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I. Notes on the recent Progress of Botany in Denmark

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	Date of Flowering. 1871.	Date of Flowering. 1870.	Date of Flowering. 1869.
<i>Galanthus plicatus</i> . . .	Feb. 15	March 4	Jan. 26
<i>Corylus Avellana</i> . . .	" 16	Feb. 18	" 14
<i>Erica herbacea</i> . . .	" 16	...	" 18
<i>Jasminum nudiflorum</i> . . .	" 16	Feb. 20	" 13
<i>Crocus susianus</i> . . .	" 16	March 1	" 30
<i>Primula vulgaris</i> . . .	" 16	...	...
<i>Crocus vernus</i> . . .	" 17	March 3	Jan. 30
<i>Hepatica triloba</i> . . .	" 18	" 5	" 23
<i>Populus tremula</i> . . .	" 18	" 18	" 21
<i>Nordmannia cordifolia</i> . . .	" 20	Feb. 19	" 21
<i>Primula veris</i> . . .	" 20	...	...
<i>Tussilago alba</i> . . .	" 20	...	Feb. 26
<i>nivea</i> . . .	" 21	March 14	" 26
<i>Scilla præcox</i> . . .	" 25	...	...
<i>Daphne Mezereum</i> . . .	" 25	March 27	Jan. 29
<i>Scilla sibirica</i> . . .	" 26	" 28	March 2
<i>Rhododendron atrovirens</i> . . .	" 27	...	...
<i>Dondia Epipactis</i> . . .	" 27	...	...
<i>Symplocarpus foetidus</i> . . .	" 28	March 18	Feb. 11
<i>Scilla bifolia alba</i> . . .	" 28	" 27	" 21
<i>Narcissus pumilus</i> . . .	" 28	" 24	" 18
<i>Andromeda floribunda</i> . . .	March 1	" 23	Jan. 17
<i>Sisyrinchium grandiflorum</i> . . .	" 1	" 23	Feb. 1
<i>Holosteum umbellatum</i> . . .	" 2	...	...
<i>Sisyrinchium grandiflorum</i> } <i>album</i> . . .	" 3	March 25	Feb. 20
<i>Knappia agrostidea</i> . . .	" 4	...	...
<i>Rhododendron nobleanum</i> . . .	" 6	April 2	Jan. 16
<i>Iris reticulata</i> . . .	" 6	...	...
<i>Nuttallia cerasiformis</i> . . .	" 7	March 20	Feb. 7
<i>Narcissus minimus</i> . . .	" 8	" 26	" 20

13th April 1871.—ALEXANDER BUCHAN, Esq., M.A.,
President, in the Chair.

Professor Balfour noticed the death of Mr Wm. Wilson, author of the *Bryologia Britannica*, which took place at Paddington House, near Warrington, on 3d April. He was a Corresponding Fellow of the Society, and contributed to its Transactions and Herbarium. He was in his seventy-second year.

The following Communications were read:—

I. *Notes on the recent Progress of Botany in Denmark.*

By ROBERT BROWN (Campst.), Ph. D.

Denmark has long been noted not only for the high character and simple happiness of its people, but also for its progress in the arts, science, and literature. Copenhagen, now the only town of any great size under the Danish Crown, is the centre of this culture, and may well be styled "The Athens of the North." It is, indeed, now to some extent what Edinburgh was at the beginning of this century,—the home of a galaxy of brilliant men in all departments of literature and science. Of late years, however, owing to the insignificant political importance of the country, and possibly also to ignorance of the importance of its literature, the Danish language has been much neglected, especially by naturalists, who are therefore to a great extent ignorant of the numerous admirable researches which are continually being published in it. To enumerate all of these would be beyond my power, but having lately been engaged in researches which have led me to become acquainted with many of the chief memoirs lately published, I consider that it may be useful if the Society's attention is called, however briefly, to some of them.

