principal phenomena connected with the staminal evolution in *Mentzelia* and *Bartonia*, I shall now proceed to consider what conclusions may be legitimately drawn therefrom regarding the nature of the andrœcium in these plants. Payer's opinion, as I have already stated, was that this andrœcium consists of several staminal whorls. His idea was, no doubt, suggested by the definite and regular manner in which the several ranges of stamens succeed each other on the inner surface of the receptacular cup. If, however, the andrœcium really consisted of a number of whorls, we should expect to find the carpels appear *after* the completion of the staminal evolution, and not before it. The fact that by far the greater number of the stamens appear after the carpels are developed, seems to me to constitute a fatal objection to Payer's theory.

If the general disposition of the stamens be attended to, it will be observed that the stamens of the first two or three ranges in *Mentzelia*, and of the first five in *Bartonia*, exhibit a distinct arrangement into groups superposed to the sepals. If, again, it be borne in mind that in almost all polyadelphous plants the carpels appear before the evolution of the stamens is completed, it cannot reasonably be doubted that we have here to do with five confluent compound stamens superposed to the sepals, with a centripetal evolution of lobes analogous to what Payer has described in the compound stamens of the *Myrtaceæ*.

Admitting the correctness of this interpretation of the andrœcium of *Mentzelia* and its allies, the question arises as to the propriety of

separating them, as Payer has done, into a distinct Order from the *Loaseæ*. The researches of Payer have shown that in these latter the andrœcium consists of five compound stamens superposed to the sepals. Thus far, therefore, the analogy between the andrœcia of the two groups would hold good. In the *Loaseæ*, however, the evolution of the staminal lobes is centrifugal as regards the axis, while that in the *Mentzelieæ* is centripetal. This difference is certainly a very striking one, but it may fairly be doubted if it is sufficient to separate into distinct Orders two groups of genera so closely allied in all other respects. The centripetal development of lobes in the compound stamens of the *Myrtaceæ*, to which I have compared that of the *Mentzelieæ*, was considered by Payer analogous to the basifugal evolution of leaf-lobes in ordinary leaves, while the commoner centrifugal development of staminal lobes such as that in *Hypericum*, *Tilia*, etc., he compared to the basipetal evolution of leaf-lobes. In a note, however, to my paper "On Diplostemonous Flowers" in last year's volume of the Society's Transactions, I ventured to question the correctness of the distinction which Payer has sought to draw between the two cases, as follows,—"Payer has somewhat hastily, I think, compared the compound stamens in the *Myrtaceæ* to leaves with lobes developed from base to apex, or basifugally ('Organogénie,' p. 718). His figures, however, distinctly indicate that here, as in the ordinary form of compound stamens, there is a mesial stamen or lobe of the compound stamen, from which, as a point of departure, the evolution of the other stamens extends; and it appears to me improbable that a basifugal succession of lobes should be initiated by the development of a lobe in the middle line at the base of the compound stamen. The phenomenon seems more naturally explained by supposing that the first-developed lobe of the Myrtaceous compound stamen corresponds to the first-developed or terminal lobe in the ordinary form, in which case the evolution in both cases would be basipetal; the only difference between the two being that, while in the *Hypericaceæ*, etc., the lobes are developed on the back or outer face of the rachis of the compound stamen (the staminal cushion), in the *Myrtaceæ* they appear on its front or inner face. In confirmation of this opinion, I may refer to the highly-developed staminal groups in *Melaleuca purpurea*, where, in each phalanx, the stamens evidently proceed from the *inner* face of the flattened and elongated rachis."* If this explanation

* Transact. Bot. Soc. Edin., vol. viii. part 1, p. 100.

of the centrifugal and centripetal modes of evolution in compound stamens be admitted, it will be seen that the difference between the *Loaseæ* and *Mentzelieæ* is not so great as might at first sight be supposed. At all events, it seems to me that systematists should hesitate, in absence of other diagnostic characters of any value, to break up the old Order *Loasaceæ*.

Having stated my reasons for holding the andrœcium of the *Mentzelieæ* to consist of five confluent compound stamens, I shall now consiuer some of the arrangements in the *Rosaceæ*, in which family Payer has pointed out an analogy in staminal evolution with that of the *Mentzelieæ*. I am induced to do so more particularly, because the explanation I have given of the andrœcium of *Mentzelia* and *Bartonia* seems to throw considerable light upon the morphology of that of the *Rosaceæ*. I have constructed diagrams, in accordance with Payer's figures, of the principal forms of staminal arrangement met with in this family, to which I shall refer in the following remarks. I have myself carefully examined the development of the andrœcium of *Rubus Idæus* and *Rosa spinosissima*; and to a certain extent observed that of *Comarum* and *Geum*.

In *Rubus*, soon after the appearance of the petals, the hemispherical termination of the receptacle comes to be surrounded by a flattish cushion. The external outline of the cushion is that of a pentagon with gently concave sides; and the petals form the angles. An examination of the earliest development of this cushion, gives one the impression of its being produced by an extension and fusion of the bases of the petals. On the surface of the cushion, the stamens are developed in the following manner:—First, *ten* stamens appear, one on either side of each petal, and closely approximated to it. From these points the evolution of the other numerous stamens extends centripetally. This development of stamens is accurately described by Payer as "une éruption de petits mamelons, qui commençant près les pétales, s'en éloignerait peu à peu."* In *Rubus tomentosus*, the species which Payer has figured, the series of stamens approaching each other from any two adjacent petals do not coalesce until the stamens of the fourth degree, as I have represented in the diagram (Fig. 8). In *R. Idæus* I find that this coalescence usually takes place in the stamens of the third degree. I am satisfied that, in this plant, the carpels

* 'Organogénie,' p. 504.

begin to appear considerably before the staminal evolution is completed; but, from the minute size of the staminal mammillæ here, it is difficult to determine the period very precisely.

In *Geum*, Payer describes the stamens as "very numerous and disposed in whorls which alternate with each other, and appear successively from above downwards, on the inner surface of the receptacular cup, which is pretty deep. Each whorl is composed of ten stamens. In the whorl which appears first, and which in consequence has the highest place on the inner surface of the receptacular cup, the ten stamens are grouped in pairs in such a manner that there is one to right and left of each petal."* (Fig. 10.)

In *Rosa*, Payer describes the andrœcium as identical in its development with that in *Geum*, consisting of numerous alternating whorls of stamens appearing centripetally, each composed of ten stamens.† This statement, however, seems scarcely to agree with his figure of *Rosa alpina* ('Organogénie,' pl. 100, fig. 26), where the stamens of the second degree are superposed in pairs to the petals and singly to the sepals, making, in all, fifteen stamens in that range; and where there is apparently, moreover, a similar number of stamens in each of the succeeding ranges. I have no doubt that Payer's figure is quite correct, as the same arrangement of the stamens of the second degree appears to be constant in *Rosa spinosissima*. The diagram (Fig. 9) which I have given, may therefore be relied upon as an accurate representation of the staminal arrangement in *Rosa*.

In *Fragaria*, *Spiræa*, and *Cotoneaster*, Payer has shown that there is a first range of *ten* stamens, disposed, as in *Geum* and *Rosa*, so that there is one on either side of each of the five petals; then a second range of *five* stamens superposed to the sepals; and lastly, a third range also of *five* stamens superposed to the petals (Fig. 11).

The andrœcium in *Geum* and *Rosa* is that which most closely resembles, in its development, that in the *Mentzelieæ*. In looking at the young flowers when the andrœcium first appears, it is striking to observe the great analogy which exists between the primary stamen in *Mentzelia* accompanied by two secondary ones, and the petal in *Geum* or *Rosa* accompanied by two stamens of the first range. In *Bartonia* the resemblance is still further heightened by the primary stamens being actually developed as petals. If we recall what I have mentioned

* 'Organogénie,' pp. 501–2. † Ibid. pp. 502–3.

as an occasional arrangement in *Mentzelia*, where there are *five* stamens of the first degree, *ten* of the second, and *fifteen* of the third, ten of these last being superposed in pairs to the primary stamens, and five alternate with them, the arrangement cannot fail to strike one as being extremely similar to that in *Rosa*, where there are, first the *five* petals, then *ten* stamens, and then *fifteen*, these last having exactly the same relation to the *petals* as the fifteen stamens of the third degree in *Mentzelia* have to the *primary stamens*. This analogy is so very close that it seems impossible to doubt that whatever explanation holds good as to the one case must necessarily do so as to the other. If, therefore, my interpretation of the andrœcium in the *Mentzelieæ* be correct, it will follow that in *Rosa* and *Geum* the andrœcium consists of staminal groups, of which the petals, ordinarily so called, are the apices, just as the false petals in *Bartonia* are the apices of its staminal groups. In *Rubus* the evidence of staminal groups of which the petals are the apices is still more apparent, where the staminal evolution *manifestly* extends itself from five centres or points of departure, the centres being the so-called petals. As to *Fragaria*, *Spiræa*, and the like, their staminal arrangement only differs from that in *Geum* or *Rosa* in the number of stamens developed after the first range of ten.

It will be seen from the foregoing, that, if my reasoning be admitted, all the Rosaceous forms above described must be considered as, strictly speaking, apetalous; the andrœcium consisting of five confluent compound stamens with petaloid apices, alternate with the sepals. The genus *Alchemilla*, it appears to me, stands in a most interesting relation to these forms. Here the flower is also apetalous, but, instead of a whorl of *compound* there is one of *simple* stamens alternate with the sepals. In *Alchemilla*, we have, I believe, so far from an aberrant form of staminal arrangement, as is generally supposed, in reality a type—complete, though of elementary simplicity—of the andrœcium of a great portion of the family.

A second series of Rosaceous andrœcia is to be found in the genera *Aremonia*, *Agrimonia*, *Sanguisorba*, and *Poterium*. The development of the flower in these forms, as detailed by Payer, shows that they are characterized by having a single whorl of stamens *superposed to the sepals*. In *Aremonia* and *Agrimonia* there is a true corolla of petals alternate with the sepals, which in *Sanguisorba* and *Poterium* disappears. In *Aremonia* and *Sanguisorba* the stamens are simple, while

in *Agrimonia* and *Poterium* they are compound. It is unnecessary to enter more fully into the description of these arrangements, as the diagrams I have constructed will render them perfectly intelligible.*

In accordance with the foregoing remarks, the staminal arrangements in those *Rosaceæ* of which the development is known, may be classified under two principal types, as follows :—

I. *Alchemilla-type.*—Single whorl of stamens *alternate* with the sepals. No true corolla.
  (*a*) Stamens simple: *e.g. Alchemilla* (Fig. 7).
  (*b*) Stamens compound, confluent, with petaloid apices: *e.g. Rubus* (Fig. 8); *Rosa* (Fig. 9); *Geum* (Fig. 10); *Fragaria*, *Spiræa*, etc. (Fig. 11).

II. *Aremonia-type.*—Single whorl of stamens *superposed* to the sepals. With or without a true corolla.
  (1) With a true corolla.
    (*a*) Stamens simple: *e.g. Aremonia* (Fig. 3).
    (*b*) Stamens compound: *e.g. Agrimonia* (Fig. 4).
  (2) Corolla absent.
    (*c*) Stamens simple: *e.g. Sanguisorba* (Fig. 5).
    (*d*) Stamens compound, confluent: *e.g. Poterium* (Fig. 6).

It will be seen from the above that, if I am correct in my conclusions, *Alchemilla* bears to *Rubus*, *Geum*, or *Fragaria*, in staminal arrangement, the same relation as *Aremonia* does to *Agrimonia*, or *Sanguisorba* to *Poterium*. This tends strongly to confirm Payer's opinion, in which he followed the older botanists, that *Alchemilla* has really closer affinities with the *Potentillidæ* than with the *Sanguisorbeæ*, with which it has been more recently associated.

Perhaps a *third*, and possibly diplostemonous, type of Rosaceous andrœcium is to be found in those genera (*Sibbaldia*, etc.) included in the tribe *Chamærhodeæ*, but these require careful organogenic investigation.

* The analogy of *Sanguisorba* and *Poterium*, with *Aremonia* and *Agrimonia*, indicated by this association, does not, perhaps, rest upon a very secure foundation. I have followed Payer, who remarks that "les Pimprenelles doivent être regardées comme les Aigremoines tétramères dont les pétales ont avorté." It is, however, with considerable hesitation that I have done so; because, if in *Sanguisorba* the sepals and stamens are developed in four pairs, in regular decussate succession, as Payer's researches seem to indicate, it is difficult to justify the assumption of an abortion of petals alternate with the sepals. Our knowledge, however, of the analogy between the arrangement of floral parts and that of ordinary leaves upon the stem, is as yet too imperfect to allow of any definite conclusion upon the subject.

EXPLANATION OF PLATE XXIII.

In the diagrams the sepals are shaded: the true petals in outline. The stamens are represented by black spots, of which the larger indicate the older, the smaller the younger ones. The false petals, or petaloid staminodes, are indicated in black, like the stamens. The epicalyx, which is proper to some of the Rosaceous forms represented, is omitted, partly to make the diagrams of more general application, and partly to avoid unnecessary and perhaps confusing detail.

Fig. 1. Arrangement in *Mentzelia* (*Loasaceæ*). Calyx. Corolla. Stamens compound, confluent, superposed to the sepals.

Fig. 2. Arrangement in *Bartonia* (*Loasaceæ*). Essentially the same as in *Mentzelia:* only, the apices of the staminal groups or compound stamens are developed as petaloid staminodes.

Fig. 3. Arrangement in *Aremonia* (*Rosaceæ*). Calyx. Corolla. Single whorl of simple stamens superposed to the sepals.

Fig. 4. Arrangement in *Agrimonia* (*Aremonia-type*). The same as in *Aremonia;* only, the stamens are compound.

Fig. 5. Arrangement in *Sanguisorba* (*Aremonia-type*). Corolla absent. Of the four sepals, the antero-posterior pair are the older, the lateral the younger. Similarly the antero-posterior pair of stamens are the older, the lateral the younger.

Fig. 6. Arrangement in *Poterium* (*Aremonia-type*). Corolla absent. Sepals 4. Stamens 4, superposed to the sepals, compound, and confluent.

Fig. 7. Arrangement in *Alchemilla* (*Rosaceæ*). Apetalous. Sepals 4. Stamens 4, simple and alternate with the sepals.

Fig. 8. *Rubus* (*Alchemilla-type*).

Fig. 9. *Rosa* (*Alchemilla-type*).

Fig. 10. *Geum* (*Alchemilla-type*).

Fig. 11. *Fragaria, Spiræa, Cotoneaster*, etc. (*Alchemilla-type*). In this and the three preceding forms the symmetry is quinary. The stamens, as in *Alchemilla*, alternate with the sepals; but instead of being simple, they are compound and confluent, with petaloid apices. No true petals. As the diagrams indicate, the staminal lobes vary in number in these forms; but in all the ten oldest stamens are disposed so that there is one on either side of each petaloid staminode.

Fig. 12. Section of young flower of *Comarum palustre: ec*, epicalyx; *s*, sepals; *p*, the so-called petals (petaloid staminodes); *st*, stamens of the first range, of which two accompany each "petal;" the other stamens have not yet appeared; *ax*, convex extremity of the floral axis upon which the carpels afterwards appear. Ultimately, the staminal arrangement is the same as in *Fragaria* (Fig. 11).

MONIMIACEÆ NOVÆ.

AUCTORE ALPH. DE CANDOLLE.

SIPARUNA, *Aubl. anno* 1775; *Juss. Gen.* Citrosma, *Ruiz et Pav. Prodr. anno* 1794.

1. *S. fulva;* dense rufo-tomentosa, foliis ellipticis acutis basi obtusis vel subacutis eroso-denticulatis, cymis fœmineis petiolo subæqualibus, fructu pyriformi-globoso limbo patente obtuse 5–6-lobo coronato.—In Peruvia orient. (Spruce, n. 4361).

2. *S. Panamensis;* ramis ex fasciculis pilorum minimis sparsim punctatis, foliis ellipticis vel obovato-ellipticis acuminatis basi acutis margine undulato-subcrenatis supra pilis raris plerumque solitariis subtus petioloque, fasciculis pilorum minimis conspersis, cymis petiolo duplo longioribus cinereo-pubescentibus.—Circa Panama (Hayes, n. 671).

3. *S. hispida;* hispidissima, novellis fulvo-sericeis, foliis obovatis vel obovato-ellipticis acutis crenulato-dentatis, cymis fœmineis petiolo brevioribus, perigonii obovoidei extus dense tomentosi lobis 5 ovatis brevibus, fructu pyriformi hispido.—In Peruvia orient. (Spruce, n. 4243), ex Bolivia sept. (Wedd. in h. Mus. Par.).

4. *S. auriculata;* pilis plerumque solitariis fulvis vel cinereis hispido-tomentosa, foliis obovatis breviter acutis remote denticulatis prope basin abrupte angustatis et ipsa basi lobis duobus latis acutis auriculatis supra pilosis subtus tomentosis, fructu obovoideo-sphærico fulvo-hispido.—In Peruvia orient. (Spruce, n. 4369).

5. *S. Trianæi;* ramis fasciculis brevissimis pilorum conspersis, foliis ellipticis vel obovato-ellipticis pilis fasciculatis brevibus sparsis supra evanescentibus obscure crenato-dentatis, cymis fœmineis petiolo subæqualibus fulvo-pubescentibus, perigonii limbo brevissimo crenato-lobato patente.—In Nova Granata (Triana).

6. *S. Sprucei;* glabriuscula, foliis ovalibus oblongisve longe acuminatis basi sæpius acutis integris tenuibus, cymis petiolo brevi longioribus, floribus masc. perigonio patente lobis 4 rotundis velo nullo, fœm. paucis lobis 4 ovato-lanceolatis subpatentibus.—Prope Panure ad Rio Uaupès (Spruce, n. 2777).

7. *S. micrantha;* ramis petiolisque fasciculis pilorum brevibus hispidulis, foliis oblongis plerumque acutis basi obtusis integris supra

glabris subtus in nervis fasciculis pilorum pilosulis, cymis petiolo brevi longioribus, floribus monoicis minimis, perigonii lobis obsoletis.—Ad Rio Negro prope San Carlos (Spruce, n. 3765).

MOLLINEDIA, *Ruiz et Pav.*

1. *M. sericiflora;* foliis lanceolatis acuminatis basi cuneatis supra basin remote serratis margine paulo revolutis subtus in nervis petioloque pubescentibus, perigonio clavato adpresse sericeo, lobis exterioribus ovatis obtusissimis interioribus in appendicem retroflexam fimbriato-dentatam retroflexis.—In provincia Rio de Janeiro (Freive Allemao).

2. *M. Boliviensis;* foliis ovato-acuminatis basi acutis coriaceis glabris a medio serratis, cymis masc. petiolo vix longioribus sparsim adpresse pilosis, floribus obovoideis, lobis externis late ovatis internis sublongioribus introflexis ellipticis crenatis.—In valle Tipuani (Wedd.).

3. *M. Widgrenii;* ramis fulvo-tomentosis, foliis oblongo-obovatis utrinque subacutis a medio serratis supra glabris subtus fulvo-tomentosis, cymis fœm. monocarpis petiolo multoties longioribus, basi perigonii persistente sericea.—In Brasiliæ prov. Minas Geraes (Widgren, n. 367, in h. cl. Mart.).

GLADIOLUS ILLYRICUS IN DEVONSHIRE.

I have just received from Mrs. Gulson, of Eastcliff, fresh specimens of *Gladiolus Illyricus*, collected at Bitton Wood, near Teignmouth, Devon, where the plant occurs sparingly. I must endorse Messrs. Dyer and Trimen's remark, that the colour of the flowers is somewhat paler than represented in the 'Journal of Botany' plate.

W. G. SMITH.

CORRESPONDENCE.

Arum Canariense, *Webb, in Madeira.*

Lea Rectory, June 8, 1865.

In reply to Dr. Bolle's inquiry about this plant (p. 154, *supra*) I am able to assure him that Madeira is apparently its proper focal habitat: and that whereas in the Canaries it is so rare or local as to have escaped my observation altogether, it is as common and universal a plant everywhere in Madeira, from

500 to 2000 feet above the sea, as *A. maculatum*, L., is in England; occurring in precisely similar situations, viz. moist shady banks, under walls and hedges by roadsides, and in damp sheltered places all over the island, flowering from March to May. It is, therefore, doubtless the plant intended by Professor O. Heer, under the name of *A. Italicum.* Indeed, till I met with Webb's description (in January, 1857) of his *A. Canariense*, (Phytogr. iii. 293, 294) I had been content to refer the Madeiran plant to *A. Italicum*, Mill., as a form, or at most a mere variety,—an opinion which is indeed somewhat more disturbed, but not entirely removed, by the high authority of Dr. Schott. The plant is called in Madeira *Bigaloa* or *Bigalhoa*, and arrowroot is occasionally prepared from its corms. It is justly accounted a troublesome and noxious weed, and very difficult of extirpation.

I am, etc.,
R. T. Lowe.

Erucastrum Pollichii.

Fairy Croft, Saffron Walden, June 19, 1865.

In the Proceedings of the Royal Horticultural Society, I stated, "On a large heap there grew a FEW plants of *Erucastrum*," etc. In transferring this statement to your pages, I am made to say I found "*a fine plant;*" this is a mistake. There was a quantity of the plant. It appears again this season abundantly; it likewise has made its appearance among a large crop of common Charlock in part of an old pasture broken up this spring, which has certainly been undisturbed for fifty years, and probably for a much longer period. If you wish for any specimens for yourself or friends, I shall be most happy to supply them.

I am, etc.,
Joshua Clarke.

MEMORANDA.

Calluna Vulgaris in Newfoundland.—Mr. Murray, late of the Geological Survey of Canada, and now engaged in a survey of Newfoundland, has brought to Montreal specimens of this plant, which were collected by Judge Robinson on the east coast of Newfoundland, near Ferryland (lat. 47°, long. 52° 50′), and which are stated to be from a small patch of the plant not more than three yards square. The locality is in the same part of the island to which the specimens collected by a Mr. Cormack (or M'Cormack), and formerly in the collection of the Linnean Society, are referred (Journ. Bot., Vol. II. p. 55), namely, the south-east peninsula; and two additional localities in this peninsula are noticed in Cormack's label, namely, the head of St. Mary's Bay and Trepassy Bay or Harbour. It is supposed that the Cormack who collected these specimens is the well-known explorer of the interior of Newfoundland;

but we do not find any notice of the plant in his published narrative, although it contains many botanical notes. De la Pylaie was no doubt the first to collect the plant in Newfoundland, since, though it is not in his herbarium, Prof. Brunet informs us that it is mentioned in his MS. notes. We now have certain knowledge of localities of heather in Massachusetts, in Cape Breton (see *ante*, page 29), and in Newfoundland; to which may be added Giesecke's testimony that it occurs in Greenland. ('Canadian Naturalist,' 1864, p. 459.)

[There are a good number of Giesecke's Greenland plants at the British Museum, but *Calluna vulgaris*, mentioned in his list, is unfortunately not among them.—Ed. Journ. of Bot.]

NEW PUBLICATIONS.

Handbook of British Waterweeds or Algæ. By Dr. John Edward Gray, F.R.S., etc. The Diatomaceæ by W. Carruthers, F.L.S., etc. London: Hardwicke. 1864.

It is nearly half a century since S. F. Gray published his 'Natural Arrangements of British Plants,' and to this important work—the first to apply the natural system to our British Flora—Dr. Gray largely contributed. Since then, his life has been devoted to zoology, and the number and value of the papers which, during this long period, have been published by him, are unexampled, we believe, by any other zoologist. He has again returned, to some extent, to his first love, and induced by the very extensive herbarium of British Algæ which Mrs. Gray possesses, he has lately, during the spare hours of an active life, prepared a valuable little manual of this class of plants. It must have been evident to our readers, that he has been engaged in such work, from the papers he has occasionally published in this Journal, on new Algæ. The little volume will form a useful manual for the shore. The genera, amounting to 295, are carefully described, as are also the species in all the larger Algæ, but lists only are given of the minute and microscopic forms. In all cases, however, the species are arranged according to their affinities, and each genus is divided into two or more sections, in proportion to the number of species it contains. This is an important feature in the volume, and one that will make even the lists of specific names it contains convenient in field diagnosis. It is to be regretted that the authorities are omitted in a large proportion of the volume. This makes it

difficult to trace the origin of the changes which Dr. Gray introduces, and to determine those of which he is himself the author. An index would have enhanced the usefulness of the work. The catalogue of the Diatomaceæ, by Mr. Carruthers, has been carefully prepared, and the need of such a list is evident, from the fact that this contains nearly double the species given in any former publication.

Catalogue of British Plants, including the Flowering Plants, Ferns, and Characeæ; to which is appended a List of the varieties of British Ferns. Fourth Edition. Printed for the Botanical Society of Edinburgh. Edinburgh: Adam and C. Black. London: Longman.

As the last published work which professes to give an enumeration of the British plants, with the exception of the lower Cryptogams, does not take notice of most of the additions recently made to the British flora, as the new edition of Babington's 'Manual' has not yet appeared, and as Syme's great work is not yet completed,—this Catalogue, executed as it is with care, and brought down to the latest date, is the most perfect list we have of our flora. It contains 568 genera, 1817 species, and 369 varieties, and is a real boon to all working British botanists. Its value will best be appreciated by comparing it with the fifth edition of Babington's 'Manual.' The following twenty species, most of which were first made known in this Journal, are not in Babington's 'Manual,' viz.:—

Ranunculus pseudofluitans.
Erucastrum *inodorum*.
Hutchinsia alpina.
Viola arenaria.
Sagina nivalis.
Claytonia perfoliata.
Hypericum undulatum.
Ulex Gallii.
Trifolium hybridum.
Rosa Bakeri.
Rosa collina.
Pyrus rupicola.
Ammi majus.
Hedera Canariensis.
Galinsoga parviflora.
Plantago Cynops.
Neotinea intacta.
Potamogeton nitens.
Desmazeria Sicula.
Chara alopecuroides.

The following varieties are not in Babington's 'Manual,' viz.:—

Nymphæa alba, *floribus parvis*.
Erodium cicutarium.
α. pimpinellifolium.
β. triviale.
γ. pilosum.
Potentilla reptans, β. sericea.
Asplenium Adiantum-nigrum, γ. obtusum.
Ophioglossum vulgatum, β. ambiguum.

Names of species apparently changed since the publication of Babington's 'Manual:'—

Delphinium Ajacis	=	D. consolida, *Bab.*
Lepigonum rupicola	=	L. rupestre, *Bab.*
——— salinum	=	L. neglectum, *Bab.*
Stellaria media, *β.* pallida	=	S. Boreana, *Bab.*
Potentilla maculata	=	P. alpestris, *Bab.*
Arctium nemorosum	=	A. intermedium, *Bab.*
——— intermedium	=	A. pubens, *Bab.*
Eriophorum polystachyum	=	E. angustifolium.

Why are the following species, found in Babington, omitted?

Polygala vulgaris, *var.* oxyptera.
Sagina debilis.
Arctium tomentosum.
Euphorbia Cyparissias.
[Narcissus minor.]

We should also be glad to learn what the editors have to say to the following queries:—Why is *Armoracia amphibia* put in [ ]? Why is not the oldest name applied to *Erucastrum inodorum?* Why is such a fictitious Natural Order as that of *Orontiaceæ* kept up, after an authority like Schott, who worked all his life with these plants, declared it to be a mere tribe of the monoclinous *Aroideæ?* Why do we read *Marsileaceæ* instead of Marsiliaceæ (as the leading botanists spell it), when the man's name was Marsili, and not Marsile? And why in Kuetzing's name is the *e* left out?

The Island of Cyprus (Die Insel Cypern, ihrer physischen und organischen Natur nach, mit Rücksicht auf ihre frühere Geschichte). By Dr. F. Unger and Dr. Th. Kotschy. Vienna: Braunmüller. 1865. 8vo, pp. 598. With maps and illustrations.

The joint authors of this work have repeatedly placed before the public the result of their various explorations in the East. In the present work we have their combined labours on the island of Cyprus, its history and physical geography,—valuable to systematic botanists on account of its containing the most complete list of Cyprus plants ever published, with a description of several new species, though the list could be much augmented by the materials existing in our herbaria. There are altogether more than 1000 Phanerogamic plants; among them, 117 *Compositæ*, 103 *Papilionaceæ*, 96 *Gramineæ*, 53 *Labiatæ*, 51

Umbelliferæ, 49 *Cruciferæ*, 44 *Caryophylleæ*, 39 *Liliaceæ*, 29 *Borragineæ*, 23 *Ranunculaceæ*, 20 *Scrophulariaceæ*, and 20 *Orchideæ*. The forests of the island consist chiefly of two Pines (*Pinus maritima*, Lamb., and *P. Laricio* = *Poiretiana*, Endl.).

Economic botanists will read with interest the three chapters on Labdanum, Storax, and Mastich; that relating to Labdanum, a gum-resin exuded by *Cistus Creticus*, Linn., and collecting on the beard of goats, is perhaps the most complete; whilst that relating to Storax is rather unsatisfactory, as two of the most important articles on this subject have escaped the notice of our authors. We mean that published a few years ago by Mr. Daniel Hanbury ('Pharmaceutical Journal' and 'Bonplandia'), in which that author, with his usual painstaking accuracy and indefatigable research, almost exhausts the subject. The other one is that published years ago by Sir J. E. Smith in the Linnean Society's Transactions, and in which the curious fact is pointed out, that the Liquidambar of which a few trees are *cultivated* in Cyprus is *not L. orientale*, but the American species!

The type and paper of the work are very good; but, though printed by the Vienna University Press, we regret to add that, like most of the publications issuing from that office, the work is much disfigured by misprints. The following list may serve as a specimen, and might be augmented to a considerable extent:—Page 244, solsticialis, *for* solstitialis; p. 246, Sylibum, *for* Silybum; p. 248, Raponticum, *for* Rhaponticum; p. 220, Poekok, *for* Pocock; p. 275, Molucelta, *for* Molucella; p. 281, alkana, *for* alkanna; p. 286, altheoides, *for* althæoides; p. 290, Anthirrhinum, *for* Antirrhinum; p. 293, Phelipeæ, *for* Phelypæa; p. 344, ecchinatus, *for* echinatus; p. 357, aculleatus, *for* aculeatus; p. 369, Crategus, *for* Cratægus; p. 369, Aarzolus, *for* Azarolus; p. 388, unisiliqua, *for* unisiliquosa.

When less pressed for room, we may give some extracts from this interesting volume.

Scenes of Wonder and Curiosity in California. Illustrated by upwards of 100 engravings. By James M. Hutchings. London: Chapman and Hall, 1865, 8vo, pp. 267.

This seems to be a reprint of a book written by an American, "located" somewhere in Upper California, and illustrated by capital woodcuts taken from photographs. It is a compilation from various

sources, and gives some glimpses of the fine scenery and grand vegetation of the country to which it relates. The Yo-Semite Valley, with its bold rocks, numerous waterfalls, lakes, woods, and rivers, must still be a fine field for botanical exploration. What interests *us* most is the account given of the Mammoth trees (*Sequoia Wellingtonia*, Seem.), which, though not so complete as the one published a few years ago in the 'Annals of Natural History,' furnishes a few additional details. The suggestion there thrown out that the Grove of Calaveras might have been discovered by Mr. G. M. Wooster, because his name and the date June, 1850, was found on one of the trees termed "Hercules," is confirmed in so far that Wooster was one of the party who found the trees. But "Mr. Wooster," says our author, "disclaims all title to the discovery, and gives it to W. Whitehead, Esq., who, while tying his shoe, looked casually around, and saw the trees, June, 1850." In a country where large trees are as abundant as tall men are in Kentucky and Virginia, this discovery does not seem to have attracted much attention at first. At least two years later, that is in the spring of 1852, they were re-discovered by Mr. A. T. Dowd, a hunter, employed by the Union Water Company, of Murphy's Camp, Calaveras County, to supply the workmen with fresh meat.

"While industriously following in pursuit, he suddenly came upon one of those immense trees, that have since become so justly celebrated throughout the civilized world. All thoughts of hunting were absorbed and lost in the wonder and surprise inspired by the scene. 'Surely,' he mused, 'this must be some curiously delusive dream!' but the great realities standing there before him, were convincing proof, beyond a doubt, that they were no mere fanciful creations of his imagination.

"When he returned to camp, and there related the wonders he had seen, his companions laughed at him and doubted his veracity, which previously they had considered to be very reliable. He affirmed his statement to be true, but they still thought it 'too much of a story' to believe,—thinking that he was trying to perpetrate upon them some first-of-April joke.

"For a day or two he allowed the matter to rest,—submitting, with chuckling satisfaction, to the occasional jocular allusions to 'his big tree yarn,' and continued his hunting as formerly. On the Sunday morning following, he went out early as usual, and returned in haste, evidently excited by some event. 'Boys,' he exclaimed, 'I have killed the largest grizzly bear that I ever saw in my life. While I am getting a little something to eat, you make preparations to bring him in. All had better go that can possibly be spared, as their assistance will certainly be needed.'

"As the big tree story was now almost forgotten, or by common consent

laid aside as a subject of conversation; and, moreover, as Sunday was a leisure day,—and one that generally hangs the heaviest of the seven on those who are shut out from social intercourse with friends, as many, many Californians unfortunately are,—the tidings were gladly welcomed; especially as the proposition was suggestive of a day's excitement.

"Nothing loath, they were soon ready for the start. The camp was almost deserted. On, on they hurried, with Dowd as their guide, through thickets and pine groves; crossing ridges and cañons, flats and ravines; each relating in turn the adventures experienced, or heard of from companions, with grizzly bears and other formidable tenants of the forests and wilds of the mountains; until their leader came to a dead halt at the foot of the tree he had seen, and to them had related the size. Pointing to the immense trunk and lofty top, he cried out, 'Boys, do you now believe my big tree story? That is the large grizzly I wanted you to see. Do you still think it a yarn?'

"Thus convinced, their doubts were changed to amazement, and their conversation from bears to trees; afterward confessing that, although they had been caught by a *ruse* of their leader, they were abundantly rewarded by the gratifying sight they had witnessed; and as other trees were found equally large, they became willing witnesses, not only to the entire truthfulness of Mr. Dowd's account, but also to the fact, that, like the confession of a certain Persian queen concerning the wisdom of Solomon, 'the half had not been told.'

"Mr. Lewis, one of the party above alluded to, after seeing these gigantic forest patriarchs, conceived the idea of removing the bark from one of the trees, and of taking it to the Atlantic states for exhibition, and invited Dowd to join him in the enterprise. This was declined; but, while Mr. Lewis was engaged in obtaining a suitable partner, some one from Murphy's Camp, to whom he had confided his intentions and made known his plans, took up a posse of men early the next morning to the spot described by Mr. Lewis, and, after locating a quarter section of land, immediately commenced the removal of the bark, after attempting to dissuade Lewis from the undertaking. This underhanded proceeding induced Lewis to visit the large tree at Santa Cruz, discovered by Fremont, for the purpose of competing, if possible, with his *quondam* friend; but finding that tree, although large, only 19 feet in diameter and 286 feet in height, while that in Calaveras county was 30 feet in diameter and 302 feet in height, he then turned his steps to some trees reputed to be the greatest in magnitude in the state, growing near Trinidad, Klamath county; but the largest of these he found only to measure about 24 feet in diameter, and 279 feet in height; consequently, much discouraged, and after spending about five hundred dollars and several weeks' time, he eventually abandoned his undertaking."

The author thinks that depriving one of the finest trees of its bark was "a sacrilegious act; although it is possible that the exhibition of the bark among the unbelievers of the eastern part of our continent and of Europe may have convinced all the 'Thomases' living that we

have great facts in California that must be believed sooner or later." We wish our author had enumerated amongst the "great facts" the extraordinary size attained by many of the fruits and kitchen vegetables of that country. Some of them are indeed objects of "wonder and curiosity."

It was lately announced in the Linnean Society's Journal (viii. p. 274) by Professor W. N. Brewer, that in 1864 it had been discovered that about lat. 36° or 37° on the western banks of the Sierra Nevada, the Wellingtonias "are very abundant along a belt at 5000–7000 feet alt. for a distance of more than twenty-five miles, sometimes in groves, at others scattered through the forests in great numbers. . . . The largest tree I saw was 106 feet in circumference at four feet from the ground. It had lost some buttresses by fire; it must have been at least 115 or 120 feet when entire; it is 276 feet high. The Indians tell of a much larger tree, which I did not see." The fear that this species might become extinct, expressed by some persons when we knew only the Calaveras Grove, is therefore quite unfounded. Additional proof of its abundance is furnished by the volume now before us, where the author has brought together the various accounts given of the Wellingtonias at the Frezno and Mariposa (misspelt "Maipura" in the Linnean Journal) groves. The size of the principal trees of the Mariposa grove was ascertained by Mr. Clark and Colonel Warren, and first appeared in the 'California Farmer.'

"The first tree was 'The Rambler,' and measuring it 3½ feet from the ground, we found it 80 feet in circumference; close to the ground, 102 feet; and, carefully surveyed, 250 feet high. Tree No. 2, nearly 50 feet in circumference. No. 3 (at the spring), 90 feet, 3½ feet from the ground; 102 at the ground; and 300 feet high. Nos. 4 and 5 ('The Sisters') measured 82 and 87 feet in circumference, and 225 feet high. Many of the trees had lost portions of their tops, by the storms that had swept over them.

"The whole number measured, was one hundred and fifty-five, and these comprise but about half the group, which we estimate cover about two to three hundred acres, and lie in a triangular form. Some of the trees first meet your view in the vale of the mountain; thence rise south-easterly and north-westerly, till you find yourself gazing upon the neighbouring points, some ten miles from you, whose tops are still covered with their winter snows. The following are the numbers and measurement of the trees:—

"1 tree, 102 feet in circumference.	"1 tree, 72 feet in circumference.
1 tree, 97 feet do.	3 trees, 70 feet each do.
1 tree, 92 feet do.	1 tree, 68 feet do.
3 trees, 76 feet each do.	1 tree, 66 feet do.

1 tree,	63	feet in circumference.	1 tree,	28	feet in circumference.
3 trees,	63	feet each do.	2trees,	100	feet each do.
2 trees,	60	feet each do.	1 tree,	82	feet do.
1 tree,	59	feet do.	1 tree,	80	feet do.
1 tree,	58	feet do.	2 trees,	77	feet each do.
3 trees,	57	feet each do.	1 tree,	76	feet do.
1 tree,	56	feet do.	3 trees,	75	feet each do.
3 trees,	55	feet each do.	1 tree,	64	feet do.
2 trees,	54	feet each do.	4 trees,	65	feet each do.
1 tree,	53	feet do.	2 trees,	63	feet each do.
1 tree,	51	feet do.	1 tree,	61	feet do.
4 trees,	50	feet each do.	10 trees,	60	feet each do.
6 trees,	49	feet each do.	3 trees,	59	feet each do.
5 trees,	48	feet each do.	2 trees,	51	feet each do.
2 trees,	47	feet each do.	6 trees,	50	feet each do.
3 trees,	46	feet each do.	1 tree,	49	feet do.
2 trees,	45	feet each do.	1 tree,	47	feet do.
1 tree,	44	feet do.	1 tree,	46	feet do.
2 trees,	43	feet each do.	2 trees,	45	feet each do.
2 trees,	42	feet each do.	1 tree,	43	feet do.
1 tree,	40	feet do.	7 trees,	44	feet each do.
1 tree,	35	feet do.	4 trees,	42	feet each do.
2 trees,	36	feet each do.	3 trees,	41	feet each do.
2 trees,	32	feet each do.	8 trees,	40	feet each do.

"Some of these were in groups of three, four, and even five, seeming to spring from the seeds of one cone. Several of these glorious trees we have, in association with our friend, named. The one near the spring we call the 'Fountain Tree,' as it is used as the source of the refreshment. Two trees, measuring 90 and 97 feet in circumference, were named the 'Two Friends.' The groups of trees consisted of many of peculiar beauty and interest. One of those, which measured 100 feet in circumference, was of exceeding gigantic proportions, and towered up 300 feet; yet a portion of its top, where it apparently was 10 feet in diameter, had been swept off by storms. While we were measuring this tree, a large eagle came and perched upon it, emblematical of the grandeur of this forest as well as that of our country.

"Near by it stood a smaller tree, that seemed a child to it, yet it measured 47 feet in circumference. Not far from it was a group of four splendid trees, 250 feet high, which we named the 'Four Pillars,' each over 50 feet in circumference. Two gigantic trees, 75 and 77 feet in circumference, were named 'Washington' and 'Lafayette;' these were noble trees. Another group we called 'The Graces,' from their peculiar beauty. One mighty tree that had fallen by fire and burned out, into which we walked for a long distance, we found to be the abode of the grizzly; there he had made his nest, and it excited the nerves to enter so dark an abode. Yet it was a fitting place for a grizzly. Another tree, measuring 80 feet, and standing aloof, was called the

'Lone Giant;' it went heavenward some 300 feet. One monster tree that had fallen and been burned hollow, has been recently tried, by a party of our friends, riding, as they fashionably do, in the saddle, through the tunnel of the tree. These friends rode through this tree, a distance of 153 feet. The tree had been long fallen, and measured ere its bark was gone and its sides charred, over 100 feet in circumference, and probably 350 feet in height.

"The mightiest tree that had yet been found, now lies upon the ground, and, fallen as it lies, it is a wonder still; it is charred, and time has stripped it of its heavy bark, and yet across the butt of the tree as it lay upturned, it measured 33 feet without its bark; there can be no question that in its vigour, with its bark on, it was 40 feet in diameter, or 120 feet in circumference. Only about 150 feet of the trunk remains, yet the cavity where it fell is still a large hollow beyond the portion burned off; and, upon pacing it, measuring from the root 120 paces, and estimating the branches, this tree must have been 400 feet high. We believe it to be the largest tree yet discovered.

"This grove of mammoth trees consists of about six hundred, more or less. It must not be supposed that these large taxodiums monopolize the one mile by a quarter of a mile of ground over which they are scattered; as some of the tallest, largest, and most graceful of sugar pines and Duglass firs we ever saw, add their beauty of form and foliage to the group, and contribute much to the imposing grandeur of the effect."

To the south-west of the Mariposa Grove is the so-called "South Grove," and thence due south, and about six miles from the Mariposa Grove, is the Frezno Grove, which consists of about 500 trees on about as many acres of undulating, forest land. The largest measured eighty-two feet in circumference. An extensive grove has also been discovered on the head waters of the San Joaquin river, about twelve miles east of the Frezno Grove; but it has not yet been explored.

BOTANICAL NEWS.

Mr. Notcutt has just published 'A Handbook of British Plants.'

In a printed notice forwarded to us, Dr. Buchenau, of Bremen, directs attention to the poisonous properties of *Narthecium ossifragum*. Cows which have eaten the plant have died after a severe attack of dysentery, their milk turning as bitter as gall, and cats known to have partaken of this milk have died also. The late Professor Walz has found two active principles in the plant, viz. *Narthecic acid* and *Narthecine*, the latter a resinous body. But the analysis is as yet incomplete, and Professor Wöhler, of Göttingen, is going to continue the investigation if a sufficient quantity (say twenty to forty pounds) of the herb can be got together.

Besides an investigation of our Cryptogamic flora, Professor Schimper, who has recently come over to this country, is trying to find out whether there is

any geological evidence of our islands having passed through two, instead of only one glacial period. In Switzerland, Belgium, and Scandinavia, certain facts have come to light, tending to prove that the first glacial period was succeeded by a time when a luxuriant vegetation and plenty of animal life could spring up, until that creation was swept away by a second glacial period.

A scheme is now under consideration for carrying out the proposition made by the British horticulturists who met at Brussels on the occasion of the International Show and Congress in 1864, and renewed by those who attended this year at that held at Amsterdam, to the effect that the next should be held in London in 1866. Those who are interested in the advancement of Horticulture, whether as exhibitors, cultivators, amateurs, or patrons, are going to be invited to aid in making the International Exhibition and Congress of Botanists and Horticulturists worthy of this country.

Our obituary this month includes the names of Sir John Richardson and Sir Joseph Paxton. Sir John Richardson was born on the 5th of November, 1787, at Dumfries, and died on the 5th of June. He completed his education at Edinburgh, entered the navy as assistant surgeon, and distinguished himself as an Arctic traveller, both as a companion of Sir John Franklin, and as leader of an overland expedition in search of him. His scientific writings are chiefly zoological; but botanists are indebted to him for bringing home good collections of Arctic and subarctic plants. Sir Joseph Paxton was born in 1803, at Milton Bryant, near Woburn, Bedfordshire. The son of humble parents, he commenced life as a gardener, and in due time became the chosen friend of a duke, the designer of the Crystal Palace, a knight, a Member of Parliament, and a man of good estate. We first hear of him at Chiswick, where he was working in the Horticultural Society's Garden for a few shillings a week, and where he displayed considerable talent for practical joking. It happened that Paxton had the key of a gate leading into the Duke of Devonshire's grounds, and when the late duke wished to pass through the Horticultural Society's establishment, the young gardener often opened the gate, procured him a light for his cigars, gave him information about the plants, and was otherwise civil. An acquaintance thus gradually sprang up; but his future patron did not even know his name; for when, some time after, the duke had occasion to appoint a head gardener for his seat at Chatsworth, he applied at the Horticultural Gardens "for the young man who has that good voice and used to open the gate for him," the Duke being rather hard of hearing. Objections were made by the authorities at Chiswick about Paxton's capacities, but these the Duke overruled. In Chatsworth, Paxton's duties were at first confined to the gardens, and they were afterwards extended to the management of the great Derbyshire estates of the Duke. In 1831 Paxton commenced, in conjunction with J. Harrison, 'The Horticultural Register and General Magazine,' and in 1832, 'The Magazine of Botany and Register of Flowering Plants,' of which fifteen annual volumes appeared, and which then was somewhat remodelled and continued under the title of 'Paxton's Magazine of Gardening and Botany;' ultimately being transformed into 'Paxton's Flower Garden.' In 1838, when Dahlias were fashionable, he wrote 'A Practical Treatise on the Cultivation of the Dahlia,' which was translated into French, German, and Swedish, and to

the translations of which Humboldt and Jussieu wrote introductions. The last work with which his name is associated was a 'Botanical Pocket Dictionary,' in which he had Dr. Lindley as a coadjutor, and which professes to give the history and culture of all plants known in Britain. Among the many magnificent works which Paxton constructed at Chatsworth was the great conservatory, a glass and iron structure, 300 feet long, which he made the model of the Crystal Palace in Hyde Park, his design being accepted by the Royal Commissioners after 233 plans had been rejected. For his public services on this occasion he was knighted. In 1853 he commenced the building of the Crystal Palace, at Sydenham, which was completed in June, 1854. In the same year he became Member of Parliament for Coventry, he being elected without opposition. Shortly after his entry into the House, he submitted a plan for employing a corps of navvies at the siege of Sebastopol, which was accepted by Government and proved practical. For some time past he had been in ill-health, and had announced his intention to resign his seat in Parliament. He entered the Crystal Palace for the last time on the day of the recent flower-show, but he felt then so weak that he was unable to accomplish a review of the whole display. Growing daily weaker, he died on the 8th of June, at his residence at Rockhills, next the Crystal Palace. His friend and patron, the Duke of Devonshire, had preceded him a few years, and shortly before his death handed him a life policy for £20,000. Sir Joseph, without giving up his lucrative place at Chatsworth, followed the profession of an architect and civil engineer from the time he constructed the Crystal Palace. His writings bear traces of haste, and have a horticultural, though not a strictly botanical value.

Botanical Society of Edinburgh, *April 13th*.—Dr. Alexander Dickson, President in the chair. The following communications were read :—1. An Account of the Flora of that part of Hampshire called the New Forest. By Henry Trimen, Esq. The author stated that the number of species known to inhabit it now amounted to 723, of which number he had himself collected 530. The flora was shown to contain many species of both the east and west of England, which are not usually found in the same district. The western type of vegetation was seen to prevail, however, and this was considered to be due to the damp humid climate. Numerous species rare in the south of England, but common in North Britain, were mentioned, and their growth traced to the barren nature of the soil.—2. Contributions to the Flora of Otago, New Zealand. By Dr. Lauder Lindsay. In this paper the author gave an account of some rare *Musci*, *Hepaticæ*, and *Algæ*, which had been collected by him in New Zealand. —3. Under the Snow, or the Flowering of Plants in Closed Cases. By N. B. Ward, Esq. (The substance of this was given at page 159 of the 'Journal of Botany,' Vol. III.)—4. Report on the Flowering of Plants in the Open Air at the Royal Botanic Garden. By Mr. M'Nab.—A letter was read from Mr. William Bell, dated "Botanic Garden, Saharunpore, 28th Feb., 1865." He has recently made more observations on the sexual organs of Ferns and Mosses, and has been led to the belief that the antheridial and archegonial cells are not the true generative organs of these plants.—Mr. Sadler exhibited specimens of *Dicranodontium asperulum* of Mitten's 'Musci Indici,' collected at Mains Castle, New Kilpatrick, by Mr. W. Galt.

1.

2.

W. Fitch, del. et lith.

Vincent Brooks, Imp.

ON THE ENGLISH MINTS.

By J. G. Baker, Esq.

(Plate XXXIV.)

Mentha, like *Rosa*, is a genus which once was studied very carefully in Britain; but which has been comparatively neglected of late years. The fullest accounts which we have of the indigenous species, Sole's 'Menthæ Britannicæ,' and the third volume of Smith's 'English Flora,' bear date respectively 1798 and 1825. Having recently paid some attention to the genus, and passed through my hands a large number of English and Continental specimens, I have ventured to think that it might not be unprofitable to attempt a rather more extended enumeration of the English forms, and a comparison of them with those of the adjacent parts of the Continent, than it is convenient to give in a Flora. The best account of the German Mints with which I am acquainted is that of Dr. Wirtgen, of Coblentz, whose published descriptions ('Flora of the Rhine Province,' etc.) and fasciculi of specimens excellently illustrate one another. His third edition of the fasciculus has been issued only very lately, and as it contains specimens of upwards of a hundred forms, we may presume that it exhausts the subject as nearly as anything of the kind is ever likely to do. Dr. F. Schultz's recent writings on the genus in the 'Flora' and 'Pollichia' I know only at second-hand. Of the French *Menthæ* there is an elaborate enumeration in the third edition of Boreau's 'Flore du Centre de la France.' For an excellent set of specimens of many of the plants which M. Boreau describes, I have twice been indebted to M. Déséglise. Much information relative to the *Menthæ* of the south-west of France is contained in M. Timbal-Lagrave's 'Essai monographique sur les espèces, variétés et hybrides du genre *Mentha* qui croissent dans les Pyrénées centrales.' In London and at Kew I have examined the collections of Buddle, Linnæus, Smith, Sowerby, Forster, and Borrer. For the opportunity of studying leisurely an almost complete set of specimens of the forms figured by Sole, I am indebted to Mr. John Hardy, of Manchester. My own set of specimens was burnt with the rest of my collection a year ago, but in writing out these notes I have had the use of the very complete set of English Mints belonging to Mr. Syme, and, in procuring several of the books, used the liberal aid of the Rev. W. W. Newbould.

It is now doubtless quite sufficiently understood that the length of the stamens, so much relied upon by several of the older authors as a diagnostic character, is utterly valueless for that purpose. All the common forms, notably *sylvestris*, *hirsuta*, *sativa*, and *arvensis*, may be seen not unfrequently with exserted and included stamens in the same individual. There does not seem to be here any tendency towards the state of things seen in *Linum* and *Primula*. It is far most usually the stamens that are variable in length, and the style is only very rarely not protruded beyond the corolla. An idea of the wide variation in length which the filaments and styles occasionally show may be perhaps best gathered from the following list, all the permutations given in which were noted in a single capitate head of the ordinary *M. hirsuta* in this neighbourhood last autumn:—

No. 1. Four stamens nearly equalling each other and the pistil, all much longer than the corolla.

No. 2. Four stamens reaching only the base of the corolla lobes; pistil as in No. 1.

No. 3. Like No. 1, but the stamens five in number.

No. 4. Pistil much exceeding corolla, all the stamens unequal, two nearly as in No. 2, two just exceeding the corolla.

No. 5. As in No. 1, but one of the anthers nearly sessile, not attaining the base of the corolla lobe.

No. 6. Pistil as in No. 1, one stamen exceeding it, two just shorter, one equalling corolla.

No. 7. Pistil just exceeding corolla, two stamens considerably longer, two reaching base of the corolla lobes.

No. 8. As in No. 7, but three stamens long and one short.

No. 9. One stamen exceeding, one equalling corolla, two stamens and pistil just attaining the base of the lobes.

No. 10. Pistil just exceeding corolla, one stamen equalling corolla, one reaching to the base of the lobes, two shorter.

Taking the genus as a whole, with us No. 2 appears to be the most usual,* No. 1 the next usual combination, but whether in No. 2 the seed is less usually developed than in No. 1, as seems likely, or whether

* Yet M. Timbal-Lagrave writes, "Le caractère tiré des étamines incluses ou exsertes, dont quelques botanistes se sont servis pour distinguer certaines espèces, ne paraît pas constant, aussi est-il à peu près abandonné par les botanistes modernes. Pour ma part, la plante que je viens de décrire (*M. dubia*, Chaix), est la seule qui m'ait offert des étamines incluses."

the shortness of the stamens, when occurring, is compensated by a superabundant development of roots, my observations do not enable me positively to say.

As regards the classification of the forms, it has been usual amongst modern authors to separate them, according to the position of the flowers into a Spicate, Capitate, and Verticillate group. The objection to this is that we have plants which barely differ from one another except by this very characteristic. *Mentha hirsuta* or *aquatica*, as defined by Smith and Fries, includes spicate, capitate, and verticillate forms, and from one end of the series to the other the change is very gradual. *Mentha piperita*, too, normally spicate, becomes capitate in some of its forms. Fries makes *Sessilifoliæ* and *Petiolatæ* his primary groups, but both *M. sylvestris* and *viridis* have occasionally short stalks to the lower leaves, whilst on the other hand *M. crispa*, E. B., S. 2785, which all agree to refer as a monstrosity either to *piperita* or *hirsuta*, has sessile leaves; and in the verticillate *Menthæ*, the transition from the very nearly sessile-leaved *M. cardiaca* of Gerarde, through *M. gracilis* and *pratensis* to the fully-stalked species, is as gradual as possible. Dr. Wirtgen forms his groups upon the circumstance of whether the corolla-tube be naked or hairy internally, and the seeds smooth or rough, and treats a large number of the forms as hybrids. By this method also plants, otherwise very closely allied, are placed in different divisions. As regards hybridity, so far as I have had the opportunity of observing, for instance, the forms which range under *M. sativa*, Smith, they are neither usually associated, growing in small quantity, with *M. hirsuta* and *arvensis* growing together in large quantity, nor less liable than the other Mints to perfect seed. I will therefore use the ordinary arrangement, and enumerate all the English forms which I have examined, quoting the synonyms of Sole, Smith, Boreau,* and Wirtgen† regularly, and a few others occasionally.