History of Danish Botany.—Previous to doing so, however, I may note the admirable history of Danish Botany, which Herr Docent i Botanik Didrichsen, Librarian at the Botanic Garden, and formerly one of the naturalists of the Royal Danish vessel "Galatea," in her voyage round the world under Admiral Steen-Bille—under the title of "For Hundrede aar Siden: smaa Samlinger til et tidsrum af den Danske Botaniks historie"—has published in the "Naturhistorisk Tidsskrift," 3 R. 6 B. p. 49 (1869), in which the records of botany in Denmark since the period of Linnæus are sketched.

Natural History Journals.—In Copenhagen, beside Medical, Law, Veterinary, and Sporting serials, and popular journals of History, Antiquities, and Geography, there is the well-known Tidsskrift (generally known as "Kroyer's Tidsskrift," from its projector and late editor, Professor

Kroyer), a popular Journal of Natural History, edited by Lütken, Fogh, and Warming, and the Journals of the Natural History Society, the Botanical Society, and the Academy of Sciences. The Proceedings and Transactions of the Academy of Sciences contain papers of high value in all departments of science, including some very valuable ones on botany, such as Gottsche's "Hepaticæ of Mexico," illustrated by plates, than which I have seen no Society's Transactions superior—not even the lavishly illustrated ones of Russia. The Natural History Society has also many botanical papers in their excellently conducted and illustrated journal, while the Botanical Society's *Tidsskrift* is, of course, wholly occupied with botanical papers read at its meetings. This Society, established only a few years ago, now numbers a considerable membership, including two ladies.* It meets once a month, commencing in October, with a short autumn vacation, in the class-room in the Botanic Garden, under the presidency of Professor Lange,—well known as the editor of the "Flora Danica," "Handbook to the Danish Flora," and other works, and as joint author with Willkomm of the "Prodromus Floræ Hispaniæ,"—who lectures on botany at the School of Veterinary Surgery, Forestry, and Agriculture, in the suburbs of the city. This admirable establishment has good buildings, museum, arboretum, garden, and farm attached to it, and does not find its equal in any similar institution in this country at least. The Proceedings of the Botanical Society are sent regularly to our Society, and are accessible to all members, so that I need not more particularly refer to them.

The New Botanic Garden.—The old Botanic Garden of Copenhagen is situated in the very heart of the city, off the *Kongen's Nyetorv* (King's New Square), and is surrounded on every side with tall brick houses, the buildings of the Royal Academy of Fine Arts, and the masts of vessels. It is a small garden, but well kept, so far as it is possible, with very limited funds, and artificial and natural disadvantages of various kinds. It also contains some good plants, but those in the conservatories, like the

* In Jan. 1871, 2 honorary, 59 resident, 75 non-resident, and 27 foreign members.

plants in most old Continental gardens, from overcrowding and deficiency of light, are apt to run to wood. The gardens have been here since 1778, but are now about to be removed.*

Curiously enough, I found that owing to the severe winter, Coniferæ, which are hardy in this country, and in the cold winter of the North-West American eastern, or mountain regions, are not left out there in the open air all the year round. *Pinus insignis*, for instance, is not hardy; neither is *P. Sabiniana*, nor *Sequoia gigantea*, nor *S. sempervirens*. *A. Douglasii* does not succeed. It has been tried in Denmark on a large scale, but failed. *Thuja gigantea* is, however, hardy out of doors; but *Cryptomeria japonica* not at all. *Aucuba japonica* is tolerably hardy, but in the winter its leaves often get affected. *Biota Doniana* is also not hardy. *Ilex Aquifolium* is found rarely on the west coast, but does not prosper near Copenhagen, where it is not indigenous. The hot-houses are rich in Mexican plants, chiefly from Dr Liebmann's collections. The Orchids are in cork baskets, which are light and cheap, besides being strong and more natural looking than wire ones. There is a fine collection of Cactaceæ. The collection of Palmaceæ is also good, though housed in a manner which would compare poorly with Kew or Edinburgh.

Arctic plants, I was informed by the late curator, Mr Weilbach, were found difficult to grow. They only flowered one summer, and then ran to leaf, owing to having no cold place to keep them during the hot season.

The museum attached to the garden is tolerably good, but cramped for room; and attached to it is an admirable botanical library. The herbarium is rich in interesting collections, including those of Vahl, Liebmann, and other Danish botanists, but suffers, like everything else in Denmark, from a want of funds. The present director, Professor Lange, is, however, making good use of it, and doing the best he can in the circumstances. The late curator, Mr Weilbach, passed several years in England, and since his death in 1868, his place has been well filled by Mr Friederichsen. For some time past, the removal of the garden has been

* See "Beretning om Universitets paatænkte nye Botaniske Have. 1870," (with two plates).

contemplated, the plans are now ready, and the ground partially laid out.

Flora Danica.—The publication of the 47th livraison of this celebrated work marks an era in Danish botany. Originally commenced in 1799, under the editorship of Herr Vahl, this last part, published at the expense and under the authority of the King, by our associate, Professor Lange, fully keeps up the high reputation it has long maintained as the standard work on the plants of Northern Europe and the Danish Arctic Colonies. This part contains, as usual, sixty plates, which represent seventy-five plants (fourteen of these being varieties of species already partially described in the “*Flora Danica*,” and two hybrids), of which twenty-four have not been figured previously in any other iconographic work. These seventy-five plants comprise thirty-five Phanerogams (twenty-five Dicotyledons, nine Monocotyledons, and one Gymnosperm), forty Cryptogams, (one Fungus, seven Characeæ, twelve Mosses, ten Hepaticæ, and ten Lichens).

Among the species or varieties represented in this part, are ten, found in Greenland (also in the northern parts of Scandinavia, and two in Iceland), but not in Denmark, and one in Iceland only. The other sixty-four species are drawn from Danish specimens. The designer of these plants is Herr Thornman, of Copenhagen, an artist who, in this department of his profession, is deservedly recognised as occupying a high place. Curiously enough, however, Herr M. J. Bayer, who commenced to work on the “*Flora Danica*” in 1799, while Vahl was editor, and who has, during this long period of sixty-nine years, designed more than 1600 plants (more than half the plants contained in this work), is still living, but owing to old age and infirmities, has been compelled to resign his pencil to a younger man. The following plants deserve to be especially mentioned :—

Plate 2761.—*Festuca elongata*, Ehrh., is, it would appear, the oldest name of a much disputed plant, which has been confounded with a common form of *F. pratensis* (*F. pseudo-loliacea*, Fr.), but which is now generally considered to be a hybrid between *F. pratensis* and *Lolium perenne*. It has, in fact, the character common to the two

species, and, moreover, presents other signs of hybridity ; and though seen rarely, and few in number, Lange has never yet been able to find seeds well matured and susceptible of germination. The plants from which it is supposed to be derived belong to two different genera (even to two different groups of grasses—*Hordeaceæ* and *Festucaceæ*). It was at one time classed under *Lolium* (*L. festucaceum*, Link.), and at another under *Festuca* (*F. elongata*, Ehrh. ; *F. loliacea*, Cur. ; *F. Phœnix*, Thuil.), but it appears to belong to the second of these genera rather than to the first, and it seems proper to apply to it Ehrhart's name.

Plates 2764–65.—Some authors have considered *Galium palustre*, L., and *G. elongatum*, Presl, two distinct species, but careful study shows that the characters are neither sufficiently permanent nor important enough for the two species so-called to be considered as more than two forms of the same plant. Both forms are common in Denmark, and often grow together, so that they can be judged of very conveniently. A parallel analogy appears in *G. debile*, Desr., and *G. constrictum*, Charb., of the south-east of Europe, now ordinarily believed to be one species, though fully as different in appearance as the two mentioned above.

Plate 2767.—*Primula Thomasinii*, Godr. et Gren. (*P. officinali-elatior*, Muret), is probably the hybrid issue of a cross between *P. elatior* and *P. officinalis*. As far as the characters go, it is intermediate between these two species ; and in Denmark, as in the other countries where it is found, it occurs rarely, and in few examples. In those parts of Denmark where it grows (at Skjelskør, Seeland), formerly *P. elatior* had not been met with, and for that reason Lange, in the third edition of his “*Haandbog i Den Danske Flora*,” p. 181, looks upon it more as a large flowered variety of *P. officinalis* ; but recently, *P. elatior* having been found in that locality, this objection to its being viewed as a hybrid has been removed.