Group 1. MENTHÆ SPICATÆ.—*Whorls of flowers agglomerated into cylindrical or oblong terminal spikes.*

* *Sessilifoliæ.*

I. *M. rotundifolia*, Linn., Smith; Boreau, 1910; Wirtgen, nn. 7, 8. *M. sylvestris*, Sole, t. 3.

Stem 2–3 feet high, erect, hardly at all branched below, firm,

* 'Flore du Centre de la France.' Third edition. Paris, 1857.
† 'Herbarium Mentharum Rhenanarum.' Third edition. Coblentz, 1865.

quadrangular, thinly coated with fine matted fleecy hairs. Leaves quite sessile, wrinkled, and with the veins deeply channelled, dull green, and thinly hairy all over above, paler green, and thinly fleecy-hairy all over beneath, with prominent veins, the shape roundish or broadly ovate, with a cordate base, the point bluntish, the largest measuring about 2 inches long by $1\frac{1}{2}$ broad, the serrations broad, blunt, and not deep. Inflorescence a panicled arrangement of spikes, of which the main one is 2–3 inches long by $\frac{1}{4}$ to $\frac{3}{8}$ inch broad, either quite continuous or slightly interrupted below, the bracts of the lowest whorls scarcely leaf-like. Bracteoles ovate or lanceolate-acuminate, about equalling the expanded flowers, thickly furnished with strong erecto-patent hairs. Calyx sessile or furnished with short hairy and glandular pedicels, the tube campanulate, about $\frac{1}{2}$ line long, coated thickly with fine whitish erecto-patent hairs, the teeth lanceolate, more thickly hairy, only half as long as the tube, the corolla small, pale lilac, the outside hairy, the inside naked, the nut finely granulated. Scent strong and coarse.

I have seen specimens of this from the Isle of Wight and Devonshire, northward to Edinburghshire, but many of the stations are doubtfully spontaneous. It is not a plant of Scandinavia proper, as is the case with all our other species,* but it occurs in the Island of Bornholm. With us, it seems unusually little liable to vary. The texture of the leaves and shape of the bracteoles and calyx teeth best distinguish it from the next. The principal variation is in the size, rugosity, and serration of the leaves. Wirtgen's var. *clandestina* (fasc. 3. n. 70), a form or state with slender interrupted spikes, large bracts, included stamens and very small corolla, I have seen from Stadiscombe, Devonshire (J. Banker).

II. *M. sylvestris*, Linn.; Smith, Koch, in part.

Var. 1. *M. sylvestris* α, Smith. *M. sylvestris*, Boreau, 1917; *M. sylvestris vulgaris*, Bentham, Fries; Wirtgen, fasc. nn. 9, 13, 14, 71, 72; *M. villosa prima*, Sole, t. 1.

Stem 2–3 feet high, erect, hardly at all branched below, firm, quadrangular, more or less thickly coated with fine white fleecy hairs. Leaves pale green, nearly naked, or thinly coated with fine white fleecy hairs above, and more or less densely fleece-felted below, sessile or very nearly so, lanceolate or ovate-lanceolate, the largest

* *M. piperita* is regarded by Fries as a doubtful native.

from 2 to 3 inches long by from 1 to 1½ broad, the point often lengthened out, and the teeth sharper and closer than in the preceding. Inflorescence a panicled arrangement of spikes, of which the main one is from 2 to 3 inches long by from ¼ to ½ inch wide, continuous or slightly interrupted below, but the lowest bracts seldom leafy. Bracteoles linear-subulate, equalling or slightly exceeding the expanded florets, densely clothed with erecto-patent white fleecy hairs. Pedicel from ½ line to 1 line long, clothed with fine white reflexed hairs. Calyx-tube campanulate, ½ line long, the teeth as long as the tube, narrowing suddenly above the base to a long lanceolate-subulate point, both tube and teeth thickly hairy, with erecto-patent hairs. Corolla lilac or tinged with rose, about twice as long as the calyx, hairy externally, naked internally, the nut verrucose and bearded at the point. Scent weaker and more aromatic than in the preceding.

Var. 2. *nemorosa*, Bentham, Wirtgen, nn. 16–20, 73. *M. sylvestris* α, Fl. Dan. and Fries; *M. sylvestris* β, Smith; *M. nemorosa*, Willd., Boreau, 1916; *M. villosa secunda*, Sole, t. 2.

This, so far as I can see, agrees precisely, in the shape and size of the calyx and teeth, with the preceding, and in all other important points. The leaves are broader and shorter in proportion, generally broadly ovate with a rounded base, even the under surface, at any rate in the lower leaves, being greenish, the coating of the stem and calyx stalk and tube thinner, and the spikes denser and broader. With us in Britain this is the most frequent form, and Fries tells us that this is also the case in Scandinavia, but the former is the plant marked *sylvestris* in the Linnæan herbarium, and there is also a sheet of this without any name attached. The half-dozen specimens given in the third edition of Wirtgen's fasciculus, differ from one another considerably in the points to which allusion has been made. I cannot separate *M. emarginata* of Reichenbach and Boreau from this. The specimen given by Wirtgen in his second fasciculus (n. 18) has only the upper lobe of the corolla distinctly emarginate, and this is sometimes the case with our plant.

Var. 3. *mollissima*, Benth. t. 121. *M. sylvestris* α, Koch.

Stem densely white-woolly, leaves ovate with a cordate slightly clasping base, the largest about 2 inches long by 1 broad, the serrations shallow and blunt, and the point bluntish, the upper surface, especially in the highest ones, dull brownish-green, and mealy all over, the sub-

stance thick, so that the leaf is soft to the touch, the white coating thick beneath, and the spike and calyx very villose. This does not quite agree with my French specimens of *candicans*, and recedes still further from the type in the same direction than Smith's var. γ, which was gathered by Rand and Buddle in Kent, and with Wirtgen's examples of either *mollissima* or *incana*. I have seen it from Glen Ogilvie, in Forfarshire, gathered by Drummond, and various later collections, and from Acle, in Norfolk, gathered by Sir J. E. Smith. Smith marks it "nova species," "a var. of *sylvestris*, but not fragrant?" The *M. Chalepensis candicans raro florens*, from the Chelsea Botanic Garden, from Miller in the Banksian herbarium (*M. incana*, Sole, mss. non Willd.), is very nearly the same plant.

Var. 4. *alopecuroides*. *M. alopecuroides*, Hull, fide Smith; *M. rotundifolia*, Sole, t. 4; *M. sylvestris*, Smith; *M. rotundifolia* var. *velutina*, Bab. Man. ed. 1; *M. sylvestris*, var. *velutina*, Bab. Man. ed. 2; *M. rotundifolia-nemorosa*, Wirtgen?; *M. velutina*, Lejeune?; *M. dumetorum*, F. Schultz?

Stem more or less thickly covered with fine fleecy deflexed grey hairs. Leaves sessile, roundish, and decidedly cordate, the lowest measuring 2–3 inches long by 2 broad, the upper surface dull green, and thinly hairy all over, the lower surface grey-green and uniformly but thinly hairy, the substance thin and flexible, the serrations open but sharpish, the point bluntish, the lower leaves sometimes pendent, and their internodes about as long as the breadth of the leaves. Pedicel ½ line long, thickly covered with fine deflexed hairs, the tube and teeth covered thickly with long fine patent hairs. The leaves here are quite as broad and as round as in the broadest-leaved forms of *rotundifolia*, but they are much less wrinkled and thinner in texture, and the bracteoles and calyx teeth are those of *sylvestris*. I have seen specimens of this from Arran, near Brodick, Prof. Babington; Perthshire, Killin, near a cottage, Borrer; and from various stations in Norfolk, collected by Smith, Turner, and recently by the Rev. Kirby Trimmer. Sole reports it also from Essex and Kent. I have not seen anything from the Continent which exactly coincides with our plant.

These four forms differ from one another very much in the shape and texture of the leaves, and the coating of the various parts of the plant, but I have found the shape of the bracteoles and calyx teeth to be nearly uniform in all of them. I have not seen any British ex-

amples doubtful between this and the preceding, like the specimen marked *rotundifolia* in the Linnæan herbarium. *M. crispa*, of Lamarck and Chevallier, seems to be a form of *rotundifolia* with contorto-crisped and acutely-toothed leaves, and *M. undulata* of Willdenow, a similar form of *M. sylvestris*, but I am not acquainted with either as British.

III. *M. viridis*, Linn., Smith; Sole, t. 5; Boreau, 1918; Wirtgen, fasc. n. 1. *M. sylvestris glabra*, Koch, Synopsis, ed. iii. p. 476; Reichenbach, Icones, 1284, fig. 1.

Stem 2–3 feet high, erect, branched below with short erecto-patent branches when luxuriant, firm, quadrangular, naked or slightly hairy beneath the nodes, often brightly tinged with purple. Leaves sessile or the lower ones slightly stalked, lanceolate or ovate-lanceolate, rounded or even cordate at the base, dark green and glabrous above, paler and prominently veined with green or purple beneath, rather thickly glandular, but either quite naked or hairy only on the midrib and principal veins, the point narrowed out and acute, the teeth sharp but neither very close nor deep, the lowest measuring about 1 inch across by 3 or 4 inches long. Inflorescence a panicled arrangement of spikes, of which the main one is 3 or 4 inches long by $\frac{3}{8}$ inch wide, the lowest whorls sometimes $\frac{1}{2}$ inch from each other, and the lowest bracts leafy. Bracteoles linear-subulate, equalling or exceeding the expanded flowers, smooth or slightly ciliated. Pedicels about $\frac{3}{4}$ line long, purplish glandular, but never hairy. Calyx also often purplish, the tube campanulato-cylindrical, $\frac{3}{5}$ line long, the teeth lanceolate-subulate, equalling the tube, the lower part of which is naked, but the teeth and often the upper part clothed more or less densely with erecto-patent hairs. Corolla reddish-purple, about twice as long as the calyx, naked both within and without. Nut smooth. Scent strong and aromatic.

This varies slightly in the shape of the leaves, the elongation of the spike, and the hairiness of the upper part of the calyx, but upon the whole seems to be as distinctly marked as any of our species. It most resembles *M. piperita officinalis*, which may be distinguished by its stalked leaves and much larger flowers. Between *M. viridis* on the one hand and *M. sylvestris* and *rotundifolia* on the other, the line of separation with us is clear, but upon the Continent is bridged over by various intermediate forms, of which *M. amaurophylla* and *Nouletiana* of Timbal-Lagrave are two. I believe it to be a true native in some

of its stations in the North of England. In one place I have gathered it often springing up amongst furze bushes and brambles in what seems to be quite unbroken ground, but it is cultivated so much and grows usually in such suspicious places, that our recent authors regard it unanimously as doubtfully indigenous. The form of this with contorto-crisped leaves is *M. crispata* of Schrader and Willdenow, Wirtgen, fasc. n. 2, *M. Hercynica*, Rohl, *M. sylvestris crispata* of Koch and Reichenbach's Icones. This is one of Ray's plants, gathered by Dale in Essex, and I have seen specimens also from Glen Farg, in Perthshire, collected by Dr. Dewar.

IV. *M. crispa*, Linn. Sp. Pl. 2 edit. p. 805; E. B. S. t. 2785. *M. piperita crispa*, Koch, Wirtgen, n. 67; *M. aquatica crispa*, Benth., t. 177; Reichb. Icones, t. 1285, fig. 2.

Stem somewhat branched when luxuriant, erect, firm, quadrangular, thickly clothed with strong decurved hairs. Leaves broadly cordate-ovate in outline, nearly or quite sessile, the margin much crisped and deeply laciniated, deep green and thinly hairy above, paler and more thickly hairy beneath, the venation fan-like. Main spike of flowers oblong-conical or subcapitate, $1\frac{1}{2}$–2 inches long by $\frac{3}{4}$ inch broad, the lowest whorl rather separated and its bracts leaf-like. Pedicel $\frac{1}{2}$–$\frac{3}{4}$ of a line long, calyx-tube about a line long, with a tuft of hairs at the base but not very hairy upwards, the teeth $\frac{1}{2}$ line long, subulate above from a triangular or lanceolate base, thinly hairy with erecto-patent hairs. Bracteoles linear-subulate, slightly ciliated. Corolla slightly hairy.

This is not very unfrequent in gardens, and is no doubt a garden escape only in the Northumbrian station, from which it is figured in E. B. Supplement. Although evidently a monstrosity, it is by no means clear to what species it owes its origin. If to *M. piperita*, as seems most likely, the suppression of the petiole is remarkable. M. Boreau refers it to *M. citrata*. There are specimens in Mr. Borrer's herbarium marked "Quite wild from a meadow called The Severals, at Audley End, Essex, *W. Cumming*." It is figured by Parkinson and Bobart, and there is a specimen amongst Buddle's British plants, vol. cxxi. fol. 23 in Herb. Sloane.

** *Petiolatæ.*

V. *M. piperita*, Huds. Fl. Ang., p. 251. *M. piperita officinalis*, Koch, Synops. 2, p. 633.

Var. 1. *officinalis*, Sole, t. 7. *M. piperita* α, Smith; *M. officinalis*,

Hull; *M. piperita*, Boreau, 1919, Wirtgen, n. 66; *M. viridi-aquatica*, F. Schultz.

Stem erect, 3 or 4 feet high, somewhat branched below with erecto-atent branches when luxuriant, firm, quadrangular, slightly hairy, often tinged with purple. Leaves all stalked, the stalks of the lower ones $\frac{1}{2}$–$\frac{3}{4}$ of an inch long, naked or nearly so, the leaf lanceolate, narrowed or rather rounded towards the base, the point narrowed out and acute, the lowest 2–3 inches long by about $\frac{3}{4}$ of an inch broad, naked and dull green above, paler and glandular all over, but only slightly hairy upon the veins beneath; the teeth sharp, fine, and erecto-patent. Inflorescence in a loose lanceolate or acutely conical spike, 2–3 inches long by about $\frac{3}{4}$ of an inch broad at the base, the lowest whorls separate and usually the lowest bracts leaf-like. Bracteoles lanceolate-acuminate, about equalling the expanded flowers, slightly ciliated. Pedicels 1 line to $1\frac{1}{2}$ line long, purplish, glandular, but not hairy. Calyx also often purplish, the tube about 1 line long and the teeth $\frac{1}{2}$ a line, the tube campanulate-cylindrical, purplish, not hairy, but dotted over with prominent glands; the teeth lanceolate-subulate, furnished with short erecto-patent hairs. Corolla reddish-purple, about twice as long as the calyx, naked both within and without. Nut smooth. Scent strong and aromatic.

Var. 2. *vulgaris*, Sole, t. 8. *M. piperita*, Hull; *M. piperita* β, Smith.

Stem somewhat hairy, petioles the same, leaves broader than in var. 1, ovate-lanceolate rounded or even cordate at the base and not so much narrowed towards the point, slightly hairy on the upper side and towards the edge, more so beneath and less glandular, the spikes broader and shorter, tending towards capitate or even quite bluntly capitate in stunted specimens. Calyx and corolla as in var. 1, but the scent not so strong.

This was known clearly to Ray, but was misunderstood by Linnæus, as both his herbarium and descriptions testify. The true plant is in his herbarium, but what he took for *piperita* is a form of *M. hirsuta*, grown in the Upsal garden, with less hairy leaves and a more pungent scent than usual. In the extreme states the two varieties look considerably different, but they are connected closely by intermediate stages. Var. *officinalis* has much of the aspect and habit of *M. viridis*, whilst on the other hand plants occur occasionally respecting which it

seems to be an open question whether they should be referred to var. 2 or to forms of *M. hirsuta* tending towards *citrata*. No doubt a botanist who called *officinalis* "*M. viridi-aquatica*" would call *vulgaris* "*M. aquatica-viridis*," but there are no specimens of the latter in Wirtgen's fasciculus, and I cannot find anything answering to it in Koch, Fries, or Boreau. Sole's original *M. piperita sylvestris* (shortly to be noticed) falls under a different section of the genus, but according to Dr. Wirtgen's classification, to the plants just described, and the same is the case with Steudel's *M. Langii*, the *M. piperita* α of Koch; but Smith's Norfolk plant, which he refers to his *M. piperita* γ, is a form of our plant with broad leaves in combination with the spike of var. 1. The most northern counties in Scotland from which I have seen this are Forfarshire and Inverness-shire, gathered by Lady Carnegie and Mr. Borrer.

VI. *M. pubescens*, Willd. *M. nepetoides*, Koch, Fries; Reich. Icones, t. 1282, fig. 4; *M. hirsuta* γ, Smith, Eng. Fl. vol. iii. p. 79; *M. aquatica-sylvestris*, G. F. Meyer and Döll; *M. hirsuta*, Linn. fide Fries, non Linn. herb.

Var. 1. *M. palustris*, Sole, t. 6, non Mœnch. *M. pubescens*, Willd.; Boreau, 1920; Wirtgen, nn. 29–32, 75.

Stem 2–3 feet high, erect, quadrangular, slightly branched below with erecto-patent branches when luxuriant, thickly covered with strong deflexed grey hairs. Leaves stalked, the petioles rough with spreading hairs, the blade ovate, rounded at the base and rather pointed, the lowest measuring about 3 inches long by $1\frac{1}{2}$ inches broad; dull-green and rather thickly-hairy all over above, paler and hairy all over beneath; the serrations moderately sharp, but not very deep. Spike oblong or bluntly conical, 2–3 inches long by from $\frac{1}{2}$–$\frac{5}{8}$ of an inch wide, the one or two lowest whorls rather separate from the rest, and their bracts leaf-like. Pedicel 1 line long, thickly clothed with strong spreading hairs; the tube campanulato-cylindrical, 1 line long, and very hairy; the teeth $\frac{3}{4}$ of a line long, linear-subulate, and very hairy. Corolla purple, twice as long as the calyx, hairy both internally and externally.

Var. 2. *M. piperita sylvestris*, Sole, t. 24. *M. hircina*, Hull; *M. aquatica*, Linn. Herb. in part.

Habit of the preceding. Stem very slightly hairy and the hairs short and silky. Lowest leaf-stalks about $\frac{1}{2}$ an inch long, slightly hairy. Leaves ovate-oblong, about twice as long as broad, rounded

at the base, deep-green and very slightly hairy above, paler and only shortly hairy on the veins beneath; the serration sharpish but not deep. Calyx of var. 1, but the hairs of both stalk and tube fewer, shorter, and not so strong. Spike broadly oblong-conical, with the two lower whorls separated, the lowest stalked and subtended by broadly ovate stalked bracts twice its length. Corolla slightly hairy.

These two are our British representatives of a considerable series of spicate Continental forms allied to *M. hirsuta*, but tending more or less towards *M. sylvestris*, to which belong *M. pubescens*, Willd., *M. hirta*, Willd., *M. hispidula*, Boreau, *M. nepetoides*, Lejeune, *M. Maximileana*, F. Schultz, and *M. Bosquetiana*, Timbal-Lagrave. Both of them are in Buddle's herbarium, and were known clearly to Ray. Our var. 1 is exactly *M. pubescens*, Willd., but I am not clear which is the Continental analogue of the other. Out of the two specimens given for *M. aquatica* in the Linnean herbarium, one is a British example of our var. 2, and from this it is probable the "*planta non hirta*" and "*spicam obtusam*" of his description is taken. I have seen specimens of var. 1 from the following stations:—Cornwall, orchard at Trezoddarn, *Borrer;* Somersetshire, *Sole;* Middlesex, Marylebone, and Kensington, *Rand;* Hertfordshire, Waterford Marsh, near Hertford, *Mr. Ansell;* Denbighshire, Wrexham, *J. E. Bowman;* Norfolk, Saham, *Smith;* and Earlham, *E. Forster;* and of var. 2, only from near Bocking, in Essex, gathered by Dale, and Lyncomb, near Bath, by Sole. Sole's name is the earliest post-Linnæan name for the plant, but it was preoccupied by Mœnch.

Group 2. MENTHÆ CAPITATÆ.—*Whorls of flowers agglomerated into roundish or oblong terminal heads.*

VII. *M. hirsuta*, Linn. *M. hirsuta* α and β, Smith, Eng. Fl. vol. iii. p. 79; *M. aquatica*, Sole, t. 10, 11; Boreau, n. 1929; Wirtgen, nn. 33–37, 39–41, 76–78; Reichenbach, Icones, 1286, fig. 1.

Stem 2–4 feet high, branched below with short erecto-patent branches when luxuriant, erect, quadrangular, thickly coated, especially above, with strong deflexed grey hairs. Leaves stalked, the petioles rough with spreading hairs, the lower about $\frac{1}{2}$ an inch long; the blade broadly-ovate, rounded or somewhat cordate at the base, and acute or bluntish at the point, the lowest measuring from $1\frac{1}{4}$–3 inches long by from 1–$1\frac{1}{2}$ broad; dull-green and more or less hairy all over above, paler and

more strongly-hairy beneath, especially on the veins; the serrations bluntish or moderately sharp. Flowers in a large rounded or oblong terminal head, with one or two slightly separated whorls, which are surrounded by stalked or subsessile leaf-like bracts. Pedicels 1–2 lines long, densely clad with strong deflexed hairs; tube campanulate-cylindrical, 1 line to $1\frac{1}{4}$ line long, very hairy; the teeth $\frac{1}{2}$ to $\frac{3}{4}$ of a line long, narrowing suddenly above the base to a lanceolate-subulate point, and densely hairy. Bracteoles linear-lanceolate, strongly hairy. Corolla purple, about twice as long as the calyx, hairy both within and without. Nut verrucose. Scent usually rather strong.

Apparently the commonest Mint throughout Britain, and extending from the seacoast to Orkney. Mr. Croall finds it up the Dee valley to Invercauld, and I have gathered it at 500 yards above the sea-level in Yorkshire, and nearly as high in Durham. I have used the name *hirsuta* in preference to *aquatica*, because neither of the Linnean specimens of the latter are our plant, and part of the description does not fit it; whilst of *hirsuta* both the specimen and description coincide with it. Specimens from Sussex (Borrer and H. C. Watson) and Surrey (Winch) coincide with the *M. rubro-aquatica*, Wirtgen, fasc. 2, n. 35; *M. Wirtgeniana aquatica*, fasc. 3, n. 46; *M. aquatica odorata*, Fries, Herb. Norm. This has quite the habit of the normal plant, but has the lower part of the stem and lower petioles quite naked, the leaves quite naked above and only shortly ciliated at the edge and upon the veins beneath, the pedicel, calyx-tube, and teeth hairy throughout, but the hairs only very short, and the corolla slightly hairy. This is not the *M. odorata* of Sole, as Dr. Wirtgen supposes, and Reichenbach and Boreau are both at fault with regard to Sole's plant. The *M. piperita* of the Linnæan herbarium, *M. Pimentum* of Nees von Esenbeck, is considerably more hairy than this, but does not otherwise differ. *M. purpurea*, Host, has more widely separated lower whorls, and is the first step in the direction of *M. sativa*.

VIII. *M. citrata*, Ehrh., Smith; Reichb. 2007; Boreau, 1925. *M. odorata*, Sole, t. 9, not Reich. and Boreau. *M. adspersa*, Mœnch, F. Schultz.

Habit of the preceding. Stem quite smooth, throughout usually tinged with purple. Leaves broadly ovate, rounded or cordate at the base, deep green above, usually more or less tinged with purple, sprinkled with glands beneath, but not at all hairy on either side.

Flowers in a rounded terminal head, with one or two slightly separated whorls subtended by leaf-like bracts. Calyx purplish; the tube and teeth similar in shape and dimensions to those of the preceding, but both these and the bracteoles are quite naked. Corolla twice as long as the calyx, naked both within and without. Nut smooth. Scent aromatic, citron-like.

This seems to me quite connected with the preceding by the intermediate forms above referred to. I have seen it from only one British station where it is at all likely to be wild, a ditch near Bedford, where it was gathered by the Rev. C. Abbott, from one of whose specimens the E. B. 1025 figure was drawn.

Group 3. MENTHÆ VERTICILLATÆ.—*Whorls of flowers mostly distinctly separated, and with leaves springing from them which much exceed them.*

* *Sessilifoliæ.*

IX. *M. cardiaca*, Gerarde, Em. 680. (Tab. nostr. n. xxxiv.) *M. gentilis*, Sole, t. 15; E. B. 449; Koch in part, non Linnæus; *M. rubra*, Huds. in part; Fries, Nov. 179, non Smith. *M. gracilis*, Smith, in part; *M. pratensis*, Boreau, 1933, non Sole; *M. vegeta*, mss. in herb. Forster.

Stem 2–3 feet high, erect, firm, quadrangular; branched below, with erecto-patent branches when luxuriant, thinly hairy, with deflexed hairs, or sometimes naked below, often purplish. Leaves all sessile, or the lowest very slightly stalked, resembling those of *M. viridis* in appearance and texture, lanceolate or ovate-lanceolate, the lowest from 2–3 inches long by about an inch broad, the lower part narrowed gradually and the point acute, the upper surface deep green and naked, the lower paler and glandular but only slightly hairy on the veins; the serration sharpish, but distant and not deep. Whorls all above the centre of the stem, the upper ones nearly an inch apart, the leaves of the lowest 1–2 inches long, and of the upper ones at least twice as long as the whorls. Pedicel $\frac{1}{2}$–$\frac{3}{4}$ line long, not hairy, but rather glandular, and often purple. Calyx-tube nearly a line long, campanulate-cylindrical, glandular all over, but only the upper hairy. Teeth $\frac{1}{4}$–$\frac{1}{3}$ line long, lanceolate-subulate, densely hairy, with erecto-patent hairs. Bracteoles linear, slightly ciliated. Corolla reddish-purple, only about half as long again as the calyx, naked both within and without. Scent of *M. viridis*.

Var. 2. *M. gracilis*, Sole, t. 16, non Brown.

Stem slender, only very slightly hairy beneath the nodes. Leaves lanceolate, thinner in texture, dull green, and quite naked above, slightly hairy on the midrib beneath and rather shining, narrowed towards both ends, and the point acute. Lowest whorls with leaves $1\frac{1}{2}$–2 inches long, upper with leaves three or four times their length, the clusters small and few-flowered. Pedicel 1 line long, glandular, but not hairy. Calyx-tube campanulate, slightly tending towards cylindrical, about $\frac{3}{4}$ of a line long, not at all or scarcely hairy. Teeth $\frac{1}{4}$ of a line long, scarcely longer than broad, the base triangular but narrowed rather suddenly at the middle to a sharpish point, densely hairy with erecto-patent hairs.

Whether the plant figured by Sole as *M. gracilis* be anything more than a weak, slender form of var. 1, I will not undertake to say, but all the specimens marked as *gracilis* in the Smithian herbarium seem to me not distinguishable from this latter. Fries writes of Sole's plant (Novit. 2, p. 181) as follows: — "*M. gracilis*, Sole et Smith, var. α! quantum e speciminibus siccis video, nostræ (our var. 1) valde dissimilis est, habitu revera, gracili, tenui, pallido . . . nec ad ullam sequentium (*sativa*, *gentilis*, *arvensis*, etc.) referam ob folia subsessilia, quæ eo memorabiliora cum folia ipsa valde angustata et elongata. Hanc ex Anglia tantum vidi." Sole's figure represents his own Wiltshire specimens exceedingly well. Our var. 1 was a plant well known to the older writers. It is figured by Dodonæus, Gerarde, and Parkinson. By Ray it was confused with *M. gentilis*, but Dale and Buddle recognized it clearly. By Linnæus it seems to have been quite overlooked, and unless it be Sole, it is doubtful whether any of our post-Linnæan writers have fairly understood it. The remarks of Fries (Summa, p. 196) respecting it are excellent. He writes, "Species valde distincta, robusta, Patribus bene cognita; postquam Smithius cum heterogeneis formis conjunxerat, pæne periit et ut videtur plerisque locis exstirpata. Herba, folia, caules (modo purascentes) omnino *M. viridis* et nulli Petiolatarum rite affinis, quamvis flores verticillati." Besides the verticillate habit of growth, the calyx and corolla are much larger than those of *M. viridis*, but for the rest there is a close similarity. The British stations from which I have seen specimens are the following: Durham, banks of the Tyne, near Newcastle, Winch; Leicestershire, Worthington (or Smoile),

near Ashby de la Zouch, not truly wild, Rev. W. H. Purchas;* Norfolk, wet common before the blacksmith's shop at Saham, wild, Smith; Oxfordshire, near Woodstock, H. Boswell; Hertfordshire, Waterford Marsh near Hertford, Mr. Ansell; Middlesex, banks of the Lea near Walthamstow, T. F. Forster. Sole appears to have known it only as a garden plant and garden escape. His figure shows the habit well, but in the magnified calyces there is no clear distinction shown between glands and hairs. Mr. S. Dale, in Ray's 'Synopsis' writes, "This is a common Mint, but has no smell of Basil." The original E. B. figure called *gentilis* (449) was drawn from one of the Walthamstow examples of this, but the calyx-teeth are much more triangular in the plate than in the specimen.

** *Petiolatæ.*

X. *M.s ativa*, Linn. Herb.; Huds. E. B. t. 448; Koch in part, not Fries; Boreau, 1947. *M. hirsuta* and *M. acutifolia*, Smith, Eng. Fl. iii. p. 79; *M. aquatica*, δ. *pilosa*, and ε. *subsativa*, Fries, n. 183. *M. aquatica*, var. *verticillata*, 32; *arvense-aquatica*, 47–53, 79–83; *aquatica-arvensis*, 59–62, 100, 101, 103, 105; Wirtg. fasc. 3.

Stem 2–3 feet high, erect, quadrangular, when luxuriant branched with short erecto-patent branches below, covered more or less densely with strong decurved hairs. Leaves stalked, the petioles densely hairy, the lowest $\frac{1}{2}$–$\frac{3}{4}$ inch long; the blade ovate, usually broadly so, more or less rounded at the base, the point acute or bluntish, the lowest from $1\frac{1}{2}$–$2\frac{1}{2}$ inches long, by from $\frac{3}{4}$–$1\frac{1}{4}$ broad, dull-green, and more or less hairy all over above, paler and still more hairy beneath; the serrations sharp or bluntish. Whorls beginning at or a little below the middle of the stem, the leaves about 1 inch apart, and sometimes stalked; their leaves 1–2 inches long, and those of the upper ones from as long as to twice their length. Pedicel 1 line long, thickly clad with strong deflexed hairs. Calyx-tube 1 line long, campanulate-cylindrical, thinly clothed with spreading hairs; the teeth lanceolate-subulate, $\frac{1}{2}$–$\frac{3}{4}$ line long, densely clothed with erecto-patent hairs. Bracteoles very hairy. Corolla purplish, about twice as long as the calyx, hairy both inside and out. Nut verrucose. Scent of *M. hirsuta*.

Var. 2. *M. paludosa*, Sole, t. 22. *M. hirsuta*, E. Smith, E. Fl. iii. p. 79; *M. subspicata*, Weihe, Boreau, 1926.

* Numerous specimens have been distributed, through our Thirsk Botanical Exchange Club, from this locality, under the name of *M. pratensis*.

Like the preceding, but whorls all above the middle of the stem; the lowest 1 inch apart, their leaves about 1 inch long; the upper whorls without any open space between them, and their bracts equalling them.

Var. 3. *subglabra*. *M. aquatica*, *B. verticillata*, γ. *suavifolia*, Fries, Nov. 184; *M. ovalifolia*, Opiz, Boreau, 1935; and *M. palustris*, Mœnch, Boreau, 1936.

Stem shortly hairy above, naked below; leaves bright green, thinner in texture, and only slightly hairy on either side; pedicel and calyx shortly hairy, or the former naked; corolla showy, but slightly hairy.

This is evidently for Britain, as a whole, the next most frequent ditch and swamp form to *M. hirsuta*. It differs from that, so far as I can see, almost solely in the arrangement of the flowers, and between the normal *M. hirsuta* and normal *M. sativa*, the less frequent var. 2 is quite intermediate. The Linnæan specimen, labelled originally as "*verticillata*," for which "*sativa*" has afterwards been substituted, has the upper whorls agglomerated and their bracts scarcely protruding, with broad, rough, blunt, rather deeply but bluntly toothed leaves. One of the Linnæan specimens marked "*aquatica*" is a not very hairy example of our var. 2. I have seen both Miller's and Buddle's examples of *M. acutifolia*, Smith, but cannot distinguish it from the ordinary form of var. 1, except by its narrower and sharper leaves. Var. 3 recedes conspicuously from the type in the direction of the next species, and is sometimes called *M. rubra*. I have seen characteristic specimens from Kincardine (Syme), Durham (Winch), Worcestershire (T. Westcombe), and Lancashire (Wilson). *M. plicata*, Opiz, Boreau, 1927, appears to be a connecting link between var. 2 and the fully comose form of var. 1. Judging from the specimens *M. rivalis*, Sole, t. 20, is our var. 3, but the three forms he mentions are referable to our var. 1.

XI. *M. rubra*, Huds. in part; Smith, Eng. Fl. vol. iii. p. 82; E. B. t. 1413; Boreau, 1934. *M. sativa*, Linn. in part, not Herb.; Koch in part; Fries, Nov. edit. ii. p. 183; *M. Agardhiana*, Fries, Nov. edit. i. p. 71.

Stem 3–4 feet high, suberect, not rigid, branched irregularly below when luxuriant, almost naked throughout or slightly hairy above; often purplish. Leaves stalked, the petioles naked or slightly hairy, the lowest $\frac{1}{2}$–$\frac{3}{4}$ of an inch long, the blade comparatively thin in texture

and often tinged with purple, broadly ovate, more or less rounded at the base, the point acute or bluntish, the lowest 2–3 inches long by 1–1½ broad, the upper surface deep green and naked, or very slightly hairy, the lower surface paler, glandular, and slightly hairy on the veins, the serrations moderately large and sharp. Whorls beginning at or a little below the middle of the stem, the lowest 1 inch apart and sometimes stalked; their leaves 1–2 inches long, and those of the upper ones from as long as to twice their length. Pedicel purplish, 1–1½ line long, glandular but not hairy. Calyx-tube campanulato-cylindrical, 1 line long, glandular but not hairy, or with only a few scattered short hairs. Teeth ½ line long, narrowed suddenly from a triangular or lanceolate base to a subulate point, not very thickly furnished with erecto-patent hairs. Bracteoles linear, slightly ciliated. Corolla twice as long as the calyx, purplish-red, in fine specimens ¼ inch long, naked both internally and externally.

It is apparently diffused very generally throughout England in a truly wild state, and there are specimens in Mr. Syme's collection from as far north in Scotland as Edinburghshire. Of our verticillate forms it is the largest and the handsomest, for in stem and corolla and leaf there is, when it grows under favourable circumstances, considerable brightness of contrasted colours. The detailed description of Fries (Nov. p. 185), who advocates the claim of this as having the best right to be considered as the Linnæan "*sativa*," agrees well with our plant. It appears from his account to be not unfrequently grown in gardens in Sweden, but I am only acquainted with it in our country as a ditch and stream-side plant. Though occurring in several places, it is doubted as a native of Central France by Boreau. It is not given at all by Wirtgen, whose former *M. rubra* is *M. Wirtgeniana*, F. Schultz, shortly to be noticed. A curious form gathered by Dr. Windsor at Partington, in Cheshire, has long tufted white fleecy hairs upon the teeth and upper part of the tube of the calyx, and the stem and veins of the under side of the leaves similarly clothed. The leaves of *M. rubra* vary considerably in texture, being sometimes thin and bright green, sometimes thicker and more opaque. Usually the upper leaves are two or three times as long as the whorls, but a plant sent to the Thirsk Botanical Exchange Club by Mr. T. B. Flower, from Crewe's Hole, Gloucestershire, bears just the same relation to the ordinary form that *M. paludosa* bears to *M. sativa*.

XII. *M. gentilis*, Linn., Smith, Koch in part.

Var. 1. *M. gentilis*, Linn. Herb. in part; Fries, Nov. ii. p. 187. *M. odorata*, var. *verticillata*, Wirtgen, n. 59.

Stem 1½–2 feet high, firm, slender, purplish, when at all luxuriant branched with several spreading or erecto-patent branches, thinly hairy with short deflexed hairs. Leaves shortly stalked, the petioles rather hairy, the lowest about ¼ inch long, the blade broadly ovate, rounded at the base, the lowest 1½–2 inches long by 1 broad, the point bluntish or acute, the texture thicker and coarser than in the preceding, the upper surface thinly hairy all over, the lower paler and more thickly hairy all over, the serrations erecto-patent and moderately sharp and deep. Whorls beginning at or a little below the middle of the stem, close and few-flowered, the lowest about 1 inch apart, sometimes stalked, with leaves about 1 inch long, the upper with leaves double their length, and the top pair or two of leaves mostly flowerless. Pedicel ¾–1 line long, glandular, and not hairy or with a casual hair. Calyx-tube campanulate, with a slight tendency towards cylindrical, ¾ of a line long, not very thickly hairy all over or naked at the base. Teeth under ½ line long, but rather lanceolate than triangular, densely hairy with erecto-patent hairs. Nut smooth. Corolla not more than 2 lines long, naked both externally and internally. Scent aromatic.

Var. 2. *M. Wirtgeniana*, F. Schultz, Wirtgen, nn. 4, 5, 68, 104. *M. rubra*, Wirtgen olim, non Smith.

Like var. 1 in habit of growth, but the stem hardly at all hairy, the leaves thinner in texture, brighter in colour, and hairy only upon the veins beneath; the calyx and corolla equally small, the latter hardly at all hairy except the teeth, which here also are lanceolate-acuminate rather than triangular, and nearly or quite twice as long as broad.

Var. 3. *M. Pauliana*, F. Schultz, Wirtgen, n. 3 *a* and *b*. *M. gentilis*, E. B. t. 2118; *M. rubra*, Sole, t. 18; *M. gentilis* and *M. elliptica*, Lejeune, fide Wirtgen.

Like var. 1 in habit of growth, the stem hairy principally above or nearly naked; the leaves similar in shape and size, rather thin in texture, the upper surface thinly hairy all over, the lower paler and hairy only on the veins and towards the edge; the calyx-tube ¾ line long, broader at the neck and consequently more truly campanulate, often slightly hairy, the teeth not more than ¼ line long, bluntly or acutely triangular, densely hairy with erecto-patent hairs.

Var. 4. *M. pratensis*, Sole, t. 10.

Stem slightly hairy, only the lowest leaves slightly stalked, n shape ovate-oblong, rather rounded below and the point bluntish, the lowest from $1\frac{1}{2}$–2 inches long by $\frac{3}{4}$–1 inch broad, the upper surface dull green and covered all over with short hairs, the lower surface paler and hairy principally in the veins; the whorls all above the centre of the stem, the higher ones with leaves not much exceeding them; calyx-tube and teeth of var. 3, but slightly and shortly hairy.

This is a plant often found as a weed of cultivated ground, with a diffuse habit of growth, wiry purplish slightly hairy stems, short, subcampanulate, often naked calyx-tube, inconspicuous hairless flowers, and a more aromatic scent than any of the verticillate forms except *M. cardiaca*. According to Dr. Wirtgen's plan of classification, these two and our *M. rubra* go with *citrata*, *viridis*, and *piperita*, and *M. arvensis* and *sativa* with *aquatica* and *pubescens*. Of the two Linnæan specimens one is our var. 1, but the other a less hairy than usual form of *M. arvensis*. Whether *M. pratensis* of Sole be rightly placed here, I know too little of it to speak with any degree of confidence. The other forms are invariably truly comose. The *M. rubra* of Hudson includes both this and *cardiaca* along with our plant, but they were all three recognized and distinguished in England long before his time by Dale and Buddle. The *M. variegata* of Sole (t. 19), *M. elegans*, Lejeune, is a garden form of this with variegated leaves. I have seen *M. gentilis*, as here defined, from 1, 2, 5, 7, 9, 10, 11, 12, 13, of Mr. Watson's provinces, and it is figured from 4 in 'English Botany.'

XIII. *M. arvensis*, Linn., Smith, Koch, Fries, Wirtgen.

Var. 1. *M. arvensis*, Sole, t. 12; Boreau, 1958; Wirtgen, nn. 55, 56, 58, 86, 88–91, 95–99.

Stem 1–2 feet high, the lower part often procumbent, the upper loosely ascending, furnished when at all luxuriant with loosely-spreading branches, densely clothed, especially above, with deflexed hairs. Leaves stalked, the stalks of the lowest fully $\frac{1}{2}$ inch long and densely hairy, the blade full green and more or less densely hairy all over above, paler and thinly hairy all over beneath, the lower ones measuring about 2 inches long by 1 broad, broadly ovate with a decurrent half, the serrations bluntish and not deep. Whorls often beginning below the middle of the stem, the lowest $\frac{1}{2}$–$\frac{3}{4}$ inch apart, the highest with leaves 2–4 times their length, and the upper pair or two usually flowerless.

Pedicel ½–1 line long, naked or slightly hairy with spreading hairs. Calyx-tube ¾ line long, quite campanulate, the teeth ¼ line long, bluntly or rather sharply triangular, as long as broad, covered all over with patent or erecto-patent hairs. Nut rough. Corolla reddish purple, about twice as long as the calyx, hairy both within and without. Scent usually strong and coarse.

This seems to be, both in Britain, Germany, France, and Scandinavia, the ordinary cornfield form of the plant. Sole's var. γ, according to the authentic specimens, is a strong erect luxuriant form of this, with coarsely hairy leaves and calyx. Smith's var. δ seems to be a diminutive paludal state of the plant with rather sharper calyx-teeth.

Var. 2. *M. nummularia*, Schreb., Boreau, 1951; Wirtgen, n. 94.

Stronger and less branched than var. 1; the stem less hairy; the leaves broader, greener, and less hairy, the teeth blunt and shallow, the lower one rounded or cordate at the base, the lowest roundish and hardly toothed. This appears to be a not uncommon cornfield form, and is often labelled *M. agrestis*.

Var. 3. *M. præcox*, Sole, t. 13.

Stem strong and upright, hairy above, nearly naked below. Leaves ovate, coarse, bluntish, hairy all over with bristly hairs above, paler and hairy principally on the veins below. Calyx quite campanulate, hairy all over, and the teeth triangular. Pedicel 1 line long, nearly naked. This is evidently not more than a robust stream-side form of the plant.

Var. 4. *M. agrestis*, Sole, t. 14; Boreau, 1957. *M. scordiastrum*, F. Schultz?; Wirtgen, n. 92?

Stem erect, much branched, very hairy with stiff deflexed hairs. Leaves broadly ovate, rounded or cordate at the base, 2–2½ inches long by 1½ broad, coarse in texture and somewhat rugose, dull green and densely hairy with strong bristly hairs all over above, paler beneath and not so hairy, the serratures broad and deep. Lower whorls 1 inch apart, upper with leaves twice their length, the pedicel 1–1½ line long, clothed with deflexed hairs; tube and teeth together 1 line long, the former quite campanulate, the latter triangular, both densely hairy. Corolla on the outside shaggy. This differs from var. 1 principally by its larger and broader leaves, by their deeper serrations, and the dense bristly hairiness of the upper surface. I have seen specimens from Somersetshire (Sole), Durham (Winch), and Sussex (Borrer).

M. Marrubiastrum, F. Schultz, recedes still further from var. 1 in the same direction.

Var. 5. *M. Allioni*, Boreau, 1961. *M. Austriaca*, Allioni, non Jacquin, fide Boreau.

Stem 2–3 feet high, loosely branched, often rather reddish, naked or nearly so below and shortly hairy above. Leaves thin and flexible in texture, deep green and thinly hairy all over above, hairy principally on the veins beneath. Pedicel naked or slightly hairy. Calyx-tube green, quite campanulate, hairy all over, especially at the base, but not densely so, the teeth short but acutely triangular, the corolla more showy and less hairy than in var. 1. This is a not unfrequent stream-side plant, very liable to be confused with *M. gentilis*, from which it may be most readily known by its hairy corolla and dotted seeds. The true *Austriaca*, as I have it from M. Déséglise, is quite a different plant.

Var. 6. *M. parietariæfolia*, Becker; Wirtgen, n. 87; Boreau, 1963. *M. arvensis parietariæfolia*, Reichb. Icones, 1289, fig. 2.

Stem loosely ascending, 2–3 feet high, not much branched, the lower part naked, the upper slightly hairy with short deflexed hairs. Petiole naked, the blade broadly ovate, narrowed very gradually from above the middle or slightly rounded into a decurrent haft, the point bluntish or sharp, the texture thin, the venation pellucid, hardly at all hairy on either side, the edge slightly ciliated with short hairs, the seration blunt and shallow, and the lower half of the leaf almost or quite entire. Whorls extending below the middle of the stem, the lowest $1\frac{1}{2}$–2 inches apart, the upper with leaves several times their length, and the top whorl or two flowerless. Pedicel 1 line long, naked or very slightly hairy. Calyx-tube $\frac{3}{4}$ line long, campanulate, the hairs thin and short, the teeth $\frac{1}{4}$ line long, bluntly or sharply triangular, only slightly hairy. Corolla deep-coloured, twice as long as the calyx, slightly hairy. This is a handsome and conspicuous stream-side form, bearing much resemblance in habit and appearance to *M. rubra*, but with the *arvensis* type of calyx. It was found in Yorkshire many years ago by Mr. John Hardy, of Manchester, on the banks of the Don, near Conisborough, and I have seen it also in Winch's Herbarium, labelled as *M. præcox*, from the banks of the Mole, near Brockham. In Scandinavia, *M. arvensis* is the most boreal species of the genus, being the only one that reaches Lapland.

Menthæ of the Buddle Herbarium.

As has been already indicated, by Ray and his contemporaries, about the end of the seventeenth century, our English Mints were collected diligently and studied carefully. The herbarium of Buddle, which forms part of the Sloane Collection at the British Museum, contains examples of all the plants numbered as species in the foregoing list, with the exception of *M. citrata*. The following is a list of Buddle's specimens, with their determinations. In a manuscript Flora by Buddle (Sloane MSS. 2970–2980), which has never been published, the bringing of which to light and the tracing out of the connection of which with the herbarium we owe to Mr. Carruthers, Buddle enumerates twenty-four forms, of which the collection contains examples of all but two. The list will show his interpretation of Ray's names and synonyms. The number which begins each paragraph refers to Buddle's manuscript Flora. It is the third or Dillenian edition of Ray's 'Synopsis' which I have referred to (published in 1724), where eight *Menthæ verticillatæ* (including *capitatæ*) and seven *Menthæ spicatæ* are given.

Ray's Menthæ verticillatæ.

36 is *M. arvensis Allioni*. In his Flora (Sloane MSS. 2975. fol. 22), Buddle combines together under this number the synonyms of Ray's 1 and 2, writing "there are great varieties of this."

37 is just our typical *M. sativa*. Buddle labels it "Mentha Calaminthæ arvensis verticillatæ similis, sed multo elatior: est forsitan varietas C. aquaticæ, Ray."

38, which Buddle labels as Ray's No. 3, is represented by two specimens, one of which, contributed by Bobart, is *M. Pauliana variegata*, the other a broad-leaved and broad-bracted form of *sativa*.

39 is *M. arvensis Allioni*, with rather sharper calyx-teeth and less hairy leaves than 36. Buddle labels it "M. verticillata, glabra, foliis ex rotunditate acuminatis."

40, which Buddle calls "M. verticillata odore fragrantissimo," is a form of *M. sativa* with not very hairy acute leaves, twice as long as broad.

41 is our *M. cardiaca*. Buddle quotes the synonyms of Gerarde and Parkinson, as given under Ray's No. 4, omitting those of J. and C. Bauhin, which he quotes under No. 42, thus separating Ray's plant

into two. He writes, "This Mr. Dale makes different from the following."

42. *M. Pauliana variegata.* Besides the synonyms of the two Bauhins just referred to, Buddle gives *Calamintha ocymoides*, Tabern. 351; *ocymoides repens*, Ger. Ox. 549; *cardiaca*, Park; and calls this "The Basil Mint," expressing a doubt whether this and 41 are truly indigenous.

43. Two specimens, one of them Bobart's plant mentioned by Ray, both our *M. rubra.* Buddle gives here all the synonyms of Ray's No. 4, and one or two others.

44. *M. acutifolia*, Smith (*vide supra*), from the banks of the Medway, called by Buddle "M. aquatica verticillata odoris gratissimi." I cannot distinguish *M. angustata*, F. Schultz, from this.

45. A form of *sativa*, with deeply and doubly-toothed leaves, the lower ones cordate at the base, and upper whorls with bracts scarcely exceeding them, called by Buddle "M. Sisymbrii facie et odori, hirsuta, verticillata."

46. Buddle gives here the synonyms of Ray's No. 6. It is a not very hairy form of *M. hirsuta*, with a terminal head and two whorls, the lowest subtended by two large leaves. This just agrees with what I have from M. Déséglise as *M. purpurea*, Host. (*vide* Boreau's 'Flore du Centre').

47. Buddle gives here the synonyms of Ray's No. 7. It is a more hairy and thoroughly capitate form of *M. hirsuta*, agreeing with the example so labelled in the Linnæan herbarium.

49. A very much branched form of *M. hirsuta*, from Stoke Newington, called by Buddle "Sisymbrium ramosissimum floribus in summis ramulis in globulos conglomeratis."

RAY'S MENTHÆ SPICATÆ.

48. Our *M. pubescens vera*, "first observed by Mr. Rand about some ponds near Marybone," labelled by Buddle "Sisymbrium hirsutum, folio angustiore et acutiore, minime ramosum."

50. Two specimens, one *M. piperita officinalis*, labelled "Mentha aquatica nigricans fervidi saporis;" the other, *M. piperita vulgaris*, labelled "Mentha rotundifolia rubra Aurantii odore, Bobart. Hist. 369; Sisymbrium pratense, Math.; Mentha rotundifolia spicata altera, C. B.;

Mentha rubra folio et flore nigræ Menthæ, Lobel, Cut. Bobart. Hist. t. 6. n. 11."

51. Our *M. pubescens hircina*, exactly agreeing with one of the specimens called *aquatica* in the Linnæan herbarium, for which Buddle gives the synonyms of Ray's No. 4.

52. No specimen. In manuscript, "M. aquatica folio oblongo viridi glabro saporis fervidissimi;" and under 51 Buddle writes, "This and the following are the same." The locality here is, "By the New River sides, near Newington."

53. *M. piperita officinalis*, labelled by Buddle as Ray's No. 7.

54. Two specimens labelled as Ray's No. 1, one Dale's plant, mentioned by Ray, which is *M. crispata*, the other from D. Bobart, which is normal *viridis*.

56. A broad nearly naked-leaved form of *M. viridis*, with very hairy calyx-teeth, so that the unopened spike looks quite shaggy, labelled as Ray's No. 2, "ab ipsissimo Dale, qui non tantum Menthas varias collegit sed accurantius distinxit."

57. *M. sylvestris nemorosa*, Doody's plant mentioned in the note to Ray's No. 5.

58. *M. sylvestris nemorosa.* Leaves rather blunter and less sharply toothed than in the last, labelled as Ray's No. 5, and Buddle writes, "According to my notion of them, these two last are near akin."

59. *M. rotundifolia*, labelled as Ray's No. 6.

Besides these there are specimens of our *M. crispa*, labelled "Mentha crispa, Danica sive Germanica, speciosa, Parkinson; Cut. Bobart. Hist. t. 6, n. 11," and of normal *M. viridis*, labelled "M. Romana angustifolia sive cardiaca, Parkinson, 31."

Sowerby, near Thirsk, May 9, 1865.

EXPLANATION OF PLATE XXXIV., representing *Mentha cardiaca*, Gerarde. Fig. 1, an entire flower; 2, calyx:—*both magnified.*

ON *FARADAYA*, A NEW AUSTRALIAN GENUS.

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

In the thirty-first number of his 'Fragmenta Phytographiæ Australiæ,' Dr. F. Mueller defines a new genus, which, in honour of the illustri-

ous Faraday, he names *Faradaya*, and of which only one species (*F. splendida*), discovered by Dallachy in woods at Rockingham Bay, was known to him. Dr. Mueller referred the genus to *Bignoniaceæ*, and, on sending his printed description, accompanied it by a specimen of the plant, he was pleased to ask my opinion with regard to the stability of the genus. An examination convinced me that *Faradaya* was identical with a genus which for some time had engaged my attention, and about which I wrote, by the last mail, to Professor Asa Gray, as one of the persons interested in it. The genus I hold to be a sound one, but Dr. Mueller, usually so correct, was, in this instance, certainly wrong, in referring it to *Bignoniaceæ*, with which the plant has nothing to do, it being a genuine member of the Natural Order *Verbenaceæ*, closely related to *Clerodendron* and *Oxera*. Let me state the history of the genus. In 1862, I described in the tenth volume of the 'Bonplandia,' p. 249, a *Clerodendron*, from the Tongan or Friendly Islands, under the name of *C. Amicorum*. Shortly afterwards, Asa Gray, travelling over the same ground, also came across this species, and had already given it exactly the same name when the 'Bonplandia' reached him. On redescribing it in the Proceedings of the American Academy, vol. vi. p. 50, he added another species, *C. ovalifolium*, from the Viti Islands, and pointed out that both agreed in their 4-lobed, almost regular calyx and corolla, and 4 stamens, at the same time proposing the sectional name *Tetrathyranthus* for these two *Clerodendrons*. At the beginning of this year an allied third species, collected by Mr. J. Storck in Viti, reached me, which also had a 4-lobed corolla and 4 stamens, but the calyx was almost invariably 2-lobed, the lower lobe frequently splitting into 2. This led to renewed examination. The calyx I found to be closed before anthesis and splitting or rather tearing irregularly into 4, 3, or 2 lobes, when the corolla is forcibly pushed through a very narrow aperture at the extreme end, indicated by four very minute points, one would hardly call them teeth, though they are in reality the teeth of the limb of the calyx. The splitting of the calyx is analogous to what we find in the genus *Tecoma* (as now circumscribed) and several genera of *Eubignonieæ*; we have nothing like it in the genuine *Clerodendrons*; and, I think, there can be no doubt that this set of plants must constitute a separate genus. I meant to have taken this view of the case in dealing with them in my 'Flora of Viti,' and to have adopted A. Gray's sectional name for the

genus; but as I now find the species from Rockingham Bay to be a congener, and as a new name has actually been published, I shall adopt Mueller's name. We thus get the following systematic arrangement, viz.:—

FARADAYA, gen. nov. *Verbenacearum*, F. Muell. Frag. Phyt. Austr. v. p. 21.—*Clerodendron*, sect. *Tetrathyranthus*, A. Gray, in Proceed. Am. Acad. vi. p. 50.

1. *F. splendida*, F. Muell. l. c. p. 21.—Rockingham Bay, Queensland (Dallachy !).

2. *F. ovalifolia*, Seem.—*Clerodendron (Tetrathyranthus) ovalifolium*, A. Gray, l. c. p. 50.—Viti Islands (U. S. Expl. Exped. !).

3. *F. Amicorum*, Seem.—*Clerodendron Amicorum*, Seem. in Bonpl. x. p. 249. *C. (Tetrathyranthus) Amicorum*, A. Gray, l. c. *Terminalioides*, Sol. mss. in Herb. Brit.—Tongan Islands (Banks and Solander ! Barclay ! U. S. Expl. Exped.).

4. *F. Vitiensis* (sp. nov.) Seem. Fl. Vitien. ined. cum icon.—Viti Islands (Storck !).

The flowers of this, as well as all the other species, seem to be cream-coloured.

In looking over the herbarium of the British Museum for congeners, I met with a plant having a calyx similar to my *Faradaya Vitiensis*, and provisionally named by R. Brown *Vitex* (?) *macrophylla* (foliis simplicibus integerrimis ovato-oblongis glabris costatis basi 2-glandulosis; caule arboreo), and discovered by Banks and Solander at Cape Grafton. There is only one specimen extant, and an examination showed that the ovary is 5-celled, and that the carpellary leaves are involute as in *Clerodendron* and *Faradaya*. Solander gave to this plant the manuscript name *Ephielis simplicifolia*, coupling it with another Verbenaceous plant (*Vitex littoralis*, A. Cunningh.) from New Zealand. As the former represents an entirely new generic type Solander's name might be adopted, since Schreber's *Ephielis* does not stand, being synonymous with Aublet's *Matayba* (now regarded as a section of *Ratonia*). I should add that the only flower which could be examined had only four equal lobes of the corolla, whilst Solander mentions five; in æstivation the external lobe overlaps the two placed next it, and these again overlapping the internal one.

Ephielis, Solander, mss. in Bibl. Mus. Brit. excl. sp. Calyx ante anthesin clausus, demum irregulariter 2-fidus, "glaber, persistens, 3-

lineas longus." Corolla "irregularis (extus sericea); tubus cylindraceus, deorsum incurvus, longitudine calycis; faux magna, ventricosa, tubo duplo longior; limbus 5-partitus; laciniæ oblongæ, obtusæ, patulæ, longitudine tubi, 2 superiores erectiusculæ (intus niveæ), 2 laterales divaricatæ (colore supernum); infima lacinia dependens, cæteris paulo longior (intus rubicunda, macula baseos magna lutea)." Stamina 4, "tubo longiora; antheræ 2-lobæ." Ovarium 5-loculare, ovulis solitariis. "Stylus filiformis, subulatus, inclinatus, corollæ paulo longior. Stigma subulatum, acutum, reflexum. Drupa oblongo-obovata, subtus 2-nata, obtusissima (non penitus matura magnitudine nucis Avellanæ) nux ovalis, 5-locularis, loculo centrali major, nuclei oblongi solitarii."—Arbor Novæ Hollandiæ orientalis, foliis oppositis ovato-oblongis integerrimis costatis glabris, basi 2-glandulosis; floribus cymoso-paniculatis axillaribus et terminalibus, albidis.

Species unica:

1. *E. simplicifolia*, Sol. mss. l. c.—*Vitex* (?) *macrophylla*, A. Brown, Prodr. p. 512.—Cape Grafton (Banks and Solander!).

POTAMOGETON NITENS IN THE RIVER TAY.

Mr. John Sim, of Perth, has found the longer form of the plant in the river Tay, at Perth. The lowness of the water has allowed him access to it for the first time; and as he could not determine the name of the plant, from want of access to books, he was so good as to send a large bundle of it to me in a fresh state. The specimens closely resemble the *P. lanceolatus* of Reichenbach's 'Icones,' vii. t. 31, which is certainly not the *P. lanceolatus*, Sm., and seems almost equally certainly a state of *P. nitens*, l. c. t. 34. Mr. Sim states that the plant grows in deep and very rapid water, in company with *P. perfoliatus* and *P. crispus*.—C. C. Babington.

ON PLANTS PRODUCING DOUBLE FLOWERS.

Mr. Edward Otto, the Curator of the Hamburg Botanic Garden, has recently published in the 'Gartenzeitung,' so ably edited by him, a list of the plants producing double flowers which have come to light since my second list (Journ. of Botany, Vol. II. p. 318) of them was printed. Most of them have already been recorded in our Journal

but there are several additions, some taken from an article on double flowers in the 'Revue Belgique,' liv. i. 1865, and some from Mr. Otto's own notes.

Ranunculaceæ.

Anemone Apennina, *Linn.* Europa austr.

A. stellata, *Lam.* Europa.

Berberideæ.

Berberis vulgaris, *Linn.* Europa.

Pomaceæ.

Pyrus spectabilis, *Ait.* China.

Onagrarieæ.

Œnothera biennis, *De Cand.* Am. bor. (Ed. de Selys.)

Campanulaceæ.

Campanula urticæfolia, *Schm.* (a var. of *C. Trachelium*, previously mentioned). Europa.

Primulaceæ.

Lysimachia Nummularia, *Linn.* Europa, Am. bor.

Polemoniaceæ.

Cobæa scandens, *Cav.* Mexico.

Gesneraceæ.

Gloxinia speciosa, *Hort.* Brasilia.

Begoniaceæ.

Begonia sp. Amer. austr. (Ed. Otto.)

BERTHOLD SEEMANN.

CORRESPONDENCE.

Edinburgh Catalogue of British Plants.

Although not answerable for the above Catalogue, either as author or editor, I may remark, in reply to your queries, that *Arctium tomentosum* is omitted because in my last account of the genus (Ann. Nat. Hist., Jan. 1865) I have stated that it is not a native of Britain, and was recorded through mistake. It is probable that two of the queries, the first and fourth, are misprints.

As most of the altered names were used at my desire, it is proper to explain their cause. Our *Delphinium Consolida* is clearly not the true plant. It is the *D. Ajacis* of Gay (G. and G., Fl. Fr. i. 46).

Lepigonum rupicola and *L. salinum*. See the reasons for the change in Eng. Bot. Suppl. n. 81.*

Spergula media, β. *pallida*. *S. pallida*, Dum., is a much older name than *S. Boreana*, Jord. See Bull. Soc. Bot. Belg. n. 49, and plate. It is probably a distinct species. I have found it abundantly at Holme-next-the-Sea, Norfolk.

Potentilla maculata, Pourr. This name is of the date of 1788. See Lehm. Rev. Potent. 119.

Arctium, sp. See my paper quoted above.

Eriophorum polystachion. It is altogether an open question which of the Linnæan names for this species we like to use. I now prefer *E. polystachion* to *E. angustifolium*.

I have my own slight objections to some points in the Catalogue not noticed by you, especially to the removal of the whole of *Paronychiaceæ* to the *Monochlamydeæ*. *Scleranthus* might possibly be correctly placed there, as is done by Walker-Arnott, but he leaves the rest of the order in its old place; and Bentham (a very high authority on such points) does not change the position even of *Scleranthus*.

I wish all after page 35 had been omitted. The list of the cultivated "varieties" of British Ferns is of neither use nor interest to the botanist, and adds to the expense of the catalogue unnecessarily.

Yours, etc.,

Cambridge, July 13*th*, 1863. C. C. Babington.

NEW PUBLICATIONS.

Fragmenta Phytographiæ Australiæ, contulit F. Mueller, Ph.D., etc. Melbourne: 1863–64. Vol. IV., pp. 195.

We have from time to time noticed the appearance of the different fascicles composing this volume as they came at hand, and have now great pleasure in announcing the completion of the volume—the fourth of the whole work, accompanied by plates illustrating new or rare genera and species. In the last fascicle we have a new genus of *Monimieæ* (*Palmeria*), a climbing plant from Rockingham Bay; a number of new *Sapindaceæ*, *Myrtaceæ*, *Leguminosæ*, *Orchideæ*, etc. The illustrations of the whole volume refer to *Harpulia Wadsworthii (Sapindaceæ)*, *Podocarpus Droyniana (Coniferæ)*, *Michiea symphyanthera (Epacrideæ)*, *Styphelia Hainesii (Epacrideæ)*, *Mackinlaya macrosciadea (Umbelliferæ)*, *Grevillea Martini (Proteaceæ)*, *Chamælaucium Thomasii (Myrtaceæ)*, *Drosera Adelæ (Droseraceæ)*, and *Gastrolobium grandiflorum (Leguminosæ)*.

* Could not some way be found of making this work better known to botanists, so as to ensure its repaying the actual outlay expended upon it by its proprietor, Mr. J. W. Salter?

In the Appendix we have several new *Hydrocotyles*, three of which (*H. lobocapa*, *capillaris*, and *diantha*) do, however, not belong to that genus. None of the genuine *Hydrocotyles* are annual, or have a distinct carpophorum. A careful re-examination of them, and *all* the other Australian and New Zealand *Hydrocotyles* having the same habit as these three, will convince Dr. Mueller that a number of plants have been referred to a genus with which they have no relationship.

The first number of the fifth volume of this valuable work has also come to hand; it is principally devoted to new plants from Rockingham Bay. The new genera are *Brombya* (Rutaceæ), *Mackintyria* (Leguminosæ), *Gillbeea* (Saxifrageæ), *Irvingia* (Araliaceæ), *Faradaya* (Bignoniaceæ), and *Cardwellia* (Proteaceæ). *Gillbeea* does not seem to differ from *Aphanopetalum*, except by numerical characters, on which little reliance can be placed; *Irvingia* was first indicated in this Journal, and is identical with *Kissodendron*, but has the priority by about a couple of months; whilst *Faradaya* is not a *Bignoniacea*, but a *Verbenacea*.

A Handbook of British Plants, designed expressly for Schools, Science-Classes, and Excursionists. By W. L. Notcutt. London: Longman. Pp. 213.

This work does not make any pretension to originality. The author says in his preface, "The following pages have been drawn up with the view to supply the want of a brief, simple, and cheap introduction to the study of British plants, especially for the use of classes in schools, and for the science-classes established in various parts of the kingdom under the Department of Science and Art. It is in no wise intended to compete with the larger Floras of Babington, Hooker, and Bentham, but rather to serve as a first book for beginners, and introduction to those works." It contains—1. A general introduction, with directions how to examine a plant and form a herbarium; 2. A list and analysis of the Natural Orders represented in the British flora; 3. Brief diagnoses of all the genera of British flowering plants and ferns; 4. Similar compendious diagnoses of the species; and, 5. A glossary of botanical terms. The price is just one-third of the cheapest of the books just mentioned, and the size convenient for the pocket. So far as we can judge from a glance over the pages, great care seems to have been taken in its compilation; and all novelty in matters of nomenclature and classification has been wisely eschewed.

The Plants indigenous to the Colony of Victoria, described by F. Mueller, Ph.D., F.R.S., etc. Melbourne: 1864–5. Lithograms. 4to.

This volume of plates has been issued separately, whilst the printing of the descriptive portion of the work is very properly deferred until Bentham's 'Flora of Australia' shall have sufficiently advanced not to interfere with the continuation of the enumeration of all the Victorian plants which Dr. Mueller is prepared to give, and has partly ready for press. The lithograms are 64 in number, and executed by Schonfeld, of Melbourne. They are a great improvement upon those we have had from the same artist, being less shaded than his previous ones, and the analyses are clearer, and thus much more intelligible. But for uncoloured plants there is, even now, too much shading. The work is published at Government expense, highly creditable to the colony, and of real service to science.

BOTANICAL NEWS.

An advertisement conveniently reminds us that on the 9th of September, 1866, the Physical and Natural History Society of Geneva will award a prize of 500 francs to the best monograph of a genus or Natural Order of plants. The monograph must be sent in before the 1st of July next, may be written either in Latin or French, and if its publication in the Society's Transactions should be objected to by the author, it will be returned to him. Our readers are aware that this prize was founded by the great De Candolle, and is given away every fifth year.

Professor Göppert's long-expected essay on the 'Enclosures in Diamonds,' to which we drew attention some months ago, has now been published, illustrated with plates. Some of the bodies enclosed are undistinguishable from germinating spores of fungi.

Mr. R. Tate, F.G.S., the author of the 'Flora of Belfast,' is gone to the Shetland Islands, as a member of a commission appointed by the Anthropological Society, and will carefully attend to the vegetation of these islands as far as the main object of his visit will permit.

Professor Crepin announces the publication of an enlarged edition of his 'Manuel de la Flore de Belgique' (G. Mayolez, of Brussels). Subscribers will receive the work for five francs. The 'Revue' of the Belgian Flora, which that indefatigable author has promised us, is unavoidably deferred.

The scheme for an International Horticultural Exhibition and Botanical Congress, which it is proposed to hold in London in May, 1866, is actively prosecuted. Subscriptions to a large amount have been received, and a guarantee fund of several thousand pounds has been formed. The executive committee has

also been appointed, with Sir C. Wentworth Dilke, Bart., F.L.S., as chairman, Mr. J. J. Blandy, V.P.R.H.S., as deputy chairman, Sir Daniel Cooper, Bart., as treasurer, Mr. Thomas Moore as secretary of the Exhibition, Dr. Berthold Seemann for the congress, and Dr. Hogg for general business. The other members of the executive committee are Messrs. Bentley, W. Bull, E. Easton, C. Edmunds, J. Fleming, R. Fortune, J. Gibson, Lee, Masters, T. Osborn, W. Paul, J. Standish, C. Turner, and Veitch. Prizes to the aggregate amount of £2400 will be awarded for new or well-cultivated plants and fruits. All the leading botanists and horticulturists throughout Europe will be invited to take part. At the Congress, papers previously printed in English and the original will be read. Two conversazioni, a banquet, and other entertainments, are also contemplated.

Dr. Lindley's Herbarium of Orchids has become the property of the Kew Museum.

Efforts are now making in Germany for the purpose of organizing an Arctic Exploring Expedition, and those interested in the success of the plan held their first meeting in the Goethe House at Frankfort-on-the-Maine. The movement originated with Drs. Volger and Petermann.

Mr. M. C. Cooke has just published, as a supplementary number to Hardwicke's 'Science Gossip,' an 'Easy Guide to the Study of the British *Hepaticæ*,' containing a complete catalogue of the British species, with a figure of each, at the unprecedented price of *fourpence!* We shall speak of it more fully.

We almost fear that a paragraph of our last issue, stating that the new edition of Babington's 'Manual' had not yet appeared, is rather calculated to mislead, implying as it does that a new edition may immediately be looked for. A considerable time, however, must yet elapse before that event takes place.

At the last great Flower Show, held at the Botanic Gardens, Regent's Park, Mr. W. Bull exhibited a newly-introduced and unnamed kind of Radish, from the East Indies, the fruit of which, stated to grow three inches during a single night, was recommended to be eaten instead of the root as in the ordinary radish. From specimens kindly placed at our disposal by the exhibitor, we find the plant to be *Raphanus caudatus*, Linn., of which, books of reference inform us, the leaves are eaten as a vegetable, and the seeds are pickled. The petals are whitish, tipped with purple, and traversed by purple veins, and the fruit is several feet long. We fancy this is the first time that this annual has been introduced, and there is no reason to believe that it cannot be grown with us in the open air.

It is our melancholy duty to announce the death of Dr. Samuel Woodward, which took place at Herne Bay on the 11th of July. Dr. Woodward was born on the 17th of September, 1821. In 1845 he was appointed Professor of Botany and Geology in the Royal Agricultural College, and in 1848 first-class assistant in the Department of Geology and Mineralogy at the British Museum. He was the author of a good elementary book on recent and fossil shells, and numerous valuable articles in scientific periodicals and transactions.

REVISION OF THE NATURAL ORDER *HEDERACEÆ*.

By Berthold Seemann, Ph.D., F.L.S.

(*Continued from p.* 181.)

VII. On the Genus Sciadophyllum, *P. Browne*.

XXIII. Sciadophyllum, P. Browne, Jam. 190. Pedicelli inarticulati. Flores ecalyculati, hermaphroditi. Calyx limbo 5-dentato v. subtruncato. Petala 5–10, ovato-triangularia, 1-nervia, æstivatione valvata, libera v. calyptratim cohærentia, nunc plane concreta. Stamina 5–10; antheræ oblongæ v. subglobosæ. Pollen globosum. Ovarium 4–10-loculare, loculis 1-ovulatis. Styli 4–10, erecti, liberi, demum recurvi. Drupa subexsucca, 4–10-costata, 4–10-pyrena, pyrenis 1-spermis. Albumen æquabile.—Arbores v. frutices Africæ et Americæ tropicæ, stantes v. scandentes et radicantes; foliis alternis, digitatim compositis, foliolis obsolete denticulatis v. integerrimis; stipulis in unam intraaxillarem concretis; umbellis v. capitulis in racemos dispositis; floribus albidis flavis roseis v. purpurascentibus.—Planch. et Linden, Araliaceæ, p. 19 (ined.). *Actinophyllum*, Ruiz et Pav. Fl. Per. Prodr. 51, t. 8; Fl. Peru, iii. p. 74. *Astropanax*, Seem. in Journ. of Bot, 1865, p. 176. *Araliæ* et *Paratropiæ* sp. auct.

Sciadophyllum differs from *Heptapleurum* and *Agalma* by its several free styles, from *Fatsia* by its strongly-ribbed fruit, and was founded by P. Browne on a Jamaica tree with digitate leaves, umbels arranged in racemes, a 5-toothed calyx, a corolla composed of 5 petals closely united into a calyptra, 5 stamens, 5 styles, and a 5-celled ovary. Ruiz and Pavon afterwards named the genus *Actinophyllum*, and added several Peruvian species, several of which, however, differ from the original type of the genus in having double the number of stamens and petals, and the petals so closely united that it is impossible to trace their individual limits, and the corolla might be appropriately described as monopetalous. At one time I thought it possible to restrict the genus *Sciadophyllum* to those species, the corolla of which consists, apart from all theoretical considerations, of one piece only; and, on that ground, I proposed for the African species the name *Astropanax;* but a close examination of all the materials at hand, enclosing the authentic specimens of Ruiz and Pavon, has convinced me that there is a gradual transition, from the *Sciadophylla* with free

petals, petals closely united, but distinguishable with the naked eye, and petals with difficulty distinguished by the help of high microscopic powers, and reflected light, to petals so intimately joined as to seem to form one solid piece. At a future time, when materials have more accumulated in our herbarium, and both flower and fruit of all the species shall have become known, it may, perhaps, be possible to use the corolla for generic purposes; as its nature is never obscure or doubtful, one is always able to say of how many parts the corolla of a species is composed.

* *Flores umbellati.*

1. *S. Brownei*, Spreng. Syst. i. p. 953.—*Aralia Sciadophyllum*, Swartz, Prodr. 55. *Hedera Sciadophyllum*, Swartz, Fl. Ind. Occ. i. p. 519. *Vitis heptaphylla*, Linn. Mant. p. 212.—Woods of Jamaica (Masson! in Herb. Mus. Brit.; Purdie! Alexander Prior! Marsh!).

2. *S. sphærocoma*, Benth. Bot. Sulph. p. 102.—Isle of Gorgona, west coast of trop. America (Barclay! in Herb. Benth.).

3. *S. pedicellatum*, Poir. Dict. vi. p. 176.—*Actinophyllum pedicellatum*, Ruiz et Pavon, Fl. Per. iii. p. 73, t. 308.—Mountains about Muña, Peru (Pavon! in Herb. Mus. Brit.).

4. *S. micranthum*, Planch. et Linden, Araliac. p. 20.—Ocaña, New Granada (Schlim, n. 1149). This is in Herb. Hook. under Schlim, n. 699, if I have correctly determined the species.

5. *S. villosum*, Planch. et Linden, Araliac. p. 20.—New Granada (Schlim, n. 44). Corolla unknown.

6. *S. Goudotii*, Planch. et Linden, Araliac. p. 21.—Bogotá and province of Pamplona, New Granada (Goudot! Schlim! n. 3 et 5).

7. *S. oxyanthum*, Planch. et Linden, Araliac. p. 21.—New Granada (Triana, n. 372).

8. *S. Quinduense*, De Cand. Prodr. iv. p. 261.—*Aralia Quinduensis*, H. B. et K. Nov. Gen. v. p. 8, t. 417, f. 1; Planch. et Linden, Araliac. p. 22.—Nomen vernac. "Pata de gallina." New Granada, Andes of Quindiu (Humboldt et Bonpland: Triana!), Antioquia (Purdie! Jervise!).

9. *S. decaphyllum*, Seem. (sp. nov.); glabrum; foliolis 9–10, obovato-oblongis retusis basi acutis, supra lucidis; floribus umbellatis; drupis 5-angulatis; stylis 5 recurvis persistentibus coronatis.—*Panax decaphyllum*, Sagot, Herb.—French Guiana (Sagot! n. 916).—Leaflets

3–4 inches long, 1½–2 inches broad, and their surface so remarkably shining that this species is at once distinguished by it. The specimens are in fruit only.

10. *S. Abyssinicum*, Steud. Nomencl. Bot. p. 537; Miq. Ann. Lugd. Bat. i. p. 26.—*Astropanax Abyssinicum*, Seem. in Journ. of Bot. 1865, p. 177. *Aralia Abyssinica*, Hochst. mss. in Schimp. Pl. Abyss. ed. i. n. 283; Rich. Tent. Fl. Abyss. i. 336; Walp. Ann. ii. p. 724.—Adoa, Abyssinia (Hochstetter!).

11. *S. elatum*, Seem.—*Astropanax elatum*, Seem. l. c. *Paratropia elata*, Hook. fil. in Journ. Linn. Soc. vii. p. 196.—Cameroon Mountains, 7500 feet above the sea (Mann!).—This species is very close to *S. Abyssinicum*, but appears to be sufficiently distinct.

12. *S. Barteri*, Seem.—*Astropanax Barteri*, Seem. Journ. of Bot. 1865, p. 177.—Glabrum; foliolis 5 longe petiolatis ovato- v. obovato-oblongis acuminatis basi rotundatis integerrimis coriaceis supra nitidis; umbellis racemosis 7–12-floris, bracteis ovatis acuminatis; drupis subglobosis 8-pyrenis.—Sugar Loaf Mountains, Niger (Barter! n. 2027). "A small tree," Barter.

13. *S. Baikiei*, Seem.—*Astropanax Baikiei*, Seem. in Journ. of Bot. 1865, p. 177.—Glabrum; foliolis 5 (?) longe petiolatis elliptico-oblongis acuminatis in petiolum attenuatis integerrimis submembranaceis; umbellis racemosis 4–5-floris, bracteis lanceolatis; drupis ovatis 4–6-pyrenis (albis) acute angulatis.—Niger (Barter!).—"Twenty feet high, fruit white when ripe," Barter. I have named this species in commemoration of the late Dr. Baikie, the indefatigable explorer of the Niger, to whose expedition the late Mr. Barter was attached as botanist. The leaflets are larger than these of the preceding species, less coriaceous, and different in shape.

** *Flores capitati.*

14. *S. Manni*, Seem.—*Astropanax Manni*, Seem. in Journ. of Bot. 1865, p. 178. *Paratropia Manni*, Hook. fil. Journ. Linn. Soc. vi. p. 10.—Fernando Po. 5000 feet above the sea (Mann!).

15. *S. conicum*, Poir. Dict. vi. p. 746.—*Actinophyllum conicum*, Ruiz et Pav. Fl. Per. iii. p. 74, t. 309.—Peru (Pavon! in Herb. Mus. Brit., Mathews!).

16. *S. acuminatum*, Poir. Dict. vi. p. 746.—*Actinophyllum acuminatum*, Ruiz et Pav. Fl. Peruv. iii. p. 74, t. 310.—Peru (Pavon! in Herb. Mus. Brit., Lechler! n. 2592).

17. *S. angulatum*, Poir. Dict. vi. p. 745, exclud. syn. Browne.—*Actinophyllum angulatum*, Ruiz et Pavon, Fl. Peruv. iii. p. 73, t. 307, non H. B. et K.—Peru (Pavon! in Herb. Mus. Brit.).

18. *S. Humboldtianum*, Dcne. et Planch. in Planch. et Linden, Araliac. p. 23.—*Actinophyllum angulatum*, H. B. et K. Nov. Gen. v. p. 92, non Ruiz et Pavon?—New Granada, between Pansitara and Almaguer (Humboldt and Bonpland).

19. *S. pentandrum*, Poir. Dict. vi. p. 747.—*Actinophyllum pentandrum*, Ruiz et Pavon, Fl. Peruv. iii. p. 75, t. 311.—Muña, Peru (Pavon! in Herb. Mus. Brit.).

20. *S. Trianæ*, Planch. et Linden, Araliac. p. 23.—New Granada (Triana! Jervise!).

I have seen the corolla of this plant, unknown to Planchon and Linden. It is hemispherical.

21. *S. heterotrichum*, Planch. et Linden, Araliac. p. 23.—New Granada, between Bogotá and Fusagasuga (Goudot! n. 1 B.).

22. *S. Mathewsi*, Seem. (sp. nov.); ramis foliisque glabris; foliolis 8–10 oblongis v. obovato-oblongis, obtusis v. abrupte acuminatis, basi obtusis v. acutiusculis integerrimis coriaceis, supra nitidis subaveniis, subtus venis prominulis; capitulis (Pisi maj. magnitudine) racemoso-paniculatis, rachis ramisque villoso-puberulis, pedunculis angulatis; corolla hemisphærica puberula, apice depresso; staminibus 5, antheris oblongis; stylis 4–5; drupis obconico-4–5-angulatis, glabris.—Chachapoyas, Peru (Mathews! in Hort. Hook. et Bth.).

Leaflets $3\frac{1}{2}$–4 inches long, $1\frac{1}{2}$ inches broad.

23. *S. ferrugineum*, Dcne. et Planch. in Rev. Hort. 1854, p. 107.—*Aralia ferruginea*, H. B. et K. Nov. Gen. v. p. 7. *Hedera ferruginea*, De Cand. Prod. iv. p. 264.—Between Saraguro and Oña (Humboldt and Bonpland).

24. *S. Sprucei*, sp. nov. Seem.; foliolis 9 longe petiolulatis ovali-oblongis acuminatis in petiolum attenuatis glabris, supra atroviridibus, subtus pallidioribus venis primariis subpurpurascentibus; rachi pedunculisque tomento stellato deciduo vestitis; floribus sessilibus; capitulis (fœm. fructif.) parvis; corolla ign.; stylis 4 recurvis.—Tarapoto, Peru (Spruce! n. 4550).

I have named this species in honour of its discoverer, that enterprising South American explorer, Dr. Spruce.

Species indescriptæ.

25. *S. caudatum*, Dcne. et Planch. in Rev. Hort. l. c. (Herb. Dombey).

26. *S. Gayanum*, Dcne. et Planch. l. c.

27. *S. ochroleucum*, Dcne. et Planch. l. c.

Species exclusæ.

S. avene, Korth.=*Heptapleurum avene*, Seem.
S. capitatum, Griseb.=*Oreopanax capitatum*, Dcne. et Planch.
S. digitatum, G. Don=*Carolinia insignis*, Hort.
S. divaricatum, Blume=*Heptapleurum divaricatum*, Seem.
S. ellipticum, Blume=*Heptapleurum ellipticum*, Seem.
S. farinosum, Bl.=*Heptapleurum tomentosum*, Hassk. var.
S. humile, Blume=*Heptapleurum parasiticum*, Seem.
S. Jacquinii, Griseb.=*Dendropanax arboreum*, Dcne. et Planch.
S. longifolium, Bl.=*Heptapleurum longifolium*, Seem.
S. lucidum, Blume=*Heptapleurum longifolium*, Seem. var.
S. macrostachyum, Bth.=*Brassaia macrostachya*, Seem.
S. palmatum, Blume=*Trevesia Sundaica*, Miq.
S. parasiticum, Blume=*Heptapleurum parasiticum*, Seem.
S. pulchellum, Hort.=*Tupidanthus calyptratus*, Hook. f. et Th.
S. racemiferum, Miq.=Gen. nov.
S. rotundifolium, Hort.=(?) *Heptapleurum* sp.
S. rubiginosum, Planch. et Lind.=Gen. nov.
S. scandens, Blume=*Heptapleurum scandens*, Seem.
S. subavene, Blume=*Heptapleurum Coronæ-sylvæ*, Seem.
S. tomentosum, Blume=*Heptapleurum tomentosum*, Hassk.
S. verticillatum, Spanoghe=*Heptapleurum verticillatum*, Seem.

VIII. On the Genus Oreopanax.

I should not have been able to give a complete enumeration of all the species composing this large genus and *Sciadophyllum* if Dr. Planchon and M. J. Linden had not obligingly sent me the proof-sheets of a work on the plants of New Granada and Venezuela, written by them, which contain descriptions of the *Araliaceæ* of that region, and of which they allowed me to make a free use. I have not reprinted the descriptions, but merely referred to them under the title "Planch. et Lind. *Araliaceæ*." MM. Decaisne and Planchon have also kindly furnished me with information relative to several of the undescribed species enumerated by

them in the 'Revue Horticole.' Botanists who meet with any species of *Oreopanax* in a wild state or cultivated in tropical gardens should endeavour to observe whether the flowers are really dicœcious. Many *Araliaceæ* are polygamous, but some genera seem to be always hermaphrodite. Observations on these points are very much needed.

XXVII. OREOPANAX, Dcne. et Planch. Revue Horticol. 1854, p. 108; Planch. et Lind. *Araliac.* p. 5 (*ined.*).—Flores diclines, dioici (?). Calyx limbo brevi subintegro v. obscure sinuato. Petala 5, rarissime 4, libera, æstivatione valvata. MASC.: Stamina petalorum numero; filamenta subulata, petalis longiora. Styli imperfecti 1–5, liberi v. inferne concreti. FŒM.: Stamina sterilia 4–5, fertilibus masculis breviora. Styli 3–6, liberi v. plus minus concreti. Drupa baccata, sæpius 4–5–6-pyrena, nunc abortu 1–2–3-pyrena. Albumen ruminatum.—Arbores v. frutices Americæ tropicæ, plerique Andicoli; foliis simplicibus integris v. varie divisis, stipulis in unam intra-axillarem petiolo plus minus adnatum parvam connatis; floribus sessilibus, singulis bractea v. bracteolisque duabus stipitatis; capitulis paniculatis; ovario semper glabro.—*Araliæ* et *Hederæ* sp. auct.

1. *O. capitatum*, Dcne. et Planch. in Rev. Hort. 1854. p. 108.—*Aralia capitata*, Jacq. Amer. p. 89. t. 61. *Hedera capitata*, Smith, Icon. Pict. p. et tab. 4. *H. multiflora*, De Cand. Prod. iv. p. 262. *Sciadophyllum capitatum*, Griseb. Fl. West Ind. p. 306.—The most widely diffused species of *Oreopanax*. Veraguas, on the volcano of Chiriqui (Seemann! n. 1648); Organ Mountains, Brazil (Gardner! n. 5726); Peru (Dombey! Mathews!); Carib Islands (Jacquin! De Ponthieu!)! Jamaica (Alex. Prior! W. Wright! Wilson! F. Massen! Marsh!); Central America (R. Shakespear!); Belize (Marsh!); Venezuela (Fendler! n. 1320, 526; Funk and Schlim! n. 91); Mexico (F. Müller!); Martinique (Sieber! n. 94); N. Granada (Goudot! n. 5); Ecuador (Spruce! n. 5525).

Called in Belize "Three-foot Jack," because the branches are seldom more than three feet long. (Marsh.)

2. *O. septemnervium*, Dcne. et Planch. l. c.—*Aralia septemnervia*, H. B. et K. Nov. Gen. v. p. 3. *Hedera septemnervia*, De Cand. Prod. iv. p. 263.—New Granada (H. B. et K.).

3. *O. (?) catalpæfolium*, Dcne. et Planch. l. c. (*ined.*).—*Aralia catalpæfolia*, Willd. Herb. ex Rœm. et Schult. Syst. vi. p. 697. *Hedera catalpæfolia*, De Cand. Prod. iii. p. 263.—New Granada (Triana, n. 537; Humboldt and Bonpland).

4. *O. Mutisianum*, Dcne. et Planch. l. c.—*Aralia Mutisiana*, H. B. et K. Nov. Gen. v. p. 1. *A. heterophylla*, Mutis. non Willd. *Hedera Mutisiana*, De Cand. Prod. iv. p. 262.—New Granada (Mutis, Humboldt and Bonpland, Linden! n. 1259; Goudot! n. 1; Hartweg! n. 935; Triana! 189; Purdie!).

5. *O. sessiliflorum*, Dcne. et Planch. in Rev. Hort. l. c.—*Hedera sessiliflora*, Benth. Pl. Hartweg. p. 146.—Ecuador, near Loja (Hartweg! 816).

6. *O. avicenniæfolium*, Dcne. et Planch. in Rev. Hort. l. c.—*Aralia avicenniæfolia*, H. B. et K. Nov. Gen. v. p. 2. t. 2. *Hedera avicenniæfolia*, De Cand. Prod. iv. p. 263. *Aralia trachonanthifolia*, Willd. in Rœm. et Schult. Syst. vi. p. 698.—Ecuador (Humboldt and Bonpland; Spruce! n. 5999).

7. *O. Echinops*, Dcne. et Planch. in Rev. Hort. l. c.—*Hedera Echinops*, G. Don, Gen. Syst. iii. p. 394. *Aralia Echinops*, Schlecht., Linnæa, v. p. 174.—Mexico.

8. *O. macrocephalum*, Dcne. et Planch. in Rev. Hort. l. c. sine descript.; ramis petiolis rachibus pedunculisque ferrugineo-tomentosis demum glabratis; foliis ovato- v. subrotundato-oblongis acuminatis dentatis v. grosse repando-dentatis, 3-nerviis coriaceis, supra glabris, subtus dense flavido-tomentosis; capitulis masculis globosis in racemos elongatos dispositis; bracteis ovatis acuminatis; petalis extus villosiusculis; capitulis fructiferis oblongis in racemos abbreviatos dispositis; baccis globosis stylis 5 liberis coronatis.—Province of Larecaja, Bolivia, in forests (Mandon! n. 571; Kelly! in Herb. Bth.—) Petioles 3–4 inches long; blade of leaf 5–6 inches long, 3–4 inches broad; female flower-heads as large as a good-sized walnut. The plant here described must be *O. macrocephalum*, which M. Decaisne informs me is founded upon a specimen gathered by Weddell in the same locality as that collected by Mandon.

9. *O. Lechleri*, Seem. (sp. nov.); robustum; ramis petiolis rachibus pedunculisque ferrugineo-tomentosis demum glabratis; foliis ovato-oblongis acuminatis, basi subcuneatis, integerrimis v. hinc inde dentatis, 5–7-nerviis, supra glabris, subtus dense ferrugineo-tomentosis; capitulis fructiferis longe pedunculatis paucis; stylis 5–7; cæt. ign.—Gachapata, Peru (Lechler! n. 2286).—Leaves about a foot long, 4–5 inches broad. Fruiting flower-heads as large as a cherry.

10. *O. cordatum*, Planch. et Linden, Araliaceæ, p. 7. ined.—New

Granada (Goudot! n. 6; Linden, n. 962; Purdie!).—Leaves sometimes 3-lobed in Purdie's specimens.

11. *O. Pavoni*, Seem. (sp. nov.); ramis petiolis rachibus pedunculisque dense fusco-tomentosis; foliis longe petiolatis ovatis v. subcordato-ovatis acuminatis 5-nerviis crasse coriaceis, supra stellato-puberulis demum glabratis, subtus dense fusco-tomentosis; paniculis masculis amplis; capitulis globosis (Pisi maj. magnitudine); petalis 4 ovatis extus stellato-pubescentibus; fl. fœm. ign.—Peru (Pavon! in Mus. Brit.).—Petioles 4–5 inches long; blade of leaf 4–5 inches long, 3–3½ inches broad.

12. *O. Ecuadoriense*, Seem. (sp. nov.); foliis longe petiolatis ovatis 3-fidis, lobis divaricatis ovato-oblongis acuminatis irregulariter et grosse dentatis, basi obtusis, 3-nerviis crasse coriaceis, supra glabris, subtus cinereo-tomentosis; rachibus pedunculisque tomentosis; capitulis masc. ovatis v. oblongis; petalis 4 ovatis acuminatis, extus tomentosis; fœm. ign.—Western side of the Andes, above Guayaquil, Ecuador (Pavon! in Mus. Brit.).—Petiole 7 inches long, blade of leaf 7 inches long.

13. *O. Macleani*, Seem.; ramis petiolis rachibus pedunculisque dense villoso-tomentosis; foliis longe petiolatis ovatis apice 5-lobis, lobis ovato-triangularibus acuminatis integerrimis v. hinc inde dentatis, 8-nerviis, supra glabris, subtus dense villoso-tomentosis; capitulis masc. globosis Pisi maj. magnitudine; petiolis extus villosis; fœm. ign.—Peru (Maclean! in Herb. Hook.).

14. *O. Sprucei*, Seem. (sp. nov.); ramis petiolis rachibusque albido-villoso-tomentosis; foliis palmatim 3–5-fidis, lobis oblongis acuminatis dentatis, supra glabris, subtus albido-tomentosis; capitulis masculis in paniculas amplas dispositis, Pisi magnitudine; petalis 5 ovatis acuminatis, extus albido-tomentosis, demum glabratis; fl. fœm. ign.—Nomen vernac. Ecuadoriense: Púma-máqui (*i. e.* pes tigridis) teste cl. Spruce.—In stony places at the foot of Mount Tunguragira, Ecuador (Spruce! n. 5113).—"A tree 20–30 feet high, slightly branched; flowers white," Spruce. Allied to *O. argentatum*.

15. *O. Mathewsii*, Seem. (sp. nov.); ramis petiolis rachibusque ferrugineo-tomentosis; foliis palmatim 3–5-fidis, supra glabris, subtus sparse stellato-pubescentibus, demum glabratis; fl. masc. in paniculas amplas dispositis; petalis extus glabratis; fl. fœm. ign.—Chachapoyas, Peru (Mathews! in Herb. Bth.).

16. *O. Boliviense*, Seem. (sp. nov.); ramis petiolis rachibus peduncu-

lisque ferrugineo-floccoso-villosis mox glabratis; foliis palmatim 3–5-fidis, lobis spinuloso-dentatis 5–9-nerviis, demum utrinque glabris; fl. ign.; baccis glabris (nigris) stylis 5 coronatis.—Andes of Bolivia, prov. of Larecaja, in forests (Mandon! n. 569).

17. *O. discolor*, Dcne. et Planch. l. c.—*Aralia discolor*, H. B. et K. Nov. Gen. v. p. 4. *Hedera discolor*, De Cand. Prod. iv. p. 263.—New Granada (Humboldt et Bonpland; Triana, n. 538). Peru (Lechler! n. 1974).

18. *O. argentatum*, Dcne. et Planch. l. c.—*Aralia argentata*, H. B. et K. Nov. Gen. v. p. 4. t. 114. *A. heterophylla*, Willd.; Rœm. et Schult. Syst. vi. p. 698, fide Kunth. *Hedera argentata*, De Cand. Prod. iv. p. 263.—New Granada (Humboldt et Bonpland).

19. *O. crassinervium*, Dcne. et Planch. l. c.—*Aralia crassinervia*, H. B. et K. Nov. Gen. v. p. 5. *Hedera crassinervia*, De Cand. Prod. iv. p. 263.—New Granada (Humb. et Bonpl.).

20. *O. lancifolium*, Planch. et Linden, Araliaceæ, p. 8.—Venezuela (Linden! n. 1432, in Herb. Mus. Brit. et Hook.).

21. *O. fraternum*, Dcne. et Planch. Rev. Hort. l. c.; Planch. et Lind. Araliaceæ, p. 9.—Venezuela (Funk et Schlim, n. 1530).

22. *O. Horquetero*, Dcne. et Planch. Rev. Hort. p. 108; Planch. et Lind. Araliac. p. 9.—Nomen vernac. Horquetero.—Venezuela (Funk et Schlim! n. 1529).

23. *O. hypargyreum*, Dcne. et Planch. in Rev. Hort. l. c.; Planch. et Linden, Araliac. p. 10.—New Granada (Funk et Schlim, n. 1333).

What Decaisne and Planchon have named *O. hypoleucum* is, as Dr. Planchon tells me, this species,

24. *O. Trianæ*, Dcne. et Planch. in Rev. Hort. l. c.; Planch. et Linden, Araliac. p. 10.—Nomen vernac. Higueron.—New Granada (Triana! n. 375, Jervise in Herb. Hook.).

25. *O. chrysoleucum*, Planch. et Linden, Araliac. p. 11.—Venezuela (Funk et Schlim).

26. *O. Cecropia*, Dcne. et Planch. in Rev. Hort. l. c.; Planch. et Linden, Araliac. p. 11.—New Granada (Schlim, n. 113).

27. *O. myriocarpum*, Dcne. et Planch. in Rev. Hort. l. c.; Planch. et Lindl. Araliac. p. 12.—Ibague, New Granada (Goudot! n. 2, Holton!).

28. *O. floribundum*, Dcne. et Planch. in Rev. Hort. l. c.—*Aralia floribunda*, H. B. et K. Nov. Gen. v. p. 6, t. 416. *A. Humboldtiana* et

incisa, Willd. in Rœm. et Schult. vi. p. 699, fide Kunth. *Hedera floribunda*, De Cand. Prodr. iv. p. 264.—New Granada (Humboldt et Bonpland, Triana! n. 2761, 2703).

29. *O. Humboldtianum*, Dcne. et Planch. in Rev. Hort. 1854, l. c. —*O. Bonplandianum*, Planch. et Linden, Araliac. p. 12. *Aralia ferruginea*, Linden, Cat. Hort. non H. B. et K.—Silla de Caracas et Valle de Cobre, Venezuela (Fendler! n. 531, 532, 533, Birschel! Funk et Schlim! n. 1524 et 92).

According to information kindly supplied by M. Decaisne, the undescribed *O. Humboldtianum* is identical with *O. Bonplandianum* of Planchon and Linden. It is Bonpland's n. 646.

30. *O. coriaceum*, Dcne. et Planch. in Rev. Hort. l. c.; Planch. et Linden, Araliac. p. 13.—New Granada (Triana! n. 190).

Planchon and Linden quote Triana's n. 130, which is probably a misprint.

31. *O. Ocannense*, Dcne. et Planch. in Rev. Hort. l. c.; Planch. et Linden, Araliac. p. 13.—Ocaña, New Granada (Schlim! n. 491, in Herb. Hook.).

32. *O. flabellatum*, Dcne. et Planch. in Rev. Hort. l. c.; Planch. et Linden, Araliac. p. 14.—New Granada (Schlim! n. 836, in Mus. Brit. et Herb. Hook.).

33. *O. brachystachyum*, Dcne. et Planch. in Rev. Hort. l. c.—*O. brachybotryum*, Planch. et Linden, Araliac. p. 15.—New Granada (Triana, n. 737).

34. *O. brunneum*, Dcne. et Planch. in Rev. Hort. l. c.; Planch. et Linden, Araliac. p. 5.—Antioquia, New Granada (Triana, n. 376, Jervise!).

35. *O. sclerophyllum*, Dcne. et Planch. in Rev. Hort. l. c.; Planch. et Linden, Araliac. p. 15.—New Granada (Schlim! n. 114, in Herb. Hook.).

36. *O. jatrophæfolium*, Dcne. et Planch in Rev. Hort. l. c.—*Aralia jatrophæfolia*, H. B. et K. Nov. Gen. v. p. 6, non Lind. Cat. Hort. *Hedera jatrophæfolia*, De Cand. Prodr. iv. p. 264.—New Granada (Humboldt et Bonpland).

37. *O. Lindenii*, Dcne. et Planch. in Rev. Hort. l. c. p. 108; Planch. et Linden, Araliac. p. 16.—*Aralia palmata*, Lind. Cat. Hort. non Willd.—New Granada (Schlim, n. 1725).

38. *O. Xalapense*, Dcne. et Planch. in Rev. Hort. l. c.—*Hedera*

Xalapensis, De Cand. Prodr. iv. p. 264. *Aralia Xalapensis*, H. B. et K. Nov. Gen. v. p. 8. *A. digitata*, Willd. in Rœm. et Schult. Syst. vi. p. 701, ex Kunth. — Mexico (Humboldt et Bonpland), Boteri! Jürgensen! Veraguas (Seemann! n. 1170), Chiapas (Linden! 1651).

39. *O. bulbosum*, Dcne. et Planch. in Rev. Hort. l. c.; Planch. et Linden, Araliac. p. 17.—New Granada (Goudot, Triana).

40. *O. pachycephalum*, Planch. et Linden, Araliac. p. 17.—New Granada (Funk et Schlim, n. 1453; Schlim, n. 6, Purdie!).

41. *O. Meridense*, Planch. et Linden, Araliac. p. 18.—Venezuela (Funk et Schlim! n. 1211, in Herb. Hook.).

42. *O. obtusilobum*, Dcne. et Planch. in Rev. Hort. l. c.—*Aralia obtusiloba*, H. B. et K. Nov. Gen. v. p. 5. *Hedera obtusiloba*, De Cand. Prodr. iv. p. 263.—Ecuador, near Loja (Humboldt et Bonpland).

43. *O. platanifolium*, Dcne. et Planch. in Rev. Hort. l. c.—*Aralia platanifolia*, H. B. et K. Nov. Gen. v. p. 6, t. 415. *Hedera platanifolia*, De Cand. Prodr. iv. p. 263.—Western Andes (Humboldt et Bonpland).

Species dubiæ:

44. *O. (?) Turbacense*, Dcne. et Planch. in Rev. Hort. l. c.—*Aralia Turbacensis*, H. B. et K. Nov. Gen. v. p. 3. *Hedera Turbacensis*, De Cand. Prodr. iv. p. 263. Nomen vernac. Arbol de Guaco.*—New Granada (Humboldt and Bonpland).

45. *O. (?) Cumanense*, Dcne. et Planch. in Rev. Hort. l. c.—*Aralia Cumanensis*, H. B. et K. Nov. Gen. v. p. 3. *Hedera (?) Cumanensis*, De Cand. Prodr. iv. p. 263.—Venezuela (Humboldt and Bonpland).

46. *O. (?) reticulatum*, Dcne. et Planch. l. c.—*Aralia reticulata*, Willd. in Schult. Syst. vi. p. 699. *Hedera reticulata*, De Cand. Prodr. iv. p. 264.—South America (Humboldt and Bonpland).

47. *O. (?) acerifolium*, Seem.—*Aralia acerifolia*, Willd. in Schult. Syst. Veg. vi. p. 699. *Hedera acerifolia*, De Cand. Prodr. iv. p. 264. —South America (Humboldt and Bonpland.).

48. *O. (?) cheirophyllum*, Seem.—*Aralia cheirophylla*, Spreng. Syst. i. p. 953. *A. palmata*, Willd. Herb. *Hedera cheirophylla*, De Cand. Prodr. iv. p. 264.—South America (Humboldt and Bonpland).

* In the Isthmus of Panama the name "Palo" or "Arbol de Guaco" is given to *Cratæva gynandra*, Linn. Can the two plants be the same? Flowers and fruit of *O. (?) Turbacense* are unknown, and I have not seen the authentic specimens.

49. *O. (?) angulare*, Seem.—*Aralia angularis*, Willd. in Schult. Syst. Veg. vi. p. 698. *Hedera angularis*, De Cand. Prodr. iv. p. 263.—South America (Humboldt and Bonpland).

50. *O. peltatum*, Linden ex Regel, Gartenflora, 1862, t. 363.—Amer. trop.

Species indescriptæ:

51. *O. Dombeyanum*, Dcne. et Planch. l. c.—Peru (Dombey, n. 579).

52. *O. Guatemalense*, Dcne. et Planch. l. c.; Planch. Hortus Donat. p. 9. *Sciadophyllum* sp., Lem. in Fl. des Ser. iii. p. 262, Misc. 44. *Aralia Guatemalensis*, Hort. Variat foliis obtusissimis et acutis.—Central America.

53. *O. Aleurites*, Dcne. et Planch. l. c.—Peru (Herb. Savon; communicated by Boissier).

54. *O. oxyodon*, Dcne. et Planch. l. c.—Oaxaca, Mexico (Ghiesbreght).

55. *O. pseudo-Jatropa*, Dcne. et Planch. l. c.—(*Aralia jatrophæfolia*, Linden, Cat. Hort. non H. B. et K.).—New Granada.

56. *O. pseudo-Platanus*, Dcne. et Planch. l. c.

57. *O. farinosum*, Dcne. et Planch. l. c.—Pamplona, New Granada (Schlim, n. 58).

58. *O. lanigerum*, Dcne. et Planch. l. c.—Ocaña, New Granada (Schlim, n. 58).

59. *O. macrophyllum*, Dcne. et Planch. l. c.—(*Aralia macrophylla*, Linden, Cat. Hort.).

60. *O. elegans*, Dcne. et Planch. l. c.—(*Aralia elegans*, Linden, Cat. Hort.)

61. *O. laciniosum*, Dcne. et Planch. l. c.—New Granada (Triana, n. 424).

62. *O. incisum*, Dcne. et Planch. l. c.

63. *O. amplum*, Dcne. et Planch. l. c.—La Culata, Prov. of Merida, Venezuela (Funk et Schlim, sine numero.)

64. *O. Ruizii*, Dcne. et Planch. in Rev. Hort. l. c.—Oaxaca, Mexico (Ghiesbreght).

Species exclusa:

O. Brownei, Witte=*Dendropanax Japonicum*, Seem.

PLANTS USED MEDICINALLY AT CARACAS, VENEZUELA, SOUTH AMERICA, AND THEIR VERNACULAR NAMES.

By A. Ernst, Esq.,

Local Secretary of the Anthropological Society of London, at Caracas.

(*Continued from p.* 150.*)

Cañafístola (*Cassia Fistula*, L.). The pulpy substance of the pods is a mild purgative.

Cañafístola macho, or *Cañafístola cimarron* (*Cassia bicapsularis*, L.). "Macho" (*i. e.* male) are not only called all male plants, but in some cases those species which do not yield useful substances like their congeners. "Cimarron" means wild, growing in the mountains, hence the term "maroon" or "marroon," for runaway slaves living in the woods. From the softer parts of the root a favourite emetic and purgative, very disagreeable in taste, is prepared, of which half a wine-glassful is taken before breakfast. It is also recommended in urinary complaints.

Another Cassia, called *Sena* by the people, grows near Maracaybo, and proves to be *C. obovata*, Coll., from tropical Africa. At present, I cannot give any information respecting its properties. (Conf. Pereira, 'Materia Medica,' p. 1866.)

Capacho (*Canna edulis*, Ker). The root is eaten in the manner of sweet potatoes.

Caraña (*Bursera gummifera*, Jacq.). The resin of this tree is found in the drug shops, but seldom used. The tree is but cultivated with us; it grows easily: a branch stuck into the ground soon makes roots. It is called "Indio desnudo," on account of its reddish, smooth bark. [Perhaps also on account of its shedding bark and leaves.—Ed.]

Cardo santo (*Argemone Mexicana*, L.). Throughout tropical America this is one of the most esteemed medicinal plants, and it is almost everywhere known under the same popular name, *Cardo santo*, or Holy Thistle. A decoction of the leaves is given in intermittent fevers,

* In the first part of this paper there are a few trifling errata, viz., p. 144, line 10 from below, *read* Aguacate *for* Aguacato, and line 5 from below, *read* Ajonjoli *for* Ajonjol; page 147, line 9 from above, *read* Agua *for* Aqua, and line 12 from below *read* 468 *for* 768; page 149, line 20 from below, *read* "*Lagenaria vulgaris*, Ser.," *for* "*Crescentia Cujete*, Linn.," and line 17 from below *read* Plátano *for* Platano.

on account of its powerful sudorific properties. I know a man, who, after suffering a whole year, completely cured himself in a short time by using it. A decoction of the seeds no doubt has the same effect. Cardosanto is recommended in a great number of other diseases, either alone, or mixed with other ingredients; but often without good reason, or when a cure would just as well be effected by the other drugs used.

Cariaquito (*Lantanæ* sp. variæ). There are three kinds—the red, the white, and the violet. Like all *Verbenaceæ* the Lantanas contain a volatile oil, on account of which they are used as aromatic adstringents. From the root an antisyphilitic is prepared, which however seems of little value; syphilitic diseases being rather prevalent, every somewhat peculiar plant is suspected of curing them.

Carnestolendo (*Ochroma Lagopus*, Sw.). A tree of the hot and moist coast region. The leaves are used on account of their mucilaginous properties; the wool, called *Lana vegetal*, is employed for stuffing mattresses, which are very cool and soft; the wood is soft and spongy, in a still higher degree than that of the Bucare (*Erythrina Corallodendron*, L., *E. velutina*, W., and other species used for making charcoal for the fabrication of gunpowder). Formerly the *Ochroma* was called *Balsa*, and "the never-sinking rafts which, at the discovery of South America, caused such surprise, were then constructed of it." (Seemann, Bot. of the Herald, p. 84.) This name is now unknown on the coast of Venezuela, near Choroni, whence I obtained a sample of the wool.

Caro (*Cissus sicyoides*, L.). Of the leaves poultices for inflamed tumours are made, and the creeping stems are wound round aching and stiff joints.

Catigüire or *Cabeja de Negro* (*Apeiba Tibourbou*, Aubl.). The juice of the fruit is an anti-hysteric. The emulsion of the seeds is said to destroy fleas; but I suspect it is seldom used, as the Venezuelans are not a cleanly people.