Plate 2769 represents *Armeria sibirica*, which has been found in Siberia, Finmark, Iceland, and Greenland. Lange thinks that he has reason to believe that *A. labradorica*, Wallr., mentioned in De Candolle's *Prodromus* as obtained in Greenland, does not differ specifically from this

species, the range of which stretches almost to the North American continent. It is, however, closely allied to *Armeria maritima*, and is perhaps only an Arctic variety of that species.

Plate 2771.—*Juncus atricapillus*, Drej., is a species so scattered over the downs of Northern and Western Jutland as to be regarded as a plant characteristic of that locality. It is closely allied to *J. alpinus*, Vahl., but is certainly distinct. It resembles even more *J. lamprocarpus* and *J. acutiflorus*. Like other species of *Luzula* and *Juncus*, it presents three forms, viz., a typical form, a variety *congesta*, with the inflorescence closely aggregated, and a variety *sparsiflora*, with the inflorescence (anthela) more patulate. The species is not, however, limited to Slesvig, but is found from Skagen to the south-east of Slesvig (Eiderstedt). Examples occur in the downs of Holland, and have been communicated to Professor Lange by Professor Oudemans, under the name of *J. alpinus*, showing that it can grow even in the sands of Holland. Lange has also seen many specimens gathered in the Island of Norderney. *J. anceps* of Laharpe, of Western France, is apparently the variety *sparsiflora*; but Laharpe's name must give way to the prior one of Drejer, if it should be found that it is only a variety of this species. It is, without doubt, by a mistake that Reichenbach, in the "Flora Germanica," has figured this under the name "*J. nigricans*, Drej." At least it does not come within Lange's knowledge that Drejer ever gave it that name.

Plate 2783 represents *Trifolium filiforme*, L. (*T. micranthum*, Viv.), a species rather rare in Denmark, but frequent in the south of Europe. It differs essentially from *T. minus*, Sm., which has been supposed by the greater number of authors to be the same as *T. filiforme*, L., and under that name was figured in plate 1707 of the "Flora Danica." If the Linnean *T. filiforme* is to be split up into two species, the name must be applied to this one, as his description suits it best, unless we are to confuse all the laws of nomenclature.

Plate 2787.—*Filago germanica*, L., of late has been divided into two distinct species (or, according to some botanists, two forms of one species), viz., *F. apiculata*,

G. E. Smith (*F. lutescens*, Jord.), and *F. germanica*, (L.) Smith (*F. canescens*, Jord.). The first is represented in plate 997, and the second is reproduced in this plate. It is not certainly beyond doubt that the *F. germanica* of Linnæus is a collective species comprehending two species, which have been slowly distinguished; but if we are bound to preserve for one of these the Linnean name, it is more convenient (as proposed by M. Smith), to apply it to the *F. canescens*, Jord., which agrees with Linné's description, and is, of all others, the most common in the North of Europe, while *F. apiculata* (*F. lutescens*, Jord.) appears to be more scattered through the middle regions of Europe.

Plate 2792.—*Sparganium hyperboreum*, Læstadi., is a species so closely allied to *S. minimum*, Fr., of Central Europe, that it appears to be only an Arctic form of this species, which, according to Blytt, does not pass, in Norway, the limit of Conifers, while *S. hyperboreum* grows in the Alpine region, and in Lapland, Finmark, Iceland, and Greenland. Is it necessary even to include under this name the Northern American species described by Michaux under the name of *S. angustifolium*? It is a doubtful question, but it is better to preserve the name of Læstadius, more especially as the late Robert Brown has described under the name *S. angustifolium* a different species of the same genus.