Cebadilla (*Veratrum Sabadilla*, Retz). *Cebadilla* is the diminutive of *Cebada* (Barley), and the plant obtained this name on account of its flower-spikes somewhat resembling those of barley. Hence it is wrong to spell the name Sabadilla. *Cebadilla* is one of the most common plants on the grassy mountain slopes surrounding Caracas. The seeds are gathered when not fully ripe, and sold to drug-shops at from 10*s*. to 12*s*. the Spanish quintal, or nearly 100 lb. (avoirdupois). The

largest quantity of *Cebadilla* is sent to Hamburg and Philadelphia. The export, however, diminishes from year to year. The powder of the seeds, mixed with honey, is administered by practitioners against intestinal worms, beginning with two grains a day, and gradually increasing the doses to ten.

Cebolla (*Allium Cepa*, L.). Two or three drops of the juice are said to cure singing in the ear. But some cotton with *Oleum rutæ* must be put into the entrance of the ear, so after all the onion may not be the most efficacious part of the remedy. Four or six spoonfuls of water, wherein an onion had been placed for twenty-four hours, are considered to have an anthelmintic effect.

Cedro (*Cedrela odorata*, L.). This lofty tree yields excellent timber, and is also medicinal. The powdered bark is used for bathing wounds and ulcers, and also acts as a mild emetic. The gummy substance which exudes from the stem, enters into the composition of a much used eye-water. The hard wood is of a bitter taste, and is not attacked by insects; but it is rather brittle. I have seen a perfectly sound board, nearly five feet long and one inch thick, resting with its ends on strong square beams, broken in an almost straight line, under the weight of a workman. *Cedro blanco* is *Icica altissima*, Aubl.

Cereza (*Malpighia glabra*, L., and other sp.). The astringent fruits are not only used by way of dessert, but likewise in cases of dysentery, here called Pujo, very common, especially at the beginning of the rainy season, and sometimes exceedingly difficult to stop. The Cereza-stones, powdered, and taken in wine with some resin of the same tree, are good for pectoral complaints.

Cerraja (*Brachyramphus intybaceus*, De Cand.). The milky sap applied to sties, cures them speedily.

Challota or *Chayota* (*Sechium edule*, Sw.). The vernacular name is of Aztec origin. The insipid fruit is used for poultices, and applied to irritated parts of the skin.

Chiquichique (*Cassia biflora*, L.). Common near houses. The leaves, soaked in cold water, make a refreshing draught, principally taken in fevers caused by insolation, but also in intermittents. Of the leaves poultices for the insolated parts of the skin are made.

Chirca, Chilca. Plants from San Carlos (south of the lake of Valencia) sent under this name, proved to be *Jacquinia armillaris*, L. In the neighbourhood of Caracas it is not met with, and another plant, a

Eupatorium, bears the same vernacular name [derived from the Quichua language.—Ed.]. The juice of the fresh leaves is astringent.

Chirel (*Capsicum baccatum*, L.). The berries are used as caustics, and the leaves, bruised and mixed with tallow, are applied to tumours, to promote suppuration.

Cidra (*Citrus*, sp.) A decoction of the rind of the fruit is taken for colds and indigestion. (All the species of *Citrus* have been introduced by the Spaniards, and thrive well.)

Cipres (*Cupressus sempervirens*, L.). Cultivated in gardens. A decoction of the leaves is used to procure abortion, as those of *Juniperus Sabina*, L. The leaves of *Persea gratissima* have the same effect.

Ciruelo (*Ciruelo* is the name of the tree, *Ciruela* that of the fruit). There are different species of *Spondias* in the country, viz. Ciruelo de España = *Spondias purpurea*, L.; Jobo = *Spondias lutea*, L.; and Jobo de la India = *Spondias mangifera*, L. All have a resinous bark, and on that account they are used as aromatics, principally for bathing in inflammation, pain, and swelling of the legs.

Cobalonga (*Ocotea Puchury major et minor*, Mart.). The tree grows in the southern parts of Barquisimeto, but the seeds, *Fabæ Pichurim*, are found at the drug shops throughout the country. They are aromatic, and used in diarrhœa, dysentery, colics, and nervous disorders.

Coco (*Cocos nucifera*, L.). Cultivated in "cocales," or Coco-estates, on the seashore, and very abundantly about the Lake of Valencia; near Caracas few trees are met with, the Chaguarama (*Oreodoxa regia*, Kunth) being more frequently cultivated. The oil extracted from the fruit is used principally for burning, but it has the disagreeable property to become congealed very easily, even in the torrid zone. The hard shell is calcined, and a famous remedy in many diseases. The milk or water of the nut is cooling and pleasant, and generally taken with gin. Drunk in excess, it is said to act as an aphrodisiac.

Coco de Mono (*Lecythis minor*, Jacq.). Also called "Ollita de mono" (Monkey's-pot). The fruit is put for twenty-four hours in water, which, taken afterwards, is said to give relief in asthma. Jacquin has the following in Amer. Pict. (ed. 1763), p. 169:—"Unicum semen integrum assumpsi, quod sapore gratissimo deprehendi; sed post mediam horam nausea, anxietate magna, capitisque titubatione præter consuetudinem fui vexatus; an ab hoc nucleo?" This effect does not agree with the supposed medicinal property of the fruit.

Cocui, Cocuiza (*Agave sobolifera*, Salm.), *Maguei* (*Agave Americana*, L.), also called *Pita*, "que los Indios llaman *Caruata*, y los Españoles *Cocuiza*, y de que hay otra especie en Orinoco llamada *Curagua ó Curaguate*" (Fr. Antonio Caulin, 'Historia de la Nueva Andalucía,' ed. de Caracas, p. 13). This plant was considered so important, that localities were named after it. Not far from Caracas is a little hamlet, "Las Coquijas," and in Caracas itself a rivulet (or rather, I should say, a series of pestiferous ponds of dirty water), Caroasa, which may have derived their names from it. The decoction of the root is diuretic; the leaves, called "pencas," are bruised and applied to tumours, to promote suppuration or remove it. There is no "pulque" prepared in Venezuela, as in Mexico. The fibres of the leaves are very strong, and are used for ropes and hammocks; the ropes, nevertheless, are rather stiff, and, when not oiled, are much affected by moisture. The name "Cabuya," used in New Granada and other parts for *Agave tuberosa*, Mill. (*Fourcroya tuberosa*, Ait.), is applied in Venezuela to small twine.

Colombo. The plant is called "bejuco de Estrella," and is some undetermined *Menispermea.* (It is not the Radix Calumbæ, derived from *Cocculus palmatus*, De Cand.) The root is considered nearly as powerful a tonic as Chinchona.

Comino rústico (*Pectis punctata*, L.). On account of its aromatic volatile oil, an infusion of the plant is taken for a cold and indigestion. (Cf. sub voce Alcornoque, p. 195.)

Coneja (a cultivated species of *Impatiens*). The juice, mixed with common salt, is considered one of the most efficacious "pósimas."

Conopio (*Renealmia sylvestris*, Gr.). The fruit is of a nauseous smell, and contains a fine violet colour. It is used as a resolutive for tumours, and the oil extracted from the seeds is still more appreciated. The name "Conopio" may have some reference to the Chaymas word Conopo = rain, mentioned by Humboldt in his 'Voyage,' as the plant grows only in the neighbourhood of water.

Contrayerba, also called *Tusilla* (*Dorstenia Contrayerba*, L.). Growing abundantly in the quebrada of the river Catuche, near Caracas. The root is considered a powerful remedy for counteracting poisons. It has been recommended as a universal medicine, but it is only a sudorific.

Copei (*Clusia rosea*, L., et *C. alba*, L.). The resin is used in plas-

ters for broken or dislocated bones, and the decoction of the flowers is said to be valuable in pulmonary diseases.

Coralito (*Hamelia patens*, Jacq.). The leaves put on the forehead give relief in headache.

Cordoncillo negro (*Artanthe Bredemeyeri*, Miq.). Partakes in some degree of the aromatic, pungent properties almost universal in *Piperaceæ*, and is considered an antisyphilitic, but not often used.

Corozo (*Acrocomia sclerocarpa*, Mart.). "An excellent beverage, resembling champagne, and quite as intoxicating, is made of the Palma or Corozo de Vino, by felling the trunk and cutting a hole just below the crown of the leaves. When I was at Guadima [state of Coro, Venezuela] the people had cut down several of these spiny Palms to supply themselves with 'wine' for the Easter holidays." (Dr. B. Seemann, 'Report on the Tocuyo Estate of Venezuela,' p. 21.) This wine is said to promote conception.

Cremon (a *Malvacea* from Maracaybo). Leaves like *Gossypium*, but flowers scarlet. The leaves are placed on the forehead and temples to cure headache.

Cruceta real or *Quipito hediondo*, and *Cruceta blanca*, are both unknown to me. The first is said to have an exceedingly bitter bark, used like *Cortex Chinchonæ*. Jacquin mentions, in the description of his *Mussænda spinosa* (Amer. Pict. p. 70, 71), the vernacular name is "Cruzeta" or "Crucicula," but I cannot state anything about the identity of his plant with the above-mentioned. The "Cruceta blanca" is reputed to be efficacious in hæmorrhoids, by exposing the suffering parts to the steam rising from a very hot decoction of the whole plant mixed with some brandy.

Cují (*Acacia Farnesiana*, W., *A. macracantha*, H. B., etc.). A decoction of the pods is taken in chronic diarrhœas, and the juice of the pounded pods is said to act with good effect in inflammations of the eye. It dyes the hair black. By condensing it over the fire, it becomes a blackish, exceedingly astringent substance, which resembles catechu. The gum which exudes from the stem may be used like gum Arabic.

Culantrillo (*Adiantum concinnum*, Kth., and several other species). "Jarabe de Culantrillo" is much used in pectoral diseases, and said to purify the blood. Take six ounces of leaves in a gallon of hot water; macerate for twenty-four hours, then evaporate to a proper consis-

tence, and filter. Add two pounds of sugar, and clarify with the white of an egg.

Culantro (*Eryngium fœtidum*, L.). An infusion of the leaves is taken as an aromatic. It is seldom used in Venezuelan cookery, although it grows abundantly throughout the valley of Caracas.

Cundiamor (*Momordica Charantia*, L., γ. *muricata*, W.). This plant is very common near houses, and one can scarcely pass a hedge without seeing its scarlet fruits. The ripe fruit, bruised and mixed with olive oil, is put on wounds or contusions. Children are very fond of eating the red pulp. It is, however, insipid, and thought to produce diarrhœa.

Cusparia, Cuspare (*Galipea Cusparia*, St. Hil.). The *Cort. Angusturæ veræ* is administered as a febrifuge in intermittent and remittent fevers, principally in the worst forms of the bilious remittents of tropical climates. (Pereira, Mat. Med., p. 1915, 1916.)

Dividive (*Lebidibia coriaria*, Schlecht.). The pods are so astringent that they are used for tanning. In the valley of the Tuy, and in the states of Maracaybo and Coro the tree is common, so that in the economical year 1859–1860, 2,343,648 lb. of the fruit were exported, through the three ports of La Guayra, Maracaybo, and La Vela. ('Memoria de Hacienda,' 1861.)

Doradilla (*Hymenophyllum plumatum*, Kaulf.). Growing in the higher mountains, and said to be antisyphilitic.

Durazno (Peach; *Amygdalus Persica*, L.). An infusion of the flowers is a mild purgative. The fruit is far from being so fine as in Europe. It is generally not much larger than a walnut, and sells at about two shillings a hundred. Boiled with sugar, peaches form one of the best preserves.

Eneldo (*Anethum graveolens*, L.). Cultivated. A decoction of the flowers or seeds gives relief in flatulent colics, caused by a cold.

Escoba amarga (*Parthenium Hysterophorus*, L.). A bath made with this plant will heal inflammation and breaking out with sores on the legs. (Lunan, 'Hortus Jamaicensis,' ii. 299.) Little brooms are made with it; this explains the vernacular name "Bitter Broom."

Escoba babosa (*Sida rhombifolia*, L.). One of the most variable and troublesome weeds. The most common form about Caracas is γ. *retusa*, L.; but I never saw the petals blotched with red at the base, as Grisebach, in West Ind. Flora, p. 74, states them to be. The

root of this plant goes so deep, that it is exceedingly difficult to draw it out. The vernacular name, signifying "mucilaginous Broom," indicates sufficiently the medicinal properties of the plant, which are those of most *Malvaceæ*, but in a minor degree.

Escorzonera (*Crassiolaria annua*, Jacq.). Four spoonfuls of the juice of the root are taken with some common salt as a purgative, especially in syphilitic diseases. "Hanc (*i. e.* radicem) incolæ decorticatam et cum bovina elixam in mensis apponunt; vel saccharo conditam inter bellaria numerant. Medici Scorzoneræ Europææ in vicem præscribunt ægris, eodemque sub nomine venalem offerunt pharmacopœi; unde incolis etiam audit Escorzonera." (Jacquin, Amer. Pict. p. 175.)

Espadilla (*Crotalaria stipularis*, Desv. γ. *sericea*, a synonym of *C. Espadilla*, Kth.). A sudorific found in every household.

Esparrago (*Asparagus officinalis*, L.). Seldom cultivated, and known as diuretic.

Espino (*Hydrolea spinosa*, L.). Poultices made of the leaves are said to promote the suppuration of tumours.

Fregosa (*Capraria biflora*, L.). The decoction of the leaves is taken against flatulent colics and indigestion; it is also slightly anthelmintic.

Fruta de Burro (*Xylopia glabra*, L. ?) The powdered rather astringent fruit, taken in wine, is considered to be an antidote against the bite of venomous snakes.

Galicosa or *Bandolera* (*Latreilleæ* sp., closely allied to *L. serrata*, De Cand., but not "foliis grossè et remotè calloso-serratis" (De Cand. Prod. v. 504), but rather—remotè et obsoletè dentatis.) The juice of the root is recommended in disorders resulting from a cold. It is also believed to be a strong antisyphilitic.

(To be continued.)

ON *ORCHIS MASCULA* WITH DOUBLE FLOWERS.

By David Moore, Ph.D.

(*Read before the Royal Dublin Society, May* 15, 1865.)

In the October number of Seemann's 'Journal of Botany,' for 1864, I noticed the discovery of *Orchis pyramidalis* with double flowers in

the county of Clare, by F. G. Foot, Esq., and described the changes which appeared to me to have taken place in the parts of the flower to render it double. That being the first instance on record of the species having been found in that state, was looked on with considerable interest by botanists. Dr. Masters, of London, again noticed the matter in the number of the same work for December, and gave further details of the changes which took place in the parts of the flower. Another interesting instance of one of our native species of Orchis has just been sent to me this morning from the Bridge of Allan, by Dr. Patterson, one of the resident physicians there. It is an early *Orchis mascula*, and the first time I believe it to have been ever seen with double flowers. Happily, the parts are so large, that the nature of the morphological changes, which have taken place, can be well studied. Moquin-Tandon, in his 'Éléments de Tératologie,' classifies the prolifications which take place in causing double flowers as *median*, *axillary*, and *lateral*:—*Median*, when the centre of the flower is changed and prolonged beyond its usual state, and leaving other buds, as frequently occurs in the Rose; *axillary*, when the prolification springs from the axil of one of the parts of the flower; and *lateral*, when the addition is rather to the inflorescence than to the flower itself. The remarkable changes which have taken place in the flowers of this Orchis appear to embrace two of these terms—*median* and *axillary*. The flowers are reversed on the rhachis of the axis which bears them, the labellum being next the apex, in place of the sepals being uppermost, which is the normal state of the flower. The changes of the parts are very curious and interesting. On the sides of the labellum are two smaller labella with short spurs, and in the axils of these other flowers spring, thus rendering the morphology *axillary*. These secondary florets have, again, rudimentary florets in the axils of their changed labella. There is no ovary, or column, or nectary distinct, though in some instances in the secondary flower they are apparently present in a very rudimentary state. The part where the column ought to be in the general flower is a mass of bracts and incipient florets, forming a depressed raceme—thus showing the prolification to be *median* also. The malformed parts, in the incipient flowers, do not appear to exceed the usual number of pieces in the regular flower of Orchis. This is supposed to be the second instance of *median* prolification in forming the double flower of an Orchis, the first being that already noticed by Dr. Masters,

relative to Mr. Foot's *Orchis pyramidalis*, which I sent to Seemann's 'Journal of Botany.'

I have now another remarkable instance of duplication in an Orchid flower, though caused in a very different manner from that of the former. It is the beautiful *Calanthe veratrifolia*, a tropical species. The alteration in this instance has occurred by the blending of three flowers into one, and is only partial on the raceme. The three flowers are attached to one solid peduncle, which springs from the rachis between two bracts, in place of one, which is the normal condition of the flowers. Each has its proper labellum, column, and pollen-masses; but there are only ten pieces of sepals and petals, in the place of fifteen, which would have been the case had the flowers been separate and normal. The spur on the middle flower is wanting, and in place of it are two petaloid pieces with green tips. It is further worthy of notice, that the flower on the rachis, which is immediately under the malformed one described, is without a labellum altogether.

CONTRIBUTIONS TO BRITISH LICHENOLOGY; BEING NOTICES OF NEW OR RARE SPECIES OBSERVED SINCE THE PUBLICATION OF MUDD'S 'MANUAL.'

By Isaac Carroll, Esq.

I.

In the present paper, to which I shall have to make some additions, I have adopted Nylander's classification as the best on the whole, though perhaps susceptible of improvement in detail. The system followed by Fries and others, of determining genera by the form, etc., of the spores, is to my mind exceedingly unnatural, and in very many cases inapplicable in practice.

Pyrenidium actinellum, Nyl. Flora, 1865, p. 210.—On chalk, Boxley Hill, Kent (Vice-Admiral Jones). A new genus of Nylander's.

Collema furfurellum, Nyl. Lich. Scand. p. 28.—Summit of Corbuy, Scotch Highlands, sterile (Jones).

C. furfureum, Nyl. in litt.—Summit of Ben Lawers, with apothecia (Jones, afterwards Carroll). By Loch Tay and in Glen Dochart, sterile (Jones).—A curious and distinct plant. Spores 8-næ, simple,

ovate; thallus when moistened appears under the microscope of a blood-red colour.

C. diffractum, Nyl. Syn. Lich. p. 102.—Hayle Place, Maidstone (Jones).

C. lichenodeum, Nyl. in litt.—On the summit of Ben Lawers, rather plentiful but always sterile (Jones, afterwards Carroll).

C. ceraniscum, Nyl. in litt. *C. ceranoides*, Mudd, Man. p. 41 (pr. p.) *not* of Borrer.—Summit of Ben Lawers, very rare (Jones, afterwards Carroll). Asci 4-spored.*

Leptogium Schraderi, Nyl.—Apothecia rare, near Cork (Carroll); Armagh (Jones).

L. Moorii, Hepp. ms.; *Ephebe byssoides*, Carrington, Irish Cryptogams, p. 7.—On *Jungermanniæ* at Killarney (Dr. Moore, afterwards Carrington); Glengariff (Jones).

L. rhyparodes, Nyl. Flora, 1865, p. 210.—On wet rocks near the summit of Ben Lawers, fruiting freely (Jones, afterwards Carroll).

Sphinctrinia Anglica, Nyl. Syn. Lich. p. 143 (but not *S. anglica*, Mudd, Man. p. 255, which is *S. microcephala*, Nyl. Syn. Lich. p. 144).—On *Pertusaria* at Curraghmore, near Waterford (Jones).—Perhaps a mere variety of *S. turbinata*, Fr., from which it differs in its substipitate apothecia.

Calicium eusporum, Nyl. Syn. Lich. p. 160; *Stenocybe eusporum*, Mudd, Man. p. 256.—On Holly near Killarney, and Old Deer Park, Castlemartyr, co. Cork (Carroll).

[*C. trajectum*, Nyl. Flora, 1865, p. 111.—On trees, New Forest, Hampshire (Rev. T. Salwey), *fide* Nylander, l. c.—Ed.]

Trachylia tympanella, Fr.; *Acolium tympanellum*, Mudd, Man. p. 254.—Curraghmore, near Waterford (Jones).

Gomphillus calicioides, Nyl. Syn. Lich. p. 175; *Bæomyces microcephalus*, Tayl. Fl. Hib. part 2, p. 78; Mudd, Man. p. 64.—Ireland (Taylor), Nyl. l. c.

Bæomyces placophyllus, Arch.; Mudd, Man. p. 63.—Loch Katrine (Jones). Foot of Ben Lawers (Jones and Carroll).

Alectoria nigricans, Nyl. Lich. Scand. p. 71.—Ben Nevis (Jones).

* *Collema granuliforme*, Nyl., mentioned by Nylander as having been found in Scotland by Admiral Jones (Flora, 1865, p. 210), is an error of Nylander's, since acknowledged by him.—Ed.

Ben Lawers (Jones and Carroll).—Probably not rare on the higher Scotch mountains.

Platysma lacunosum, Nyl. Syn. Lich. p. 314.—Near Fort William (Jones).

Nephromium tomentosum, Nyl. Syn. Lich. p. 319.—Invercauld! 1792 (Robert Brown in herb. Carroll).—Differs from *N. lævigatum*, Ach., by being larger in all its parts, and having the under side of its thallus tomentose.

Solorina crocea, Ach.; Mudd, Man. p. 85.—On Brandon, Kerry (Dr. Moore).

S. spongiosa (Sm.); *S. limbata*, Mudd, Man. p. 85; *S. saccata* v. *spongiosa*, Nyl. Syn. Lich. p. 331; *Lecanora limbata*, Smmrf.—Head of Glenariff, co. Antrim (Dr. Moore).

Ricasolia glomulifera, D. N.; *Sticta glomulifera*, Mudd, Man. p. 91. —North of Ireland (Dr. Moore). On oak, Dinish Island, Killarney (Carroll).

Parmelia perforata, Ach.; *P. reticulata*, Tayl. Fl. Hib. part ii. p. 148.—Dunkerron, Kerry (Taylor). Dr. Nylander considers (Syn. Lich. p. 378) that Taylor's *P. reticulata* belongs to the true *P. perforata*, Ach.; *P. proboscidea*, Tayl., and *P. perforata*, Hook., belong to *P. perlata*, Ach., *v. ciliata*, Schær.; Mudd, Man. p. 92.

P. Mougeotii, Schær.; Mudd, Man. p. 102.—Kerry (Taylor and Moore).

P. exasperata, D. N.; Nyl. Syn. Lich. p. 396.—Glencar, Kerry (Carroll).

P. prolixa (Ach.), Nyl. Syn. Lich. p. 396.—Maritime rocks, Howth (Moore); South of Ireland (J. Wright).

P. stygia, Ach.; *f. minor* (fide Nyl. in litt.).—On quartz, Mayo (Moore).

Physcia parietina (L.), D. N.; var. *lychnea* (Ach.), Mudd, Man. p. 114; *P. lychnea* (Ach.); Nyl. Lich. Scand. p. 107.—On palings, etc., Scotland, and north of Ireland (Jones).

P. astroidea, Fr.; *Parmelia Clementiana*, Tayl. Fl. Hib., part ii. p. 147.—On Ash, Tervoe, near Limerick (Carroll).

Lecanora nivalis, Körb.; *L. fusco-luteolina*, Mudd, Man. p. 153.—Not rare on Ben Lawers (Jones, afterwards Carroll).

L. curvescens, Nyl.; *Pannaria curvescens*, Mudd, Man. p. 125.—Summit of Ben Lawers, very rare (Jones, afterwards Carroll).

L. rhætica, Hepp., var. *hyperborea*, Nyl.=*Aspicilia athroocarpa*, Mudd, Man. p. 164.—On high mountains, frequent.

L. athroocarpa, Dub.; Nyl. Lich. Par. 39, 40 = *Lecania cærulescens*, Mudd, Man. p. 140.—Walls, Ayton and Cleveland (Mudd in Herb. Carroll).

L. albariella, Nyl. in litt.—On chalk, Glenarm (Jones).

Pertusaria nolens, Nyl. Flora, 1864, p. 489.—On basalt, near Glenarm (Jones). Asci 8-spored. Nylander observes that this species might be readily mistaken, unless microscopically and chemically examined, for a form of *Lecanora cinerea*, and that it seems to form a connecting link between *Pertusaria* and *Lecanora*.

P. glomerata, Schær., Mudd, Man. p. 277.—On north side of Ben Lawers (July 1864, Carroll).

Thelotrema subtile, Tuck.—"Thallus macula lactea subnitidiuscula indicatus; apothecia incoloria (alba), erumpentia, sat parva (latit. 0·4 millim.), margine thallodio parum prominulo, proprio sæpe albo-pulverulento; sporæ 8-næ, incolores, oblongæ, 10–13-loculares, longit. 0·040–56, crassit. 0·009–0·010 millim. (iodo-cærulescentes). Parum (et præsertim sporis majoribus) differt a *Thelotremate bicinctula*, Nyl."—On a young beech by Lough Inchiquin, Kerry, Aug. 1864 (Carroll), very rare. This species belongs to a small group of American Lichens which extend to western Europe, and especially to the south-west of Ireland, among which are *Sticta damæcornis*, *S. intricata*, *Lecidia mutabilis* (which I also have from Portugal), and *Graphis Ruiziana*.

Lecidea Flotovii, Körb.; *Gyalecta truncigena*, Mudd, Man. p. 167 (pr. p.), Exs. 140!—Curraghmore, Waterford (Jones), Castleconnel, Limerick (Carroll). Very near *L. truncigena*, Acb., but differs in its ovate *spores*.

L. rubiformis, Whlnb.; *L. globifera*, Ach., var. *rubiformis*, Nyl. Lich. Scand. p. 193.—Summit of Ben Lawers, rare (Jones, afterwards Carroll).

L. rhizobola, Nyl. Flora, 1865, p. 4.—Summit of Ben Lawers, rare (Jones). Very near *L. globifera*, and chiefly distinguished by the long rootlet sent down from the centre of each scale of the thallus.

L. fuliginosa, Tayl. Fl. Hib. part 2, p. 131; Mudd, Man. p. 208.—Carig mountain, Kerry (Tayl. in Herb. T. C. D.). Two species appear to be confounded under the name of *L. fuliginosa*, one of which may be rightly referred to *L. confusa*, Nyl. That which appears to

me to be *L. fuliginosa* (for two plants occur on the same stone) is a well-marked species allied to *L. lurida* or *L. globifera*, but much smaller in all its parts.

L. sanguineo-atra, Ach.—Ben Lawers (Jones).

L. fusco-rubens, Nyl. Lich. Scand. p. 199.—Scotland and Glenarm, north of Ireland (Jones). On bark near Lewes, Sussex (Larbalestier, fide Nyl.).

L. glebulosa, Fr.—Jersey (Larbalestier). This fine species is quite different from *Lichen glebulosus*, Sm., which belongs to *Lecidea coarctata*.

L. vernalis, Ach.; Nyl. Lich. Scand. p. 200.—On mosses, Ben Lawers (Jones). This is the true plant identical with arctic specimens sent by Fries, and also with others collected by myself at Kaafjord, Norway.

L. ochrococca, Nyl. Lich. Scand. p. 206.—On aged *Pinus sylvestris*, at Inverouran (Jones) and Glenfalloch, Scotland (Carroll). This species is incorrectly given as Irish in Mudd's Man. p. 194.

L. violacea, Crouan, Nyl. in Flora, 1862, p. 464.—Lerwick, Zetland (Jones). Apothecia minute, scarcely visible until the plant is moistened, when they are seen almost hyaline and of a pale-bluish or violet tint. Spores oblong, 3-septate, 8 in asci. This is nearly allied to *Lecanora athroocarpa*, Dub., but differs in its biatorine apothecia and indistinct paraphyses.

L. mammillaris, Gouan; *Thalloidima mammillare*, Mudd, Man. p. 173.—Babbicomb, Devonshire (Jones).

L. bacillifera, Nyl. Lich. Scand. p. 210.—Sheep Walk, Armagh (Jones).

L. marginata, Schær.—Ben Lawers (Jones).

L. lithophila, Ach.—Ben Lawers (Jones and Carroll).

L. nigritula, Nyl.; *Buellia nigritula*, Mudd, Man. p. 217.—New Forest (Jones).

L. luteella, Nyl. in Flora, 1865, p. 6.—On limestone, Sheep Walk, Armagh (Jones).

L. rhexoblephara, Nyl. Lich. Scand. p. 240; *Rhexophiale coronata*, Fr. Lich. Arct. p. 205.—Very rare. On moss, summit of Ben Lawers (Jones). I did not find this fine arctic species last summer, although shown the exact spot where Admiral Jones had gathered it. His specimens are identical with those from Fries.

L. glaucomaria, Nyl. Lych. Scand. p. 245 ; *Schismatomma amylaceum*, β. *candidum* (Sm.), Mudd, Man. p. 222.—Parasitic on thallus of *Lecanora glaucoma*, Ach. Aviemore (Jones).

L. parasitica, Flk. ; *Dactylospora inspersa* (Tul.) Mudd, Man. p. 224. —Curraghmore, Waterford (Jones). Blarney and Riverstown, Cork (Carroll).*

Graphis Ruiziana (Fée), Nyl. Lich. Nov. Granat. ed. 2. p. 73 ; *Stenographa anomala* (Leight), Mudd, Man. p. 236.—On holly, Killarney, and Old Deer Park, Castlemartyr, county Cork (Carroll). This would range better under *Opegrapha*, but its *spores* place it near *G. sophistica*, Nyl.

Opegrapha involuta, Körb. ; Nyl. in litt.—Castlebernard Park, Bandon (Jones) ; Castlemartyr (Carroll).

O. herpetica, Ach. ; Mudd, Man. p. 234.—Armagh (Jones).

O. lentiginosa, Lyell ; *Stictographa lentiginosa*, Mudd, Man. p. 226. —Curraghmore, Waterford (Jones) ; Old Deer Park, Castlemartyr, county Cork (Carroll).

Stigmatidium venosum (Sm.) ; Mudd's Man. p. 244.—On a young Ash-tree, Glenstale, county Tipperary (Carroll).

S. circumscriptum (Tayl.) ; *Stigmatella circumscripta*, Mudd, Man. p. 252 ; *Stigmatidium leucinum*, Nyl.—Kerry (Taylor), north of Ireland (Moore), Yorkshire (W. Mudd). I cannot find the least difference, either microscopical or chemical, between our British specimens and one received by Admiral Jones from Nylander himself, named *S. leucinum ;* and have therefore restored the older name.

Arthonia ochracea, Duf.—Glencar, Kerry (Carroll). Very near *A. cinnabarina*, Wallr., but differs in the smaller, 3-septate spores.

A. pruinosa, Ach.—On an old Yew at Adare Abbey, county Limerick (Carroll).

A. anastomosans, Ach. ; *A. dispersa*, Nyl. (olim) ; *Arthothelium dispersum*, Mudd, Man. p. 252.—On holly at Old Dromore, and in Glencar, Kerry (Carroll).

A. patellulata, Nyl. Lich. Scand. p. 262.—North of Ireland (Jones) ;

* To the species of *Lecidea* we may add two species from a paper by Nylander in a recent number of 'Flora.'

Lecidia premneoides, Ach. ; Nyl. Flora, 1865, p. 147.—On walls, Jersey (Larbalestier).

L. diducens, Nyl. l. c. p. 147.—On feldspathy rocks, Jersey (Larbalestier).

on Elder at Carrigogunnel, near Limerick (Carroll) ; near Haparanda, Swedish Lapland (Carroll).

A. myriocarpella, Nyl. Lich. Nov. Granat. ed. 2, p. 107.—Aviemore, on mica-slate (Jones).

Mycoporum miserrimum, Nyl. Enum. Gen. p. 145.

Verrucaria clopima, Wahlenb. ; *Dermatocarpon isidioides*, Mudd, Man. p. 270.—Glengariff (Miss Hutchins). Very near *V. umbrina*, Whlnb. ; *Sphæromphale umbrina*, Mudd, p. 281 ; indeed, scarcely distinguishable, save by the areolate or warted thallus and smaller apothecia.

V. subumbrina, Nyl. Lich. Scand. p. 269.—On Ben Lawers (Jones and Carroll). Moist rocks on Tonlagee, county Wicklow (W. Archer), This fine species is easily distinguished from *V. umbrina*, Whlnb., by its entire perithecia, 8-spored asci, and absence of hymeneal gonidea. Spores are dark-brown, muriform, large, sometimes approaching in size those of *V. verrucoso-areolata*, Schær.

V. verrucoso-areolata, Schær., Nyl. ; *Sphæromphale verrucoso-areolata*, Mudd, Man. p. 282.—On Ben Lawers (Jones and Carroll). Var. *theleodes ; V. theleodes*, Smmrft., Nyl.—Summit of Ben Lawers (Jones). The two forms of this, the finest of our British *Verrucariæ*, are characterized by the perithecia being in the one dimidiate, and in the other (var. *theleodes*) entire, but the very large, almost black spores are alike in both forms.

V. striatula, Whlnb.—Jersey (Larbalestier). Nyl. in Flora, 1865, p. 213.

V. mucosa, Ach. ; Nyl. Pyren. p. 28.—On rocks at low-water mark, north of Ireland (Jones) ; Howth (Moore) ; Cork coast (Carroll).

V. intercedens, Nyl. Pyren. p. 33 ; *V. muralis*, Hepp. Flecht. 445. —On Ben Lawers (Jones and Carroll).

V. inumbrata, Nyl. in Flora, 1864, p. 355.—Rare, on Ben Lawers (Jones and Carroll). Resembles *V. intercedens*, but has very much smaller apothecia. Perithecia entire.

V. Sendtneri (Kphb.), Nyl. Pyren. p. 33 ; *Thelotrema muscicola*, Hepp. Flecht. 447.—On moss on the summit of Ben Lawers (Jones and Carroll). Very curious, and cannot be confounded with any other British species.

V. microspora. Nyl. Pyren. p. 29, var.—Rare, on loose stones near the sea at Woburn, county Down (Jones).

V. microsporoides, Nyl. Lich. Armor. 413.—Glenarm, county Antrim, on rocks washed by the sea in storms (Jones).

V. furvescens, Nyl. in Flora, 1864, p. 356.—On the ground, summit of Ben Lawers (Jones, afterwards Carroll). Nearly allied to *V. chlorotica*, Ach. Nylander describes the spores as 5-septate, but in specimens examined by me they were 3-septate.

V. glabrata, Ach.; *V. dermatodes*, Borr.; *Pyrenula nitida*, β. *dermatodes*, Mudd, Man. p. 229.—Frequent in the county Kerry on the bark of young trees, also at Glengariff, county Cork. Readily distinguished from *V. nitida*, Schrad., by the short, very obtuse spores, and by the absence of pellucid dots on the thallus.

V. cinerella, Flot. Nyl. Pyren. p. 60; *Pyrenula biformis*, Hepp. Flecht. 101.—Not rare, on young trees in county Kerry, and at Glengariff, county Cork.

V. bryospila, Nyl. in Flora, 1864, p. 357.—On the ground on a mountain over Kaafjord, Norway (July, 1863, Carroll); on Ben Lawers (July, 1864, Carroll).—Distinguished from *V. epidermidis*, Ach., by its entire perithecia, larger spores, and distinct paraphyses.

V. litoralis, Tayl.; Leight. Br. Ang. Lich. p. 46; *V. consequens*, Nyl. in Flora, 1864, p. 357.—On maritime rocks, apparently not rare, Kerry (Taylor); Glenarm (Jones); near Cork (Carroll). Perithecia entire or dimidiate; paraphyses "nullæ aut non distinctæ." Very near *V. epidermidis*, Ach.

V. consociata, Nyl. in litt.—Summit of Ben Lawers (Jones). A very minute and unsatisfactory plant, apparently parasitic on alien thallus; spores 1-septate, broader at one end.*

Thelopsis melathelia, Nyl. Flora, 1864, p. 358.—On the ground, on mosses, summit of Ben Lawers (Jones). Asci many-spored; spores ellipsoid or oblong, obscurely 3-septate; paraphyses filiform, distinct; hymeneal gelatine blue with iodine.

Melanotheca gelatinosa, Chev.; Nyl. Enum. Gen. p. 145.—On the bark of young trees, frequent.

* The two following new species are described by Nylander in 'Flora,' 1865, p. 212, and may be added to Mr. Carroll's long list of new species.
Verrucaria subintegra, Nyl., l. c.—On granite rocks, Jersey (Larbalestier).
V. leptotera, Nyl., l. c.—On rocks, Jersey (Larbalestier).—Ed.

NEW PUBLICATIONS.

Hardy Ferns: How I Collected and Cultviated them. By Nona Bellairs. London: Smith, Elder, and Co. 8vo series.

This little volume, appropriately dedicated to Mr. Thomas Moore, of Chelsea, who has done so much to render the study of Ferns popular, is written in a charming style, and narrates the rambles of a lady in search of ferns, and her efforts to cultivate them. The book is free from technicalities, and will probably draw fresh votaries to the study of ferns. Those who favour us with the narrative of their excursions would do well to read it carefully; it would show them how interesting such trips may be made to others if properly told. We heartily congratulate Miss Bellairs on her success.

BOTANICAL NEWS.

Mr. Van Voorst has just published 'An Illustrated Key to the Natural Orders of British Wild Flowers,' by John E. Sowerby, and a school edition of E. Newman's 'British Ferns.' From Prof. Daubeny we have 'The Trees and Shrubs of the Ancients.'

We regret to have to record the death of William Freeman Daniell, M.D., F.L.S., well known for his ardour in the pursuit of botanical knowledge, which he was enabled greatly to promote during a long residence on various parts of the West Coast of Africa, in the course of which he made many successful journeys into the interior, and also during two visits to the West Indies, and one to Northern China. Dr. Daniell's residence in Africa dated almost from his boyhood, and he was first occupied in commercial pursuits; but on his return to England he graduated as a physician, and entered the medical service of the army, in which he rose to be first on the list of staff-surgeons. After passing seventeen years in Africa, he was for some time stationed in Jamaica and the Bahamas, and afterwards served throughout the Expedition to China in 1860, where he had medical charge of one of the divisions of the army. Soon after his return he was again sent to Jamaica, where his fine constitution, which had so long resisted even an African climate, was completely broken down, and he returned to England in September last with confirmed disease of the lungs. He died at Southampton on the 26th of June, at the age of forty-seven, and was buried at Kensal Green on the 3rd of July. He was a Fellow of the College of Surgeons, and also of the Linnean, Geographical, and Pharmaceutical Societies. In the course of his long residence in Africa he became well acquainted with several of the principal native dialects, and also

acquired some knowledge of Arabic, which enabled him to converse freely with the natives, and acquire much information which is inaccessible to travellers who do not possess similar advantages. In early life he communicated to the 'Medical Gazette' a series of papers on the diseases peculiar to the Aboriginal tribes of the Bights of Biafra and Benin, which he afterwards revised and extended for publication in a separate form under the title of 'Sketches of the Medical Topography and Native Diseases of the Gulf of Guinea, Western Africa,' London, 8vo, 1849. He afterwards became a frequent contributor to the 'Journal and Transactions of the Pharmaceutical Society of London,' and the following list of his papers will show how extensive was his acquaintance with the useful and medicinal plants of Western Africa in particular, with their chemical composition, and with their economical and therapeutic uses:—

1. "On the D'amba or Dacca (Hemp used as Tobacco) of Western Africa," in vol. ix. 2. "On the *Synsepalum dulcificum*, or Miraculous Berry of Western Africa," in vol. xi. 3. "On the *Zea Mays* and other Cerealia of Western Africa," in vol. xi. 4. "On *Sanseviera Guineensis*, or African Hemp," in vol. xii. 5. "On the Katemfe, or the Miraculous Fruit of Soudan," in vol. xiv. 6. "On the *Pterocarpus erinaceus*, or Kino-tree of Western Africa," in vol. xiv. 7. "On the Ethiopian or Monkey Pepper," in vol. xiv. 8. "On the Frankincense-tree of Western Africa," in vol. xiv. 9. "On the *Amoma* of Western Africa," in vol. xiv. and again in vol. xvi. 10. "On *Cubeba Clusii* of Miquel, the Black Pepper of Western Africa," in vol. xiv. 11. "On *Cœlocline polycarpa*, the Berberine or Yellow-dye tree of Soudan," in vol. xvi. 12. "On the Copals of Western Africa," in vol. xvi. 13. "On the Egusé Oil, a new vegetable product from Western Africa," in vol. xvi. 14. "On a Red Canella Bark from the West Indies," in vol. xviii. 15. "On African Turmeric," in vol. i. 2nd ser. 16. "On *Ricinus inermis*, Mill. (var. *Manchuriensis*)," in vol. iii. 2nd ser. 17. "On the Cascarilla plants of the West Indies and Bahama Islands," in vol. iv. 2nd ser. 18. "Notes on some Chinese Condiments obtained from the *Xanthoxylaceæ*," in the 'Annals and Magazine of Natural History' for September, 1862. 19. "On the Kola-nut of Tropical Africa." Part 1. 'Pharmaceutical Journal,' March, 1865. Dr. Daniell was engaged during his last illness in writing this paper, part of which still remains unpublished. He had made the important discovery that Theine existed in the Kola-nut, and he had the satisfaction to find his discovery established by the analysis of the nut, made at his request, by Dr. Attfield. The Copal-tree referred to in one of these papers has been described by Mr. Bennett as a new genus, under the name of *Guibourtia*, and the Frankincense-tree under that of *Daniellia*. The latter is a strikingly distinct genus, and worthily commemorates the botanical merits of its discoverer, after whom Mr. Bennett has also called a remarkable species of *Phrynium*, with a deliciously sweet and succulent fruit, *P. Danielli*. On his return from the Chinese Expedition, Dr. Daniell brought with him from Manchouria specimens of several species of oaks, which have been described by Mr. Carruthers in the sixth volume of the 'Journal of the Linnean Society.' Many of the specimens which he collected are in the Herbarium of the British Museum, to which he was a frequent and liberal contributor. As may be judged from the nature of his

contributions to science, Dr. Daniell was a man of extensive and varied information, strongly attached to his profession and to its accessory studies, and ever ready to promote them by all the means in his power. He was also possessed of a warm and feeling heart, and made many friends by the kindliness of his disposition, and the steadfastness of his attachments.

Botanical Society, Edinburgh.—*May* 11.—Dr. Dickson, President, in the chair. The following communications were read:—1. On the Morphological Constitution of the Andrœcium of *Mentzelia*, and its analogy with that of certain *Rosaceæ*. By Dr. Alexander Dickson. (Printed in this Journal, Vol. III. p. 209.)—2. Report on the Chinchona Plantation at Darjeeling in February, 1865. By Dr. Thomas Anderson.—3. Abstract of a Report on the Pitayo Chinchonas. By Mr. Robert Cross. Mr. Clements R. Markham having been impressed with the importance of procuring seeds of the species of Chinchona which grow at and near Pitayo, New Granada, obtained the sanction of the Secretary for India to employ Mr. Cross in the service.—Dr. D. Moore, Glasnevin, sent living plants of *Neotinea intacta* from Galway. He stated that he had seen about forty plants in the station, but only one of them was in flower; they grew on a dry bank, close to limestone gravel.—Mr. Sadler stated that Dr. F. B. White had recently gathered the following rare Mosses near Perth:—*Grimmia orbicularis*, rocks on Kinnoull Hill; *G. Schultzii*, Dunsinane Hill; *G. leucophæa*, Callerfountain Hill; *G. trichophylla*, do.; *Hypnum abietinum*, do.: *H. rugosum*, do.

June 8.—Professor Balfour in the chair. The following communications were read:—1. On a New Gall from China, by Prof. Archer, referring to a gall described by Dr. Pereira, under the name of Woo-pei-tsze, which had recently been imported into this country for the manufacture of gallic acid. Mr. Hanbury believes it to be produced on *Rhus semi-alata*, and Mr. Doubleday thinks it is caused by the puncturing of an aphis, and not by a cynips. He next noticed a gall from India called Mahee, the produce of *Tamarix Indica* and *T. Pharos*, and rich in gallic acid; also a peculiar gall called Kakrasingee, yielded by *Rhus Kakrasinghee*, Royle, and one from Southern Germany named Knoppern, produced on *Quercus Cerris*. In conclusion, he noticed a curious gall from Shanghai, resembling somewhat the Chinese and Japanese galls, but wanting their peculiar branched appearance.—2. On Cape Saffron. By Prof. Archer. This Saffron is the produce of a *Scrophulariacea*, and noticed by Dr. Pappé in his 'Flora Capensis.' It yields a good orange dye, and resembles common Saffron in taste and smell.—3. Cubebs from Southern Africa. By Prof. Archer. Mr. Archer believed the cubebs to be the fruit of *Vepris lanceolata*, G. Don, a *Xanthoxylacea*.—4. Notes on the Destructive Effects of Beetles on certain young Plantations. By Mr. James Myles, factor to Mr. Speirs of Elderslie.—5. Notes of an Excursion from Simla to the Valleys of the Giri, Pabur, and Tonse Rivers, tributaries of the Jumna. By Dr. Cleghorn.—6. Recent Botanical Intelligence. Communicated by Professor Balfour.—A note was read from Dr. Paterson, Bridge of Allan, referring to a double-flowered *Orchis mascula*, which he had recently picked in Keir grounds. (A paper on this subject, by Dr. Moore, is printed in this Journal, Vol. III. p. 284.)

ON THE NOMENCLATURE OF THE BRITISH *HEPATICÆ*.

By William Carruthers, Esq., F.L.S.

The examination of Mr. Cooke's admirable illustrated catalogue of the British *Hepaticæ* made me look into the question of the priority of the names given by S. F. Gray, in his 'Natural Arrangement of British Plants,' (London, 1821) to which the attention of the readers of the 'Journal of Botany' has already been called by Dr. Pfeiffer, in a letter published at page 124 of the second volume. I am induced to publish the results of this investigation, so that the erroneous nomenclature of so many genera and species may be rectified, and the credit of labours so long overlooked may be restored to those to whom it really belongs.*

* Dr. J. E. Gray, in a paper on Chlorospermous Algæ, published in the 'Annals and Magazine of Natural History,' ser. 3rd, vol. viii. p. 404, says:—"I always look back with pleasure to the time that I spent in collecting plants and in studying and teaching botany, and especially to the period when I was occupied in preparing the systematic part of the 'Natural Arrangement of British Plants,' the work that first introduced the natural system of plants to the student of English botany; for I need make no secret of the fact that I alone am responsible for that part of the work, since, though it was published under my father's name, he wrote the introduction only. Having in his youth studied British plants according to the system of Ray, he never would adopt the Linnæan system; and the only interest that he took in the systematic part of the work was that he considered the 'Genera Plantarum' of Jussieu as a revision and modification, according to the increase of knowledge, of the Rayian method, while he regarded the Linnæan system as only a dictionary by means of which the names of plants could be most easily discovered. The kind encouragement and assistance which I received during its preparation from M. De Candolle, the father, and M. Dunal, of Geneva (then in England), from Mr. R. A. Salisbury, and from my dear friends, Edward Bennett, the late Secretary of the Zoological Society, and J. J. Bennett, now Keeper of the Botanical Collection in the Museum, and the use that the course of study it necessitated has been to me in after life, fully made up for all the obstruction and difficulties that were thrown in my way by other botanists, which delayed the appearance of the work for nearly a year, and for the illwill exhibited towards me for many years after. But their opposition was of no avail: the Natural System has been established for years; and though the work was not a success—and, indeed, how could one be, that attempted to introduce at once into English botany almost all that had been done on the Continent up to the period of its publication, and thus was so far in advance of the then state of

At the time when Gray published his work, the *Hepaticæ* were receiving considerable attention from various Continental botanists. This was undoubtedly owing, to a considerable extent, to the accurate and beautiful drawings published by (Sir) Wm. J. Hooker, in his 'British Jungermanniæ' (1816), and 'Musci Exotici' (1818–1820). The learned author did not subdivide the large genus *Jungermannia*, as he considered the fructification too uniform to supply characters sufficient to establish different genera. He, however, in the introduction to his volume, indicated several groups which have subsequently been considered of generic value, such as—*Martinellius*, Gray (*Radula*, Dumort.), *Lejeunia*, Libert, (*Pandulphinius*, Gray), and *Frullania*, Raddi, (*Salviatus*, Gray); and in the 'Clavis analytica,' which he prefixed to the description of the species, he grouped together many sets of species which are now united into genera.

Raddi was the first to deal with the subdivision of the genus *Jungermannia*. In 1818 he established *Reboulia* and *Fegatella* (Opusc. Scientif. di Bol. ii.), and in 1820 he added the genera *Metzgeria*, *Pellia*, *Fossombronia*, *Frullania*, *Calypogeia*, *Rœmeria* (*Riccardius*, Gray), and *Bellincinnia* and *Antoirea* (= *Madotheca*, Dum.). In the same year Mdlle. M. A. Libert established the genus *Lejeunia* (Ann. Gen. des Sc. Phys. et Nat. vol. vi.).

Unaware of what had been done by Raddi and Libert, Gray arranged the whole family into genera; and the best testimony that can be borne to the clear perception he had of the relation of the different groups and the value of their characteristics, is to be found in the fact that though his labours have been overlooked, all his genera, with a single exception, are to be found in recent systematic works, though under different names. Raddi's 'Memoir' was read in 1817, but it could not have reached London when Gray was passing the sheets of his work through the press, for the preface to the volume of the Transactions in which it is published is dated 10 Oct. 1820. Raddi's names,

botanical knowledge in England, where the study had been under the incubus of a blind attachment to the Linnæan system?—yet it has kept its ground; and the very opposition was useful to me by causing me to pay more attention to analytical studies, and to carry into zoology the knowledge, accurate terminology, and systematic method of study employed in the sister science, which has led me to believe that the study of botany is the best introduction, even now, for the successful prosecution of the other branches of natural science."

however, have the right of priority over Gray's, and consequently the following six genera must be at once placed among the synonyms :—

Strozzius, Gray, p. 682=*Reboulia*, *Fegatella*, Raddi, 1818.
Herverus, Gray, p. 685=*Metzgeria*, Raddi, 1820.
Papa, Gray, p. 686=*Pellia*, Raddi, 1820.
Maurocenius, Gray, p. 687=*Fossombronia*, Raddi, 1820.
Salviatus, Gray, p. 687=*Frullania*, Raddi, 1820.
Kantius, Gray, p. 706=*Calypogeia*, Raddi, 1820.

And to these must be added *Pandulphinius*, Gray, which is equal to *Lejeunia*, Libert.

In 1822, Dumortier published his 'Commentationes Botanicæ,' which contained an "Essai d'une Monographie des Jongermannes.' In this he groups the species under different generic titles, and gives diagnoses of the genera. But at this time he knew nothing of Raddi's papers, and though, in 1831, when he published his 'Sylloge Jungermannidearum Europæ Indigenarum' he had heard of them, he says in his preface that he had been unable to procure a copy, and was, therefore, ignorant of what Raddi had done.

Corda established several additional genera in his 'Genera Hepaticarum," published in Opitz's 'Beiträge' (1828), and in his "Monograph of the German Jungermanniæ" (1830–35), which forms part of Sturm's 'Deutschlands Flora.'

Neither Corda nor Dumortier were aware that Gray had preceded them in their work,—and, indeed, to this day his labours have been unrecognised. There were reasons for ignoring the work when it was published—reasons which fill one with shame to think that party-feeling and personal illwill could have influenced men of science in England to such an extent some forty years ago. But, notwithstanding the obstructions and difficulties thrown in the way of publication, and the illwill exhibited for years to both father and son, the views they advocated made progress, and the Natural System, in the end, overcame all opposition. The unfortunately successful attempt to ignore the work at home, no doubt helped to prevent its circulation abroad; and so the genera of Dumortier and Corda have been adopted even by British botanists. But Gray's names have the undoubted priority, and consequently the following changes must be introduced into the nomenclature of our British species. The foreign species that have been referred to some of the following genera are very numerous, so

that the alterations we now give will be but a small portion of what must result from a restoration of the rightful names.

SCALIUS, Gray, p. 704 = *Haplomitrium*, Nees ab Esen. Hep. Eur. i. p. 100 (1833).

S. Hookeri, Gray=*H. Hookeri*, Nees ab Esen.

CESIUS, Gray, p. 705=*Gymnomitrion*, Corda, in Opitz, Beitr. i. p. 651 (1828).

C. concinnatus, Gray=*G. concinnatum*, Corda.

C. adustus=*G adustum*, Nees.

C. crenulatus=*G. crenulatus*, Gottsche.

C. coralloides=*G. coralloides*, Nees.

NARDIUS, Gray, p. 694=*Alicularia*, Corda in Sturm, Fl. Germ. Cript. xix. and xx. p. 25 (1830).

N. scalaris, Gray=*A. scalaris*, Corda.

N. compressus, Gray=*A. compressa*, Hook.

Gray included in *Nardius*, *Jungermannia emarginata*, Ehrhart (*N. emarginatus*, Gray); but this species was made the type of a new genus, *Sarcoscyphus*, by Corda in 1830, and it is now *S. Ehrharti*, Corda.

LIPPIUS, Gray, p. 706=*Saccogyna*, Dumort. Comment. Bot. p. 113 (1822).

L. viticulosus, Gray=*S. viticulosa*, Dumort.

BAZZANIUS, Gray, p. 704 =*Mastigobryum*, Nees, Ldbg., and Gottsche, Syn. Hep. p. 214 (1844). The name was introduced by Nees for a section of his genus *Herpetium*, in his Hep. Eur. iii. p. 43 (1838), and was subsequently established as a genus by Lindenberg in the Syn. Hep.

B. trilobatus, Gray=*M. trilobatum*, Nees.

B. deflexus=*M. deflexum*, Nees.

HERBERTUS, Gray, p. 705 = *Sendtnera*, Gottsche, Lind. and Nees, Syn. Hep. p. 238, which includes *Mastigophora*, Nees, Hep. Europ. iii. p. 89 (*Sendtnera*, Endl. Gen. Pl. p. 1342), and *Schisma*, Dumort. Comment. Bot. p. 114.

H. aduncus, Gray, = *S. adunca*, Gottsche, Lind. and Nees.

H. Woodsii = *S. Woodsii*, Endl.

MARTINELLIUS, Gray, p. 690=*Candollea*, Raddi, Memorie della Soc. Ital. di Modena, xviii. p. 22 (1820). (A genus of *Dilleniaceæ* had been dedicated by Labillardière to De Candolle in 1806.) *Radula*, Dumort. Comment. Bot. p. 112 (1822). *Candollea* was divided by

Raddi into three sections, corresponding to the three divisions of *Radula* which Dumortier afterwards established in his 'Sylloge Jungermannidearum' (1831), and to which he gave the sectional names of— I. *Radulotypus;* II. *Scapania;* and III. *Plagiochila.* These sections were, in 1836, raised into genera by Nees and Montagne, who retained the original name, *Radula*, for the first genus, and adopted Dumortier's sectional names for the other two. *Martinellius* was divided by Gray into two sections: *a*, equal to *Radula* and *Scapania;* and *b*, equal to *Plagiochila.* The synonymy of Gray's genus is accordingly as follows:—

M. complanatus, Gray = *Radula complanata*, Dumort.
M. volutus = *R. voluta*, Tayl.
M. aquilegius = *R. aquilegia*, Tayl.
Scapania compacta, Lindbg. = *M. resupinatus*, Gray.
S. undulata, Nees = *M. undulatus*, Gray.
S. umbrosa, Nees = *M. umbrosus*, Gray.
S. planifolia, Nees = *M. planifolius*, Gray.
S. nemorosa, Nees = *M. nemorosus*, Gray.
Plagiochila asplenioides, N. and M. = *M. asplenioides*, Gray.
P. spinulosa, Nees and Mont. = *M. spinulosus*, Gray.
P. decipiens, Nees and Mont. = *M. decipiens*, Gray.

Under the name *Mylius*, Gray placed three species, viz. *Jungermannia Taylori*, which is a true *Jungermannia;* the minute *J. cuneifolia*, the fructification of which is yet unknown; and *J. polyanthus*, which has been separated by Corda as the type of the genus *Cheiloscyphos*. *Mylius* cannot consequently be retained; it is the only one of Gray's genera of *Hepaticæ* that was based on insufficient data.

Cavendishia, Gray, p. 690 = *Madotheca*, Dumort. Comment. Bot. p. 111 (1822).

C. lævigata, Gray = *M. lævigata*, Dumort.
C. platyphylla, Gray = *M. platyphylla*, Dumort.
C. rivularis = *M. rivularis*, Nees.
C. porella = *M. porella*, Nees.

The restoration of Gray's genus *Cavendishia* will necessitate the adoption of another designation for the genus of *Ericaceæ* to which Lindley gave the same name in 1835, Bot. Reg. letterpress to pl. 1791.

Marchesinus, Gray, p. 689 = *Phragmicoma*, Dumort. Comment. Bot. p. 112 (1822).

M. Mackaii, Gray=*P. Mackaii*, Dumort.

PALLAVACINIUS, Gray, p. 684=*Blyttia*, Endl. Gen. 472–6 (1840). *Diplolæna*, Dumort. (Already (1814) used by R. Brown for a genus of *Diosmeæ*.)

P. Lyellii, Gray=*B. Lyellii*, Endl.

P. Hibernicus, Gray=*B. Hibernica*, Endl.

Gottsche considering the absence of the nerve in the frond of *P. Hibernicus* as of generic importance, established a new genus for this species and its allies in Rabenhorst's Hep. Europ. n. 121, under the name of *Mörckia*. It is now consequently *Mörckia Hibernica*, Gottsche.

RICCARDIUS, Gray, p. 683=*Aneura*, Dumort. Comment. Bot. p. 115 (1822). *Römeria*, Raddi. (Employed by Medikus in 1792 for a genus of *Papaveraceæ*).

R. multifidus, Gray=*A. multifida*, Dumort.

R. pinguis, Gray=*A. pinguis*, Dumort.

R. pinnatifidus=*A. pinnatifida*, Nees.

R. palmatus=*A. palmata*, Nees.

CYATHOPHORA, Gray, p. 683=*Preissia* (Corda in Opitz, Beitr. 1828), Nees in Lindley's Introd. ed. 2, p. 414 (1835). (De Candolle employed *Cyathophora* for a section of *Wedelia* in 1836, Prod. v. p. 538.)

C. angustifolia, Gray=*P. commutata*, Nees.

NEW OR LITTLE-KNOWN POLYNESIAN THYMELEÆ.

By ASA GRAY, M.D.

1. WIKSTRŒMIA *rotundifolia*, Decaisne (*Daphne rotundifolia*, Linn. f.); foliis herbaceis brevissime petiolatis late ovalibus utrinque obtusissimis vel rotundatis fere glabris, venis primariis adscendentibus tenuibus reti venularum vix fortioribus; ramulis cano-pubescentibus; capitulis paucifloris brevissime pedunculatis; floribus subsessilibus pilosiusculis; calycis lobis ovatis obtusis.—Tongatabu.—The hypogynous scales (in this 4 connate in pairs) and the ovary, whether smooth or hairy at the apex, seem to furnish no good or available characters in this genus. The species are difficult to define.

2. WIKSTRŒMIA *fœtida* (*Daphne fœtida*, Linn. f.—*Capura purpurata*, Linn. Mant.—*W. Forsteri*, Decaisne.—*W. Indica*, C. A. Meyer);

foliis herbaceis ovato-oblongis oblongisve sæpius acutis glabris, venis primariis patentibus reti venularum copioso tenui vix validioribus; fasciculis capitulisve subsessilibus vel brevipedunculatis; rhachi glabrata brevi; alabastris ramulisque novellis sericeo-puberulis; calycis lobis ovatis oblongisve obtusis; drupa ovoidea.

Var. *α. Tahitensis;* foliis coriaceo-membranaceis apice vel utrinque acutis; rhachi capitulorum primum pubescente raro excrescente; floribus brevissime pedicellatis confertis.—Tahiti, etc.

Var. *β. Samoensis;* foliis tenuioribus membranaceis plerumque acutis vel acuminatis; floribus magis pedicellatis in capitulo laxiore, rhachi deflorata squarrosa demum excrescente glabra.—Samoan or Navigators' Islands.

Var. *γ. Vitiensis;* foliis membranaceis nunc firmioribus ovalibus utrinque obtusis vel obtusissimis; floribus paucis glabellis.—Fiji Islands.

Var.? *δ. Oahuensis;* foliis subcoriaceis oblongis acutis vel acutiusculis subtus glauco-pallidis; floribus perpaucis.—Oahu, Remy, (n. 223) and Maui, Sandwich Islands.

3. WIKSTRŒMIA *retusa* (sp. nov.); foliis crassiusculis cuneato-obovatis subsessilibus apice rotundatis sæpius retusis opacis fere glabris, subtus pallidis venis primariis adscendentibus rectiusculis prominulis venulis minime reticulatis, supra venis venulisque fere obsoletis; fasciculis florum subsessilibus; floribus ramulisque puberulis; calycis lobis ovatis obtusissimis tubo multum brevioribus; drupa subglobosa. —Loochoo Islands, C. Wright in Amer. N. Pacif. Expl. Exped.

4. WIKSTRŒMIA *elongata* (sp. nov.); foliis membranaceis oblongo-lanceolatis seu ovato-oblongis acuminatis acutisve glabris subtus pl. m. glauco-pallidis ($2\frac{1}{2}$–4-pollicaribus), venis primariis patentibus quam venulæ laxe reticulatæ magis prominulis; ramulis glabris seu glabellis; capitulis paucifloris brevissime pedunculatis; rhachi deflorata mox glabra haud excrescente; drupa oblonga vel fusiformi.—Mountains of Kauai, Maui, and Oahu, Sandwich Islands.—Flowers not seen. Drupe 5–6 lines long.

5. WIKSTRŒMIA *Sandwicensis*, Meisn. in DeCand.; foliis subcoriaceis vel herbaceis ovato-oblongis ovatisve basi rotundatis apice sæpius acuminulatis ramulisque glabris, venis primariis patentibus subtus prominulis, venulis obscuris; capitulis multifloris subsessilibus breviter pedunculatisve demum spiciformibus; rhachi elonganda deflorata (unciali)

squarrosa sericeo-pubescente; calycis sericei lobis ovalibus obtusis; drupa ovoidea.—Hawaii, Sandwich Islands, near the coast, at Byron's or Hilo Bay.—If the downy and at length elongated rhachis prove inconstant, then the Sandwichian and dubious var. δ of *W. fœtida* may be joined with this.

6. WIKSTRŒMIA *Uva-ursi* (sp. nov.); procumbens; ramulis brevissime tomentosis foliosissimis; foliis crasso-coriaceis obovatis obtusissimis retusisve raro apiculatis (subpollicaribus) brevipetiolatis opacis glabris, venis venulisque obscuris, capitulis subsessilibus multifloris in spicam elongandis; rhachi (demum semipollicari) deflorata tomentosa confertissime areolata; calycis lobis lato-ovatis obtusis tubo triplo brevioribus; drupa globosa. Oahu and Kauai, Sandwich Islands (Remy, n. 225, etc.).

7. WIKSTRŒMIA *buxifolia* (sp. nov.); humilis, ramosissima; ramulis novellis tomentoso-sericeis; foliis coriaceis ovalibus obovatisque basi acutis brevipetiolatis apice plerumque rotundatis (pollicaribus vel minoribus) opacis glabris, venis primariis obscuris, venulis obsoletis, costa subtus prominula; fasciculis plurifloris subsessilibus; rhachi deflorata vix elongata tomentoso-pubescente areolata; calycis lobis ovato-lanceolatis oblongisve dimidium tubi adæquantibus vel sæpius 2 interioribus brevioribus; drupa subglobosa.—Hawaii, west of the Great Crater; Kauai ?, Sandwich Islands.

8. WIKSTRŒMIA *phillyreæfolia* (sp. nov.); humilis, ramosissima, undique glabra; foliis coriaceis ovalibus oblongis seu oblongo-lanceolatis acutis obtusisve basi in petiolum brevem attenuatis, costa subtus prominente, venis vix prominulis vel obsoletis; fasciculis paucifloris subsessilibus; rhachi glabra deflorata squarrosa haud excrescente; calycis lobis ovato-lanceolatis seu angusto-oblongis tubo dimidio brevioribus; drupa globosa cærulea.

Var. α; foliis viridibus majoribus (1–2-pollicaribus) parum rigidis, venis subtus sæpius manifestis, venulis obscuris.—Hawaii, Sandwich Islands, near the Great Crater.

Var. β. *rigida*; foliis confertissimis pallidioribus opacis rigide coriaceis parvulis vel parvis (semi-subpollicari), venis venulisque obsoletis.—Mouna Loa, up to 6700 feet; also in Coll. Remy, n. 222.

DRYMISPERMUM *lanceolatum* (sp. nov.); glaberrimum; foliis breviter petiolatis lanceolatis utrinque subacutis supra nitidulis, venis venulisque teneribus; fasciculis terminalibus paucifloris; calyce infun-

dibuliformi-tubuloso extus glabro, lobis ovato-acuminatis.—Fiji Islands, in the mountains behind Macuata (Mathuata).—Leaves 2 inches long. Flowers "white and fragrant," 4-merous, a little more than an inch long.

Leucosmia, Benth. Char. *Drymispermi*, nisi calycis squamæ fauci insertæ, lobis alternæ.—Flores 5–4-meri, 8–10-andri, genitalibus more quarundam Rubiacearum, etc., dimorphis!

The anthers do not prove to be versatile, as they were said to be by Bentham, nor are they so represented in his plate. The dimorphism, moreover, which I detected in these species, shows traces in *Drymispermum* also, so that instead of placing the two genera under distinct tribes, modelled after those of *Thymeleæ* proper, as done by Meisner, it is more likely that *Leucosmia* should be reduced to a mere section of *Drymispermum*, distinguished by the scales alone, which are minute in two of the species.

The only species which we have from Tongatabu is Bentham's *L. Burnettiana*, which, so far as I know, is always 5-merous and 10-androus. But in the Samoan and Fiji Islands an allied species was collected, having 4-merous, 8-androus flowers, and truly ovate-lanceolate acuminate leaves, such as Forster's character assigns to his *Dais disperma*. It seemed likely, therefore, that Forster's species, with "*floribus octandris decandrisque*," was made up of these two; and I still incline to suppose that the character in his 'Prodromus' had the ovate-lanceolate, slender-pointed and thinner-leaved, 8-androus species in view. But on the other hand, the fine drawing of Forster's *Dais disperma* (t. 136), made on the spot, at Tongatabu (of which, by the kindness of Mr. Bennett, the obliging Curator of the botanical collections at the British Museum, I possess a copy), exactly represents Bentham's *L. Burnettiana*. The only difference is that Bentham's plate represents the form with slender filaments, and Forster's that with subsessile included anthers. The specimen in G. Forster's herbarium, acquired by the British Museum at Lambert's sale, consists, as Mr. Bennett informs me, of a single leaf of the same species. This leaf, and those of the drawing are by no means "enerviis," so that this portion of Forster's phrase remains still unaccountable. [But they might be called "enerviis" when the leaves are fresh.—Ed.]

Under these facts, Forster's *Dais disperma* must be referred to Bentham's *Leucosmia Burnettiana* (which should have taken the name of

disperma), rather than to my *L. acuminata*, which cannot be shown to have been known to Forster at all. [Similar considerations led me (Bonplandia, 1862, p. 154) to refer *Dais disperma* to *Leucosmia Burnettiana*.—Ed.]

1. Leucosmia *Burnettiana*, Benth. (*Dais disperma*, Forst., fide herb. et tab.—*Drymispermum Forsteri*, Meisn.); foliis late ovalibus ovatis summis nunc orbiculatis subito acuminulatis crassiusculis; capitulo terminali multifloro; floribus 5-meris 10-andris extus glabris, lobis ovatis; squamis faucialibus parvis integris; antheris linearibus oblongisve; drupa globosa putamine percrasso.—Shores of the Tongan, Samoan, and Fijian Islands.

2. Leucosmia *acuminata* (sp. nov.); foliis ovato-lanceolatis seu ovato-oblongis sensim vel promisse acuminatis membranaceis; capitulis terminalibus axillaribusque plurifloris; floribus 4-meris 8-andris extus glabris, lobis oblongis; squamis faucialibus majusculis tenuibus subincisis erosisve; antheris oblongis.—Samoan and Fijian Islands.

3. Leucosmia *pubiflora* (sp. nov.); foliis ovato-lanceolatis oblongisve sensim acutatis vel acuminatis subcoriaceis; pedunculis axillaribus et fasciculatis e ramis vetustioribus defoliatis; capitulis pauci-plurifloris; floribus 5-meris 10-andris extus pubescentibus, lobis oblongis; squamis faucialibus parvis integris; antheris parvis brevi-oblongis; drupa immatura ovato-fusiformi.—Fiji Islands.

Drymispermum sp., n. 379, Seem. Cat., is referable to *Leucosmia pubiflora*, as probably is also *D. montanum*, Seem. l. c. n. 380. *D. subcordatum*, Seem. l. c., and his *D.* n. 382 (which has the faucial scales of *L. acuminata*) are too imperfectly known to me to be determined.

Cambridge, Massachusetts, United States,
July 3, 1865.

PLANTS USED MEDICINALLY AT CARACAS, VENEZUELA, SOUTH AMERICA, AND THEIR VERNACULAR NAMES.

By A. Ernst, Esq.,
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(*Concluded from p.* 284.)

Golondrino (*Euphorbia prostrata*, Ait.), growing frequently amongst the pavement of Caracas. "Golondrino" is the vulgar name for a kind of tumour in the armpits, which may be cured by poultices made of *E. prostrata*.

Granada (*Punica Granatum*, L., it is the shrubby form (*P. nana*), sometimes with white or double flowers). The fruit is used as an astringent, the bark of the root as an anthelmintic, even against tapeworm. About the history and application of this drug, see Küchenmeister, 'Parasiten,' Leipzig, 1855, p. 122.

Guaco, or perhaps more correct *Huaco*. I can only confirm Dr. Seemann's (Bot. of the Herald, 150, 151) remark, that several plants of different Natural Orders bear this name. About Caracas several species of *Mikania* are called Guaco; whilst a piece of a creeping stem (8 inches long, 1 inch thick), obtained from Ciudad Bolivar under the same name, belongs to some *Aristolochia*. The medical properties of the Mikanias are not yet sufficiently known, and are probably greatly exaggerated. The juice is antispasmodic, alexipharmic, anthelmintic, astringent, and has also been recommended in Asiatic cholera.

Guamacho (*Peirescia Bleo*, De Cand.). Used for making living fences. The fruit and the leaves are very refreshing.

Guanábano (*Anona muricata*, L. Soursop), *Chirimoya* (*A. Cherimolia*, Mill), and *Riñon* (*A. squamosa*, L.) These three species are cultivated in Venezuela, but there are several varieties, of which the *Chirimo-Riñon* is one. *Anona montana*, Macf., grows on the lower mountains, and is called *Guanábano cimarron*. (See this word under "Cañafístola macho.") The Guanábano and its congeners are very refreshing. The juice of the fruit, with sugar-and-water, called Carato de Guanábano, makes a delicious beverage, frequently given in liver complaints.

Guapota (*Plumbago scandens*, L.). The leaves are said to act as caustics.

Guarataro (*Eleusine indica*, G.). The roots, soaked in water, are a remedy in urinary disorders, and a decoction of the whole plant is said to promote the growth of hair.

Guaritoto (*Jatropha urens*, L.). The root is taken in form of a powder against stones in the bladder and as a decoction in gonorrhœas and leucorrhœas.

Guásimo (*Guazuma ulmifolia*, Lam.) The bark is used for its mucilaginous properties.

Guayavita Arrayan (*Eugenia Arrayan*, Seem. Bot. of the Herald, 125). Used medicinally on account of its astringent properties. The juice of the unripe fruit cures the stings of scorpions. (T. M. Benítes, 'Principios para la Materia Médica del pais Caracas.')

Guayavo (*Psidium Guava*, Radd.). The variety *pomiferum* is more common than *pyriforme*. The pulp is either white or red. In Caracas, where numerous insects lay their eggs in it, and where, when the fruit is ripe, larvæ are found in it, the *Guayavo* is not a favourite fruit. It is somewhat astringent.

Guayacan. (As I have only seen the wood, I do not know whether *Tecoma Guayacan*, Seem. Bot. of the Herald, p. 180, is identical with the Venezuelan *Guayacan*, or whether it is *Guaiacum officinale*, L. [It is probably the last-mentioned, which I gathered not far from Porto Cabello, and where it is an export. I did not meet with *Tecoma Guayacan* in Venezuela.—Ed.] Both are known to have very hard wood, and probably for the same reason, "the direction of the fibres being remarkable, each layer of which crosses the preceding diagonally." ('Pereira,' p. 1919.) I got a piece of the wood from Puerto Cabello, which had been nearly a century underground, and was yet as hard as stone. The raspings are used in venereal diseases, and to cure obstructed menstruation.

Hidrópica (*Pistia occidentalis*, Bl.) Its use for bathing in dropsy is certainly quite imaginary, although it agrees nearly with the principle "Similia similibus."

Higuera (*Ficus Carica*, L.). Poultices made of figs and milk are used as anodyne; dried figs are put on wens, pulpy, elastic tumours, which appear on different parts of the body, and are called "lobanillos" in this country.

Higuerote (near Caracas, generally *Ficus gigantea*, H. B. K., Synopsis i. 381; but several other species of *Ficus* bear this name, the word being the augment of *Higuera*). The milky sap is used in poultices for luxations of the bones; it is said to destroy warts; and, mixed with tallow, to facilitate the extraction of corns. "Cerro del Higuerote" is the highest point in the mountains which separate the valley of Aragua from that of La Guaira.

Hinojo (*Anethum fœniculum*, L.). Well known for its stomatic and diuretic properties.

Huevo de gato (*Solanum hirtum*, Vahl; De Cand. Prod. 13. i. p. 197). A decoction of the root is given for spitting of blood and hæmorrhoids; it is likewise diuretic and emmenagogue. For this purpose two drachms of the root are boiled in a pound of water, until the whole decoction is reduced to eight ounces; honey is added, *ad libitum;* the

dose is two ounces in the morning and evening for a fortnight. The ripe fruit is edible.

Huevo de sapo (*Physalis pubescens*, L.; Griseb. 435; De Cand. Prod. 13. i. p. 446). A decoction of the leaves and flower-buds is said to be very efficacious in Asiatic cholera.

Indio desnudo. (See "Caraña.")

Incienso. This is generally the product of *Boswellia serrata*, Roxb., but sometimes *Trixis neriifolia*, Humb. Rel. Hist. i. p. 605, a shrub growing on the Silla de Caracas. An excellent glue for mending glass and China is prepared by taking olibanum, white wax, and white lead in equal parts. The broken pieces should be warmed before glueing them.

Incienso macho, a name sometimes given to "Tacamahaca," a resin derived from *Calophyllum Calaba*, Jacq.

Javillo (*Hura crepitans*, L.). The seeds are purgative, but, on account of their rather poisonous qualities, seldom used.

Jazmin amarillo (*Allamanda cathartica*, L.). Cultivated in gardens.

Jazmin colorado (*Mirabilis Jalapa*, L.; De Cand. Prod. 13, ii. p. 427), The powdered root is sometimes used for purging. The flowers are extremely variable in colour. In the immediate neighbourhood of Caracas, and in the city itself, it is generally of a fine red; near Antimano, three miles to the west, white and yellow predominates; again, at Chacao, two miles east, white with red spots and lines was noticed in several instances. Stamens and pistil are always of the same colour as the calyx. These differences are constant.

Jazmin real (*Jasminum grandiflorum*, L.; De Cand. Prod. viii. 313). The juice of the leaves is said to cure ulcers in the mouth. *Jasmin amarillo* (*Allamanda cathartica*, L.), is cultivated in gardens.

Jobo (*Spondias lutea*, L.). See "Ciruelo."

Juan de la Calle (*Trixis frutescens*, P. Br.). A decoction of the leaves is used in fomentations for old catarrhs. The plant is common, although it does no longer grow in the streets, as its vernacular name, "John-of-the-street," might lead one to suppose.

Lecherote; Orosuz (*Gonolobus aristolochioides*, H. B. K.). The stem of this vine is used like liquorice in cough. The milk is of sweet taste.

Lechoza (*Carica Papaya*, L.). The fruit is eaten either raw or boiled with sugar, and in both cases an excellent remedy for keeping the bowels open. The seeds have an aromatic, pepper-like taste, and

are reputed to be anthelmintic. The milky sap of the unripe fruit has, as is well known, the effect of rendering tough meat tender. Sometimes fruits appear in the stamen-bearing specimens, called "Lechoza macho;" and this is considered by our people little less than a miracle. I found several times stamen-bearing flowers with a rudimentary pistil, so that fructification was rather doubtful. This may account for the rarity of fruits under these circumstances. (See also Darwin, 'Origin of Species,' Amer. edit. p. 392.) *Carica cauliflora*, Jacq., Griseb. West Ind. Flor. p. 290, grows in the higher mountains; its small, yellowish-red fruits are called "Tapa-culo," on account of the seeds stopping mechanically the rectum.

In the neighbourhood of Merida, *Bocconia frutescens*, L., bears the name *Lechozo* (teste Herb. Moritz.)

Lechuga (*Lactuca sativa*, L.). It is more used for salad than medicinally. Lettuce-tea is taken as an anodyne in pectoral diseases, and the juice of the leaves, rubbed on the forehead and temples, is recommended in insomnolency.

Llanten (*Plantago major*, L.). The vernacular name, pronounced "L-yantén," is derived from the Latin "Plantago, como llano de *planus*," etc. This cosmopolitan plant is not very common about Caracas, and is considered to be astringent. The fresh leaves are put on tumours or wounds.

Limon agrio (*Citrus vulgaris*, Risso). Lemon-juice is used in many cases. It is said to cure a cutaneous disease called "culebrilla," which appears as a kind of eruption, with small, reddish pustules, having nearly the figure of a snake; hence the name ("Culebrilla," little snake). People believe it to be fatal when it goes round the whole body, or any part of it.

Lombricera; yerba de lombrices (*Spigelia Anthelmia*, L.). Both names indicate the anthelmintic properties of the plant.

Majagua (*Paritium tiliaceum*, Adr. Juss.; *Hibiscus tiliaceus*, L.). A decoction of the bark is mucilaginous, and taken in asthma and bronchitis. It is said to promote growth of the hair, by washing the head with it. The tree is not very common in the neighbourhood of Caracas.

Malva (*Malachra capitata*, L.). This plant is cultivated in the gardens, and highly useful. Wounds and ulcers washed with an infusion of the leaves get speedily cured. An infusion of the flowers makes a refreshing beverage in fevers, dysenteries, etc.

Mamei (*Mammea Americana*, L.; De Cand. Prod. i. 561). The seed, ground and mixed with some fatty substance, is said to cure the itch. It certainly kills the *Pulex penetrans*, L., for which Küchenmeister ('Parasiten,' p. 455) recommends *Oleum anisi*.

Mamon (*Melicocca bijuga*, L.; De Cand. Prod. i. 615). The astringent seed is seldom used; the leaves are said to destroy fleas. Jacquin (Selectarum Stirpium Americanarum Hist., Vindob. 1763, p. 109) gives the best description of the fruit, and the manner in which it is eaten. There is another fruit, called *Cotopriz*, distinguished from *Mamon* by a more elliptical form and a yellowish pulp, that of *Mamon* being somewhat reddish. Humboldt (Synops. iii. 421) refers this name to *Myrtus erythroxyloides*, H. B. and K., and De Candolle (Prod. iii. 241), speaking of this plant, says, "Flores fere, fruct. et sem. omnino ign." Humboldt gives the habitat of his *Myrtus* "prope Cumanam." But there, as well as in Caracas, *Cotopriz* is no *Myrtacea*, but a true *Sapindacea*, closely allied to *Melicocca bijuga*, L., and perhaps only a variety of that species. (*? Melicocca olivæformis*, H. B. K. Syn. iii. 165.)

Mango (*Mangifera Indica*, L.). Three varieties are known in the valley of Caracas: the large, green *Mango*, the *Mango hilacho* (the most common form, called "hilacho" because the seed is covered with strong fibres = hilos, which pass through the flesh of the fruit); and a small form without these fibres, called *Mango bocado* (= bit, on account of its smallness). Unger ("Botanische Streifzüge auf dem Gebiete der Culturgeschichte," Wiener Sitzungsberichte, xxiii., January, 1851) is incorrect when he says (p. 213) that the Mango-fruit has the form of a *walnut*. It is of a roundish-oblong shape, flattish, situated at the sides and somewhat kidney-shaped, 4″ or 5″ long and 2″ or 3″ in diameter. Unger is again wrong in the following observation (*loc. cit.*):—"The skin of the fruit being peeled off, the latter is put in water to lose its smell and taste of turpentine." Our American Mangos have a very slight, not unpleasant smell of turpentine; but nobody eats them in the aforesaid manner; on the contrary, the fruit would lose by this process all its flavour and sweetness, and become quite insipid. A variety unknown to me, the *Mango morado*, has most of the turpentine; the other varieties have a taste nearly like fresh carrots. The tree does not bear transplanting well, as it has large and but very few roots. The decoction of the dried skin of the fruit is recommended in pectoral diseases, on account of its volatile oil.

The ripe fruit is wholesome, but considered to be very heating (*caliente*). This distinction of heating and cooling fruits and drugs is generally carried through; we might say, sthenica and asthenica. Mango and oranges are called heating; Indian figs, sweet lemons, Lechoza, etc., cooling. Water is taken only after the first class. Drinking brandy after eating Cambures is also believed to cause immediate death. (The same belief exists in Peru; see Tschudi, 'Travels in Peru,' New York, 1853, p. 132.)

Maní (*Arachis hypogæa*, L.). The toasted seeds are said to be aphrodisiac. [The same belief I found existing in Mexico.—Ed.] The oil extracted from the fresh seeds is of a very agreeable smell and taste, but easily gets rancid.

Manirote (*Anona Manirote*, H. B. and K. Syn. iii. 126). A decoction of the inner part of the bark is taken in dropsy. The fruit is sweet, but unwholesome.

Mastranzo (*Marrubium vulgare*, L.). Leaves used for bathing in paralysis.

Mastuerzo (*Lepidium sativum*, L.). Used as an antiscorbutic and antiseptic. The root is said to be a good remedy for chronic diarrhœas. *Lepidium Virginicum*, L., is called "Mastuerzo silvestre."

Mata de Miel; Melero (*Combetrum velutinum*, De Cand., teste Moritz in herbario "ob florum odorem mellis"). A decoction of the leaves is recommended in pulmonary diseases.

Mata de Queso = Cheese-bush (*Buddleja Americana*, L.). The leaves are put on tumours or other inflamed parts of the skin.

Maya (*Nidularium Karatas*, Lemair; Griseb. West Ind. Flor. p. 591). The somewhat acid fruit acts as a mild purgative. It is considered to be very heating. "The Indians give the same names to the stars, which we call 'Cabrillos' (the Pleiades); they say 'Mayaguarallo,' that is, 'equal to a bunch of Maya.'" ('Historia de la Nueva Andalucia,' by Fr. Antonio Calin, ed. of Caracas, p. 12.)

Mejorana (*Origanum Majorana*, L.). Cultivated.

Melon (*Cucumis Melo*, L.). Cultivated on account of its edible fruit. An emulsion of the seeds makes a very refreshing beverage.

Membrillo (*Cydonia vulgaris*, L.; not *Gustavia angustifolia*, Benth., as in the Isthmus of Panamá (Seemann, Bot. Her. 126). With the fruit an excellent jelly is prepared, which is somewhat astringent, and the mucilaginous seeds are given in pectoral diseases.

Merey (*Anacardium occidentale*, L.). A decoction of the bark is very astringent, and the fruit has the same effect. The seed is caustic.

Mirasol. Under this name I have found *Helianthus annuus*, L., cultivated. Humboldt (Syn. ii. 471) gives the same name under *Wedelia pulchella*, H. B. and K. The juice of the flowers of *Helianthus* is given in intermittents; it is said also to destroy stones in the bladder. It is also called *Girasol* = turning round with the sun; the other name means "looking at the sun."

Mostaza (*Sinapis nigra*, L.; *S. alba*, L.). The plant is not cultivated, but the mustard seed is sold at the druggists' shops, and used as in Europe.

Naranjo (the tree), *Naranja* (the fruit), *Citrus Aurantium*, Risso, is the Sweet Orange; *C. vulgaris*, Risso, the Bitter or Seville Orange. With Seville oranges (*Naranjas agrias*) a beverage called "Naranjada" is prepared in the following manner:—Cut a Seville orange with its peel on in slices, and put these in hot water previously sweetened with sugar, and containing some gum arabic. The "Naranjada" is taken tepid, and is an excellent remedy in intestinal disorders. Sweet oranges are eaten early in the morning, for keeping the bowels open.

Nicua (*Calonyction speciosum*, α. *vulgaris*, Choisy). The juice of the stem, with salt and water, is used as a purgative.

Niguïta (*Acnistus arborescens*, Schlecht.). The fruit is edible.

Níspero (*Sapota Achras*, Mill.). Of the fruit poultices are made for inflammations of the liver. The seeds are recommended for hydrophobia.

There are two other fruits belonging to *Sapoteæ*, viz. *Zapota* = *Lucuma mammosa*, Gærtn., and *Garci-González* = *Lucuma Rivicoa*, Gærtn. In the French West Indian Islands, the fruit of the latter bears the name of "Œuf végétal," on account of its yellow pulp. It is a lofty tree. *Garci-González* or *Gonzalito* is also the name of a bird, which I suppose to be the *Xanthornus bananæ*, Gm. It seems to feed on the fruits of *Lucuma Rivicoa*, the seeds of which are often found under the trees. The same name was borne by a gallant soldier in the early history of Caracas, and may have some connection with it. Soon after the death of Diego de Losada, the founder of that town, Garci-González, the nephew of an adventurer, Pedro Malaver de Silva, came to

Caracas (1570), accompanied by eighty men, and protected the young town against the Indians by adopting a peaceful policy.

Ñongué (*Datura Stramonium*, β. *Tatula*, L., De Cand.). The use of *Stramonium* in asthma is known to the country-people. Is this plant really indigenous? It never occurs far from habitations.

Ocumo (*Colocasia antiquorum*, var. *esculenta*, Schott! *Arum esculentum*, L.). It is the var. α. *alba*, Seem. (Bot. Her. 212) which is cultivated, but never on a large scale. With the fresh tubers poultices are made for curing ulcers. As the plant has been introduced, the name *Ocumo* is certainly introduced too; but whence? [Has it really been introduced?—Ed.]

Olivo (*Olea Europæa*, L.). There are here a few specimens, but they never produce fruit. The fresh leaves are put on ulcers in the mouth. Another plant (*Capparis ferruginea*, L.) bears the same vernacular name. For this and several other observations I am indebted to Dr. Manuel Vicente Diaz, of Caracas.

Orégano (*Origanum vulgare*, L.). Cultivated in gardens, and medicinally used on account of its aromatic qualities. An infusion of the leaves with honey is said to be an emmenagogue. The smell of *Orégano* is thought to drive away snakes.

Ortiga. The Spanish form of the Latin word *Urtica*, used for several species of *Pilea*, all of which are considered to purify the blood and cure gonorrhœa.

Parcha (*Passiflóræ*, sp. var.). Generally the name is restricted to *P. quadrangularis*, L.; the other species, with smaller fruits, being called *Parchita*. The first does not occur in a wild state, but it is often cultivated. The fruit contains an excellent refreshing juice, the fine flavour of which is increased by adding sugar, white wine, and a little nutmeg.

Patille (*Citrullus vulgaris*, Schrader; *Cucumis Citrullus*, β. *Jaré*, Scr.). The Water Melon is cultivated on account of its refreshing fruit.

Pazoti (*Chenopodium ambrosioides*, L.) A common plant, of rather an unpleasant smell. It is tonic and anthelmintic.

Peonía (*Erythrina Corallodendron*, L.). The more common name of various species of *Erythrina* is "Bucare." The powdered seeds are recommended for epilepsy.

Pepino (*Cucumis sativus*, L.). Not much cultivated. Of the fruit

poultices are made for irritated parts of the skin. (The Creoles call "irritaciones" a great number of complaints which have their origin in a morbid action of the organs.)

Perejil (*Petroselinum sativum*, Hoffm.). Cultivated, but only on account of the green leaves, as the root becomes tough and woody. Parsley is a known diuretic.

Picapica (*Mucuna urens*, De Cand.). The vernacular name is derived from the Spanish verb *picar* = to sting. I believe another name, "Ojo de Zamuro" (eye of the carrion-vulture, *Vultur aurea*, L.), belongs to the seeds of the same plant. Dr. Seemann found in Panamá the name "Ojo de Venado" (Bot. Her. 109). *Mucuna urens* does not grow in the immediate neighbourhood of Caracas; the nearest place is Dos Aguados, on the road from Caracas to Laguaira, perhaps 1500 feet above the sea. In the valleys of Aragua I saw it frequently. The stinging hairs of the pods are sometimes taken with honey against worms.

Piña (*Ananassa sativa*, Lindl.). Cultivated on account of its delicious fruit, which is recommended as refreshment in liver complaints, in bilious fevers, and in jaundice. The rind is said to destroy bugs.

Piñon (*Jatropha Curcas*, L.). This quick-growing shrub is used for fences. The seeds are a strong purgative. The milky sap of the stem is used in hæmorrhoids, on ulcers and wounds caused by burning. The seeds contain much oil, but this is here not extracted. Klœden ('Erdkunde,' i. 789) says that nearly 1000 tons of this oil go every year from Lisbon to England; he calls it "Saatöl."

Pira (*Amaranthus paniculatus*, δ. *strictus*, Moq.). A decoction of the root is recommended in astriction of the bowels, called "empacho" in this country.

Pitahaya (*Cereus Pitahaya*, De Cand.; *C. variabilis*, Pfr. Salm-Dyck, Cact. in Horto Dyckens. cultæ, anno 1849, p. 49). The root is diuretic, and somewhat astringent.

Poleo (*Micromeria Brownei*, Benth.). This aromatic herb is used in diseases of the respiratory organs. A very strong decoction is said to be an emmenagogue.

Pucherí (*Laurinearum* sp.). The name *Pucherí* seems to be the same with *Pithurim*, so that the tree might be *Orotea Pichurim*, H. B. and K. (Syn. i. 458), now *Nectandra Pithurim*, Nees. This tree is supposed to give the *fabæ Pichurim*, which here in Caracas are sold by druggists under the name "Cobalonga." (See this word.)

I have been told (but I doubt the information) that this *Cobalonga* (the true Pithurim-bean), comes from a *Tiliacea*, *Dasynema glabra*. The aromatic seeds of *Putheri* are used in colics and other stomachic disorders.

Quimbombó (*Abelmoschus esculentus*, Wight et Arn.). The unripe capsules, used in soups, are a good remedy for debilitated constitutions, to promote evacuations. The vernacular name points to its African origin, the same the Brazil name *Ouinjombo;* both are derived from the Congo name *Quillobo* (Klœden, Erdkunde, i. 764.)

Quinchoncho (*Desmodium heterocarpum*, De Cand. Prod. ii. 337). This name also is African, the plant being thence introduced, and it was formerly cultivated in Venezuela as food for the slaves; but the seeds are very hard, and need at least ten hours' boiling before they become digestible for a *white* man's stomach. The leaves are sometimes used in fomentations for rheumatism.

Rabano (*Raphanus sativus*, L.; *A. Radicula*, α. *rotunda*, De Cand.). Cultivated on account of its edible root, which is diuretic.

Rabo de Alacran = Scorpion-tail (*Heliotropium Indicum*, L.; *Heliophytum Indicum*, De Cand.). An infusion is sudorific, and the juice of the leaves is said to cure the itch.

Raiz de Cachicomo. The root of an *Apocynea;* it contains a milky sap, has a repugnant smell, and is used as an antisyphilitic, and in chronic rheumatism. (*Cachicamo* is the vernacular name of the *Dasypus novemcinctus*, L.)

Raiz de mato. The roots of several *Aristolochiæ* bear this name; but generally it seems to be restricted to that of *A. picta*, Karst. (Dr. M. v. Diaz). It is considered to counteract the effect of the bites of venomous snakes, and it is very aromatic.

Rompesaraguëlo (*Ageratum conyzoides*, L.). A common weed, the name of which may be Indian, although it is explained by some as "rompes á tu abuelo" (you tear your grandfather), with reference to a child's play. One child takes hold of the lower part of a leaf, another of the upper. If one pulls so hard as to tear the leaf, the other exclaims, "Rompes á tu abuelo." I do not hold this to be the origin of the name, but it is a curious instance of what now is called popular etymology, and I should not have mentioned this custom had I not met with a somewhat parallel one in B. Seemann's 'Hannoversche Sitten und Gebräuche in ihrer Beziehung zur Pflanzenwelt,' Leipzig,

1862, p. 32, where *Capsella Bursa-pastoris*, Mönch, plays a somewhat similar part. Of the leaves of *Ageratum* poultices are made for tumours of every kind.

Rosa de Berberia (*Nerium odorum*, Soland). The name states that this plant has been introduced; it came about fifty years ago from Portorico to Venezuela. The double red variety is the most common with us. Reputed to be poisonous. (Humboldt's "Rosa de Belveria" is *Brownea racemosa*, Jacq. Syn. iv. 36.)

Rosa de Montaña; Palo de Cruz (*Brownea grandiceps*, Jacq.). An infusion of the flowers is a powerful astringent, and was formerly much used in curing dysentery. The wood is said to stop bleeding. (*Asclepias Curassavica*, γ, is reputed for doing the same.)

Ruda (*Ruta graveolens*, L.). Cultivated in gardens, and used on account of its stomachic properties.

Sangre de Dragon (*Croton sanguifluus*, H. B. and K., and *C. hibiscifolius*, H. B. and K. Syn. i. 406.) The resinous substance, known under this, is very astringent.

Santa Maria (*Pyrethrum Parthenium*, Sm. Griseb. 380.) Cultivated in gardens, and used instead of camomile (*manzanilla*, whilst *manzanillo* is *Hippomane mancinella*, L.).

Sarrapia (*Dipterix odorata*, Willd.). The seeds (*fabæ v. sem. Tonco*) are used in colics on account of their aromatic qualities, now ascertained to be the same as those residing in *Asperula odorata* and *Anthoxanthum odoratum*.

Sasafras (*Ocotea Cymbarum*, H. B. and K. Syn. i. 459. "Arbor giganteæ magnitudinis, sub nomine *Sassafras Orinovensibus* celebrata, ligno durissimo suaveolente, ad fabricandam scaphas inserviente." A decoction of the bark is recommended in nervous diseases, and as a powerful sudorific.

Sauco (*Sambucus Canadensis*, L.). *Sambucus Mexicana*, Presl, I think, is not a good species, but rather a form of *S. Canadensis*, the younger leaves being slightly pubescent, and the glands not always present. This Elder is far from being as efficacious or sudorific as *S. nigra*, which is sold by our druggists.

Sauce (*Salix Humboldtiana*, W. Griseb. 113.) A most graceful tree, growing like *Populus pyramidalis*, and much employed for making living fences about *Caracas*. The bark is astringent, but not much used.

Suelda-con-Suelda (*Commelyna Cayennensis*, Rich; Griseb. 524.) Poultices made of the leaves are put on dislocated or fractured bones. An infusion of the leaves in white wine is recommended in colics.

Tabaco (*Nicotiana Tabacum*, L.). Tobacco is principally cultivated in Cumaná and Barinas. In the year 1859–60 there were exported 15,369 lb. With the thickened juice of the leaves a kind of paste is prepared, called "mó" and "chimo," pieces of which are taken in the mouth and chewed. This custom is found in Merida, Trujillo, and some parts of Barinas. Tobacco-leaves are put on forehead and temples in headache. The decoction of the leaves is used in a great many diseases, even for bites of venomous snakes; but popular medicine has the principle, *post hoc, ergo propter hoc.*

Tamarindo (*Tamarindus Indica*, L.). Dr. Vargas,* whose memory will ever be cherished in Venezuela, and known to botanists by the number of plants he sent to De Candolle, recommended the following in diseases of the liver and jaundice:—Boiling water, 1 bottle; fol. sennæ, 1 ounce. Boil, and let the decoction stand till it becomes cold; decant; add 4 handfuls of tamarinds without shells, 4 peeled ripe Seville oranges, and ½ lb. of sugar. Boil again till the decoction has the consistence of a jelly; clear, and add a spoonful of nitrate of potash, or 3 spoonfuls of cremor, another spoonful of rhubarb, and mix well. Dose, 3 spoonfuls every day, with tepid water. The dose is to diminish when there are many evacuations.

Tartago, Higuereta, Palma-Christi (*Ricinus communis*, L.; Griseb. 37). The leaves are put on external inflammations, after having been a little warmed in the sun or over a fire; even in toothache this remedy is recommended. *Oleum Ricini* (Aceite de Tártago) is the most commonly used purgative in the country. It seems strange that this oil is imported from Europe, the plants growing abundantly everywhere. But the difficulty is in gathering the fruits, the working classes being so extraordinarily lazy that only a very high price could induce them to collect them. [I found three varieties of this plant in Venezuela.—Ed.]

Tomate (*Lycopersicum esculentum*, Mill.). Cultivated on account

* Vargas bequeathed his extensive library, containing many valuable works on natural history, and his collection of plants and minerals, to the University of Caracas. By this time the plants, from sheer neglect, are nearly all destroyed.

of its fruit, which medicinally are used to cure different skin-diseases. Tomatoes fluctuate very much in price; at Christmas-time, when the consumption is very great, a donkey's load is paid for at the rate of £2. 10*s.* and even £3, whilst at other times the same quantity may be had for 2*s.* or 3*s.*

Tomillo (*Micromeria varia*, Benth.; *Satureja thymoides*, Lowe; De Cand. Prod. xii. 215). Cultivated and used as an aromatic.

Toronjíl (*Ocymum micranthum*, Willd.). An infusion is taken in diseases of the stomach caused by a cold, in colics, and as vehicle for repulsive remedies.

Totumo (*Crescentia Cujete*, L.; Seemann, Synops. Crescentiarum, in Trans. of Linn. Soc. vol. xxiii. p. 20). The juice of the roasted fruit, mixed with honey, is said to be an emmenagogue, and very often used. The tree, as well as its congener *C. cucurbitina*, L., is cultivated near Caracas, both growing originally near the seacoast. The word "Tutuma" is found in the language of the Chaymas Indians. (Humb. Rel. Hist.)

Trompillo (*Solanum verbascifolium*, L.; De Cand. Prod. xiii. 1, p. 114). The leaves are used for making poultices.

Tuatua (*Jatropha gossypifolia*, L.; Griseb. p. 36). A purgative, of which people believe that there follow just as many evacuations as leaves have been used for making the draught. (I never found the glabrous form, *J. elegans*, Kl.)

Tuna (*Opuntia Tuna*, Mill., and *O. Ficus-Indica*, Mill.; Griseb. p. 302). The fruit is refreshing and somewhat astringent, as is the whole plant. *Tuna* is a Chaymas word, and means "water" (Humb. Rel. Hist.). Is this plant indigenous to America or not? David Urquhart ('The Pillars of Hercules; or, a Narrative of Travels in Spain and Morocco in 1848,' New York, 1855) speaking of the Barbary Fig, claims it as an Eastern plant. He gives the Moorish name "*Kermus ensare*" (perhaps more correctly, *Kermus-en-Nasra*), and contends that the Spanish word *Tuna* is derived from "Tunis." "The Shillohs of Las call it *Tacanarete*, as if it had come to them from the Canary Islands," and the people of these islands call it *Alcormas*. These arguments break down when closely examined. The Moorish name, *Kermus-en-Nasra*, indicates clearly that the plant was brought by the Christians; the word *Kermus*, meaning originally an insect, was transferred to a plant which nourishes another insect nearly allied to the

known one. It is also natural to suppose that the *Opuntia*, in its way from America to Europe, came at the same time to the Canaries, and hence to the African coast, so that the name *Tacanarete* would be in favour of the American origin. Neither is the name *Alcormas*, though it is certainly of Oriental origin, against it. In Germany, *Zea Maïs*, L., is generally called "Türkischer Weizen" = Turkish Wheat; and yet we know it came from America.* There is one difficulty, nevertheless. Mr. John Hogg (Hooker's Journ. of Bot. i. 1834, "Observations on some of the Classical Plants of Sicily,") mentions *Cactus Opuntia*, L., referring to it κάκτος, Theophr. lib. vi. cap. 4, and adding, "The Indian Fig, *Ficu d'India*, although so long naturalized in Sicily, was most probably introduced from Africa."

Tuturutu (*Pedilanthus tithymaloides*, Poit.; Griseb. 52). The milky sap is emetic. The plant is not found in the immediate neighbourhood of Caracas, but it is common in Laguaira.

Uvero (*Coccoloba Caracasana*, Meisn.). The author of 'Polygonaceæ' is mistaken in giving "La Ceiba" as the vernacular name of the plant. La Ceiba is a locality, where Moritz collected many plants in the valleys of Aragua. *C. uvifera*, L., is called "Uva de Playa"= Sea-side Grape. The fruits of the *Uvero* are used on account of their astringency.

Verdolaga, corrupted from *Portulaca* (*Portulaca oleracea*, L.). An exceedingly common weed, growing even in the streets. A decoction is said to be anthelmintic and refreshing.

Verdolaga de cabra (*Talinum patens*, Willd.; De Cand. Prod. iii. 357). Used on account of its refreshing qualities.

Vinagrillo (*Oxalis corniculata*, L.). Used, on account of its acidity, for cleaning teeth, and in cooling draughts. The same name is given to a Fern, *Allosorus flexuosus*, Presl.

Yagrumo (*Cecropia peltata*, L.; Griseb. Fl. West Ind. 153). The decoction of the leaves and roots is said to cure the dropsy. The sap of the younger part of the bark contains fibrine, caseine, and wax. (See H. Karsten, "Ueber den Bau der *Cecropia peltata*, L.," in Act.

* Urquhart gives other amusing derivations. "Botany," he says, comes from *botmore*, turpentine-tree; "Dalca," this is their (*i. e.* the Moors') word for *vine*; the English "wood" is derived from the Moorish *wood*; "wort," as in colewort, from *wurde*, rose; whence also "order," the rose being the emblem of order, whence "under the rose." *Le jeu ne vaut pas la chandelle!*

Acad. Cæs. Leop. Carol. Nat. Cur., vol. xxiv. p. 83). *Yagrumo macho* is *Panax speciosum*, Willd., DC. Prod. iv. 254.

Yerba bruna (*Mentha aquatica*, L.; DC. Prod. xii. 170). Used as an aromatic.

Yerba de clavo=Nail-herb (*Jussiæa angustifolia*, Lam.). The vernacular name is taken from the shape of the ovary. A decoction of the plant is said to be useful in diseases of the sexual organs.

Yerba Luisa (*Lippia citriodora*, K., DC.). An infusion of the leaves is used as a tonic in stomachic disorders.

Yerba mora (*Solanum nodiflorum*, Jacq., *a. macrophyllum*). The juice of the leaves is said to cure various cutaneous diseases; poultices made of the leaves are used for headache and inflamed tumours, to promote suppuration.

Yura (*Manihot utilissima*, Pohl). The *bitter* root, boiled and pounded, is used for making poultices in erysipelas, and the leaves are reputed to be soporific when put under the pillow. The poisonous sap of the tubers is called *yare*, but it is of a very volatile nature. Several varieties of the form with non-poisonous tubers [*M. Aipi?* Ed.] are cultivated in Venezuela.

Yuquilla (*Janipha Yuquilla*, H. B. and K. Syn. i. 418). This appears to be a doubtful species. A decoction of the tubers is recommended in gonorrhœa, and in chronic catarrhs.

Zabila (*Aloe vulgaris*, L.; Griseb. 582). Used principally as an emmenagogue, but also in pulmonary diseases and syphilis. The leaves are called *pencas*.

Zanahoria (*Daucus Carota*, L.; DC. Prod. iv. 211). The roots are used as emollients for the breasts of wet-nurses. (Conf. Apio.)

Zarza or *Zarzaparilla* (*Smilax officinalis*, H. B. and K. See for further details, Seemann, Bot. Her. 217–220). "The Spanish term zarzaparilla (from *zarza*, bramble, and *parilla*, a [small] vine) signifies a thorny vine" (Pereira, Mat. Med. ii. 1153). The medicinal properties of this plant are well known. Throughout the country it is believed that the water running through the "zarzales" (places where *Smilax officinalis* grows) is particularly wholesome, being supposed to extract from the roots a part of their power. This erroneous opinion has recently induced the Minister of the Interior of Venezuela to prohibit the gathering of zarzaparilla.

Addenda.—*Bejuco de cadena.* The name of *Ipomœa acetosifolia*

belongs to a plant which was brought me under that name, but does not bear it. The true Bejuco de cadena is *Bauhinia suaveolens*, H. B. and K.; DC. Prod. ii. 517, which I suppose to be the same as *Schnella splendens*, Benth.; Griseb. p. 214. It has got the name (Chain-vine) from its principal use. In the interior houses are built without using a single nail, beams and rafters being securely tied together with the tough and flexible stems of the Bejuco de cadena.

PLANTS GROWING IN THE STREETS OF CARACAS.

By A. Ernst, Esq.

Dr. Ed. Vogel, the African traveller, once prepared a Florula of the Berlin streets. The following is a contribution towards that of a tropical city, the capital of a large South American Republic.

Only *the streets* of the central parts are considered; all are paved. No account is taken of the gardens. I mention only the plants which are always found, beginning with the most common, and adding their popular names. There are no trees.

1. *Eleusine Indica*, Gærtn. *Guarataro inc.*
2. *Portulaca oleracea*, L. *Verdolaga.*
3. *Oxalis corniculata*, L. *Vinagrillo.*
4. *Sida rhombifolia*, L. *Escoba babosa.*
5. *Pappophorum alopecuroides*, V. *Rabo de zorro.*
6. *Pilea muscosa*, L.?
7. *Telanthera polygonoides*, Moq. (var. *compacta*).
8. *Euphorbia prostrata*, Ait. *Golondrino.*
9. *Boerhaavia paniculata*, Rich.
10. *Senebiera pinnatifida*, DC.
11. *Lepidium Virginicum*, L. (*Mastuerzo silvestre.*)
12. *Parthenium Hysterophorus*, L. *Escoba amarga.*
13. *Chenopodium ambrosioides*, L. *Pazote.*
14. *Amarantus paniculatus*, Moq. *Pira.*
15. *Heliotropium Indicum*, L. *Rabo di Alacran.*
16. *Eclipta alba*, Hassk.
17. *Capraria biflora*, L. *Fregosa.*
18. *Desmanthus depressus*, Kth.

19. *Tillandsia recurvata*, L. On roofs of houses.
20. *Porophyllum ruderale*, Cassini. (*Namú.*) On roofs of houses.
21. *Polypodium incanum*, Sw. On roofs of houses.

OBSERVATIONS ON THE PURPLE LABURNUM.

By James Backhouse, Esq.

I am not aware of the circumstances under which the Purple Laburnum originated, as to whether we owe it to accident or to horticultural skill; but it has the reputation of being a hybrid between two plants of very dissimilar habit, viz. *Cytisus Laburnum* and *Cytisus purpureus*. To the fact of these being its parents, by its throwing out branchlets of true Laburnum and bushes of *Cytisus purpureus*, it often bears indisputable testimony; and it thus also testifies against the outrage to nature in its hybridization.

The Purple Laburnum is propagated by grafting on the Common Laburnum, but the Common Laburnum branchlets on the Purple Laburnum are not from the Laburnum stock, but from the branches of the Purple Laburnum, and often far above the union with the stock. And generally, if not always, a bush of *Cytisus purpureus* is protruded a little below the branchlet of Common Laburnum.