Plate 2793.—*Carex paniculata*, var. *pallida*, Lge., found in the shade in moist places near to Sorö, in appearance differs much from the typical species, and approaches so nearly to *C. axillaris*, Good. (*C. Boenninghauseni*ana, Whe.) in the mode and place of growth, and by the colour of the bracts, that at first Lange thought it a form of that species, and has described it under the name of *C. Boenninghauseni*ana, var. *subpaniculata*. Since then the completely developed fruits (rarely the case with *C. axillaris*), their form, as well as the inflorescence, has led him to believe that it approaches nearer to *C. paniculata*, and to be a form of that species growing in the shade. Of late an idea has arisen, that it may be a hybrid of *Carex paniculata* and *C. remota*, with both of which it presents some characters in common: this is the favourite parentage attributed to it. It

may be remarked that the true *C. axillaris* is found along with it.*

Ærsted's Central America.—Perhaps next to the “*Flora Danica*,” the most magnificent work relating to botany, which has been produced of late years in Denmark, is “*L’Amerique Centrale*,” of our associate, Dr A. S. Ærsted, Professor of Botany in the University of Copenhagen, who, between 1846–8, travelled in Costa Rica and Nicaragua. As yet only the first livraison of this magnificent work has been published (1863), chiefly at the cost of the Danish Academy of Sciences. The part now before the public consists of eighteen pages of physical notes on Costa Rica and Nicaragua, a map, two physiognomical views, and eighteen fine plates in copper.

Ærsted's Classification of the Oaks.—In the “*Naturhistoriske Forenings Vidensk. Meddelelser*,” Nr. 1–6 (1866), pp. 1–96, Ærsted has given a new classification of oaks, founded on the venation of leaves, form of style, &c., which in a second paper on *Quercus agrifolia*, published in the same Transactions for 1869, he has modified. Having recently been engaged in a similar line of study, I gladly bear witness to the thoroughness of his work, and its value as a contribution to the history of the Cupuliferæ. As, however, both memoirs have French abstracts, and as I have elsewhere (“*Farmer*” 1870) given a full analysis of his views, and will give a fuller account, illustrated with figures, in a work now in progress, it is not necessary to occupy further space with an abstract here. I give his general conclusion regarding the distribution of the forms in the peculiar flora of California.

He remarks that the holly-leaved oak (*Q. agrifolia*), considered as forming a particular section (*Stenocarpæa*), is specially interesting, because the section is peculiar to California. We also see that the more essential character of the flora of California in general is shown in a marked degree in the order Cupuliferæ. What

* Lange in “*Oversigt over d. K. D. V. Selsk. Forhand.*” o. s. v. f. 1869, No. 3, S. 108. As these notes are passing through the press, Part 48 of the “*Flora Danica*” has arrived. The sixty plates represent seventy-seven plants (thirty-seven phanerogams and forty cryptogams). There are many interesting notes on each species, which I must pass over in this place.

is most singular in that flora is that, while pertaining to a continent, it has all the characters of an insular flora, the Sierra Nevadas forming a wall of demarcation as distinct as if they were an intermediate sea. This is the reason why whole families, and even genera, sub-genera, or particular sections, are represented by species peculiar to California. On the other, the vegetation in that country is of a totally different character from that of the Eastern States, even to the trees; and, above all, the walnuts and magnolias which dominate in the forests east of the Rocky Mountains in great number—both individuals and species—are absolutely wanting in California, and many other, at least twenty-three families, found in the Eastern States, are entirely wanting in the west.

Finally, it may be necessary to remark as characteristic of the Californian flora, that the Asiatic element mingles with it in considerable numbers. The points adverted to above may be summarised:—1. That in California there is not one species of Cupuliferæ common to the Eastern States. 2. That the division of the sub-genus (*Erythrobalanus*), which in these States is most dominant both in individuals and number of species, is only represented by one species in California, while on the contrary we met one peculiar section (*Stenocarpæa*). 3. It is found that the two genera (*Castanopsis* and *Pasania*), which are elsewhere wanting in America, are of the Asiatic flora. While California is essentially separated from the Eastern States, it is, as far as we can see, closely allied in its flora to the contiguous countries to the west of the Rocky Mountains, viz., Oregon to the north, and New Mexico to the south.*