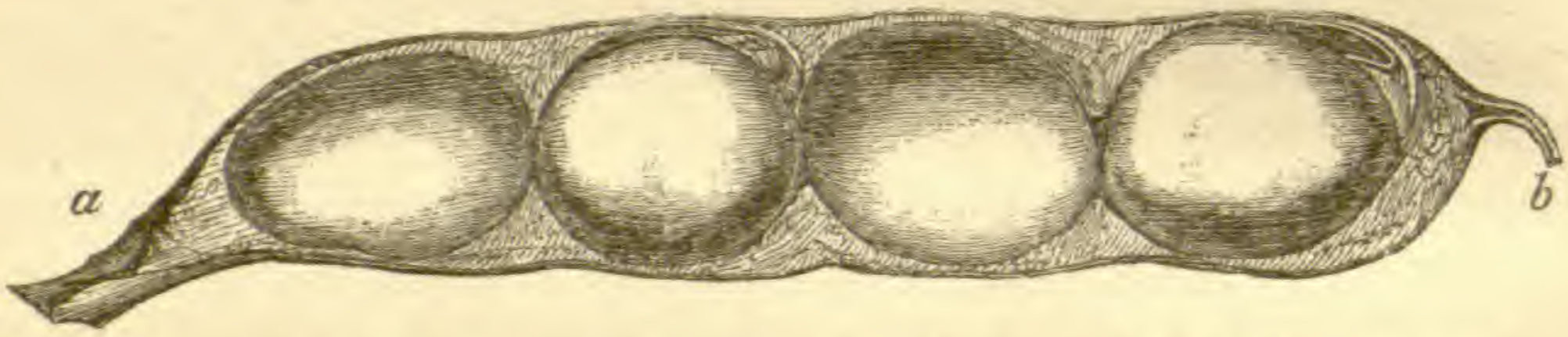
The flowers of the Common Laburnum and of *Cytisus purpureus* projected from the Purple Laburnum are fertile, and I have been asked, if the seed from them would vegetate? To this I can now answer on behalf of the Laburnum seeds, that they will. I sowed the seeds from two pods of Yellow Laburnum grown on a Purple Laburnum this summer, as soon as they were ripe, and they all vegetated. The pot in which they were sown was placed in my vinery, to prevent any other seeds getting among them by accident. I do not yet see a *Cytisus purpureus* on my Purple Laburnum, but expect one, as a necessary consequence of the branchlet of Common Laburnum having been produced. Within the last twenty years I have noticed many Purple Laburnums projecting the Yellow Laburnum and *Cytisus purpureus*, but none in which only one of these was projected; though both were not always projected simultaneously. The flowers of the Purple Laburnum are, so far as I have noticed, always barren.

I should be glad to know if any other hybrid plants separate again into their two parental conditions.

ON THE EXISTENCE OF A SECOND FORAMEN IN THE LEGUME OF *FABA VULGARIS*.

By Arthur B. Church, M.A. Oxon, F.C.S.

In the 'Journal of Botany' for April, 1864, I announced the existence of a small foramen towards the proximal end of the ventral suture of the pod in several leguminous plants, notably in the common Field Bean. At the same time I suggested that the drying of the pod, without dehiscence, took place in virtue of this opening. I had observed,



however, that the drying of the pod in *Faba vulgaris* as often begins at the distal as at the proximal extremity, and therefore searched for the cause of this phenomenon by carefully examining the further end of the pod. The existence of a second opening, at the point of the beak, was soon detected. This newly observed foramen generally appears before that at the proximal end of the legume; both originate in the shrinking and drying up of the adjacent tissues, which are particularly thin near the sites of the foramina.

The physiological function of these openings is evident, but their significance in systematic botany still remains to be investigated. I proposed the term aëropyle for the opening first discovered; that now described may be distinguished as the distal aëropyle, the epithet proximal being applied to the former.

That the aëropyles are really in communication at once with the external air and with each other is beautifully seen in the following experiment. Remove a ripe undehisced pod of *F. vulgaris* from the plant; plunge the "beak" under water, and having placed the lips round the other part of the pod blow gently through it. A slight pressure of the breath will suffice to cause air to enter at the proximal aëropyle, to travel through the pod, and to pass out as a rapid chain of bubbles from the further air-gate into the water; no air escapes elsewhere.

MEMORANDA.

NOTES ON GASTROLOBIUM GRANDIFLORUM, AN AUSTRALIAN POISON PLANT.—The poison plant (*Gastrolobium grandiflorum*, F. Müll.) which proved so detrimental to the herds and flocks on the Cape, Burdekin, and Flinders rivers, is a bush, several feet high, with orange-coloured flowers. J. Macdouall Stuart, the famous explorer, brought the first specimens from Attack Creek, south of Arnhem's Land. It is to be feared that the plant has a wide range in tropical Australia (though it was not met with on the route of the expedition to which I was attached). To some extent the occupants of territory in which it occurs may, however, guard against this bane, since the plant has become widely known; nor is it unlikely that it may be extirpated by setting fire repeatedly to the scrubby ridges on which it grows. *G. grandiflorum* is the only species of the genus as yet found beyond south-west Australia, where several congeners (*G. bilobum*, *G. calycinum*, *G. callistachys*, *G. oxylobioides*), on account of their poisonous properties, render extensive tracts unoccupiable. On a future occasion I shall have to enter on detailed statements of the effects of the *Gastrolobia* on the animal frame, give the results of their chemical analysis, and refer to the highly deleterious effect of the *Swainsonia Greyana* (which as a pasture herb on the Darling flats, frequently causes the death of horses during dry seasons, when other herbage fails) as well as to the deadly effect of the *Lotus australis* on sheep.—*F. Müller* (*Extract from Proceedings of Royal Society of Victoria.*)

BOTANICAL NEWS.

Our obituary, of this issue, includes the distinguished names of Hugh Cuming and Sir William Jackson Hooker, the former, the possessor of the largest conchological, the other, the possessor of the largest botanical collection ever formed. Hugh Cuming was born at West Alvington, Kingsbridge, in the county of Devon, on the 14th of February, 1791. Even as a child, his love of plants and of shells displayed itself in a remarkable manner; and under the friendly patronage and encouragement of Colonel Montagu, author of 'Testacea Britannica,' who resided in the neighbourhood, it was largely fostered and developed. Apprenticed to a sail-maker, he was brought into contact with seafaring men, and in the year 1819 he made a voyage to South America, and settled in business at Valparaiso. Here his passion for collecting shells found an ample field for its development, and was greatly stimulated and assisted by the English Consul, Mr. Nugent, and by several officers of the British Navy; among others, by Lieutenant Frembly and the officers of the surveying ships, under the command of Captains King and Fitzroy. In 1826, he gave up his business, in order to devote himself wholly to his favourite pursuit. With this object, he built a yacht, expressly fitted for the collection and stowage of ob-

jects of natural history; and a cruise of upwards of twelve months, among the islands of the South Pacific, amply rewarded him for his toils in dredging and collecting by sea and shore. On his return to Valparaiso, he prepared for a voyage of more extended duration along the western coast of America; and his reputation being now widely extended, he started under peculiar advantages. After two years spent in exploring the coast, from the Island of Chiloe, in lat. 44° S., to the Gulf of Conchagua, in lat. 13° N., Mr. Cuming returned with all his accumulated stores of plants and animals to his native land. In 1835 he determined to undertake a new expedition, and fixed upon the Philippine Islands, rich in natural productions, little explored, and where his knowledge of Spanish would be of great advantage, as the scene of his labours. Letters of recommendation from the authorities at Madrid to the Governor-General at Manila, to the governors of the various provinces into which the islands are divided, and to the Archbishop of Manila, procured him a hospitable welcome. After four years spent among the islands of the Philippine group, and short visits to Malacca, Singapore, and St. Helena, Mr. Cuming returned to England with the richest booty that had ever been collected by a single man. His dried plants, which numbered 130,000 specimens, were immediately distributed, as well as his living Orchids, which were numerous and of great beauty. Large number of birds and reptiles, quadrupeds and insects, were also added to the museums at home and abroad. But his collection of shells formed by far the most important part of the spoils which he had secured. Mr. Cuming had long been subjected to chronic bronchitis and an asthmatic affection, each successive paroxysm of which afforded his friends more and more serious grounds of alarm. His last attack came on the 26th of July, after a visit to the Crystal Palace; dropsical symptoms, to which he had before been subject, reappeared; and he died on the 10th of August, at his residence in Gower Street, surrounded by the collections which had been the object and solace of his life.

Sir W. J. Hooker was born in 1785; his father, who was in business at Norwich, being a man who devoted all his leisure to reading, especially travels and German literature, and to the cultivation of curious plants; by which, doubtless, was laid the foundation of that love of natural history for which his son was distinguished. Sir William's education was received at the High School of Norwich. Having at an early age inherited an ample competency from his godfather, William Jackson, Esq., he formed the design of devoting his life to travelling and natural history. Ornithology and entomology first attracted his attention; but, being happily the discoverer of a rare Moss, which he took to Sir J. E. Smith, he received from that botanist the bias which determined his career. Henceforth, botany was his sole aim; and, with the view of collecting plants, he made expeditions to Scotland and its islands, France, Switzerland, and Iceland, and made preparations for a prolonged exploration of Ceylon,—frustrated by the disturbances which broke out in that island. During this period, 1806–14, he formed the acquaintance of many of the principal scientific men in England and on the Continent. In 1815 he married the daughter of Dawson Turner, of Yarmouth, himself well known as a good

botanist, and settled at Halesworth, in Suffolk. Here was laid the foundation of his herbarium, and here commenced a long series of botanical works, the principal ones of which are:—Journal of a Tour in Iceland. 1811. 8vo.—Plantæ Cryptogamicæ Coll. Humboldt et Bonpland. 1816. 8vo.—British Jungermanniæ. 1816. 4to.—Flora Londinensis. 2nd edit. Edited and Continued. 1817–1828. 5 vols. folio.—Musci Exotici. 1818-1820. 2 vols. 8vo.—Flora Scotica. 1821. 2 vols. 8vo.—Botanical Illustrations. 1822. Folio.—Exotic Flora. 1823–27. 3 vols. 8vo.—Account of Sabine's Arctic Plants. 1824. 4to.—Catalogue of Plants in the Glasgow Bot. Garden. 1825. 8vo.—The Botany of Parry's Third Voyage. 1826. 8vo.—British Flora. 1830. 8vo.—British Flora Cryptogamia (excl. Fungi). 1833. 8vo.—Characters of Genera from the British Flora. 1830. 8vo.—Flora Boreali-Americana. 1833-1840. 2 vols. 4to.—Letter on the Death of the Duke of Bedford. 1840. 4to.—Notes on the Botany of the 'Erebus' and 'Terror.' 1843. 8vo.—Species Filicum. 1846–64. 5 vols. 8vo.—A Century of Orchideæ. 1846. 4to.—Kew Gardens. 1847. 16mo.—The Botanical Paper in the Manual of Sc. Inquiry. 1849. 8vo.—Victoria Regia. 1851. Folio.—Museum of Economic Botany at Kew. 1855. 8vo.—Filices Exoticæ. 1857-1859. 4to.—The British Ferns. 1861, 1862. 8vo.—Garden Ferns. 1861, 1862. 8vo.—A Century of Ferns. 1854. 8vo.—A Second Century of Ferns. 1860. 8vo.—Hooker and Taylor. Muscologia Britannica. 1818. 8vo.—Hooker and Greville. Icones Filicum. 1829–1831. 2 vols. folio.—Hooker and Walker Arnott. The Botany of Beechey's Voyage. 1841. 4to.—Hooker and Bauer, Genera Filicum. 1842. 8vo.—The Botanical Magazine. 1827–65. 38 vols. 8vo.—The Journal of Botany. 1834–1842. 4 vols. 8vo.—Companion to the Botanical Magazine. 1835-1836. 2 vols. 8vo.—The London Journal of Botany. 1842–1848. 7 vols. 8vo.—Journal of Botany and Kew Garden Miscellany. 1849–1857. 9 vols. 8vo.—Icones Plantarum. 1837-1854. 10 vols. 8vo. An increasing family and a decreasing income induced him, in 1820, to accept the Regius Professorship of Botany in Glasgow, at which place the next twenty years of his life were passed. In 1836 he received the honour of Hanoverian knighthood, from William IV., and in 1841 his connection with Scotland terminated, and a new era of his life began with his appointment to the Directorship of the Royal Botanical Gardens at Kew. Sir William's appointment was drawn up by Earl Russell; it gave him a salary of £300 a year, with £200 to hire a dwelling-house for himself, which should be large enough to contain his library and herbarium, the latter requiring no fewer than twelve ordinary-sized rooms for their accommodation. This was afterwards increased to £800 a year, with an official house in the gardens, and accommodation for his herbarium in the residence of the late King of Hanover. Though his public duties naturally attracted the most attention, his scientific labours not only did not cease on his coming to Kew, but were literally doubled. Rising early and going to bed late, and rarely going into society, the whole of his mornings and evenings were devoted to botany. The 'Species Filicum' was prepared wholly at Kew; and, when to this we add that he published, from his own pen, upwards of fifty volumes of descriptive botany, it must be confessed that his public career has in no way interfered with his scientific one.

Indeed, up to the day of his death his publications were progressing as busily as ever, and the first part had appeared of a new work, the 'Synopsis Filicum,' for the continuation of which extensive preparations had been made. Not content with publishing himself, he was always forward in obtaining for others botanical employment. Besides numberless appointments given to young and rising gardeners and botanists, he procured the publication of the results of many scientific expeditions and missions, and latterly, after many years' strenuous exertion, he induced almost all our Indian and Colonial Governments to employ botanists upon the publication of their Floras. In person Sir William Hooker was tall and good-looking, with a peculiarly erect and agile gait, which he retained to the end of his life. He died at Kew, of a disease of the throat, on the 12th of August, having just completed his eightieth year. His widow survives him; and he leaves one son, the present Director of the Royal Gardens, and two daughters.

The thirty-fifth meeting of the British Association was held last month at Birmingham. There is but little in the way of botany to report from it, and the few papers that were read were of little importance. Mr. Hieru gave a notice of "*Ranunculus radians*, Rev., as a British plant." He discovered it in June, 1864, at Silverdale, in Yorkshire. Professor Babington, in the last edition of his 'Manual,' considers it as a form of *R. trichophyllus* with floating leaves, but at the meeting of the Association he said the arguments for and against the plant being considered as a species were about equal. Dr. Cleghorn read a paper on "The Deodar Forests of the Western Himalaya," which are becoming of more importance from the demand for the wood in the construction of railways. Dr. Hinds read a paper on "A Monstrosity of the Rose," and exhibited specimens; and Mr. E. J. Lowe one on "The Propagation of Ferns by Means of Spores." In the geological section one or two papers were read on palæontological botany, viz. Dr. Dawson on "The Post-pliocene Plants of Canada," and on "The Successive Palæozoic Floras in Eastern North America;" and Mr. Mitchell on "Unrecorded Leaf-forms from the Pipe Clay bed of Alum Bay, Isle of Wight." The Association made a grant of £20 to Mr. Mitchell to enable him to prosecute his inquiries into these plants.

The fortieth meeting of German Naturalists and Physicians was held at Hanover on the 18th of September and following days. The botanical section was well attended, and we hope to give a summary of its proceedings in our next issue. For the next place of meeting, Frankfort-on-the-Maine has been chosen.

Mr. W. Mudd, now Curator of the Botanic Gardens, Cambridge, is preparing a monograph of the British species of *Cladonia*.

Mr. Thomas Moore has just published a small volume, entitled 'The Elements of Botany, for Families and Schools.'

Lindley and Moore's 'Treasury of Botany,' forming a companion volume to Maunder's 'Treasury of Knowledge,' the publication of which has been so long delayed, is now announced to be ready.

Fitch, del et lith.

Vincent Brooks, Imp.



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WELWITSCHII ITER ANGOLENSE.

(*Continued from p.* 115.)

V.—BIGNONIACEARUM A CL. FR. WELWITSCH IN AFRICÆ ÆQUINOCTIALIS TERRITORIO ANGOLENSI COLLECTARUM DESCRIPTIO, AUCTORE DR. B. SEEMANN.

(Plates XXXV.–XL.)

Muenteria, Seem. gen. nov. Jacarandearum. Calyx spathaceus, junior clausus, demum hinc longitudinaliter fissus. Corolla infundibuliformis, limbo 2-labiato, labio supero 2-, infero 3-lobo. Stamina 4, didynama, cum rudimento quinti; antheræ glabræ, divaricatæ. Stylus elongatus; stigma 2-lamellatum. Capsula siliquæformis, 2-locularis, 2-valvis, septo valvis planiusculis contrario. Semina ∞, alata.—Arbores erectæ, Africæ tropicæ, foliis oppositis imparipinnatis, floribus terminalibus racemoso-paniculatis.—*Spathodeæ* sp. auct.

I beg to dedicate this fine genus to my friend Dr. J. Münter, Professor of Botany in the University of Greifswalde, whose devotion to the cause of science is so well known,—the genus, which Dr. Walpers named after him, having proved identical with *Picræna*, Lindl. My *Muenteria* is most allied to *Dolichandrone*, Fenzl, Seem., and *Markhamia*, Seem., from both of which it is well distinguished. A revision of all the African *Bignoniaceæ* will probably show that *Spathodea lutea*, *Zanzibarica*, *puberula*, and *acuminata*, are congeners. Dr. Welwitsch's collection contains but two species, viz. :—

1. *M. stenocarpa* (sp. nov.) Seem. (Tab. nostr. n. 36); *Spathodea stenocarpa*, Welw. mss.; glabra; foliis 3-jugis cum impari; foliolis breviter petiolatis, ovatis ovato-oblongis v. oblongis, longe acuminatis integerrimis, supra viridibus, subtus pallidioribus v. subglaucis; racemis laxe paniculatis; pedunculis 2–3-floris; calycis apice uncinatim recurvo; corollis hinc inde glanduloso-punctatis; capsula lineari falcato-curvata (1–1½ ped. long. ½ poll. lat.).—Distr. Golungo Alto (Welwitsch ! Iter Angol. n. 482, 483), and also collected by Livingstone's Expedition, between Lat. 14 and 19° S.

"Arbor frondosa, 15–25 ped., ramis patulis, ramulis cinereis ad nodos valde compressis, floriferis sæpe subnutantibus. Folia opposita (nec ternatim verticillata) 3-juga cum impari majori. Corolla extus e

viridi-sulphurea; intus intense sulphurea, striis punctisque atropurpureis longitudinalibus, limbi laciniæ margine valde crispulæ, intus fusco-purpureæ, et glandulis magnis circularibus obsitæ."—Welw. mss.

2. *M. tomentosa*, Seem. (Tab. nostr. n. 35); *Spathodea tomentosa*, Benth. in Hook. Niger Flora, p. 462; Walp. Ann. iii. p. 89; foliis 5–6-jugis cum impari, foliolis (impari exceptis) sessilibus ovatis oblongisve acuminatis integerrimis v. dentatis, supra puberulis, subtus ferrugineo-tomentosis; pedunculis pedicellis bracteolis calycibus capsulisque ferrugineo-tomentosis; capsula elongata (2 ped. long., $\frac{1}{2}$–1 poll. lat.).—Distr. Golungo Alto (Welwitsch! Iter Angol. n. 485).

This fine species has also been found at Fernando Po (Theod. Vogel!, Mann!); on the banks of the Niger (Barter! n. 555, *ex parte*); Senegambia (Don! n. 877); Senegal (Heudelot! n. 877, in Mus. Brit.).

"Arbor 30-pedalis, laxe ramosa v. semper stricta, erecta. Flores flavi, intus rubro-violaceo-vittati. Staminis 5-ti rudimentum subulatum."—Welw.

FERDINANDIA (gen. nov. *Catalpearum*), Welw. in lit. Calyx clausus, subglobosus, demum irregulariter in lob. 3–4 fissus. Corolla campanulato-subbilabiata, 5-loba. Stamina 5, didynama, cum 5-ti sterili. Ovarium 2-loculare, ∞-ovulatum. Stylus elongatus; stigma 2-lamellatum. Capsula siliquæformis, cylindrica (2 ped. long.), torta, 2-valvis, septo crassiusculo valvis opposito. Semina ∞, 2-serialia, transversa, alata.—Arbor Angolensis, pulcherrima, 30–35-pedalis, tempore florentiæ fere aphylla, ramis ramulisque annotinis omnibus floriferis; foliis oppositis 3–5-jugis cum impari, foliolis petiolatis ovato-oblongis v. obovatis breviter acuminatis basi obliquis, coriaceis, supra glabris, subtus albido-villoso-puberulis; racemis lateralibus abbreviatis 5–9-floris; calycibus extus tomento violaceo-purpureo brevi velutinis; corollis magnis speciosissimis aurantiaco-miniatis, intus sanguineo-striatis. Species unica:

1. *F. superba*, Welw. in lit.—*Bignonia Ferdinandi*, Welw. Apontamentos Phyto-geogr. p. 585. n. 10, 1859.—Distr. Golungo Alto, in sylv. dumetosis ad 2200 ped. altit., socialis cum *Afzeliæ* et *Oncobæ* sp. fl. Nov., Decembr.; fruit. Junio et Julio. (Welwitsch! Iter Angolense, n. 488.)

This tree, one of the most beautiful of the rich flora of Angola, was first named, by Dr. Welwitsch, *Bignonia Ferdinandi*, in honour of his

Majesty Ferdinand, King of Portugal, the munificent patron of his African explorations. In working out the *Bignoniaceæ* I found that it constitutes a very distinct new genus, with which Dr. Welwitsch was desirous of further identifying his Majesty, by conferring upon it the manuscript name "*Ferdinandia*"—a name which I have great pleasure in adopting.

Catophractes Welwitschi (sp. nov.), Seem. (Tab. XXXIX.); caule ramis spinis calycibusque niveo- v. subflavido-villoso-tomentosis demum glabratis; foliis oppositis v. fasciculatis brevipetiolatis ovalibus v. ovali-oblongis grosse crenatis utrinque dense niveo- v. subflavido-tomentosis; floribus axillaribus sessilibus solitariis v. in extremitatem ramorum capitatim aggregatis, 5–6-meris; corollæ glabræ (albæ) tubo curvato, intus lineis 5–6 villosis, limbo patenti, laciniis obovatis obtusis; filamentis corollæ tubo supra adhærentibus, ima basi glabris; ovario villoso; stylo elongato; stigmate 2-lamellato; capsula ovali utrinque attenuata compressa echinata glabra, 2-loculari, loculicide 2-valvi, seminibus ∞, transversis, compressis, alatis ad quodque septi latus ∞-serialibus.—Distr. Monamedes (Welwitsch! Iter Angolense, n. 490).

The discovery of this plant shows the genus *Catophractes*, which Don established upon a mere scrap from Namaqua Land, to be a sound one, belonging to *Catalpeæ*, and closely related to *Rhigozum*, from which it principally differs in the nature and shape of the calyx, the echinate capsule and the seeds being arranged in several rows on each side of the septum. The scrap, which served for Don's description, is nowhere to be found, but the drawing published of it, in the Linn. Transactions, is believed to be accurate. Assuming that to be the case, I cannot consider Dr. Welwitsch's plant as identical with *C. Alexandri*; though it comes very near to it. A striking difference is observable in the insertion of the stamens. In *C. Alexandri* the filaments rise distinctly from the base of the corolla-tube, and their starting-point is indicated by villose hair. In *C. Welwitschi* the filaments are inserted in the throat of the corolla, and the filaments so closely merged into the body of the corolla as to be scarcely traceable lower down; they certainly do not terminate in a woolly point,—the villose lines observable at the base of the corolla-tube alternating with the veins indicative of the filaments. "Frutex 4–6-pedalis, erectus, a basi ramosus, in juventute totus niveo-tomentosus. Rami patentes, graciles, ramulis plurimis in spinis subulatis acutissimis demum atro-

nitentes abortientibus. Flores albi, speciosi, carnosuli et fragiles, 5–6-meri. Corollæ tubus elongatus, quidquam curvatus; limbus 5–6-fidus patens, aliquantulum 2-labiatus, laciniis obtusis. Flores nunc in axillis fol. sessiles, nunc ad ramulorum extra 3–5-capitatim dispositi. Calyx intus lævigatus e viridi-albidus."—Welw. Sched.

Spathodea, Pal. Beauv. Fl. Owar. i. p. 46, t. 27. excl. sp. Char. gen. emend.: Calyx spathaceus, junior clausus, demum hinc longitudinaliter fissus. Corolla subcampanulata, limbo 4-fido subæquali. Stamina 4, didynama, cum rudimento 5-ti; antheræ divaricatæ, glabræ. Ovarium 2-loculare, loculis ∞-ovulatis. Stylus elongatus; stigma 2-lamellatum. Capsula oblongo-lanceolata, 2-locularis, loculicide dehiscens. Septum valvulis contrarium. Semina alata, ∞, ad quodque septi latus ∞-serialia.—Arbores mediocres, Africæ tropicæ, foliis oppositis 2–9-jugis cum impari; foliolis brevipetiolatis oblongis integerrimis; floribus racemosis terminalibus amplis.—Seem. Journ. of Bot. 1863, p. 226.

Spathodea campanulata, Beauv. Fl. Owar. i. p. 47. t. 27, exclud. t. 28; De Cand. Prod. ix. p. 208; Vent. Choix, n. 440, in adn.; Bot. Mag. t. 5081; Van Houtte, Fl. des Ser. viii. t. 830 (Ser. i.); Lem. Jard. Fleuriste, iv. t. 388–389; Benth. in Hook. Niger Flora, p. 461.—*Spathodea tulipifera*, G. Don, Gen. Syst. iv. p. 223; De Cand. Prod. ix. p. 207. *Bignonia tulipifera*, Schum. et Thonn. Beskr. p. 273 (Tab. nostr. n. 40).—Distr. Golungo Alto et Cazengo (Welwitsch! Iter Angolense, n. 486, 487).

The reason which induced me to add another figure, to those already existing, of this most beautiful Bignoniaceous tree, was to show the fruit, which is unknown to most botanists. In previous papers on this plant, I pointed out that the fruit, which Palisot figured with this species, belonged to *Kigelia*, and that, owing to this confusion, the true character and relationship of *Spathodea* were entirely misunderstood. Two species, belonging to two distinct generic types, were referred by Palisot to his *Spathodea*. As explained elsewhere (Journ. of Bot. 1863, p. 225), I decided to retain the name *Spathodea* for *S. campanulata*, and make the second species (*S. lævis*) the type of the new genus *Newbouldia*. Hitherto only one species of *Spathodea*, as restricted by me, was known; but we are indebted to Captains Speke and Grant's Expedition to the sources of the Nile, for a second species, the flowers of which are quite equal in size to *S. campanulata*. The two may thus be distinguished:—

S. Nilotica (sp. nov.) Seem.; calycibus villoso-tomentosis, nervis impressis.—"Bushy scarlet-flowering tree. Ungoro Glav., Aug. 1860. Speke and Grant's Expedition to the Sources of the Nile."

S. campanulata, Palis.; calycibus tomentosis, nervis elevatis v. inconspicuis.

Stenolobium stans, Seem. in Journ. of Bot. 1863, p. 88.—*Bignonia stans*, Linn. Spec. 871. Distr. Sierra Leone. (Welwitsch! Iter Angol. n. 484.) Cultivated in the gardens of Sierra Leone, doubtless introduced from America.

Kigelia pinnata, De Cand. Prodr. ix. p. 247. Seem. in Trans. Linn. Soc. Lond. xxiii. p. 22. Distr. Golungo Alto (Welwitsch! Iter Angol. n. 491, 489).

Explanation of Plates.

Tab. XXXV.—*Muenteria tomentosa*, Seem. (From specimens collected by Dr. Welwitsch.) Fig. 1. Section of flower. 2. Pistil. 3 and 4. The lower and upper portion of capsule. 5. Seed. Fig. 2 slightly magnified.

Tab. XXXVI.—*Muenteria stenocarpa*, Seem. (From specimens collected by Dr. Welwitsch.) 1. Corolla opened. 2. Pistil. 3. Cross section of ovary. 4. Capsule. 5. Diagram of cross-section of capsule. 6 and 7. Seeds. All, except figs. 4, 6, and 7, magnified.

Tab. XXXVII. and XXXVIII.—*Ferdinandia superba*, Welw. (From specimens collected by Dr. Welwitsch.) Fig. 1. Lower portion of corolla. 2. Cross-section of ovary. 3 and 4. Lower and upper end of fruit. 5 and 6. Seeds. Fig. 2 slightly magnified. At the back of the plate one of the larger leaves.

Tab. XXXIX.—*Catophractes Welwitschii*, Seem. (From specimens collected by Dr. Welwitsch.) Fig. 1. Corolla and pistil. 2. Pistil. 3. Ripe capsule. 4. Cross-section of capsule. 5. Seed. Figs. 1 and 2 slightly magnified.

Tab. XL.—*Spathodea campanulata*, Pal. (From specimens collected by Dr. Welwitsch.) Fig. 1. Pistil. 2. Cross-section of ovary. 3. Ripe fruit. 4. Cross-section of fruit. 5. A seed. Fig. 2 slightly magnified.

DISCOVERY OF *INULA SALICINA*, *De Cand.*, IN IRELAND.

By Dr. D. Moore.

I have lately returned from a journey made to the county of Galway for the purpose of searching for this *Inula*, which I had reason to believe grew there. With this note you will receive specimens of it,

from the locality where I found it in considerable abundance in a truly wild condition. The history of the discovery of this plant is rather curious, as I shall briefly relate. In June, 1843, I went to Portumna, county Galway, for the purpose of getting plants and specimens of *Teucrium scordium*, which grows plentifully on the margins of Lough Derg. When botanizing along the wild shores of that great river-lake, I observed a plant growing sparingly and unknown to me in the flowerless state in which it then was. I supposed it might be a stunted state of *Hieracium prenanthoides*, but could not get a flower of it to satisfy myself. I however picked some specimens as they were, which remained in my herbarium unnamed from the period when they were found up to the present year, when it became necessary to overhaul my Irish plants, for the purpose of preparing matter for the little work which Mr. G. More and I are engaged upon. Among the doubtful plants were placed the Lough Derg specimens of *Inula*, which we could not make out, none of them having flowers. Mr. More was going to England at the time, and proposed to take these, along with other plants about which we were uncertain, to have them compared and shown to some botanical friends.

When Mr. Syme saw the specimens, he at once suggested that they might prove to be *Inula salicina!* From letters which subsequently passed between him and me on the subject, I felt anxious to set the matter at rest, and determined to make another journey to Lough Derg, to try and find the plant again, and if possible in flower. Thinking I might have been too early in June, I went this year in August, and had the satisfaction of rediscovering the *Inula*, but could only find two specimens, which had flowered, and were then seeding. The flowers appear to be sparingly produced on the plant in its wild state, and were on single capitula, without appearance of corymb. It grew on the side of the lake among the rough herbage, which consisted principally of *Schœnus nigricans, Molinia cœrulea, Galium boreale, Solidago Virga-aurea*, etc.

I traced it for more than two miles along the shore of Lough Derg, from Portumna onwards, until the ground became muddy and soft, when the herbage changed, and the plant ceased to grow.

After comparing our plant with the figure of *Inula salicina* in 'Flora Danica,' and also with cultivated specimens, I feel constrained to think it is at least not the normal form of that species. The midrib, under

side of the leaf, and stem are rougher and more hairy in the Irish plant; besides, the margins of its leaves are bluntly dentate.

Koch remarks on *Inula salicina*: "Variat rarius caule foliisque hirtis."

The discovery of this plant in the British Isles adds another link to the interesting chain of evidence, which has lately been much strengthened, showing the existence, on the western shores of Ireland, of both south and central European plants, which do not reach Great Britain proper.

ON WHITE-FLOWERED VARIETIES OF BRITISH PLANTS.

By James Britten, Esq.

The valuable paper "On Plants producing Double Flowers" which recently appeared in the 'Journal of Botany' suggested to me the idea that a list of those British plants which, usually producing coloured blossoms, occasionally vary in having these white, might be of some small interest to the reader. I have therefore drawn up the following list, partly from books and partly from my own observation, from which it will be found that out of the (about) 1000 British plants producing flowers in the ordinary sense of the term, *i. e.* excluding the *Juncaceæ* and lower Orders, and also those species the corolla of which is usually white, no less than 142 occasionally depart from their usual habits, and produce white blossoms. From the list it will also be seen that plants, in the blossoms of which red is the prevailing shade, are most liable to vary in this manner. Next in order come those which have blue flowers, while similar varieties of species producing yellow flowers are comparatively very few. The cause of this variation is frequently ascribed to an imagined peculiarity in the soil in which the variety occurs; but my own observation leads me to suppose that such, in many instances at least, is not the case, though I am unable to suggest any other solution to the problem. Some of the under-mentioned species, *e. g. Delphinium Consolida*, *Aquilegia vulgaris*, *Polygala vulgaris*, etc., may be found with blossoms of various hues in almost every locality in which they occur, while the majority but seldom vary. I have indicated the species of which I

have seen white-flowered varieties by the mark (!) following the name. The list is arranged according to the 'London Catalogue.'

Ranunculus Flammula, *L.*
R. bulbosus, *L.!*
Aquilegia vulgaris, *L.*
Delphinium Consolida, *L.!*
Papaver Argemone, *L.*
P. Rhœas, *L.!*
Fumaria capreolata, *L.*
Hesperis matronalis, *L.*
Raphanus Raphanistrum, *L.!*
Helianthemum vulgare, *Gært.!*
Viola odorata, *L.!*
V. canina, *Sm.*
Polygala vulgaris, *L.!* Var. β. depressa, *Wend.!*
Dianthus prolifer, *L.*
D. Armeria, *L.*
D. Caryophyllus, *L.*
Saponaria officinalis, *L.*
Silene acaulis, *L.*
Lychnis Viscaria, *L.*
L. Flos-cuculi, *L.*
L. diurna, *Sibth.*
L. Githago, *Lam.*
Spergularia marina, *Camb.*
Malva moschata, *L.!*
M. sylvestris, *L.!*
Erodium cicutarium, *Sm.!*
Geranium pratense, *L.*
G. pyrenaicum, *L.*
G. rotundifolium, *L.*
G. pusillum, *L.!*
G. molle, *L.!*
G. dissectum, *L.*
G. Robertianum, *L.*
Ononis arvensis, *L.!*
O. antiquorum, *L.*
Melilotus officinalis, *Willd.**
Trifolium pratense, *L.!*
Lotus corniculatus, *L.*
Vicia sylvatica, *L.*
V. Cracca, *L.*
Lathyrus sylvestris, *L.*
Rosa canina, *L.!*
Epilobium angustifolium, *L.*
E. rosmarinifolium, *Hænk.*
E. hirsutum, *L.*
E. montanum, *L.*
Sedum Telephium, *L.*
Centranthus ruber, *DC.*
Scabiosa succisa, *L.*
S. columbaria, *L.!*
Knautia arvensis, *Coult.*
Sonchus arvensis, *L.*
Cichorium Intybus, *L.*
Serratula tinctoria, *L.*
Carduus nutans, *L.*
C. acanthoides, *L.*
C. lanceolatus, *L.*
C. palustris, *L.!*
C. arvensis, *Curt.*
C. acaulis, *L.*
Onopordum Acanthium, *L.*
Centaurea nigrescens, *Angl.*
C. nigra, *L.*
C. Cyanus, *L.!*
C. Scabiosa, *L.!*
C. Calcitrapa, *L.*
Erigeron acris, *L.*
Campanula rotundifolia, *L.*
C. patula, *L.*
C. Rapunculus, *L.*
C. latifolia, *L.*
C. Trachelium, *L.*
C. glomerata, *L.*
C. persicifolia, *L.*
Specularia hybrida, *A. De Cand.!*
Jasione montana, *L.*
Erica Tetralix, *L.!*
E. cinerea, *L.!*
E. vagans, *L.*

* Perhaps *M. vulgaris*, Willd., was really intended.

Calluna vulgaris, *Salisb.!*
Menziesia polifolia, *Juss.*
Andromeda polifolia, *L.*
Vaccinium Myrtillus, *L.*
Vinca minor, *L.!*
V. major, *L.*
Gentiana Amarella, *L.*
G. campestris, *L.*
Erythræa Centaurium, *Pers.*
Polemonium cæruleum, *L.*
Convolvulus arvensis, *L.*
Solanum Dulcamara, *L.*
Verbascum Thapsus, *L.*
Veronica Anagallis, *L.*
V. Beccabunga, *L.*
V. Chamædrys, *L.*
V. agrestis, *L.!*
Bartsia Odontites, *Huds.*
Rhinanthus Crista-Galli, *L.*
Melampyrum pratense, *L.*
Pedicularis palustris, *L.*
P. sylvatica, *L.!*
Digitalis purpurea, *L.*
Antirrhinum majus, *L.*
Linaria vulgaris, *Mill.*
Scrophularia nodosa, *L.*
Salvia verbenaca, *L.*
Thymus Serpyllum, *L.*
Origanum vulgare, *L.!*
Calamintha Acinos, *Clairv.*
C. Clinopodium, *Spen.*
Ajuga reptans, *L.!*
Ballota nigra, *L.!*
Lamium purpureum, *L.*
Galeopsis Ladanum, *L.!*
G. Tetrahit, *L.!*
Stachys Betonica, *Benth.*
Prunella vulgaris, *L.!*
Scutellaria galericulata, *L.*
Myosotis palustris, *With.!*
M. cæspitosa, *Schultz.*
M. sylvatica, *Ehrh.*
Borago officinalis, *L.*
Pulmonaria officinalis, *L.*
Echium vulgare, *L.*
Primula vulgaris, *L.*
P. veris, *L.*
P. farinosa, *L.*
Anagallis arvensis, *L.*
Polygonum Persicaria, *L.*
Orchis Morio, *L.*
O. mascula, *L.*
O. fusca, *Jacq.*
O. hircina, *Scop.*
O. pyramidalis, *L.*
O. latifolia, *L.*
O. maculata, *L.*
Gymnadenia conopsea, *Br.*
Crocus vernus, *Willd.*
Fritillaria Meleagris, *L.!*
Hyacinthus nonscriptus, *L.!*
Colchicum autumnale, *L.*

The foregoing list may be thus classified :—

A. Plants, in the blossoms of which *red* is usually the predominating colour	82
B. Plants, in the blossoms of which *blue* is usually the predominating colour	46
C. Plants, in the blossoms of which *yellow* is usually the predominating colour	14
Total	142

I may mention that I shall be very glad to receive any additions to the list.

High Wycombe.

ON CERTAIN GARDENS AT A HIGH ELEVATION IN DURHAM AND NORTHUMBERLAND.

By J. G. Baker, Esq.

During a recent visit to the upland portions of the counties of Durham and Northumberland, in company with the Rev. W. W. Newbould, to collect information for a new Flora of the two counties just named, which is projected by the Tyneside Naturalists' Field Club, we visited the lead-mining tracts of the dales of the East and West Allen, principally for the purpose of making notes upon the altitudinal range of the wild plants of the district. The village of Allenheads, well known as the centre of the mining industry of the south-west of Northumberland, and one of the residences of its principal landed proprietor, W. B. Beaumont, Esq., M.P., is situated at a height above sea-level of from 1350 to 1400 feet. This is in East Allendale, and immediately beneath the gritstone peak of Kilhope Law (2200 feet in height) the loftiest summit in Northumberland south of the Cheviot range. At the head of the parallel valley of West Allendale stands Coalclough, which is probably the highest village in England, as it ranges from 1650 to 1700 feet in altitude. At 1680 feet there is a tolerably fair specimen of such a garden as is often to be seen in the upland country villages in the north; the only remarkable point about it being the great height above sea-level of the situation. In the eastern dale also there are two gardens attached to high isolated farmhouses, at a height, as measured by aneroid barometer, taking the floor of the mining office at Allenheads as a starting-point, of 1665 feet and 1640 feet respectively. There is so little information, so far as I know, attainable anywhere in print, about the height to which, in different parts of Britain, the various kinds of grain and garden produce are cultivated, that I have thought it worth while to send you a full list of what these three gardens contain. The highest house with which I am acquainted in the north of England, which is regularly inhabited all the year round, is a farmhouse near the lead-mine of Grasshill, at the head of the stream (Harwood beck) which falls into the Tees a short distance above the High force, in the county of Durham. This is just 2000 feet above the sea-level, as measured by the aneroid in comparison with the adjacent peak called Highfield, which is 300 feet

above it. Here, in the hollow of a disused limekiln, I saw last June a small crop of stunted Rhubarb, and was told by the occupant of the house, that Turnips and Potatoes had also been grown. In treating of the botanical geography of the North Riding of Yorkshire I have been in the habit of taking 600 yards as the line of limit between Watson's Agrarian and Arctic regions, and here we have one solitary instance of three species having been grown, under favourable circumstances, at 200 feet higher. For the three Allendale gardens already referred to, which may be taken in round numbers at 550 yards, the list is as follows, viz.:—

Fruit.—Plum, Raspberry, Red Currant, Black Currant, Gooseberry, and, strange to say, *Rubus saxatilis* grown in a bed after the fashion of Strawberries.

Kitchen Garden.—Potato, Rhubarb, Turnip, Cabbage, *Mentha gentilis* and *M. viridis*, *Anthemis nobilis*, Southernwood, Wormwood, Lettuce, Carrot, Cauliflower, Tropæolum, Marjoram, Onion.

Trees and Ornamental Shrubs.—Sycamore, Ash, Larch, Spruce, Scotch Fir, Hawthorn, Rowan, *Ulmus montana*, *Syringa vulgaris*, *Rosa alba*, *Salix viminalis*, *S. purpurea*, *S. Smithiana*, *S. phylicifolia*.

Flower Garden.—*Aconitum Napellus*, *Iris Germanica*, *Hesperis matronalis*, *Dielytra formosa*, *Pyrethrum Parthenium*, *Aquilegia vulgaris*, *Scrophularia nodosa*, Ribbon-grass, *Dianthus barbatus*, *Centaurea montana*, *Polemonium cæruleum*, *Epilobium angustifolium*, *Alchemilla vulgaris*, *Sedum Rhodiola*, *Meconopsis Cambrica*, *Verbascum Thapsus*.

Weeds.—*Epilobium montanum*, *Poa annua*, *Ranunculus repens*, *Lamium purpureum*, *Stellaria media*, *Phalaris Canariensis*.

Descending a stage lower, at 1600 feet, we get Beans and *Pisum arvense*. An extensive garden surrounds Mr. Beaumont's hall at Allenheads, which ranges in altitude from 1370 to 1460 feet, and this yields a large number of additional species of each class, especially of the second. As this list is of less general interest, I reserve it for the Flora. In Allendale, at the present time, Wheat is grown within five miles of Allenheads at an altitude of 800 feet, and Barley and Oats within three miles of Allenheads at from 1000 to 1100 feet; but Oats have been formerly grown as a field crop at Coal Clough, at 550 yards. In Weardale the highest field of each kind of grain which we saw were measured by aneroid as under, viz. Oats, 1340 feet; Barley, 1000 feet; Wheat, 750 feet.

Sowerby, near Thirsk, Oct. 16*th*, 1865.

ON THE OCCURRENCE OF *CRYPTOTÆNIA CANADENSIS, De Cand.*, IN SOUTHERN CHINA.

By H. F. Hance, Ph.D., etc.

In August, 1862, my friend Mr. Francis Parry gave me a specimen of an Umbellifer gathered by him during the same month at Si-chu-shan, about forty miles west of Canton, which I have since ascertained to be *Cryptotænia Canadensis*, De Cand.; and compared with a Connecticut specimen received from Professor Asa Gray.

The detection of this plant in the extreme south-eastern corner of Asia is a very remarkable fact in phyto-geography. On the North American continent, it ranges from Canada as far south as Louisiana but the most western station for it of which I am cognizant is near Westport, in the State of Missouri, where it was gathered by Mr. Creutzfeldt in 1853, on Lieut. Gunnison's exploration for a railway route from Fort Leavenworth to the Great Basin, south of the Great Salt Lake. It has also been detected in Japan, and is one of the many curious instances of the reappearance there of species found only on the eastern side of the North American continent, which presents so singular a problem, the solution of which has been attempted by Professor A. Gray, in his celebrated and masterly paper on the Flora of Japan, and its relation to that of North America, based on Mr. Charles Wright's collections. M. Maximowicz, who gave me a specimen collected by him near Nagasaki, informs me that it grows sparingly in shady woods. It has not hitherto been met with in any part of Siberia, in Davuria, Manchuria, Mongolia, nor, indeed, in any single spot of the whole Asiatic continent; and, as the Japanese locality and that which I now record are separated by a difference of exactly ten degrees of latitude, the circumstance is very curious. China has, however, been so very imperfectly explored, even in the vicinity of the now long-established ports of trade, that it would be unsafe to form any conclusions on a few isolated facts. I believe a careful exploration of the southern provinces will eventually show that many northern Asiatic forms extend further south than is supposed. As an instance, *Patrinia scabiosifolia*, Lk., a plant belonging to a distinctly septentrional genus, and which, though found in Davuria, on the Amur, the Ussuri, and in the neighbourhood of Peking, has never, I believe, been met with to the south of that capital, was gathered by me some years ago on the summit of

the Lam-tai-wu mountain, in the province of Fokien, at about 2000 feet elevation, where it grew associated with *Echinops Grijsii*, mihi, *Symplocos Sinica*, Ait., *Salvia Chinensis*, Bth., a small *Allium*, etc.; and, since then, it has been collected by Mr. Sampson about 200 miles north of the city of Canton. It also occurs in Japan, Siebold and Zuccarini's *P. parviflora* being the same.

It is further noteworthy, as a singular fact in geographical distribution, that the only other species of *Cryptotænia* known,—*C. elegans*, Webb,—should be confined to the Canaries.

Whampoa, S. China, 27th June, 1865.

ON THE GENUS *BRAINEA, J. Sm.**

By H. F. Hance, Ph.D., etc.

The remarkable arborescent Fern on which this monotypic genus is founded, and which has hitherto only been detected in the Khasya hills and southern China, was first described (1853) by Sir W. Hooker, under the name of *Bowringia* (Journ. Bot. v. 237), and most beautifully and accurately figured by Mr. Fitch. The learned author alludes to the difficulty of pointing out its affinities; and, while noticing its reeemblance to *Doodia* and *Woodwardia*, seems inclined to place it near *Gymnogramme Japonica*, Desv. Mr. Thomas Moore ('Index Filicum,' xlv. *a.* 1857) stations it in his tribe *Polypodineæ* § *Meniscieæ*, which includes *Brainea*, *Meniscium*, and *Dryomenis*, and remarks that it seems to him to connect the *Lomarieæ*, through *Woodwardieæ*, with the *Meniscieæ*. In the opinion of Mr. John Smith (Bot. Herald, 427, and Cult. Ferns, 41, *a.* 1817), the genus should stand in his tribe *Pterideæ* § *Blechneæ*, which comprises *Blechnum*, *Doodia*, *Lomaria*, *Brainea*, *Woodwardia*, *Anchistea*, *Lorinsoria*, and *Stenochlæna*. In 1859, Sir W. Hooker gave a second illustration of this plant (Fil. Exot. t. 38),

* Sir W. Hooker attaches his own name as the authority for this genus, and is so quoted by Mr. Bentham, in the 'Flora Hongkongensis.' It is true that Sir W. Hooker (Journ. Bot. ix. 355) dedicated the genus to Mr. Braine, but this was in December, 1857, whilst Mr. John Smith had done the same, *earlier in the year*, if I am not mistaken (Seemann, Bot. Herald, p. 427): moreover, I find Mr. T. Moore and Mr. Smith himself both citing the latter gentleman's 'Catalogue of Kew Ferns,' published a year previous, as the original authority.

and observed:—"It should surely hold the same rank among the *Grammitaceæ*, section *Hemionitideæ*, of Presl, which *Woodwardia* and *Doodia* do among *Blechnaceæ* of the same author." Professor Mettenius (Fil. Lechlerianæ, part ii. p. 9, *a.* 1859) considers its natural place in the system to be in the neighbourhood of *Acrosticheæ*. Finally, in 1864, Sir William Hooker (Sp. Fil. v. 161) definitively locates the genus in his suborder *Grammitideæ*, which includes *Jamesonia*, *Notholæna*, *Monogramme*, *Gymnogramme*, *Brainea*, *Meniscium*, *Antrophyum*, *Vittaria*, *Tænitis*, *Drymoglossum*, and *Hemionitis*.

Although this suborder seems to me to contain some heterogeneous elements, yet I certainly think *Gymnogrammeæ* (as it would be more correctly called) the true and natural station for *Brainea;* whilst the resemblance to *Lomaria* and its allies, insisted on by Mr. Smith, and recognised by Mr. Moore, appears to me to be rather analogical than indicative of direct affinity. It would be difficult to produce a more perfect instance of parallelism between two tribes than that shown in the following diagram, in which the opposite genera exactly correspond.

Lomarieæ.	*Gymnogrammeæ.*
Blechnum	Gymnogramme, § Coniogramme.
Sadleria	Brainea.
Woodwardia, § Lorinsoria . . .	Gymnogramme, § Dictyogramme.

And, still more singularly, both *Sadleria* and *Brainea* are remarkable for their stout arborescent caudex; in which respect they stand alone amongst their immediate allies.

No sharply defined limits exist between the tribes *Acrosticheæ*, *Gymnogrammeæ*, and *Polypodieæ*. The singular *Anetium citrifolium*, Splitg., has evidently as much claim to rank as an aberrant *Acrostichum* as it has to be united with *Hemionitis* or *Antrophyum*, which two latter appear to me in no wise distinct. And, whilst the costular veinlets of *Gymnogramme Japonica* are, contrary to M. Fée's assertion, frequently soriferous, I have specimens of *Brainea* in which the entire under surface of the frond is just as densely covered with sporangia as that of *Acrostichum (Stenochlæna) scandens*, L. In *Polypodium tridactylon*, Wall., the sori very frequently extend along the veins, and even anastomose occasionally quite freely; in which case the plant is, of course, *Gymnogrammoid*. In the *Niphobolus* group of *Polypodium*,

again, which, so far as habit is concerned, is certainly not unnatural, being distinguishable at once by the fleshy stellate-haired fronds, *P. angustatum*, Suz., with its large, distant, oval, sunken sori, comes nearer such a plant as *P. sinuosum*, Wall., than to the rest of the species; which, by their numerous, approximate, and subconfluent sori, and occasionally somewhat Elaphoglossoid habit (e. g. *Niphobolus hoyæfolius*, T. Moore, apparently not taken up by Hooker), offer a distinct approach to *Acrostichæ*. With regard to *Meniscium*, I confess that a renewed consideration of the subject compels me to assent to Professor Mettenius's view; who, after admitting the genus (Ueber ein. Fargttn. iv. 25, in adn. ad *Phegopt. cuspidatum*), and placing it next to *Acrostichum*, § *Chrysodium*, has since (Fil. Lechlerianæ, pt. ii. 21) unhesitatingly reduced it to *Phegopteris*, § *Goniopteris*. The comparison of such plants as *Polypodium urophyllum*, Wall., *P. lineatum*, Colebr., *P. proliferum*, Roxb. (the latter of which was at first placed by Hooker in *Meniscium*), with *M. salicifolium*, Wall., will at once show the reasonableness of this step; and Hooker, whilst maintaining the genus, remarks (Sp. Fil. v. 162):—"Too nearly allied to some species of *Goniopteris*." In *M. simplex*, Hook., it is quite exceptional to find simple sori, such as are represented in Hook. Journ. Bot. i. t. 11, or even subconfluent ones, as shown in 'Filices Exoticæ,' t. 83. In almost all instances, the fertile fronds are contracted, and have their entire under surface concealed by a uniform covering of sporangia. The plant is, then, sometimes technically a *Phegopteris*, at others an *Acrostichum*, § *Heteroneuron*, as was well observed by Mr. Smith (Bot. Herald, 425). In *M. triphyllum*, Sw., again, the sori are either simple and globose, or more or less confluent, and then often so widened as to form nearly contiguous bands on the frond, precisely similar to those of *Acrostichum (Heteroneuron) costatum*, Wall., β. *deltigerum*, Hook.; and it is singular that the remarkable red tint of the fronds of *P. (Goniopteris) rubidum*, *P. lineatum*, and *P. urophyllum*, occurs also in *Acrostichum costatum*. I have in these remarks, with Sir W. Hooker and Mr. Moore, considered *Phegopteris* as inseparable from *Polypodium*, not having been able to satisfy myself of its distinctness. Mr. J. Smith, who accords it generic rank, still places it in a division of his *Polypodieæ*, near *Gymnogramme*. But if, as Fée (who, while locating it next *Polypodium*, observes that the species are "bien plus rapprochées des *Aspidium* que des *Polypodium*"), Mettenius, and Grisebach con-

tend, its true affinity is with *Aspidium*,—a view to some extent countenanced by the occurrence of a conspicuously indusiated form of *P. urophyllum* (for a well-developed example of which I am indebted to the Rev. C. Parish),—it will be seen that *Aspidieæ* are no more clearly distinguishable from *Acrostichеæ* than the other tribes mentioned above.

The foregoing remarks will show any one who is not conversant with fern-literature, or has only examined the few forms at the disposal of an ordinary student of the European flora, with what difficulties the classification of the whole number of known species is surrounded. Amongst the numerous authors who of late years have devoted their attention to Ferns, there have existed the most irreconcilable differences of opinion as to the number, characters, and limits of the genera to be admitted, and even as to the great divisions in which genera are to be grouped. In the writer's opinion, those who have attempted to attain greater precision by the excessive multiplication of genera have failed in their avowed object; while they have, assuredly, most frequently formed quite unnatural and arbitrary combinations. Nor, does he think, notwithstanding the great advance made in our knowledge of the development of these plants within the last twenty years, and the many beautiful works devoted to their illustration, that it can be fairly said we have yet mastered even the principles upon which a sound and natural classification must be based. Pteridology, at the present day, however humiliating the confession, must be admitted to be in about the same condition as the vegetable kingdom in general, when Linnæus applied himself to the task of reducing it to order.

Whampoa, S. China, August 19*th*, 1865.

ON THE *ORTHOTRICHA* AND THE RARER AND MORE INTERESTING SPECIES OF MOSSES FOUND NEAR DAILLY, IN AYRSHIRE.

By John Shaw, Esq., Free Church Training College, Glasgow.

The parish of Dailly, in Ayrshire, is mainly included in the valley of the Girvan, where it deepens and widens into the sea. This valley

runs to the south-west. It contains the river Girvan, a somewhat largish and leisurely stream. Around the village of Dailly the country is peculiarly well-wooded. The moisture of the atmosphere is remarkable; on evenings, in summer, the ground is reeking with vapour; hence the cause of the excellence of the district as a moss region. It is especially rich in *Orthotricha*. As these Mosses grow for the greater part on trees, without continued supplies of moisture they could not flourish. Dry districts are absolutely destitute of them; for, although their capabilities for containing moisture are marvellous, they do not retain it long.

The following table will give the main facts in regard to the different species in a succinct form, the numbers representing the comparative rarity of the species :—

Orthotrichum leiocarpum. February. 50. On trees isolated and in woods.
O. diaphanum. February and March. Trees and old walls. 30. Preferring isolated trees.
O. pulchellum. April. Trees, rarely rocks. 40. On ashes and elders in woods; more rarely on isolated trees.
O. saxatile. May. Limestone rocks. 20.
O. cupulatum, var. *riparium*. May. Rocks in streamlets. 70. The type not found in Dailly.
O. pumilum. May. Old trees. 10. Chiefly on isolated trees—Limes.
O. Sturmii. May. Rocks. 1. On trappean rocks.
O. rupestre. May. Ash-tree. 2. Not found on rocks and walls in Dailly.
O. Rogeri (pallens). May. Elders. 10. Form with pointed leaf.
O. stramineum. June. Trees. 40. On isolated trees mainly.
O. tenellum. June. Trees. 30. On isolated trees; lower parts.
O. Shawii. June. Ash-tree. 10. Observed only on one tree.
O. Sprucei. June. Willows, etc. 40. On parts often inundated by river.
O. rivulare. June. Trees and rocks. 30. On parts often inundated by river.
O. patens. June. Trees. 10. By the banks of the river.
O. fastigiatum. June. Trees. 30. Isolated and in woods.
O. affine. July. Trees and stones. 30.
O. Lyellii. July. Old trees. 5. The barren plant plentiful.
Ulota calvescens. July. Trees. 5. Trees in shady woods.
U. crispula. July. Trees. 5. Trees in woods.
U. crispula, var. *ambigua*. July. Trees. 40. Trees in woods.
U. crispa. End of July. Trees. 20. Trees in woods.
U. Bruchii. September. Trees. 70. Trees.
U. Drummondii. September. Trees. 5. Exposed woods.
U. phyllantha. Trees and rocks. 100. Everywhere.

In submitting this list I gladly express my obligations to Mr. Wilson and Dr. Schimper, and especially to Dr. Wood, who, when I commenced to work in the district, spared neither time nor trouble to introduce me to the genus. It might be said in all fairness that Dr. Wood has done more for the *Orthotricha* in Britain than any other British bryologist.

It will be observed that *O. obtusifolium*, *O. speciosum*, *U. Ludwigii*, and *U. Hutchinsii* have not been detected in Dailly. *O. obtusifolium* may be expected to turn up; the others are subalpine forms.

O. cupulatum, var. *riparium;* this takes the place of *O. rivulare* in the feeders of the Girvan, and does not occur elsewhere in the district.

O. pumilum was detected here for the first time by Dr. Schimper. I had gathered the moss often, but could make nothing of it.

O. Sturmii was first noticed as British by Dr. Wood in a collection sent to him by Dr. Moore, of Glasnevin. In 1860 I collected it both here and on Ailsa Craig. Subsequently it has been gathered in Scotland in different places by Mr. M'Kinlay, Mr. Howie, and myself. It seems to be confined to trappean rocks. I have gathered it in company with *O. anomalum* and *O. rupestre*, near Bowling.

O. Rogeri I first gathered near Douglas, Lanarkshire, on Elder-trees, in May, 1861, and sent it as such to Mr. Wilson, who thought it but a form of *O. affine*, the general scapegoat of more than one *Orthotrichum* difficulty. I gathered it again, when Dr. Schimper visited Dailly, and he unhesitatingly pronounced it *O. Rogeri*.

O. Shawii is confined to one Ash-tree.

O. patens I have had long in my herbarium as a form of *O. affine*, when under the influence of great moisture. Dr. Schimper pronounced it *O. patens*.

O. fastigiatum. Dr. Schimper has determined that this is truly a British species. The only two British capsules under that name belonged to *O. affine;* and much existing under the latter name is probably *O. fastigiatum!* *O. fastigiatum* ripens earlier, has a shorter and rounder capsule, and is devoid of that greenish aspect of capsule peculiar to *O. affine*.

Ulota calvescens is excessively rare here and near Loch Doon, where I have also gathered it.

Those who favour the Darwinian hypothesis will remark that some

species of *Orthotricha* have a singular power of selection in regard to habitat. Some are restricted to Ash-trees, one to Elders, another favours Limes, another Willows; some, again, prefer isolated trees, others trees in woods.

It is singular that the two species *O. saxatile* and *O. anomalum*, long confounded till Dr. Wood showed the distinction between them, should grow one on limestone the other on trap.

The following list contains the rarer species of the other genera which have been found in this locality. The nature of the soil accounts for the absence of many species. There are no extensive marshy tracts; there is an entire absence of sandy hollows; we therefore do not find many of the species of *Hypna*, *Sphagna*, and *Brya* found in Lancashire and Cheshire.

The species marked with an asterisk are characteristic of particular habitats, and indicate the presence of species that are generally found associated with them. Thus *Hypnum condensatum* implies the presence in the hill gullies and bogs where it is found, of *Hypnum commutatum*, *Bryum pseudo-triquetrum*, *B. bimum*, etc.

Bartramia arcuata fruits freely on gully slopes. The female moss is the scarcer. Near Loch Doon I found another more fruitful station. It is ripe in the month of March.

**Bartramia ithyphylla.*

Bryum obconicum, not at all rare here. I think this a good, though a somewhat difficult species. Mr. Wilson gathered, in company with it, *Bryum murale* (Wils. MSS.) when with me here in 1861: I do not know this species, and have therefore not been able to identify it in the district. *Bryum obconicum* fruits later than its ally *Bryum capillare.*

Cryphæa heteromalla, on Ash-trees.

**Fissidens pusillus*, on a wettish sandstone wall, in company with *Seligeria recurvata.*

Grimmia Doniana. *Hedwigia ciliata* fruits very freely in company with this beautiful moss.

Grimmia tricophylla fruits very sparingly here: near Wemyss Bay, on the Firth of Clyde it fruits most abundantly and beautifully.

**Gymnostomum tenue.*

Hypnum brevirostre, fruits in very great abundance here, in company with *Hypnum striatum.*

Hypnum delicatulum. I gathered one beautiful specimen in fruit of this rare moss.

Hypnum depressum occurs only in a barren state.

Hypnum irriguum is not at all plentiful.

Hypnum rivulare fruits somewhat freely on the stones in Lady Burn, near Dailly.

Hypnum Schreberi fruits sparingly on hill-slopes.

**Hypnum stellatum*, a small state in fruit occurs in a limestone bog.

Hypnum Teesdalii, not uncommon.

**Hypnum triquetrum* fruits freely, as does also *H. loreum* and *H. tamarascinum.*

Isothecium alopecurum.

Leskea pulvinata fruits on trees by the Girvan, where occasionally inundated. Rare.

Mnium affine, once gathered two capsules in good condition.

**Mnium undulatum*, beautiful specimens often with as many as ten *setæ.* The district produces *M. hornum*, *M. serratum*, *M. rostratum*, and *M. punctatum.*

Neckera pumila is very rare. *N. crispa* and *N. complanata* are very common in particular localities.

Pogonatum urnigerum.

**Pogonatum alpinum.*

Racomitrium heterostichum, *R. fasciculare*, *R. aciculare*, *R. canescens* are all very common.

Tortula Hornschuchiana, a barren patch was gathered by Wilson.

Tortula latifolia, in fruit; very rare. *T. lævipila* abounds, in beautiful condition.

Tortula papillosa, common.

Tortula vinealis, rare.

Trichostomum flexicaule, in company with *Hypnum stellatum*, in one station.

Zygodon conoideus, somewhat plentiful: one tree over a small stream was literally covered with it, but it is now cut down.

Zygodon viridissimus, rarer than the last, growing on sandstone rocks and on trees by streams.

English botanists will bear in mind that Scotland is bryologically later than England: hence the months of fruiting given in the table may be to some considerable extent different from theirs.

STATIONS NEAR PLYMOUTH OF SOME PLANTS THAT ARE EITHER UNCOMMON, OR ELSE NEW TO DEVON OR CORNWALL.

By T. R. Archer Briggs, Esq.

Lepidium Draba, L. Six or seven plants in a waste spot by the river Walkham, a little above the factory at Horrabridge. May 9th, 1865. A few specimens of *Ranunculus hirsutus* were growing with it, and probably were no more indigenous there than the *Lepidium*.

Barbarea intermedia, Bor. Plentiful, among turnips and cabbages, in a field at Common Wood, and a few plants in two adjoining fields, in May, 1865.

Viola sylvatica, α. *Reichenbachiana*, Bab. Man. Not rare in shady lanes. Abundant about Newnham House, near Plympton; Stony-bridge; lane between Milbrook village and Whitsand Bay, etc.

Sagina ciliata, Fries. Down Thomas, Devon; bank between Saltash and Botusfleming, Cornwall.

Lepigonum rupicola, Lebel. Plentiful on the low rocky coast to the east of Plymouth, between Staddon Point and Wembury Church, Devon; rocks at Whitsand Bay, Cornwall.

Hypericum undulatum, Schousb. Sparingly in a bog near Ivybridge, about nine or ten miles to the east of Fursdon and Common Wood, its previously recorded stations in the neighbourhood.

Geranium rotundifolium, L. Abundant in the immediate vicinity of Plymouth, and extending for a few miles to the east of the town, but more rare in the neighbouring tract to the west, across the Tamar. It occurs, however, sparingly, half a mile from Cremyll, on the road to Kingsand (parish in Devon); in dry hedgebanks on both sides of the Liskeard road, two miles from Torpoint, Cornwall; and plentifully near Wilcove, in the same county. In this last locality we found, this season, two or three plants of the allied *G. pusillum*, a species remarkably rare in the neighbourhood of Plymouth.

Trigonella ornithopodioides, DC. On a bank between Saltash and Botusfleming, Cornwall; on another between Milbrook and Whitsand Bay, and elsewhere in the neighbourhood of the latter place.

Trifolium glomeratum, L. Not general near Plymouth. On a bank in a lane between Down Thomas and the coast; and in a dry pasture between Staddon Point and Wembury, Devon.

Lotus angustissimus, L. Plentiful in the same pasture as the last, in June, 1865.

Lotus hispidus, Desf. In company with *L. angustissimus*, but much rarer.

Potentilla argentea, L. A single plant in dry soil on top of a wall at Trevol, Cornwall, July, 1865.

Spiræa Filipendula, L. Plentiful on a dry hedgebank near Landulph, Cornwall; the only locality near Plymouth where we have seen it.

Rosa micrantha, Sm. Rather frequent; growing plentifully about Bickleigh; at Blaxton; Fancy; Tamerton Foliott; between Denham Bridge and Buckland Monachorum village; on *débris* from an old quarry on the Devonshire side of the Tamar, opposite Saltash, etc. In Cornwall we have noticed it near Menheniot; between St. German's and Tidiford; at Antony; and near Landulph.

Rosa rubiginosa, L. Rare about Plymouth. Amongst Furze, near Tamerton Foliott, but where it may not be indigenous.

Mespilus Germanica, L. On a bank by the Plymouth and Exeter road, near Lee Mill bridge. Only a single bush, but growing in a situation where it was certainly never planted.

Epilobium tetragonum, L. By the side of the road between Plymouth and Milehouse, and plentifully at the latter place; at Crabtree; on limestone rubble near a quarry at Radford; by the side of the footpath between Plymouth and Laira Bridge; also about three miles beyond the bridge on the Brixton Road, and near the latter place. Abundant near Torpoint, Cornwall.

Epilobium obscurum, Schreb. Common.

E. lanceolatum, S. and M. This species, although so frequent in the immediate vicinity of Plymouth, seems to be uncommon on the other side of the Tamar. We can, however, add a Cornish station to that already given for it near St. John's (Journ. Bot. Vol. I. p. 377), as we find it grows rather sparingly on banks on both sides of the Saltash and Callington road, within a mile from the former place.

Galium tricorne, With. Plentiful in one part of a wheat field, between Trevol and St. John's, Cornwall, July 14th, 1865. A single plant by a path in a field at Down Thomas, Devon, July 1st, 1865.

Fedia Auricula, De Cand. Common in a wheat field at Wembury, and seen elsewhere, in that neighbourhood, in July, 1865; also be-

tween that place and Down Thomas, growing with *F. dentata*, an exceedingly common cornfield weed about Plymouth. In a waste by the roadside, near Antony, Cornwall, and there likewise with *F. dentata*. Cornfield between Trevol and St. John's, in the same county. July 11th, 1865.

Atropa Belladonna, L. In a shady nook on a low cliff, below Mount Edgcumbe Park. The station is in Devon, although across the Tamar.

Mimulus luteus, L. This naturalized plant grows plentifully on a sandbank in the bed of the Erme, near Erme Bridge. It was derived perhaps from some garden at Ivybridge, a village on the river, about three miles above, where we have seen it in cultivation.

Orobanche amethystea, Thuill. Several plants (some, at least, of them certainly parasitical on Daucus), on a bank above the sea, near Kingsand, Devon. June 26, 1865.

Centunculus minimus, L. Rare about Plymouth. In moist, but shallow soil, on a rock, probably washed at times by the sea, between Staddon Point and Wembury; and in several spots on Roborough Down, Devon, growing with *Radiola millegrana*. In a damp pasture between Trevol and St. John's, Cornwall.

Betula glutinosa, Walp. Common Wood.

Gymnadenia Conopsea, R. Br. Very rare in the neighbourhood of Plymouth, growing, so far as we are aware, only on Roborough Down, an extensive common between Plymouth and Tavistock.

Habenaria bifolia, R. Br. Rare. On Roborough Down.

H. chlorantha, Bab. Not rare; growing in bushy spots, and on the borders of woods. Near Tamerton Foliott; in the valley of the Plym; between Blaxton and Roborough Down; in a field near Roborough village; by the tramroad at Fancy; near Bickleigh; etc.

Allium oleraceum, L. About thirty plants on an old wall, or rather hedgebank, formed of stones and earth, near Plymstock. July, 1865. The allied *A. vineale*, var. *compactum*, Thuill., is common about Plymouth, but we have seen only a few specimens of the typical plant in two spots near Torpoint, where they grew with more of this variety.

Scirpus sylvaticus, L. In sandy soil, by the river Lynher, near Notter Bridge, Cornwall. We have recently found two remarkable *Galia* near Plymouth, which we consider hybrids between *G. elatum*, Thuill., and *G. verum*, L. We have sent specimens to Mr. J. G. Baker,

who thinks we are right in so regarding them, and informs us that one would be called *vero-elatum*, the other *elato-verum*. The first we found on a bank about two miles from Plymouth, where it grows between a mass of *G. elatum* and a patch of *verum*. The latter, which is probably the *G. verum*, *β. ochroleucum*, of 'English Botany,' 3rd edit., we collected from the edge of a cliff, near Wembury, where *G. verum* abounds and *G. elatum* occurs. We think we have seen a similar plant on a cliff at Whitsand Bay.

10, *Torrington Place, Plymouth, July* 20, 1865.

REDISCOVERY OF *CENTAUREA MASSONIANA, Lowe*, IN MADEIRA.

Centaurea Massoniana, Lowe, in Hook. Journ. Bot. viii. p. 297, which, since its discovery by Masson, in Madeira, nearly ninety years ago, has escaped the researches of all other botanists, has at length been rediscovered in the very spot in which it was originally found, namely, the perpendicular face of the high sea-cliff between the Pico do Rancho and Cabo Girão, on the south coast of Madeira, five or six miles west of Funchal. Here, indeed, I have myself repeatedly looked for it in vain; and the same ill-success has attended the efforts of Senhor J. M. Moniz and many others to whom I had communicated the precise locality assigned by Masson to his example still preserved in the Banksian Herbarium. But this year my friend Captain Norman, a most diligent and successful investigator of the Madeiran flora, writes to tell me that a Portuguese collector of botanical specimens, formerly employed as a gardener, and to whom a year or two ago I had myself indicated the locality, having first espied the plant, he accompanied the man in June last to the spot; and there, "below the edge of the cliff in dangerous places," Captain Norman writes, "I had no difficulty in descrying a large, handsome, deep-pink-flowered *Centaurea*, which grew in large perennial-looking tufts or bushes, and on further examination I saw five or six more, as well as a few scattered single-flowering plants. I can well understand their having been overlooked, for they grow in a difficult locality, and, viewed from the distance at which I should certainly have only viewed them if I had not specially known what to look for, would not, I think, be distinguished from the

darker sorts of *Galactites* (*tomentosa*, Mœnch) which are plentiful thereabouts, though the plants do not at all resemble each other on a closer inspection. But that they have been growing there since Masson's time there can be no doubt. By help of a countryman we gathered twenty or thirty specimens. I could not get near enough to examine the stems well, but they seemed to be woody and perennial."

I have not yet seen any of the specimens obtained by Captain Norman, but I entertain no doubt of their belonging to the long-lost plant in question, the rediscovery of which after so many years is not less satisfactory than interesting.

R. T. Lowe.

Lea Rectory, October 12, 1865.

THE THIEF PALM (*PHŒNICOPHORUM SECHELLARUM, Herm. Wendl.*).

Recently a great deal of idle speculation has been going on, and some absurd guesses have been ventured about the name of a spiny Palm from the Sechelles with simple leaves, which has now become a more frequent inmate of our gardens than it was when the circumstance took place to which the genus owes its name. There is no longer any necessity of making a mystery of the whole affair, after the person who had most reason to be annoyed at it thought proper to make himself a pointed public allusion to it, by imposing on the plant the name of *Phœnicophorum Sechellarum*, which, freely translated, might be rendered "the Palm derived or carried off from the Sechelles," but which gardeners have now more literally rendered "The Thief Palm from the Sechelles." Some years ago, Mr. Hermann Wendland, of the Royal Botanic Gardens of Herrenhausen, and Mr. John Smith, were looking over the collections at Kew with a view of exchanging plants, when Mr. Wendland's eye fell upon some small Palms, then cultivated there under the name of *Areca Sechellarum*. He expressed a wish to have, if possible, one of them for the rich palm-collection under his charge. There being only three small specimens, Mr. Smith could not make up his mind to accede to this at once, but told him that he would see about the matter. The two gentlemen then walked on, looking at other plants,

and probably never thinking any more about the Palms. The next morning, much to the annoyance of every one, one of these rare plants had disappeared, and everybody had his own opinion about its disappearance. The authorities of the garden never could find out; but Mr. Wendland, for his own satisfaction, succeeded in discovering that it was stolen by an Irishman employed at Kew, who sold it, it is said, for a few shillings. The plant went thence to the Continent, and there fetched £5; ultimately coming into the hands of Mr. Borsig, of Berlin, who, it is said, had to give at least four times that sum for it. Prof. Karl Koch, ignorant of the whole transaction, and taking the Palm, from its habit, to be an *Astrocarpum*, named it in 1859 *A. Borsigianum*. It was shortly after Mr. Wendland had succeeded in tracing out the case, that he gave to the new genus, of which he had obtained herbarium specimens, the name of *Phœnicophorum Sechellarum*, afterwards published in a scientific form. Mr. Duncan, curator of the Botanic Gardens of Mauritius, after this gave, in compliment to Governor Stevenson, of Mauritius, the MSS. name of *Stevensonia* to both this species and a plant (*Verschaffeltia*) somewhat resembling it, but differing generically. Duncan's name, not being published nor accompanied by any scientific description, must of course fall to the ground, and *Phœnicophorum* be upheld. In Duncan's 'Catalogue of Plants in the Royal Botanic Gardens, Mauritius,' fol., Port Louis, Mauritius, 1863, p. 87, we find only this entry, "*Stevensonia grandiflora*, Palmaceæ, Dependencies of Mauritius. A. [*i. e.* one of the plants introduced since Mr. Duncan took charge of the garden]." *Grandiflora* is doubtless a misprint, the plant more frequently going under *S. grandifolia*. This is simply the history of the generic name of the plant (excellently figured and described in Van Houtte's Fl. des Serres, t. 1595–1596). It might perhaps have been desirable to adopt a different nomenclature, but after a name has once been given, nobody can possibly revoke it, not even the author himself if he were thus inclined. The law of priority does not admit of exceptions.

CORRESPONDENCE.

Epacris impressa, flore pleno.

I have examined the double *Epacris impressa* at Kew. It is doubled in the same way as the large *Datura arborea*, *i. e.* by the repetition of the corolla

over and over again(" hose in hose"). Each whorl alternates with its neighbour, and there is no trace of either stamens or pistil.

Yours, etc.,

MAXWELL T. MASTERS.

NEW PUBLICATIONS.

Genera Plantarum, ad Exemplaria imprimis in Herbariis Kewensibus servata definita. Auctoribus G. Bentham et J. D. Hooker. Vol. I. Pars II. Londini: L. Reeve et Co.; Williams et Norgate.

The second part of this admirable work has just been published, containing the *Leguminosæ*, *Rosaceæ*, *Saxifrageæ*, *Crassulaceæ*, *Droseraceæ*, *Hamamelideæ*, *Bruniaceæ*, *Halorageæ*, *Rhizophoreæ*, *Combretaceæ*, and *Myrtaceæ*. The third part, to comprise the remaining Polypetalous Orders and a general index, is soon to follow, and will complete the first volume.

The working systematic botanist will study this new part with the deepest interest; it is full of new combinations, many of which will doubtless receive his sanction. The *Leguminosæ*, one of Mr. Bentham's pet families, comprise 399 genera, though an immense number of genera are done away with. The *Rosaceæ*, swelled out by the incorporation of *Chrysobalaneæ*, *Amygdaleæ*, *Drupaceæ*, *Pomaceæ*, and *Sanguisorbeæ*, comprise 71 genera. They are, in fact, equivalent to Endlicher's *Rosifloræ*, with the *Calycantheæ* removed. The *Saxifrageæ* have become a large Order by adding not only the *Escalloniaceæ*, *Hydrangeaceæ*, and *Cunoniaceæ*, but also *Brexiaceæ*, *Ribesiaceæ*, *Francoaceæ*, *Roussæaceæ*, *Philadelpheæ*, and *Parnassiaceæ*. It would have been well to have gone still a step further, and unite with them the *Crassulaceæ;* the hypogynous scales relied upon as the principal distinction of *Crassulaceæ*, are highly developed in *Spiræanthemum*, a Polynesian genus here incorporated with *Saxifrageæ*. The *Halorageæ* include *Gunneraceæ*, the *Rhizophoreæ*, Lindley's *Cassipoureæ*, and the *Combretaceæ*, Endlicher's *Gyrocarpeæ*, notwithstanding their valvate anthers. Finally, the *Myrtaceæ* embrace *Chamælaucieæ*, *Barringtoniaceæ*, *Lecythidaceæ*, and *Belvisiaceæ* of Lindley, to which few systematists will object. The drift of modern investigation seems to point also to *Lythrarieæ* as a mere section of *Myrtaceæ*.

The amount of labour devoted to this work is very great, and the

surprise of every one familiar with the enormous mass of materials which had to be consulted, must be that so few references and synonyms have been forgotten. In hastily glancing through the pages, we noticed, however, a few which may perhaps find a place in the supplement. The name for the Rosaceous genus *Rhaphiolepis*, should have given way to *Opa*, Loureiro's second species being identical with *R. Indica*. *Acicalyptus*, amongst Myrtaceæ, should have been merged into *Calyptranthes*, from which it in no respect differs. *Cracca*, Benth., has been named *Benthamantha* by Alefeld (1862), the Linnæan name *Vicia* having to give way to Rivinius's *Cracca*, restored by Godron and Grenier; but all these are mere trifles, which do not affect the general excellency of the book.

An Illustrated Key to the Natural Orders of British Wild Flowers. Compiled and Illustrated by John E. Sowerby. London: Van Voorst. 8vo. 42 pp., 9 coloured plates.

The object of this work is "to give students of our native flora some insight into the leading characteristics of the Natural Orders of British Wild Flowers; and while the descriptions of the Orders, taken principally, with permission, from Professor Babington's excellent 'Manual of British Botany,' leave little or nothing to be desired in that respect, it is trusted that the figures may go some way towards carrying out the illustrator's idea. To have extended the illustrations to the genera would have made the work too costly for the purpose for which it was intended."

With every wish to deal leniently with an author who has done good work in his time, and fully bearing in mind that his 'Illustrated Key' is intended merely for popular uses, we think that Mr. Sowerby would have done better not to have brought out the present work. The object it aims at, "to give some insight into the leading characteristics of the Natural Orders" by means of these illustrations, is not attained. We get scarcely more than a glimpse of the habit of a species, to say nothing of genus and Natural Order. To make the student acquainted with "the leading characteristics" it would have been necessary to exhibit them, but this has not been done in most instances. To go no further than *Ranunculaceæ*: the character, taken from Babington, informs us that the Order has "Sepals 3–6; petals 5 or more, rarely 0; stamens usually many; anthers adnate,

opening lengthwise; carpels many, distinct or rarely united into a single pistil; and seeds erect or pendulous." Now, on turning to the illustration, we find but very few of these important points brought out. We can see nothing of the sepals or the nature of the anthers, nor anything of the seed. The case is even worse in other Orders. In *Fumariaceæ*, for instance, not a single point is brought out. Instead of giving bits of a plant to illustrate a Natural Order, diagrams would have answered the purpose better than the present figures, and they would have taken up less room.

The letterpress should also have had the benefit of the corrections and modifications introduced into the natural system since the two local Floras on which Mr. Sowerby relies have been published. It will greatly facilitate the study of our native plants if the number of Natural Orders be reduced as much as practicable. There is no reason now why *Fumariaceæ* and *Papaveraceæ* should be kept up as separate Orders, or why *Geraniaceæ*, *Oxalideæ*, and *Balsamineæ*, *Staphyleaceæ* and *Acerineæ*, *Crassulaceæ* and *Saxifrageæ*, *Campanulaceæ* and *Lobeliaceæ*, *Araceæ* and *Orontiaceæ*, and several others, should not be united. We object also to see *Lemna* being placed in *Pistiaceæ*. The genus *Pistia* forms a section of *Aroideæ*, and *Lemna* is the type of a distinct Natural Order, the *Lemnaceæ*.

The book is neatly got up, as all Mr. Van Voorst's publications are, and it is therefore all the more vexatious that we cannot speak of it in more favourable terms.

Walpers, Annales Botanices Systematicæ. Tom. VI. Auctore Dr. C. Mueller, Berl. Lipsiæ. 1861. 8vo. Pp. 1309.

A new part of this useful work has just reached us, completing the sixth volume, which concludes the enumeration of plants described during the years 1851–55, and fills 1309 pages of small type,—a gigantic labour, for which every working botanist cannot be too thankful to the indefatigable compiler. We must again remind all those who wish to see "Walpers" as complete as each volume can be made to send direct to Dr. C. Mueller any publication in which they may have printed any new genera and species, or changed the synonymy. If possible, two copies should be sent, because they can be cut up, and thus save the labour and danger of transcribing. The publications of societies should also be forwarded direct to the author.

BOTANICAL NEWS.

The new edition of Routledge's 'Men of the Time: a Biographical Dictionary of Eminent Living Characters' is a great improvement upon the last, the whole book having been carefully revised, fewer opinions and more facts being offered, and many additional names being introduced. Botanists will find sketches of the two Babingtons, of Balfour, Bentley, Berkeley, Darwin, Daubeny, Draper (J. W.), Fortune, Gray (Asa), Gray (J. E.), Hogg (Robert), the two Hookers, Junghuhn, Koch (K.), Lankester, Lees, Lindley, Lowe (R. T.), Martius, Moore (T.), Newman (E.), Paxton, Seemann, Walberg, and Ward (N. B.); but we should have been glad if the esteemed names of Bennett, Bentham, Harvey, Miers, Thomson, Watson, and others familiar to British eyes, had not been overlooked. Only three German botanists are admitted; Bartling, Braun, de Bary, Grisebach, Gœppert, Fenzl, Unger, and many others, are passed over. Sweden has to be satisfied with one, Fries; the two Agardhs and other great names are omitted. France, Russia, the Netherlands, and Switzerland are not botanically represented in this book, though Brongniart, Decaisne, Planchon, De Candolle, Boissier, Parlatore, and many others we could name, are eminently "Men of the Time," to whose admission into the forthcoming supplement we look forward.

Early in December we are promised the first number of a *comic* scientific newspaper, to be published by Messrs. Trübner and Co. under the title of 'Gammon and Spinach.' It is stated that the object of this paper will be to ridicule those scientific men with whom no serious argument can be held, to aim effective blows at the cliquism existing in so many of our scientific societies, and to assist *savants* in laying aside conceit.

We have been much gratified to read the first 'Report of the Marlborough College Natural History Society for the half-year ending Midsummer, 1865,' just printed. It contains a journal of proceedings of this newly established society, and several of the papers read before that body at full length. The meetings were generally well attended, there being on an average as many as forty persons present; the papers now printed are popular, and well put together.

The Queen has been graciously pleased to become the Patron of the Great International Horticultural Exhibition to be held in London in May, 1866, and given £50 as a donation to the Exhibition Fund. The day fixed for the opening of the show is May the 22nd.

The Great Fern Herbarium of Mr. John Smith, late Curator of the Royal Botanic Gardens at Kew, is now for sale. It consists of about 2000 species, each species being represented in most instances by many specimens, illustrating its geographical range. No more valuable collection of ferns has ever been offered for sale; it would be a useful acquisition to some great public institution.

The Rev. R. T. Lowe, author of the 'Manual Flora of Madeira,' is going to continue, during this winter, his botanical exploration of the Cape de Verd Islands, which, though of late years visited by Drs. Bolle and J. Schmidt, are not yet thoroughly known.

Dr. Karsten has just republished the anatomical and physiological papers which, since 1843, he had inserted in various periodicals and transactions, the whole forming a quarto volume of 460 pages, illustrated by 25 plates, and entitled 'Gesammelte Beiträge zur Anatomie und Physiologie der Pflanzen.'

Mr. J. Storck, writing from the Fiji Islands, under date of June the 3rd, mentions that an English man-of-war was expected in the group, and that an excursion through Viti Levu was projected, which he had been invited to join by the British consul. There was a rumour that Mr. Charles Moore, of Sydney, would pay a visit to Fiji. The cultivation of cotton in Viti Levu was extending.

The fourth annual report of the Acclimatization Society of New South Wales shows the society to be in a very flourishing condition, and its financial resources to be increasing. During the past year part of the Paramatta Park of Sydney has been placed at its disposal, and a good many animals and plants useful to the colony have been introduced and distributed.

At the meeting of German naturalists at Hanover, botanists were numerously represented. At the first general meeting Professors Hallier and Schultz-Schultzenstein read papers on Darwin's theory. Prof. Hallier's paper referred to "Specification," and tried to prove that on this point the older views of German naturalists were more correct and comprehensive than those advanced by Darwinians. Prof. Schultz-Schultzenstein, of Berlin, referred to Blumenbach's theory of Epigenesis and "Bildungstrieb." Some things, he said, were true in Darwin's theory, all of which he claimed as German property, and what was new in Darwinism was not sound. A pamphlet by Dr. Karl Schimper, of Schwetzingen, was also distributed, and afterwards partly reprinted in the official journal, in which he ridicules Darwinism, and condemns it as shallow. The botanists and the arboriculturists and agronomists formed themselves, for convenience' sake, into two sections, there being no such formalities and restrictions as at the British Association. At the proposal of Dr. Seemann, Prof. Bartling, of Göttingen, was elected first president of the botanical section. Prof. Schultz-Schultzenstein read a paper on the difference between metamorphosis and anaphytosis, with special regard to double flowers. In the discussion Drs. Jessen and Seemann took part, the former endeavouring to prove that the parts of a flower were not leaves, but branches. Dr. von Holle (author of a 'Flora of Hanover') exhibited full sets of all the brambles he had collected in Germany. Together with many other botanists, he had been sceptical with regard to there being several species of brambles, but the conviction had been forced upon him that there were many good species. He divided them into three sections, the glabrous, pubescent, and glandular. He expressed his desire to exchange specimens with botanists of other countries, and gave an interesting account of his visit to the locality whence Nees and Weihe obtained many of their species. Prof. Bartling confirmed the belief that there were several well-defined species, though from personal observation he could not believe in anything like the number proposed by some (probably alluding to Müller's paper in the 'Bonplandia'). Dr. von Holle answered Dr. Seemann's question whether he had succeeded in discovering any diagnostic character overlooked by previous workers, and whether the

character assigned to the sections were absolute, in the negative. Dr. Sonder, of Hamburg, drew attention to the difference of taste observable in the fruit of various brambles. He could distinguish sweet- and acid-fruited ones; and about Hamburg there were popular names for the different kinds, and the sweet-fruited kinds only were brought to market. Another gentleman, whose name we could not catch, remarked that the fruit of the glandular section had a peculiarly aromatic flavour. Prof. Hallier, of Jena, spoke on the *Fungi* found on the human body, and on the Ferment-fungi in their connection with *Penicillium glaucum*. Dr. Buëk, of Hamburg, exhibited rare exotic fruits selected from his carpological collection, and Dr. Wilms *Fungi* growing on the *larvæ* of insects. Dr. Buchenau, of Bremen, read a paper on the vegetation of the genus *Triglochin*. Mr. Hermann Wendland proposed a new classification of Palms; he divided them into two suborders (*Arecaceæ* and *Cocoineæ*), showed the relationship of *Nipa* with *Borassus*, the necessity of reducing all the Cocoineæ to three genera (*Cocos*, *Elaëis*, and *Bactris*), and the identity of the American and West African species of *Raphia*. Dr. Hartig read a paper on the *Infusoria* and spores of *Fungi* supposed to infest the atmosphere, and his experiments proving the paucity of such bodies in that medium. He did not believe in spontaneous generation, but thought that organic bodies, after arriving at a certain stage of decomposition, were changed, as proved by his experiments, into new organisms. Dr. Jessen, of Eldena, showed the identity of *Prassiola crispa* and *Lyngbya muralis*, and made some remarks about the vegetation of the plant. Prof. Schultz-Schultzenstein spoke on the transformation of the crude sap into vital sap (*Lebenssaft*), which gave rise to an animated discussion. Dr. Hartig, of Brunswick (Conservator of Forests), reported on his experiments, not yet concluded, with *Pinus Strobus*, the object of which was to find out how far the production of wood was influenced by the removal of the branches and leaves, and which of the two systems of planting in arboriculture (that of giving plenty or that of giving limited space to individual forest-trees) was the most advantageous in an economical point of view. Dr. Hartig also gave an account of his recent discovery of the tannin-granules in the annual shoots of oaks; he showed that these granules had been mistaken for starch, because they turned blue under the influence of iodine; and he pointed out the practical value of his discovery to tanners. Dr. Seemann drew attention to the systematic value of the æstivation of *Umbelliferæ*, and thought that the generic characters of that order could be rendered more precise if this point was attended to. In *Umbelliferæ* proper he found the vexillary æstivation prevail in most genera having irregular corollas. Prof. Bartling remarked that he had never seen the yellow-flowering *Umbelliferæ* quite unfold their petals. The members of the section made two excursions to the Botanic Gardens at Herrenhausen, where one of the richest and rarest collections of plants, and the most complete set of Palms, is now cultivated. The name of the garden is honourably associated with the history of botany. It was here where Ehrhardt, a pupil of Linnæus, wrote his 'Beiträge,' the elder Wendland his works on Ericas, and in connection with Schrader his 'Sertum;' his son, a work on phyllodineous *Acacias*, and in conjunction with Bartling a monograph of Diosmeæ; and his grandson (Hermann Wendland), numerous papers on the Palms and allied Orders.



Fitch, del. et lith.

Vincent Brooks, Imp.

REVISION OF THE NATURAL ORDER *HEDERACEÆ*.

By Berthold Seemann, Ph.D., F.L.S.

(*Continued from p.* 276.)

IX. On the Genera Toricellia, Decostea, and Adoxa.

(Tab. XLI.)

The monotypic genus *Toricellia* was established by De Candolle (Prodr. iv. p. 257) upon a plant of the Nepal mountains, which Wallich distributed under the name of *Sambucus (?) tiliæfolia*. At first sight the plant has some points which certainly do remind us of *Sambucus*; the pith of the stem and branches is thick and spongy, as in Elder-trees, and the flowers have somewhat the look of those of *Sambucus*. But the corolla is not monopetalous, nor imbricate in æstivation; it consists, on the contrary, of 5 petals, induplicate in æstivation,—characters removing it entirely from *Caprifoliaceæ*. De Candolle placed *Toricellia* in *Hederaceæ*, but in that Order it cannot be retained, on account of its induplicate petals, which are so closely united to the calyx that, unlike those of genuine *Hederaceæ*, they never fall off, nor can they be separated from the organ they adhere to, without tearing them. Nor does the nature of inflorescence or the leaves in any way accord with that of *Hederaceæ* proper. In finally rejecting *Toricellia* from the Order, the question is where should it be referred to. In *Umbelliferæ* proper we have induplicate petals, but the inflorescence and 3–4-merous fruit are against an admission into that Order. *Corneæ* have a valvate corolla, and even if the widest interpretation is put upon the adhesion of the calyx and corolla of *Toricellia*, we could not but own that the *Cucurbitaceæ* have a differently-constructed corolla, which renders impossible any incorporation of the genus with that Order, though *Sicyos*, with its pendulous ovules, may invite an examination into possible degrees of relationship. *Haloragеæ*, as now circumscribed, seem to offer the only suitable place, and I would range the genus next to *Loudonia*, with which it agrees in the æstivation of the corolla, and somewhat in inflorescence. The special claims of *Toricellia* for admission into *Haloragеæ* rest upon its diclinous flowers, induplicate petals, and tetramerous fruits.* Most specimens of *Toricellia* contained

* At my suggestion Professor Gulliver was induced to investigate *Toricellia*,

in herbaria were distributed by Wallich, and had, in almost all instances, male flowers only. The female flowers are still unknown, but Griffith gathered branches with fruit nearly ripe, and from them, by the courtesy of the late Sir W. Hooker, our Plate (n. 41) has been made. In the printing of the plate a line of fig. 1, has not come out satisfactorily, making it appear as if calyx and corolla were merged in the manner of *Cucurbitaceæ*, whilst in the specimens the calyx-limb can be traced distinctly all round; the teeth of the calyx ought also to have been drawn less blunt.

TORICELLIA, De Cand. Prodr. iv. p. 257; Endl. Gen. n. 4557. Char. emend.: Flores diclines (v. dioici?). Masc. calycis margo acute 5-dentatus. Petala 5, obovato-oblonga, cucullata, cum lacinula inflexa, membranacea, persistentia, æstivatione induplicata. Stamina 5, filamentis brevissimis; antheræ oblongæ, 2-loculares, longitudinaliter dehiscentes; pollinis granula globosa. Ovarium rudimentarium. Stylus 1, elongatus; stigma capitatum. Fœm. (v. hermaphrod.?). Calyx tubo cum ovario connato, limbo supero, acute 4–3-dentato. Corolla nulla? Stamina nulla? Ovarium 4, v. abortu 3-loculare, loculis 1-ovulatis, ovulis pendulis. Styli 4 v. 3, liberi, apice 2-fidi, stigmatosi. Drupa ovata 3–4-angulata, calycis limbo coronata, 3–4-locularis. Semina solitaria, pendula.—Suffrutex, ramis teretibus, foliis exstipulatis alternis simplicibus cordato-subrotundis v. subquinquelobatis, palmatim 5-nerviis, grosse et acute dentatis; paniculis terminalibus ∞-floris, floribus albidis, masculis pedicellatis, fœmineis sessilibus.—Species unica:—

1. *T. tiliæfolia*, De Cand. Prodr. iv. p. 257. (Tab. Nostr. n. 41.) *Sambucus(?) tiliæfolia*, Wall. Cat. n. 483. Nepal (Wallich!), Bootan (Griffith!), Sikhim (Hooker!).

EXPLANATION OF PLATE XLI., representing *Toricellia tiliæfolia*, from specimens of Wallich and Griffith. Fig. 1. A male flower in bud. 2. A male flower open. 3. A 3-merous ovary. 4. A tetramerous fruit not quite ripe. 5 and 6. Cross and transverse sections of the same, all magnified.

Decostea, a Peruvian genus of Ruiz and Pavon, has been referred by Bartling to *Juglandeæ* with a mark of doubt, and by Endlicher (Gen.

and he finds it destitute of raphides, as is *Hippuris* and the other *Haloragineæ* he has examined. "This character is the more remarkable," he says, "because the very next Order under which *Hippuris* used to be placed, abounds in raphides."

n. 4576) it is regarded as allied to *Corneæ*. From the latter Order it differs in having the petals of the male flowers imbricate. It seems to me to be a genus which might also be referred with propriety to *Haloragineæ*. The female flowers are without petals and stamens, as I suppose those of *Toricellia* to be.

Adoxa still lingers in most of our European Floras in *Hederaceæ*, though it was shown more than thirty years ago, by J. Rœper (see Meisner, Gen. Comm. p. 111) to be intimately related to *Sambucus*. Linnæus and Jussieu referred it to *Saxifrageæ*, near *Chrysosplenium*; Adanson to *Portulaceæ*, placed by him between *Cacteæ* and *Saxifrageæ*; and De Candolle, Bartling, Lindley, Endlicher, Fries, Brongniart, Decaisne, and others, to *Araliaceæ*. Payer made *Adoxa* the type of a distinct Natural Order, which he thought more allied to *Sambucineæ* than *Hederaceæ*; and Agardh (Theoria, p. 77), who also regards it as a separate Order, looks upon the *Adoxeæ* as "*Ranunculaceæ* verticillis omnibus floralibus clausis, partibus ideo (!) numero definitis arctiusque conjunctis;" which reminds us of the views of Caspar Bauhin, who named *Adoxa* "*Ranunculus nemorosus, Muscatellina dictus.*" In 1860, Professor Rœper published a critique of parts of Agardh's 'Theoria,' in his well-known 'Preconceived Botanical Opinions Defended,'* in which he shows convincingly that on this point Agardh's views are erroneous, and that *Adoxa* does not constitute a separate Natural Order allied to *Ranunculaceæ*, but must retain its place near *Sambucus*, where he put it years ago.

THE WARATA'H, OR NATIVE TULIP-TREE OF NEW SOUTH WALES (*TELOPEA SPECIOSISSIMA*).

By George Bennett, M.D., F.L.S.

The flower called by the aborigines "Waratáh," and "Native Tulip" by the colonists of New South Wales, is considered the most beautiful vegetable production indigenous to this colony, and is produced from a stiff, erect, and rigid shrub, having the leaves of a hard woody texture, marking the *Proteads*, to which Order the Waratáh (*Telopea spe-*

* "Vorgefasste Botanische Meinungen, vertheidigt von Dr. Johannes Rœper, Professor in Rostock." Rostock; 1860. 8vo. A book displaying a profound knowledge of the vegetable kingdom.

ciosissima, R. Br.) belongs. The leaves are oblong, more or less unequally toothed, and from 4 to 6 or 8 inches in length, dark-green, but when just expanding, of a dark-red colour. The fruit is a pod containing many winged seeds. The Waratáh is indigenous to, and grows luxuriantly and in abundance in the vicinity of Sydney, and other parts of New South Wales, and when first described by botanists, was classed with a genus now known as *Grevillea*, named *Embothrium speciosissimum*, and figured under that name in Smith's 'New Holland Plants,' and in Curtis's 'Botanical Magazine' (edited by Dr. Sims). It afterwards formed a new genus, called *Telopea*, derived from *telopas* (seen at a distance), from its bright crimson blossoms being discernible far off, and those who have had an opportunity of seeing this plant in flower, either wild or cultivated, will readily admit the correctness of this name. There are some peculiarities of its natural habits, and reproduction, worthy of notice. The first year the Waratáh blossoms it throws out from two to four shoots from each flower-head, in the second year only two, and in subsequent years only one, or more rarely two.* To ascertain the way these shoots are produced, it is necessary to procure a flower-head full-blown or just fading, and on looking closely among the flowers, from one to two or four young shoots will be observed just developing themselves, and these will form the branches of the following year, from each of which a flower-head will most likely be produced. A knowledge of this fact will explain why the plucking of the flowers destroys the new branches, injuring its natural development, and keeping the shrub stunted in growth, and prevents its flowering in the ensuing year. The Waratáh produces seeds every second year. A tree growing in a garden at Hunter's Hill, in the vicinity of Sydney, five years old, and 10 feet high, produced last year as many as twenty fine heads of flowers at one time, forming a gorgeous sight; and in a tree growing in the Botanic Gardens at Sydney, I observed, this spring, from one flowering branch produced last year, three stems that had grown, each of which was now crowned by a magnificent full-blown flower-head.

When a Waratáh-tree grows in a dense thicket of shrubs, or among

* I have requested the Propagator of the Botanic Garden here to try to "strike" a flower when with healthy shoots, and I am curious to learn whether the experiment will succeed. I enclose a flower with four shoots for your inspection.

creepers by the side of a wall in the shade, it runs up to a great elevation, a tall, slender shrub, seeking the sun's rays, and obtain light and air previous to developing its blossoms; in several instances when so situated, they have been seen to attain the height of from 10 to 12 or even 15 feet, and then flowering for the first time. In suitable situations, in their wild state, they usually flower when about 4 to 6 feet high, and when at that time stripped of their blossoms, they become stunted, devoid of beauty, and so remain until suckers are thrown up from the roots, by which flowering branches are reproduced. I have also observed that the Rice-paper plant (*Tetrapanax papyriferum*, C. Koch) only produces branches from the flowering stem; in order toprove it, I removed this year all the panicles of flowers from a young tree flowering for the first time; the result was that the main stem increased in height and developed a new canopy of fine foliage, but no lateral branches were produced as obtained with those permitted to flower as usual. Those desirous of growing the Waratáh in perfection, should not permit a flower to be gathered or otherwise destroyed. Many who are aware of the habit of this highly ornamental plant, have some magnificent specimens in their gardens, attracting attention by their rich and brilliant mass of bright crimson blossoms.

The Waratáh thrives in a poor, sandy soil, well exposed to light and air. The usual time of flowering is in September (the early spring in New South Wales), and it continues for nearly two months. There are two kinds of flowers, one, the normal state, of a deep rich crimson colour, and a variety with the crimson calyx-segments tipped with white. The blossoms, when just expanding, are of a delicate light-pink, or rose-colour, gradually changing to a more or less deep crimson hue.

The most suitable time for transplanting the Waratáhs is when in flower. It was accidentally discovered that they bear removal at that time, with a better chance of rooting, by a gentleman (Mr. De Milhan) who, attracted by a specimen bearing a profusion of flowers, and growing wild in the bush, removed it into his garden, solely with the intention of preserving it as a temporary adornment, and fully expecting that as the blossoms faded the tree would also wither; but he was agreeably surprised to find it had become permanently rooted. It is now a fine tree, producing every year a profuse crop of flowers.

The Waratáh has large and strong roots, and throws up numerous suckers, more especially in its wild state, at short distances apart; this has been more particularly noticed—as if to sustain its power of reproduction—when a flowering branch has been destroyed by cutting the blossoms; for it has been remarked in many instances, that the trees transplanted in or reared and cultivated in the gardens, and the flowers preserved, have not so frequently produced suckers, as when the blossoms have been cut, very probably from that means of reproduction not being naturally required. The suckers are found to bear transplanting very well.

Sydney, New South Wales, September 21, 1865.

ON SOME PECULIARITIES IN THE GROWTH OF THE HAWTHORN-TREE.

By the Rev. W. H. Purchas.

(*From the Transactions of the Midland Scientific Association.*)

Mr. Jesse, in his 'Gleanings in Natural History,' calls attention to the fact that the stems of old Hawthorn-trees become divided into a number of subordinate stems, which, he says, form "to appearance so many distinct trees closely planted together, except that they all meet at the butt of the tree."* When, many years ago, I first read this

* "While on the subject of trees, I will notice the present state of the old thorns in Bushy Park, from which it probably takes its name. These trees are generally supposed to have been in existence at the time of Oliver Cromwell, the park being then used as a hare park. As they increase in age they have the property of separating themselves into different stems, some having four or five, or even six, which, as they separate, become regularly barked round, forming, to appearance, so many distinct trees closely planted together, except that they all meet at the butt of the tree. Some of the trees are now undergoing this process of separation, having already thrown out one stem, while in other parts they are deeply indented with seams down the whole stem. These, gradually deepening from opposite sides towards the centre, will at last split the tree into a number of separate stems which are barked round. In other trees the seam is hardly visible, though none of them are without it. This peculiarity seems confined to the Thorn, and as I have not observed it in those which appear to have been more recently planted, it is probably the effect of great age, though the trees are still flourishing."

passage, it struck me as describing what I had myself seen, and subsequent observations satisfied me of its general truth. I did not, however, for some time, pay special attention to the subject, or endeavour to trace the causes which led to the mode of growth described by Mr. Jesse. Of late, however, from living in a part of the country where old thorns abound, I have been induced to study their growth with some degree of care.

During its early, and perhaps its middle life also, the Hawthorn follows the usual mode of growth amongst exogenous trees—the successive layers of wood being deposited pretty regularly around the stem, which, in consequence, maintains a nearly cylindrical form. As, however, the tree advances in age, it appears that the woody bundles cease to grow at certain definite points of their circumference, whilst they continue to grow freely at others. The result of this is, that ribs or columnar projections are formed upon the face of the stem, to which they give an irregularly fluted appearance, the ribs, or flutings, having sometimes a vertical, sometimes a spiral direction. This mode of growth is continued for many years, the ribs, or flutings, increasing most rapidly in a direction immediately outward from the centre of the stem, the intervening seams or channels becoming meanwhile more and more deep. After awhile the same thing happens to the ribs, or flutings, as had originally happened to the parent stem; growth goes forward at some points of their circumference, whilst it ceases at others, and thus each rib becomes itself subdivided into a number of secondary ribs, or flutings. As the tree reaches the period of old age, decay, commencing at the heart-wood, proceeds gradually outwards until the whole of the (original) cylindrical part of the stem is destroyed; and when this point is reached, all living communication is, of course, at an end between the several ribs or segmental portions of the stem. These—now distinct from each other, except just near the root—are often drawn more or less asunder by the combined weight of branches and foliage, and appear as so many separate stems. On the inner face of these stems is found, not bark, but the remains of the decayed heartwood; but this inner face, once a portion of the original cylindrical stem, bears so small a proportion to the whole circumference, that it may readily be overlooked; and was indeed overlooked by Mr. Jesse, because he describes the different stems as becoming regularly barked round. It was not until I had arrived at these conclusions

that I had the opportunity of seeing the Rev. C. A. Johns's interesting little work on 'The Forest Trees of Great Britain.' I find that he there notices Mr. Jesse's remarks upon the Hawthorn, and points out that the way to decide whether Mr. Jesse's view was correct or not, would be to cut down one of the trees, and examine whether the wood is arranged in complete circles around a central pith, or in segments of circles only without a pith.

I am far from implying that in all cases where we perceive old Hawthorn-trees to have a number of stems, these must have originated from division of a common parent stem in the manner I have described. It no doubt often happens, especially in old hedgerows, that the numerous stems which are seen to spring from one root have been distinct from the first, they having sprung up as shoots or suckers when the parent stem has been cut down. I have before me a section of one of the segmental stems which I have been describing. There is, of course, no central pith, and the medullary rays are seen to diverge in a fan-like form from that part of the circumference where we find decayed wood instead of bark, and which represents a portion of the original cylindrical stem. On the opposite side of this section there are several of the secondary ribs of which I have spoken, and it will be seen that the medullary rays near the medial line of each of these ribs take a nearly straight course outward from the original centre of the stem; whilst the rays to the right and left of these curve away from them, diverging more and more as they approach the bark. The layers of wood in each rib, or fluting, have a crescent-like form, showing that growth has taken place most extensively in the line of the straight medullary rays (*i. e.* directly outward from the original centre), whilst it has been more and more feeble to the right and left of this medial line, until it has at last altogether ceased, and allowed a seam or channel to exist between each rib. Had the wood been uniformly deposited on the circumference of each rib, no such channels could have existed,—the ribs would have encroached upon and have obliterated them.

As to the question "why do the woody (or fibro-vascular) bundles of the stem thus cease to grow at some points whilst they increase rapidly at others?" I am sorry to say that I have nothing very satisfactory to offer in reply. After examining many old trees, I have certainly found that the ribs or columnar projections may in most instances, perhaps in all, be traced to the point where some vigorous

branch leaves the stem. This evident dependence of the rib upon the branch with whose under-surface it is continuous might at first sight seem to give countenance to the exploded view which regards the annual layers of wood as a longitudinal growth sent down by the leaves and buds; but it is quite consistent with the now generally accepted view that—not the wood itself, but the elaborated sap out of which the wood is formed, is that which is sent down by the leaves. On this view we must, it would seem, believe that the elaborated sap has descended most freely along that vertical course marked by the largest amount of woody growth. The real difficulty to explain is, why it should be restricted to this course, and why it should not, as in the Oak or the Ash, be diffused more uniformly around the stem and contribute to the formation of complete annual rings of wood. It is conceivable that there is some peculiarity of structure, in consequence of which the tissues transmit fluids more readily in a vertical than in a lateral direction; but this can only be determined by careful experiment and the aid of the microscope.

This peculiarity in the growth of the Hawthorn has, I think, an additional interest from its approach to some of the anomalous structures seen in tropical trees and shrubs. We can scarcely look, for instance, at Lindley's figure of *Euonymus tingens*, Introduct. 1, p. 214, without recognizing in it something like the Hawthorn. "The formation of vertical plates or ribs (or, when old, buttresses) in Exogens" is said to be far from uncommon in tropical countries [I have observed it in *Heritiera litoralis*, *Inocarpus edulis*, and many species of *Ficus*,—Ed.], but I am not aware that any one has pointed out that we have something of the kind in our own country.

Nor is the Hawthorn the only British tree on whose stem these ribs or projections are formed, although I believe it is the only one in which the heartwood decays and sets free the ribs as independent segmental stems. The Yew-tree may perhaps be an exception, but of this I cannot now be sure, though I am certain that in it the ribbed or fluted character of stem is sometimes very manifest. I have also noticed it in the Lombardy Poplar, and in very old examples of the Small-leaved or Wild Lime (*Tilia parvifolia*). In other trees also, where there is no actual rib, we may notice a tendency towards the same kind of structure in the sub-angular form assumed by the stem. In the case of the Birch-tree there are very commonly two ribs running downward

from the *sides* of the branch, instead of *one* from its under surface. These two ribs vanish as they approach the branch next below on the same side of the stem, and they, in their turn, are succeeded by others, which in like manner vanish. It appears to me that the careful study of these deviations from the normally cylindrical form of stem, which we see in the Oak and Ash, might be the means of helping towards an explanation of the strange peculiarities observable in the stems of tropical climbers, many of which are, I believe, allowed to be very imperfectly understood.