Ørsted's Researches on the Nature and Development of the Cryptogamia.—There are, perhaps, few departments of cryptogamic botany in which accurate observations are more required than in reference to the development of fungi, and the more obscure forms of vegetable life,—many so called species and genera being only stages of polymorphic species of other plants already described under different names. Ørsted has, accordingly, entered on this department of

* Videnskabelige Meddelelser fra den Naturhistoriske Forening i Kjøbenhavn for Aaret 1869.

study with great zeal and success, and has published his researches in various memoirs, most of which are almost unknown to English botanists, though one of them has been lately translated. Among these I may enumerate his *brochure*, entitled "Om Sygdomme hos planterne, som forarsages af Snyltesvampe, navnlig om Rust og Brøddom Midlerne til deres Forebyggelse" (on diseases in plants caused by parasitic fungi, &c.) (1863); an appendix to it, "Om Berberisrust og Græsrust" (1866); and "Bidrag til Svampenes Udviklingshistorie"* all very well illustrated. More recently he has published in a separate little volume, illustrated by many hundreds of figures, a special introduction to the study of cellular plants, under the title of "Lövsporeplanterne en morfologisk og systematisk Udsigt over denne Plantegruppe" (1871). There is hope of this treatise being soon made accessible to the English student in some form. It embraces a synopsis of all his former researches on the development of the cryptogamia, especially fungi.

Ærsted on the Σιλφίον of the Ancients.—Among the numerous other researches of Ærsted is a curious paper, published in the Proceedings of the Academy of Sciences (1869, p. 21), entitled, "Et Bidrag til Tydning af den i Oldtiden under Navn af Silfion meget anvendte og høit skattede, men senere forsvundne Kryderplante;" or, "An Investigation of the Plant well known to the Ancients under the name of *Silphion*, but the existence of which is disputed now-a-days."

The result of his researches on ancient coins, vases, inscriptions, &c., is that the *Silphium* is a plant nearly allied to *Narthex Asafoetida*, which he proposes to call *Narthex Silphium*.†

* Naturhist. Foren. Vidensk. Meddelelser, 1863, pp. 1-20.

† This, as is the case with nearly all the more important papers published in the Danish Scientific Societies' Transactions, is preceded by an abstract in French, which is exceedingly useful. In like manner the Russian works, when not published, as they usually are, in French or German, are preceded by a similar abstract in one or other of these languages. The Swedes follow a similar practice, and I see that some of them are adopting English abstracts instead of French or German. In a recent part of the Stockholm Transactions are several long papers written entirely in English. From recent events this change in literary fashion is likely to be more extensively adopted.

The last research of Ærsted which I will notice is his paper ("Naturhist. Forening Vidensk. Medel., 1869") on a plant with dimorphic flowers, and another with dichogamous flowers,—the one state being found in *Leptostachya parviflora*, an Acanthaceous annual, and the latter in *Calathea grandifolia*, Lindl. (*Phrynium cylindricum*, Rosc.), a Brazilian Scitamineous plant. In the same paper he has given a summary of our knowledge on both subjects.

Addition to the Flora of Brazil.—Brazil never loses its attractions for naturalists, and notwithstanding the numbers who have visited it, each returns laden with riches, botanical or zoological. The Danes, ever foremost in scientific enterprise, have not been behind other nations in contributing to the exploration of the riches of the teeming empire drained by the Amazons. Dr Lund, a distinguished Dane, visited the country some years ago, and made collections of plants and animals which are now either in the Herbarium, Botanic Garden, or Museum of Copenhagen. After his death the present Professor Reinhardt followed up his researches chiefly in regard to the remarkable bone caves; and still more recently, one of the youngest and most rising of the Danish botanists, Dr Eugene Warming, has visited that country, and made very considerable collections. These are now being described either by himself, or by other botanists under his editorship, chiefly in the Transactions of the Natural History Society of Copenhagen, and I have the pleasure of laying before you some of the recent monographs of his plants. These are entitled "Symbolæ ad floram Brasiliæ centralis cognoscendam." The Loganiaceæ and Geraniaceæ are described by Augustus Progel.* Two new species of *Strychnos* (*S. bicolor* and *S. vestita*) are described, beside several varieties of this and other genera, and, as in the other monographs, interesting critical notes are given on the synonyms, habitats, and distribution of the species, which are perhaps not inferior in value to descriptions of new forms.

Professor J. A. Schmidt describes the Scrophulariaceæ and Labiatæ, a rather large collection,† though it embraces

* Videnskabelige Meddelelser fra den Naturhistoriske Forening i Kjøbenhavn, 1869, p. 48.

† Ibid., p. 59.

in it no new species. The Apocynaceæ are catalogued by Johannes Müller (Argoviensis).* He describes a new species of *Plumieria* (*P. Warmingii*), six new species of *Aspidosperma* (*A. pallidiflorum*, *A. Warmingii*, *A. Lagoense*, *A. venosum*, *A. argenteum*, and *A. leucomelanum*), two new species of *Tabernæmontana* (*T. accedens* and *T. Warmingii*), a new species of *Forsteronia* (*F. Lagoensis*), and two species of *Hæmadietyon* (*H. Lagoense* and *H. Warmingii*). Most of Dr Warming's plants were got at Lagoa Santa, hence the trivial name of several of the species.

The Cyperaceæ are commented on by Otto Böckeler.† He describes two new species of *Cyperus* (*C. Glaziovianus* and *C. Warmingii*), two new species of *Heleocharis* (*H. leucocarpa* and *H. chrysocarpa*), five new species of *Scirpus* (*S. Warmingii*, *S. sphærocephalus*, *S. rufescens*, *S. subquadriflorus*, and *S. sphærolepis*), five new species of *Rhynchospora* (*R. Warmingii*, *R. auriculata*, *R. crassipes*, *R. Lundii*, and *R. testacea*), three new species of *Scleria* (*S. Lagoensis*, *S. Warmingiana*, *S. acanthocarpa*), and two species of *Carex* (*C. seticulmis* and *C. polysticha*). Professor C. F. Meissner, of Basle, has described the orders Polygonaceæ, Lauraceæ, and Proteaceæ; and in addition to many varieties he describes *Coccoloba Warmingii*, *Mespilodaphne patens*, *Oreodaphne frondosa*, *O. Warmingii*, *O. tetragona*, *Gymnobalanus reticulatus*, *G. Regnellii*, *Nectandra Warmingii*, *N. glauca* (Warming), *N. Regnellii*, *N. racemifera*, and *Rhopala Warmingii*, as new species.‡ The Ranunculaceæ, Dilleniaceæ, Magnoliaceæ, Winteraceæ, Menispermaceæ, Fumariaceæ, Papaveraceæ, Cruciferae, Capparideæ, Combretaceæ, Oleaceæ, Jasmineæ, Sapotaceæ, and Loranthaceæ, have been all committed to the elaboration of Dr A. W. Eichler, the editor of Martius' "Flora Brasiliensis," and now Professor of Botany at Munich.§ *Davilla Glaziovii*, *Cardamine Fluminensis*, *Cleome scabrella*, *C. Regnellii*, *Terminalia microphylla*, *T. Hylobates*, *Linociera subsessilis*, *Lucuma Warmingii*, *L. catocladantha*, *Chrysophyllum Januariense*, *C. Persicastrum*, and *Phoradendron Warmingii* (parasitic on *Vochysia elliptica*), are the new species expressly noted in these orders.

* Videnskabelige Meddelelser fra den Naturhistoriske Forening i Kjøbenhavn, 1869, p. 99.

† Ibid., p. 125.

‡ Ibid., 1870, p. 197.

§ Ibid., p. 223.

Mr J. G. Baker, of Kew, has given a catalogue of the ferns.* I do not observe that he has noted any new species. Mr Baker is inclined to lump many of the varieties which less experienced pteridologists have erected into species, so that probably, in the hands of a less capable man, some "novelties" might have been added to our already overburdened list of ferns. The collection of Dr Warming comprises ninety-eight well-defined species, all collected at Lagoa Santa.