OFFICIAL REPORT ON THE DAMAGES CAUSED BY THE CYCLONE OF THE 5TH OF OCTOBER, 1864, IN THE CALCUTTA BOTANIC GARDEN.

By T. Anderson, Esq., M.D.

(*Abstract.*)

The Cyclone was somewhat more violent in the Botanical Gardens, than at Calcutta. This is accounted for by the gardens being nearer the centre of the Cyclone, and by the open surface of the river across which the gale at its height blew diagonally, striking with a force unbroken, for the space of a mile, by any obstacle whatever. Few trees fell before eleven o'clock, and almost none after half-past four P.M. At four o'clock, the great specimen of *Adansonia digitata*, the Baobab tree of Africa, was uprooted, and fell with a crash that caused vibrations in the earth felt at a distance of some hundred yards. This tree, which had withstood the greatest force of the gale, seems to have at last given way from its roots having become loosened in the soil by the storm-wave, the waters of which rose to a height of 4 feet on the trunk. Three gigantic specimens of *Casuarina equisetifolia*, the oldest in the garden, and none of them less than 150 feet in height, fell comparatively early. Many trees, but especially *Casuarina equisetifolia*, and young specimens of Teak, were not uprooted, but their stems were broken off 15 or 20 feet above the ground, while every branch was wrenched off; nothing but bare poles without a leaf remaining. The greatest damage was caused by the storm-wave which broke over the low embankment protecting the garden towards the river. This wave laid the greater part of the garden under water, in some places, to a

depth of 6 or 7 feet. By it the river bank was injured, and in some places, where the soil is sandy, much earth was washed away. Three large breaches were formed in the bank; two caused by ships blown into the garden while the storm-wave was at its highest point. At the point where the khâl, which divides the garden near its centre, enters the Hooghly, the sluice-gate was carried away along with the culvert, forming a gap about 80 feet in width, through which the tide flowed into the garden and the rice-fields to the north. The storm-wave rushed over the garden like a torrent, sweeping away the gravel from all the roads at a right angle to its course, and strewing it over the lawn and on the flower-beds. Nearly two miles of road have been much damaged, while the road on the river embankment, which extends from the great khâl to Bishop's College has been almost entirely destroyed. This wave also broke into the long chain of tanks, the surplus waters of which are drained into the river about 200 yards below my dwelling-house. The sluice-gate was broken by the pressure of the water, the sudden rise carrying away the parapets of the second bridge over the nullah connecting two of the tanks, and further on, destroying an old wooden bridge, lifting it off its masonry supports. This devastating wave overthrew almost every shrub and small tree that had withstood the fury of the wind, loosened and swept away the soil about the roots of large trees, and caused many of them to fall even after the great force of the storm was exhausted. The garden was covered with straw, many hundred cartloads brought up by the tide and storm-wave; and timber and rubbish of all kinds were scattered everywhere, and even a portion of the helm of a ship was carried a quarter of a mile into the garden and was found at the base of a large tree of *Gmelina arborea*. No description could convey an idea of the devastation. The scene was most dismal: a thousand trees, many of them gigantic specimens, were prostrated, besides innumerable shrubs. Nothing had been spared. Trees that had not fallen were more or less stripped of their branches; some, recorded as standing, were mere poles without a branch. Not a vestige of a leaf, flower, or fruit remained; the lawn, roads, and the tanks were blocked up by trees and fallen branches; all the buildings suffered more or less damage. Much loss was sustained by the destruction of the thatched conservatory; all the plants it sheltered were buried under a mass of grass, or were broken by the posts and heavy wooden framework of the building. Many of the most delicate

Orchidaceæ were entirely lost, and the number of specimens of all species much reduced.

In the nurseries there were about 14,000 of the stronger class of plants in pots: these were buried under the ruins of the mahogany and mango groves, where the plants were kept for the sake of shade. I am glad to be able to report that nearly all these plants have been saved, although they had to be left ten days under branches and trees.

All the damage to buildings, to rare plants in pots, and to the nursery stock is of slight importance when compared with the wholesale destruction of trees, many of them the growth of seventy years, and the pride and ornament of this garden. Had the entire collection of plants in pots been lost, the greater part could have been replaced in a comparatively short time, whereas even half a century will not be sufficient to restore the trees. Many of them exist nowhere in cultivation, and some are known only by dried specimens and descriptions of those now lost. Many of the most picturesque parts of the garden resulting from the grouping of trees, or from well-developed single specimens, no longer exist. In the teak avenue, along the road from Kyd's Monument to the large bridge over the khâl, only two mutilated specimens remain. The trees in this avenue were sixty-nine years old. Out of sixty-seven mahogany trees thirty-one have been blown down, two of which were sent to this garden by the Court of Directors of the East India Company in 1796. These two trees had attained a circumference of 13 feet 6 inches, and had produced seed for the last two years. The mahogany grove consisting of trees forty-five years old is destroyed. The Casuarina avenue, planted by Dr. Wallich, has suffered severely; only four trees are standing, and these much injured. Three of the originally introduced specimens of this species, the parents of nearly all the Casuarinas near Calcutta, were blown down. The magnificent specimen of *Adansonia digitata*, 12 feet in diameter, fell towards the end of the gale. All the trees of *Amherstia nobilis* have been partially uprooted; they are supported merely by their branches, and all must be removed. The great Banyan received considerable damage, but fortunately on the north side, where the loss of the branches does not in the least spoil the contour of the tree. The Pinetum, containing many fine Araucarias, suffered much. Of about twenty-five specimens, not one has been left with the main stem entire; in most of the trees nearly a

third of the stem and branches remain. Among *Coniferæ*, the destruction of all the trees of *Pinus longifolia* deserves notice; also of a very large specimen of *Dammara orientalis* introduced from Amboina in 1798. Palms, and indeed *Endogenæ* generally, have escaped with little injury. Only two species of palms have suffered severely, one is *Areca Catechu*, the common Betel-nut Palm, of which hardly a specimen remains, and *Arenga saccharifera*, most of the trees of which have been blown out of the perpendicular, although few of them have been uprooted. The great destruction of exogens by the Cyclone, while endogens escaped, produced a peculiar effect on the scenery about Calcutta. The country, as seen from the roof of my dwelling-house, a height of 80 feet, appeared to be covered with three species of Palms (*Cocos nucifera*, *Phœnix sylvestris*, and *Borassus flabelliformis*) and Bamboos.

The destruction of the foliage of the trees and shrubs at an unnatural period, and indeed at the time when the trees had ceased to grow and were maturing the woody growth of the rainy season, has had a strange influence on some species. The most general has been the absence of flowers in spring, and departures from the usual course of shedding of leaves. Some of the most striking cases are:—First, no flowers have been produced by the mango-trees at the usual period. *Butea frondosa*, of which four trees remain, has retained the leaves it produced after the gale, and has not flowered at all. The normal condition of this tree is to remain leafless during winter, and in March to flower profusely, after which the leaves appear. The same condition has occurred in *Butea parviflora*, *B. superba*, and *B. Voiotii*. *Bauhinia variegata* follows the same course as the Buteas. This year, although it produced a second crop of leaves in October, unlike *Butea*, it lost it in December, and the only two trees of it left standing flowered abundantly at the usual time in March, before the leaves appeared. *Terminalia Catappa* and all deciduous Figs, including *Ficus Indica* and *venosa*, reproduced their leaves shortly after the Cyclone, losing them as usual in the last fortnight of March and immediately acquiring their full leaf. *Bougainvillea spectabilis*, one of the most gorgeous sights in the beginning of March, has not flowered. The half-prostrate trees of *Amherstia nobilis*, produced altogether only one abortive spike with sickly flowers, while two young plants that flowered freely last year, and are still standing almost uninjured, have shown none. *Jonesia Asoca*, which yearly vies in splendour with *Amherstia nobilis*, produced only a few ill-shaped flowers, although

some of the trees are apparently uninjured. A species of *Ulmus*, about 60 feet high, has, for the last three years, flowered regularly in March, before the leaf buds; this year it has remained partially in leaf all winter and produced only a few flowers. The flowering or fruiting of trees for the first time in India shortly after the Cyclone may be accounted for by changes resulting from the sudden check given to growth, and especially to the ripening of wood in October. I do not, however, attach much importance to the two cases of this kind that occur to me; one is the flowering of *Dioon edule* about two months after the gale, the other, of an old specimen of *Gustavia angusta*, which has been twenty years in the garden without flowering. It was partially uprooted, and in this position, in February, it produced a large number of flowers, followed by some well-formed fruits. Some trees have been killed by the mere force of the wind, or by the violent strain sustained, which, during the height of the storm is said to have been 120 lb. on the square foot. Some species, especially of *Dipterocarpeæ*, *Guttiferæ*, the genera *Dalbergia*, *Pterocarpus*, *Acacia*, *Araucaria*, and *Dammara*, have their stems covered with exudations of resin, or gum, which have oozed through the bark on the upward flow of the sap in March.

There are very few species of trees of which specimens have not been thrown down; the only ones that seem to have entirely escaped, and of which the specimens, with few exceptions, are unique, are the following:—

Dipterocarpus alatus.
Cratæva Roxburghii.
Flacourtia cataphracta.
Hydnocarpus inebriens.
Gynocardia odorata.
Eriodendron orientale.
Sterculia ornata.
S. comosa.
S. angustifolia.
Visenia velutina.
Hopea faginea.
Acer oblongum.
Ailanthus excelsus.
Erythrina Indica.
Pterocarpus Indicus.
P. dalbergeoides.
Poinciana regia.
Cassia nodosa.
Pithecolobium bigeminum.
Terminalia angustifolia.
T. citrina.
T. Berryi.
T. Travancorensis.
T. tomentosa.
T. paniculata.
Nauclea parviflora.
N. cordifolia.
Mimusops hexandra.
M. Indica.
Diospyros Sapota.
D. embryopteris.
Spathodea Rheedii.
S. adenophylla.
Vitex saligna.
Camphora officinarum.
Beilschmiedia Roxburghiana.
Cryptocarya floribunda.

The greater number of *Ficus* have also escaped. The powerful aerial roots of many of these species enable them to resist the most violent storms.

An endeavour was made to ascertain the number of trees that remain, but it was found that the work would occupy longer time than could be spared, and had to be abandoned. But it is apparent even from imperfect inquiry, that at least one-half of the trees have been blown down, while nearly all those standing are very much shattered. The list of trees thrown down and destroyed,—no account being taken of innumerable small trees and shrubs, nor of injuries to trees left standing,—contains 1,010 specimens distributed among 364 species, or nearly the entire number of arborescent species in the garden.

Dr. Wallich drew up a very full report on the effects of the gale of 3rd June, 1842. It appears that that storm did great damage. 362 trees were blown down. I observe that in this number he includes shrubs sometimes not more than five feet high, and he points out that of the 362 trees blown down 106 were teak, many of which were of large size. This gale happened before Mr. Griffith had denuded the garden of most of its fine timber-trees. The garden was then thickly covered with trees, and accordingly the number lost on that occasion bore a very small proportion to the vast number left standing. In May, 1843, eleven months afterwards, Mr. Griffith, in his report, says—"At present the garden is literally choked with trees." Had more trees existed when the Cyclone of last October occurred, most likely less damage would have been sustained, as the trees would have sheltered each other. In a garden liable to be devastated at any time by furious storms, every arborescent species should be represented by at least five specimens. Unique specimens of many species must always exist, still the endeavour of the Director should be to procure, if possible, five specimens of each species.

EXPERIMENTS ON THE COMPOSITION OF WHEAT GRAIN.

By A. H. Church, M.A. Oxon., F.C.S.,

Professor of Chemistry in the Royal Agricultural College, Cirencester.

The influence of season, climate, manure, etc., upon the composition

of wheat grain, has engaged the attention of many scientific observers. MM. Boussingault, J. Pierre, and Reiset, abroad, and Messrs. Lawes and Gilbert, in this country, have added several important facts to our knowledge of the variations in the yield and quality of corn under different conditions of culture and of atmospheric influence, and also according to the particular variety of seed grown. There were still several points to be cleared up, and it is to one among these that my attention has been more particularly directed since the autumn of 1863. It is the relation of the density of the seed to its chemical composition, and to its germinating and productive powers, that I have submitted to an experimental investigation. The first portion of my results has been already published,* and a brief account of some of those more recently obtained may prove of interest to the readers of the 'Journal of Botany.'

Most samples of dressed wheat grain, if carefully examined, will be found to consist partly of hard, horny, subtranslucent grains, partly of softer opaque floury grains, and partly of grains presenting a mixed aspect. I have specially examined two varieties of wheat, and the proportions of the three sorts of grain which my samples contain are given here in percentages:—

	Spalding: red wheat (1864).	Hallett's white rough chaffed (1865).
Translucent	49 per cent.	24 per cent.
Medium	34 „	31 „
Opaque	17 „	45 „

These proportions fluctuate, however, even with the same variety of wheat under the various conditions of season, maturity when cut, etc. It is not, however, these proportions that I wish to discuss, but a remarkable difference in composition between the translucent and the opaque grains. I am aware that previous observers have detected certain chemical differences between the poor shrivelled grains and the full plump grains. But the grains which I find to offer a most striking contrast as to the proportions of their most important constituent, present no striking contrast in size, shape, or weight. In Hallett's white wheat, for instance, the 24 translucent grains weigh 19 grs.; the 45 opaque grains weigh 34·2 grs. Had the opaque grains been of exactly the same density and size as the translucent grains, their weight

* 'Practice with Science,' part i. p. 101. (Longmans, 1865).

would have been 35·6 grs. instead of 34·2—a very trifling difference, due not to a difference in the size of the two sorts of seed, but to a slight difference in density in favour of the translucent grains. This difference in density is brought out very plainly when the seed is placed in a strong solution of chloride of calcium under the air-pump. With a solution of specific gravity 1·247, 71 per cent. of the grains sink, 29 per cent. float. In 100 of the heavy grains thus separated there are generally 35 to 38 translucent grains, and only 18 opaque; while in 100 of the light grains thus separated, there are usually only 10 translucent grains, and as many as 70 opaque grains. With these observations on one physical distinction of importance between the two sorts of seed, I may introduce my experiments on their chemical differences.

The amount of water in the selected seeds was practically the same:—

Percentage of Water.

	Spalding-red.	Hallett's white.
Translucent	16·12	14·34
Opaque	16·10	14·47

But the percentages of nitrogen were remarkably different:—

Percentage of Nitrogen.

	Spalding-red.	Hallett's white.
Translucent	1·792	2·088
Opaque	1·405	1·521

It is usually assumed that the percentage of "flesh-formers" or albuminoids in feeding-materials may be deduced from the percentage of nitrogen, by multiplying it by 6·25. According to this calculation, we find the percentage of albuminoids in the translucent grains of Hallett's white wheat to be 13·06, while in the opaque grains it is only 9·51. In Spalding red wheat, the flesh-formers in the translucent grains amount to 11·20 per cent., and to 8·78 per cent. only in the opaque grains. Assuming the medium grains to be intermediate in composition, it is easy to calculate what amount of nitrogen the whole wheat would contain. The calculated and experimental percentages of nitrogen are—

	Spalding-red.	Hallett's white.
Percentages of nitrogen calculated	1·598	1·745
„ „ found	1·600	1·752

The chief conclusions at which I have arrived from my experiments

previously published, from those recorded in the present note, and from others not yet made known, may be briefly summed up as follows :—

1. In a sample of wheat the translucent grains contain much more nitrogen than the opaque, but the same percentage of water.

2. The translucent grains are denser than the opaque.

3. A larger proportion of the opaque than of the translucent grains germinates and fruits.

4. The yield of dressed corn is greater from the denser seeds, and this dressed corn, from the greater perfection of its grains, is itself denser.

DESCRIPTIONS OF FOUR NEW PLANTS FROM SOUTHERN CHINA.

By Henry F. Hance, Ph.D., etc. etc.

1. *Nasturtium (Brachylobos) Cantoniense*, n. sp. ; caule erecto robusto 1–2-pedali plus minus hispido canaliculato, foliis sessilibus basi auriculis rotundis semi-amplexantibus oblongis hispidis inæqualiter grosse dentatis, racemis numerosis paniculatis multifloris fructiferis elongatis, petalis flavis calycem subæquantibus, siliquis vix linea longioribus subglobosis turgidis stylo distincto iis 3-plo breviore apiculatis, pedicellis patentibus vel arcuato-deflexis 3–4-plo brevioribus, seminibus cinnamomeis tenuiter rugosis.

Two specimens only of this were gathered by me, in December 1859, from the margin of a pond in the environs of Canton ; the plant was not again met with until June 1865, when Mr. Sampson found it growing plentifully on flat muddy banks of the West River, in the province of Kwangtung, in places subject to occasional summer overflows. Its nearest ally is *N. hispidum*, De Cand., from which it differs its nearly entire leaves, subglobose fruit, and much longer pedicels. The seeds of the Chinese plant, examined side by side with those of the American, under a simple microscope, differ conspicuously, being not much more than half the size, much deeper in colour, and with a *rugulose*, not *alveolate* testa. Those who, with Professor A. Gray (Man. Bot. N. U. S. ed. 2. p. 30) and Dr. Regel (Radde, Reisen in Ost-Sibir., Bot. Abtheil. Bd. 1. p. 152), unite *N. hispidum* with *N. terrestre*, R. Br., would naturally do the same with the present plant.

2. *Hypericum (Euhypericum, Drosocarpium) Sampsoni*, n. sp.—

Planta, ut videtur, perennis, caudice lignoso subrepente 1–2 caules emittente, caulibus subpedalibus erectis rigidulis teretibus glaberrimis, foliis oppositis membranaceis oblongis obtusissimis sessilibus late connato-perfoliatis integerrimis glaberrimis crebre nigro- et pellucido-punctatis subtus glaucescentibus $1\frac{1}{2}$–2 poll. longis 6–7 lin. latis inconspicue convergenti-nervosis, nervis primariis utrinque 2–3, bracteis infimis (vel foliis ramealibus ad dichotomiarum bases) foliis similibus reliquis minutis subulatis, floribus parvis (3–4 lin. diametro) in cymas laxiusculas plurifloras ramos oppositos terminantes ad caulis apicem cymam corymbiformem efformantes dispositis, sepalis oblongis obtusis alternis majoribus nigro-punctatis tenuiter nervulosis margine integerrimis, petalis ellipticis flavis nervosis sparse nigro-punctatis sepalis subæquilongis, antheris subrotundis glandula nigra apiculatis, capsula ovoidea vesiculis resiniferis ovalibus croceis tecta stylis 3 brevissimis coronata, seminibus numerosis pallidis botuliformibus longitudinaliter sulcatis transverse rugulosis.—On muddy river-banks, subject to overflows, near Lukpo, 100 miles west of Canton, rare. (T. Sampson, June, 1865.) [Specimens of this and Nos. 3 and 4 have been deposited at the Brit. Museum.—Ed.]

I believe I am correct in the section in which I have placed this remarkable and most distinct species, though it differs from its allies in its perfectly smooth-edged sepals; the capsule, though smaller, is, with the curious ovoid vesicles, quite like that of *H. Rochelii*, Griseb. and Schenk. Except in the connate leaves, it has no resemblance to *H. caprifolium*, Boiss., or *H. Naudinianum*, Coss. and DR., which belong to the *Adenosepalum* group. The leaves are quite as connate as the upper ones of *Lonicera Caprifolium*, L., which, indeed, they are not unlike in shape. No species known to me from Europe, Western Asia, or India, approaches very near to our plant; and, with the exception, I believe, of *H. erectum*, Thbg., and *H. attenuatum*, Choisy, which belong to *Euhypericum*, *Holosepalum*, those from Eastern Asia are of quite different types, being referable to the sections *Eremanthe*, *Norysca*, *Roscyna*, and *Brathys*.

3. *Sedum drymarioides*, n. sp.—Herbaceum, glanduloso-pilosulum, radicibus fibrosis, rhizomate nullo, caulibus diffusis debilibus, foliis distantibus planis carnosis integerrimis lamina ovali obtusa in petiolum ea paulo breviorem spathulato-cuneata incluso petiolo subbipollicaribus oppositis vel rarius ternis quaternisve, cymis (pseudoracemis) ramos

terminantibus terminali sæpius bifido laxis plurifloris, bracteis nullis, floribus pedunculis longis medio articulatis suffultis parvis 5-meris hermaphroditis, sepalis subacutis, petalis albis acuminatis sepalis dimidio longioribus, staminibus petalis paululum brevioribus, filamentis inferne dilatatis, antheris late reniformibus atro-purpureis, glandulis hypogynis truncatis, folliculis ellipsoideis acutis divaricatis, stylis brevibus rectis demum recurvulis, seminibus piceis longitudinaliter crasse costatis.—In damp clefts and hollows of isolated limestone rocks, Tsát-sing-ngám (Seven star rocks) near Shiu-hing, and other similar situations on the West River, province of Kwangtung, growing along with *Pilea peltata*, Hance. (T. Sampson, June, 1865.)

This pretty and delicate little plant, which (in the dried state, at least) much resembles *Drymaria cordata*, Willd., and still more the Ceylon *Stellaria drymarioides*, Thw., does not seem allied to any of the species enumerated in Drs. Hooker and Thomson's Conspectus of the Indian *Seda* (Journ. of Linn. Soc. ii. 93 sqq.); but, as none of them are found in Khasia, the flora of which most nearly approaches that of China, this is not surprising. The extreme delicacy and tenuity of the parts renders the examination of the flowers a task of some difficulty.

4. *Ophioxylon Chinense*, n. sp.—Frutescens, erectum, diffusum, cortice viridulo-griseo lenticellis albidis consperso obductum, foliis brevipetiolatis oppositis rarius ternis quaternis quinisve membranaceis glaberrimis lanceolatis integerrimis utrinque attenuatis subtus pallidis 4–6½ poll. longis ¾–2 poll. latis, cymis axillaribus solitariis vel 2–5 aggregatis folio plerumque plus duplo brevioribus glaberrimis, pedunculo communi basi longe nudo apice laxe subumbellato-ramoso multifloro, pedicellis calyce 3–4-plo longioribus viridibus, calycis parvi viridis glaberrimi lobis triangulatis vel subulatis, corolla albida 5 lineas longa supra medium inflata extus glaberrima fauce intus tomentosa, lobis obtusis tubo 4-plo brevioribus, drupis ovoideis nigrescentibus 3–4 lineas longis nucleo ruguloso.

This plant was first gathered in June, 1864, by Mr. Sampson, in a palm-grove in the extreme west of the province of Kwangtung, near the borders of Kwangsi. He found it very sparingly, and of the two specimens he gave me I retained one for my own herbarium, and sent the other to Kew, with the Natural Order only noted. I afterwards learnt from Mr. Bentham that Professor Oliver thought it was probably a new species of *Ophioxylon*. Mr. Sampson, during the past sum-

mer, made another voyage up the West River, and was so fortunate as to find the plant in several places. The more copious and complete specimens which he was so good as to place at my disposal have enabled me to draw up the above description. The species comprised in this small genus are sadly in want of a careful and critical revision. For many years one only was known, split into two by Gærtner, but without the assent of botanists generally. Dr. Wight described four new ones, of which he figured two (Icones Pl. Ind. Or. tt. 1291–2), which Dr. Thwaites has again combined (Enum. Pl. Zeylan. 191), pointing out that it had been already described by Wallich as a *Tabernæmontana*. Miquel (Fl. Ind. Batav. ii. 404) admits four species from the Indian Archipelago, remarking that the plant figured by Wight (Ic. t. 849) as *O. serpentinum*, is scarcely the same as that of Rheede and Rumphius, on which Linnæus founded the genus. The present plant evidently differs from the Ceylon and Neilgherry *O. densiflorum*, by its much smaller corolla-lobes, and seems to approach closest to *O. serpentinum*; but, to judge from Dr. Wight's figure, and the descriptions of authors, and also from a comparison with the only specimen in my possession,—a Travancore one, collected by Dr. Wallich,—it differs in its dark-coloured bark, narrower and more attenuated leaves, looser cymes, and green, not red, pedicels and calyces. None of the diagnoses hitherto given suffice for the proper discrimination of the species of this genus, nor is it easy to draw up any which will do so.

Whampoa, S. China, 6th September, 1865.

ON *HEDERA CANARIENSIS* AS AN IRISH PLANT.

By C. C. Babington, Esq.

In a recent number of this Journal (p. 201) the Editor announced the *Sharp-leaved Ivy* as a native of Ireland, but upon rather slight foundation. He showed the great probability of its being indigenous to Ireland, but, as I thought, nothing more. The plant found by the late Mr. Hodgens, somewhere in the co. Wicklow, has still to be again gathered in that county. That which grows on walls near Merrion is the true plant, but its origin may, I believe, admit of doubt. It is, therefore, with much satisfaction that I have it in my power to state that true *H. Canariensis* grows on old Whitethorn trees in the western

part of the Phœnix Park, near Dublin. It is a very wild spot, which does not seem to have undergone any alteration since the park was enclosed, nor do I see reason to believe that Ivy has ever been planted there. It grows here and there on the old Thorn-trees which form almost a wood, and in exactly the same way as common Ivy may be seen to do in any old wood. I think, therefore, that it may fairly be considered as a native plant there, and that we now have real evidence of this Ivy extending its range to Ireland.

In the month of August last, I had the opportunity of seeing and becoming acquainted with the true plant in the beautiful botanic garden of Glasnevin, at Dublin; and in the afternoon of the same day (August 30) Dr. D. Moore, Captain Hutton, and I went to the Phœnix Park to enable them to gather some rare Mosses. For that purpose as we passed through the wood of Thorns, and as my attention was naturally directed towards Ivy, as theirs was to Mosses, it fell to my lot to discover the *Hedera Canariensis*. A small portion of one of the specimens then gathered has been submitted to Dr. Seemann, who informs me that it certainly is the *H. Canariensis* as defined by him.

Now that we know for a certainty that this Ivy is Irish, we shall soon learn to what extent it occurs there. In all probability the Ivy of Killarney will be found to be *H. Canariensis*; for this plant is manifestly one of the remnants of the "Asturian Flora" pointed out by the late Edward Forbes as existing in the counties of Kerry and Galway, and which is believed to have once extended throughout the now submerged continent of Atlantis.

NEW CLASSIFICATION OF PALMS.

The following is the new classification of Palms proposed by Mr. Hermann Wendland, at the meeting of German Naturalists at Hanover, to which we recently alluded (vol. iii. p. 260).

The whole Order (which includes *Phytelephas*, *Nipa*, *Wettinia*, etc.) is primarily divided into two suborders, viz. *Arecaceæ* and *Cocoineæ*, absolutely distinguished by the manner in which the seed is attached to the endocarp. Both are again subdivided into two tribes.

Subordo I. *Arecaceæ*. Seed attached to the endocarp by the hilum or the raphe only.

Tribus I. *Arecineæ*. Seeds turned outwards.
Subtribus I. *Euarecineæ*. Ovary 1-locular, 1-ovulate.
Subtribus II. *Arecoideæ*. Ovary 3-locular or 3-carpellary, 3-ovulate.
a. Fronds pinnatisect, segments turned backwards. *b*. Fronds pinnatisect or bipinnatisect, segments turned inwards. *c*. Fronds fan-shaped.
Tribus II. *Lepidocarynæ*. Seeds turned inwards.
Subtribus I. *Calameæ*. Ovary imperfectly 3-locular.
Subtribus II. *Raphieæ*. Ovary completely 3-locular.
a. *Euraphiæ*. Fronds pinnatisect. *b*. *Mauritieæ*. Fronds fan-shaped.
Subordo II. *Cocoineæ*. Seed entirely, or with the exception of a narrow line at the back, connected with the endocarp.
Tribus I. *Borassineæ*. Drupes free, *i. e.* not grown together.
Subtribus I. *Nipaceæ*. Ovary 3-carpellary.
Subtribus II. *Euborassinæ*. Ovary with carpels merged into one.
Tribus II. *Eucocoineæ*. Drupe 3–6-celled.

CORRESPONDENCE.

White-flowered Varieties of British Plants.

It may be interesting to add to the list of plants normally bearing *coloured* flowers (vol. iii. p. 335), but under some circumstances producing *white* ones, the following :—

Cardamine pratensis ; Devonshire.
Brassica campestris ; Suffolk.
Sinapis arvensis ; Suffolk.
Viola hirta ; Worcester, Suffolk, York.
Spergularia rubra ; Devon, York.
Erodium moschatum ; Cumberland.
Spartium scoparium ; Worcester.
Genista Anglica ; Glamorgan.
Anthyllis vulneraria ; Monmouth.
Trifolium procumbens ; Suffolk.
Vicia sativa ; Worcester.
V. sepium ; Worcester.
Orobus tuberosus ; Worcester.
Geum urbanum ; York.

Agrimonia Eupatoria; Hereford.
Sherardia arvensis; several counties.
Wahlenbergia hederacea; Carnarvon.
Veronica arvensis, V. officinalis, V. montana, V. hederifolia, V. polita, Stachys palustris; in several counties.
Lycopsis arvensis; Glamorgan.

In addition to these, the following, usually *white*, I have found *red*:—

Lychnis vespertina; several counties.
Heracleum Sphondylium; several counties.
Daucus Carota; several counties; and the maritime form in Devon.
Torilis, all the species; several counties.
Symphytum officinale; several counties.
Achillea Millefolium; several counties.

I am, etc.,

Wakefield, November 11*th*, 1865. T. W. Gissing.

THE LATE DR. JOHN LINDLEY, F.R.S., F.L.S.

Society has sustained a heavy loss by the death of Dr. John Lindley, one of the most hard-working and celebrated botanists England has ever produced. He was born at Catton, near Norwich, on the 5th of February, 1799, and died at Acton Green on the 1st of November. His father was a nurseryman, known as the author of 'A Guide to the Orchard and Kitchen Garden.' Young Lindley was educated at the Norwich Grammar School, where he distinguished himself by his industry and quickness, though he had some difficulty of learning lessons by rote. At this time his inclinations led him to the study of plants and antiquities, and he spent much of his pocket-money in hiring books on the latter subject, which procured him the nickname of "Old Antiquity." He left school when about sixteen, and shortly afterwards went to Belgium for the late Mr. Wrench, of Camberwell, a seed merchant. After his return he remained with his father for a few years, and devoted himself to botanical, horticultural, and entomological pursuits. His first scientific acquaintance was with Sir William, then Mr. Hooker, who was fourteen years older than himself, and who at that time lived at Norwich. The acquaintance was continued after Hooker's removal to Halesworth; and it was at the latter place that Lindley made a translation of Richard's 'Analyse du Fruit,' which he completed by working at it for three days and two nights without intermission.

About this time there seems to have been a prospect of his proceeding to the Indian Archipelago. For some reason or other this project was abandoned, and owing to his father's reverses in business, Lindley was left to fight for himself. At this juncture he was introduced to Sir Joseph Banks, and in 1818 or 1819 proceeded to London, where he was employed by Sir Joseph as assistant librarian. Sir Joseph recommended him to Mr. Cattley, who was desirous of

finding an editor for the 'Collectanea Botanica.' This work was published in 1821, and is dedicated to Mr. Sabine by its editor, who was even at that time able to sign himself a member of the Imperial German L. C. Academy of Naturalists. In 1820 Lindley published his 'Rosarum Monographia,' which was dedicated to Mr. Charles Lyell, of Kinnordy, who was so pleased with the work that he sent the author a cheque for £100. With this money Lindley bought a dissecting microscope and a small herbarium. In 1820 he was again at Halesworth, and found some Duckweed in flower; a description of which appeared in Hooker's 'Flora Scotica.' In 1821 the Monograph on the genus *Digitalis* was published, illustrated partly by himself, but chiefly by Ferdinand Bauer. In this year was brought out a folio volume of Chinese drawings, preserved in Cattley's library. No editor's name is appended, but it seems probable from the preface that Lindley arranged these plates for publication.

In 1822 Lindley became garden-assistant secretary to the Horticultural Society, of which Mr. Sabine was then honorary secretary. In 1826 he was appointed sole assistant-secretary to the Horticultural Society, having duties to perform both in London and at Chiswick. From this time he may be said to have become the mainspring of the Society, upon which depended its efficient working as it advanced in prosperity, requiring his daily attendance during office hours in Regent Street, or once a week at the Garden, besides frequent extra work in the early morning. In 1830, at the time of Mr. Sabine's resignation, the Society had got into difficulties, which taxed his energies and attention to the utmost to overcome. In conjunction with Mr. Bentham (honorary secretary), he worked out a plan for holding at the Garden general exhibitions of flowers and fruit, in lieu of the old expensive fêtes, which somewhat restored the Society to its former prosperity, and became the model on which similar exhibitions were established. On these days Lindley's duties were extremely onerous. He was always in the Garden before six o'clock in the morning, and he never left it until after six in the evening. Nor were the meetings in Regent Street less the object of his care. Before Mr. Bentham's resignation in 1841, arrangements were made by which almost the whole business till then performed by the honorary secretary should, in addition to his own duties, fall upon Dr. Lindley, who took the designation of vice-secretary. In this office he continued until 1858, when he resigned, and became secretary to the Society and member of council. In addition to the Horticultural Society, he had his lectures both at University College and at the Botanic Garden of the Society of Apothecaries at Chelsea, in which latter establishment he held the office Præfectus Horti, as well as his own personal researches, to engage him. His connection with University College began in the year 1829, and he continued to lecture in that institution until 1861, when he resigned. Upon his resignation he was made Emeritus Professor, at the instance of Professor De Morgan, and was subsequently appointed to the office of Examiner of Botany in the University of London from 1861 to 1863. For many years his class was very large, but as the number of botanical lecturers (many of whom had been his pupils) increased, it fell off. Dr. Lindley never read a lecture, but he invariably prepared notes, and paid great attention to the arrangement of his matter. His

lectures were remarkable for clearness, conciseness, and profuse illustration. He had very early formed a plan for a 'Genera Plantarum,' which should embody all the improvements on the Jussieuan arrangement introduced by Brown, De Candolle, and others, as well as his own views. Seeing, however, that the task would be far greater than he had contemplated, he gave a sketch of his ideas of arrangement in the 'Introduction to the Natural System of Botany' (1830), in the 'Nixus Plantarum' (1833), and in the 'Key to Structural and Systematic Botany' (1835). Soon afterwards, on the announcement of a 'Genera Plantarum' by Endlicher, he finally gave up all idea of preparing one himself, and embodied the result of his preparatory labours in his 'Natural System of Botany,' or second edition of the introduction published in 1836. This is perhaps the most carefully elaborated of all Lindley's works, and suggested to Endlicher the issue of his 'Enchiridion Botanicon' (1841); this in its turn supplied several of the ideas carried out by Lindley in expanding his Natural System into 'The Vegetable Kingdom' (1846).

The 'Outlines of Botany' appeared first in 1830; its principal contents, modified and rearranged, together with a revision of the 'Nixus Plantarum,' formed the 'Key to Structural and Systematic Botany,' which was translated into several foreign languages, including Hungarian, and subsequently enlarged in a new edition under the title of 'Elements of Botany' (1841). He had also, in 1832, published a more detailed and comprehensive work, entitled 'Introduction to Botany,' which went through two editions, and was the foundation of his subsequent shorter elementary works. In 1829 appeared the 'Synopsis of the British Flora,' in which the British flowering plants were arranged according to the Natural System. The 'Flora Medica' was published in 1838 A work on a similar subject, 'Medical and Economic Botany,' made its appearance eleven years later. The 'School Botany,' which in its improved form has gone through several editions, was first published in 1839. A work with a similar object was published in 1837–8, in two volumes, under the title of 'Ladies' Botany.' In 1837 appeared a Monograph on the *Victoria regia*, of which twenty-five copies only were circulated. These were by no means Lindley's only works. The greater part of the descriptions in Loudon's 'Encyclopædia of Plants' were drawn up by him. He conducted the whole of the 'Botanical Register,' except during the first few years; and, with very little assistance, 'Lindley and Paxton's Flower Garden,' besides contributing to several of Paxton's works. The botanical articles in the 'Penny Cyclopædia' down to the letter R, and a 'Treatise on Botany,' published by the Society for the Diffusion of Useful Knowledge, were from his pen; besides parts of Sibthorp's 'Flora Græca.' From 1831 to 1837 he was engaged with William Hutton in the 'Fossil Flora of Great Britain,' a work in three volumes. As in elementary botany, so in horticulture, he commenced with a small work, entitled 'Outlines of Horticulture.' This was followed by the 'Theory of Horticulture,' first published in 1840, which, after having been reproduced in America, and translated into nearly every European language, reached a second edition in England in 1855. Dr. Lindley was very proud of this work, and regarded it as

one of his best. The 'Sertum Orchidaceum,' a work in folio, with beautifully coloured plates, mostly by Miss Drake, was completed in 1838. The 'Genera and Species of Orchidaceous Plants' also came out between 1830 and 1840; and a second edition of the latter, under the title of 'Folia Orchidacea,' was commenced in 1852, but unhappily never completed, the last part having been issued in May, 1859. Many of the books mentioned were illustrated either by his own pencil, or by that of his two daughters. Lindley was a contributor to the Transactions of the Horticultural Society, from 1822 to 1848. We have already alluded to the octavo Journal of the Horticultural Society, 1846–1855; though Lindley did not himself write much in these volumes, it is to his careful editing and research that they owe their principal value. In the Transactions of the Linnean Society we find, in the year 1820, a paper beautifully illustrated by Dr. Lindley on the *Pomaceæ*, and a shorter notice in a subsequent year on the Anatomy of the Roots of *Ophrydeæ*. In the volumes of the Journal of the same Society are also several important papers, chiefly referring to Orchidaceous plants. The records of the British Association also testify to his diligence.

In 1841 he established the 'Gardeners' Chronicle,' which offered him a wide field for the display of his ready and powerful pen, but which also gave the earliest indications of his gradually declining strength, resulting from overwork. In 1838, he was appointed, together with Mr. Joseph Paxton and Mr. John Wilton, to report on the Royal Gardens at Kew, and he entertained some hopes of being appointed Director of the establishment after it should have become a national institution; but in this he was disappointed, and an effort he made many years later to obtain a lucrative post at the India House, was also unsuccessful. During the Potato famine, Dr. Lindley and others were commissioned by Government to report on the actual state of things in Ireland. The cultivation of the island of Ascension, on the West Coast of Africa, and the beneficial results sprung from it, are also due to Dr. Lindley's suggestion. In 1851 he was one of the Jurors of the Great Exhibition. In 1862 he took charge of the whole colonial department of the second International Exhibition. With his failing health, this task seems to have been too onerous for him. He began to complain of headaches, and after the Exhibition was over it was found that his bodily and mental powers had received an injury from which they were never to recover. He was compelled to resign the Secretaryship of the Horticultural Society, with which he had then been connected for forty years. It was at this time that some of his friends subscribed for a portrait of him by Mr. Eddis. Soon afterwards a chaste and elegant epergne in silver was also presented to him, the design of which commemorated Lindley's researches among Orchids, Roses, and other plants.

Although Dr. Lindley's family and friends were aware of his precarious state, his sudden death took them somewhat by surprise. He retired to rest as usual on the 31st of October; on the following morning he was seized with a fit of apoplexy, and gradually sank. He has left a widow and three children.

Dr. Lindley was a member of about sixty scientific societies. He became a Fellow of the Linnean as early as 1820, and of the Royal in 1828. In 1832 he received the degree of Doctor of Philosophy from the University of Munich.

In 1834 he was elected an honorary member of the Berlin Academy, and in 1853 a corresponding member of the French Institute. In 1857 he received from the President of the Royal Society the Royal Medal, in recognition of his labours.

Dr. Lindley was of average height, with dark-brown hair, and ruddy complexion. He had only one serviceable eye, the other having been useless from infancy. His figure was erect, and his walk firm. He was hot in temper and impatient of opposition, but on the other hand he had the warmest of hearts.

In order to assign to Lindley his exact place in our science, a careful study of all his writings would be necessary. But we may say, it appears to us that his greatest merit consists in having successfully established in this country the Natural System. He also had a happy knack of popularizing and making clear the labours of others, but his own ideas were often crotchety. He was a capital follower, but an indifferent leader; and often placed himself in positions from which there was no escaping. As long as he stuck closely to the systematic writings of the leading botanists, his faults were scarcely apparent; but when in his 'Vegetable Kingdom' he tried to rearrange anew all the Natural Orders according to his own ideas, he failed so completely that though the book, from its many acknowledged merits, was in everybody's hands, nobody has ever accepted its arrangement, and many of the groupings are now held to be purely artificial. The Orchids were his peculiar favourites, and the various works he wrote on them will probably be regarded as the most favourable specimens of what he has done and could do; and let us own that there are few botanists who would not be glad to have written them, as there are few whose botanical career has been more useful than that of John Lindley.

For many of the above facts we are indebted to the 'Gardeners' Chronicle,' to which they are understood to have been supplied by Dr. Lindley's son. We have purposely abstained from discussing whether Lindley or Hooker was the head of botanical science in Britain, because that has been made a party question which could never have been raised as long as their great contemporary Brown was alive, and which is much better left to the decision of generations that supplant us.

NEW PUBLICATIONS.

The Elements of Botany for Families and Schools. Tenth edition. Revised by Thos. Moore, F.L.S., etc. London: Longman and Co.

A usable manual to any science is often difficult to find, because it is difficult to produce. When the author introduces into an elementary treatise his own theoretical opinions, he too often forgets the chief end of his undertaking, and while he produces a readable book, it is one generally worthless as a *text* book. Professor Haughton's recently published 'Introduction to Geology,' is a striking instance of this: in

one place he descants pleasantly enough, but quite out of place, on his hobby of honeycomb structure, in another, only a few pages from the beginning, he leads the tyro into all the minute details as to the nature, composition, and probable origin of the igneous rocks, as he has made this a special subject of inquiry. Useful and entertaining though these are, one does not want to read "Haughton" on every page, but expects a clear exposition of the facts and principles of the science put in as concise and simple a form as possible,—a series of texts, and not a volume of sermons. Such a volume for botany our readers will find this to be. There are no words wasted; every sentence contains additional information, and carries the learner further on. There is also an abundance of illustrative drawings and diagrams. It has indeed already amply approved itself to the class for which it is intended, and the editorial superintendence of Mr. Moore is a guarantee that this tenth edition is up with the botany of the day.

Fungi Britannici Exsiccati, a M. C. Cooke collecti. Cent. I. London: Hardwicke. 1865.

Mr. M. C. Cooke, with whose papers on microscopic fungi our readers are acquainted, has just published a first century of 'British Fungi.' His extensive acquaintance with this family of plants will greatly increase the value of this collection, and make it a necessary addition to every herbarium that seeks to represent all the tribes of our native flora.

BOTANICAL NEWS.

M. Alphonse de Candolle will preside over the great International Botanical Congress to be held in London in May next, and deliver an opening address.

Mr. Clements Markham has gone to the East Indies to inspect the Government *Chinchona* Plantations, and report upon them officially.

Mr. Ralph Tate has discovered, in the Shetland Islands, a *Plantago* new to the British flora, and believed to be *P. alpina*. A coloured plate of it will accompany his 'Enumeration of the Shetland Plants' in the next number of this Journal. A plate of Dr. Moore's new Irish *Inula* is also in course of preparation.

It is with deep regret we announce the death of Mr. Lovell Reeve, of Henrietta Street, well known to botanists as the publisher of many standard works on our science, and to conchologists as the author of one of the largest illustrated works on shells ever brought out. Mr. Reeve died on the 18th of November, after thirteen months' severe suffering, aged fifty-one.

Dr. Hofmeister, assisted by Drs. Pringsheim, De Bary, Irmisch, and Sachs, is about to publish a 'Handbook of Physiological Botany.'

Dr. C. Bolle has had the good fortune to discover, in the island of Ischia, a new Moss, *Trematodon Solmsii*, the third European species of the genus; and about Monaco, a new *Narcissus* (*N. Aschersonii*), both of which he describes, together with new forms of North German plants, in some Italian and German papers, reprints of which have been forwarded to us. That nuisance of our rivers, *Elodea Canadensis* (*Anacharis Alsinastrum*), a plant which has now ten synonyms, is also, Dr. Bolle reports, spreading in Prussia.

The third part of Seemann's 'Flora Vitiensis,' completing the Polypetalous Orders, is now ready.

M. Maximowicz, of St. Petersburg, is writing a Flora of Japan, for which he has collected considerable materials during his stay in that empire.

Mr. Alexander Silver, of Aberdeen, has just brought out 'Outlines of Elementary Botany, for the use of Students.' (London: Henry Renshaw.)

BOTANICAL SOCIETY OF EDINBURGH, first meeting for the thirtieth session on 9th November. Dr. Alexander Dickson, president, in the chair, delivered an opening address, in which he alluded to the progress and prosperity of the Society. After briefly considering the events of the last session, Dr. Dickson discussed the question as to the nature of the female Coniferous flower, with special reference to the arguments of Dr. Hooker on *Welwitschia*. Dr. Dickson contended that the absence of a proper stigma in these plants could not be held to indicate the absence of carpels, because a stigma was no necessary or essential characteristic of a carpel, being in some cases developed not from the carpel at all, but from the placenta. The absence of vessels in the presumed carpels of *Coniferæ* had been urged by Dr. Hooker as an objection to the carpellary view, but Dr. Dickson thought there was no *à priori* improbability that carpellary leaves of reduced type should be destitute of vessels, seeing that ordinary leaves in certain cases are destitute of vessels, as in the *Podostemonaceæ*. Dr. Dickson said that next to the results of organogenic observation, the analogy which, on the carpellary view, the *Coniferæ* would present to certain *Loranthaceæ*, afforded the best argument of a positive character in favour of that view; that in both families we should have ovules reduced to naked nuclei, solitary and basilar in the *Coniferæ*, and frequently so in the *Loranthaceæ;* that in both there would be a tendency to the production of what Schleiden termed "*Gemmula infera*," or an inferior ovule, where, from preponderating development of the very base of the ovule, it becomes more or less imbedded in the substance of the floral axis, and that in both families there is the occasional occurrence of a plurality of embryo sacs, etc. Dr. Dickson asserted that the *onus probandi* lay with the supporters of Robert Brown's hypothesis of naked ovules, and that no botanist should accept that hypothesis, involving as it does the assumption of a great anomaly, unless he were able to convince himself that the carpellary view is untenable. —The following communications were read:—I. List of Lichens collected in Otago, New Zealand. By Dr. W. Lauder Lindsay. Of the Lichens, 62 species, or 50 per cent., are common to Britain; 30 species, or 24 per cent, are con-

fined to New Zealand; 62 per cent. are common to both the northern and southern hemispheres; and 38 per cent. are confined to the latter.—II. A letter was read from Dr. J. C. Brown, Colonial Botanist, Cape of Good Hope, intimating that he had sent for the gardens at Edinburgh and Glasgow specimens of *Welwitschia mirabilis*.—As some doubts have been expressed relative to the occurrence of *Sison Amomum* in Scotland, Professor Balfour exhibited specimens collected by himself in the neighbourhood of Coldstream, not far from the Hirsel. He also stated that *Œnanthe fistulosa*, not recorded as a Scotch plant by Babington, occurs abundantly in Wigtonshire, Kircudbrightshire, and Dumfriesshire.—Dr. Balfour exhibited specimens of an Aster, apparently *Aster salignus* (*salicifolius*), found growing in quantity on an island in the Tay, near Dalguise, far from any gardens, and apparently naturalized. He remarked that several species of Aster were spread over Britain.—A correspondent noticed at Bonchurch, near Ventnor, Isle of Wight, a Fuchsia nearly 22 feet high, and having a trunk 7 inches in diameter.—Mr. M'Nab laid before the Society specimens of *Raphanus caudatus*, grown in the open air. The seeds were received from Mr. William Bell, superintendent of the Botanic Gardens, Saharunpore, in April, 1865, under the name of "Radish, 3 feet long." They were dibbled into a piece of ground, and a two-light frame placed over them. They very soon commenced to grow, so that the glazed frame had to be removed. Seven weeks after being sown, they flowered profusely, and numerous seed-vessels of a purplish-green colour were produced. These went on elongating till many of them had reached the length of 2 feet 9 inches, each plant bearing from 18 to 20 of long tapering snake-shaped seed-vessels. In the young state the seed-pods may be used like the ordinary cultivated ground radish, as they possess a peculiar pungent taste. They will also be found useful for making up mixed pickles, etc. About eight years ago seeds were received from Madras under the name of "Rat-tail radish, *Raphanus caudatus*," with seed-pods 8 inches long. This variety produces seeds freely, and is annually grown in the garden; it possesses the same pungent taste as the long-fruited plant. The large radish is very hardy, as both flowers and fruit were found on it in the open air as late as 9th November, 1865. Independent of the various culinary purposes to which this radish may be turned, it is of itself a great vegetable curiosity. If the seed is sown singly, and each plant is tied upright, the fruit will, when matured, be found hanging all round—sometimes perfectly straight, at other times assuming contorted forms. This contortion is most perceptible at the period when the seeds are swelling. At no state of their growth does either of the varieties show the slightest tendency to produce the radish underground. It will be curious to observe the nature of the offspring when the plant is fertilized with the ordinary garden radish: in all likelihood the hybrids will produce edible radishes, both above and under ground. [The first notice of this remarkable plant appeared in this Journal, iii. 264, in August last.—Ed.]—Mr. Buchan exhibited a specimen of wood found in peat in Orkney. The specimen was taken from a tree 5 feet in diameter, and was transmitted by Mr. Baikie.

Natural History Society of Dublin.—The opening meeting for the

session took place at the Royal Irish Academy House, on the 3rd of November. The chair was taken by the President, the Rev. S. Haughton, M.D. Mr. Archer, Honorary Secretary, read the Report from the Council. During the past session eight ordinary, one associate, and five corresponding members have been added to the list; whilst the losses have been six—four ordinary members, one associate, and one corresponding. The papers read have been sixteen in number, six botanical, viz. 'Botanical Notes in the Midland Counties,' by F. J. Foot, M.A.; 'On the Geological Relations and Distribution of Certain Ferns in the County Donegal,' by William Harte; 'On the Value of Characters in the Protophyta, more especially in *Desmidiaceæ*,' by G. C. Wallich, M.D.; 'Observations on the Genera *Cylindrocystis* (Meneghini), *Mesotænium* (Næg.), and *Spirotænia* (Breb.), *Palmogloea*, Kuetz.' by William Archer; Report of 'The Progress made in 1865 towards the Collection of the Irish Lichens,' by Admiral T. Jones; 'On some Mosses new to Britain, and on *Neotinea intacta* (Reichb.),' by D. Moore, Ph.D. The following gentlemen were elected to serve for the ensuing year, as President—David Moore, Ph.D.; Vice-Presidents—William Andrews, Robert Callwell, Alexander Carte, M.D, C. P. Croker, M.D.; Council—H. M. Barton, Edward H. Bennett, M.D., George Dixon, Richard L. Edgeworth, M.B., Arthur Wynne Foot, M.B., John Good, Rev. Samuel Haughton, M.D.; Archibald H. Jacob, M.D., Maziere Johnston, Joseph Beete Jukes, John J. Lalor, William Maziere, Gilbert Sanders; Honorary Treasurer—R. P. Williams; Honorary Director of Museum—Robert J. Montgomery; Honorary Secretaries—Robert M'Donnell, M.D., William Archer.

Quekett Microscopical Club.—The monthly meeting of this society was held at their rooms, 32, Sackville-street, Piccadilly, on the 24th of November; Dr. Lankester, president, in the chair. A paper was read by Mr. M. C. Cooke, vice-president, "On the application of the microscope to the discrimination of vegetable fibres," which he illustrated by a large collection of natural specimens. These were afterwards placed at the disposal of the members, and an animated discussion ensued, in the course of which it was suggested by Dr. Tilbury Fox that a sub-committee should be formed to investigate and report on the subject. The meeting was numerously attended, sixteen members were elected, and twenty-three candidates proposed. The proceedings terminated with a conversazione.

Société de Physique et d'Histoire Natureile de Genève.—*Prix quinquennal de Botanique, fondé par Aug.-Pyramus de Candolle.*—Un prix de cinq cents francs sera décerné, le 9 septembre 1866, à l'auteur de la meilleure monographie d'un genre ou d'une famille de plantes. Seront admis au concours les ouvrages inédits, rédigés en français ou en latin, qui auront été envoyés à l'un des soussignés, francs de port, avant le 1er juillet 1866. Les membres ordinaires de la Société ne sont pas admis à concourir. La Société se réserve le droit de publier le mémoire couronné, si cela convient à l'auteur. Si toutefois son étendue ne lui permettait pas de l'imprimer dans ses mémoires, il serait restitué à son auteur.—E. Plantamour, Président; C. Marignac, Secrétaire.

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ERRATA.

Page 33, line 10 from below, read "inarticulati" for "articulati;" p. 120, line 9 from below, read "23" for "33;" p. 136, line 20 from below, omit the word "that;" line 7 from below, of the same page, read "H" for "N;" p. 144, line 10 from below, read "Aguacate" for "Aguacata;" p. 149, line 20 from below, read "Lagenaria vulgaris, Ser." for "Crescentia Cujete, L."; p. 163, line 19 from below, read "Passifloreæ" for "Perrifloreæ;" p. 169, line 22 from below, read "few plants" for "fine plant;" p. 194, line 13 from above, read "Thomsonii" for "Tomsoni;" p. 201, line 4 from below, read "calyculati" for "ecalyculati;" p. 315, line 4 from below, read "Pichurim" and "Ocotea" for "Pithurim" and "Orotea," and line 3 from below of the same page, read "Pichurim" for "Pithurim;" p. 316, line 3 from above, read "Pichurim" for "Pithurim;" p. 316, line 10 from above, read "Cajanus Indicus, Spr." for "Desmodium heterocarpum, De Cand.;" p. 321, line 2 from above, read "Oreopanax Humboldtianum, Dcne. et Planch." for "Panax speciosum, Willd.;" p. 321, line 14 from above, read "Yuca" for "Yura;" p. 332, line 4 from below, read "de" for "di;" p. 354, line 12 from above, read "Astrocaryum" for "Astrocarpum;" p. 358, line 15 from above, put a semicolon before Fries, and a comma after Fries.