Dr Ernst Hampe has catalogued the mosses,† and, as might be expected, has found several novelties, viz. :—

Sphagnum sparsum.	Entodon splendidulus.
Hyophila Warmingii.	E. Lindbergii.
H. urceolaris.	Anomodon? Lagoenis.
Leucobryum angustum.	Cyrto-hypnum subgracile.
Trematodon anomalus.	Chryso-hypnum expallesceus.
Dicranum rigidiusculum.	C. Simorhynchum.
D. subeuspidatum.	C. camptorhynchum.
Thysanomitrium æmulans.	C. campaniforme.
Macromitrium Hornschuchii.	Serpo-hypnum sparsifolium.
Bryum polygamum.	S. riparioides.
Prionodon rubiginosus.	Rhyncho-hypnum Warmingii.
Erythrodonium (new genus comprising E. Warmingii).	R. argyroviride.
Pterigynandrum Brasiliense.	R. subsecundum, and
P. squarrosum.	R. substrumiferum.

Dr George de Martens‡ has given a list of the Brazilian Algæ as yet discovered, comprising 11 fresh water species, and 166 marine. Dr Warming's own collection comprises 110 species, and these are especially noted by Otto Nordstedt,§ without, however, adding any new species to the list.

Martens shows that several species of Algæ have crept into the Brazilian flora which have no right to a place there, and ought to be expunged. These are—

Seytosiphon Filum, <i>Lyngb.</i>	Fucus vesiculosus, <i>L.</i>
Haliseris polypodioides, <i>Ag.</i>	nodosus, <i>L.</i>
Sporochnus aculeatus, <i>Ag.</i>	Cystoseira fibrosa, <i>Ag.</i>

* Videnskabelige Meddelelser fra den Naturhistoriske Forening i Kjøbenhavn, 1869, p. 81.

† Ibid., 1870, p. 267.

‡ Ibid., 1870, p. 297.

§ Ibid., 1869.

C. abrotanifolia, β patens, <i>Ag.</i>	Gelidium cartilagineum, <i>Gaillon.</i>
Sargassum vulgare, β tenuifolium, <i>Ag.</i>	Suhria vittata, <i>J. Ag.</i>
S. foliosum, <i>Mert.</i>	Mastocarpus mamillosus, <i>Kg.</i>
Ptilota plumosa, γ Brasilensis, <i>Kg.</i>	Corallopsis Salicornia, <i>Grev.</i> and
Callophyllis laciniata, <i>Kg.</i>	Polysiphonia complanata, <i>Ag.</i>

Several other lists are published, or in preparation, regarding Warming's collections, which will be elaborated in the continuation of Martius' "Flora Brasiliensis," now being continued under the editorship of Professor Eichler. These are noticed in "Flora" (Regensburg), 1870, pp. 113-354.

Warming's Researches on the Inflorescence of the Euphorbia.—Dr Warming has also published (1871), illustrated by eighty-six figures on copper and seventeen on wood, an inaugural thesis on the vexed question of the inflorescence of the Euphorbiaceæ, entitled "Er Koppen hos Vortemælken (Euphorbia, L.) en Blomst eller en Blomsterstand? En organogenetisk morfologisk Undersøgelse (1871)," (The "Cyanthium" of *Euphorbia*, is it a flower, or really an inflorescence?), pp. 111. It has a full abstract in French affixed, so that his conclusions are accessible to botanists ignorant of Danish, though without the aid of the illustrative figures I would fail, in the space at my disposal, to give anything like a clear idea of them. I prefer, therefore, to refer those interested in the subject to the memoir itself.

Observations on the Development of Heat in Philodendron Lundii, Wrmg.—In the "Vidensk. Medd. fra den Naturhistoriske Forening i Kjöbenhavn," for 1869, Eugene Warming describes a new Philodendron from Brazil under that name. He thinks it different from *P. bipinnatifidum*, Schott., and *P. Sellowii*, K., but he thinks it possible after these two species—and particularly the second—are better known, that it may be found to be identical with one or other of them. The phenomena which it presents during flowering are as follows:—

1st. The spathe commences to open in the morning, and is completely open at from five to seven o'clock in the afternoon. The flower lasts from thirty-four to thirty-six hours.

2d. The spadix inclines in front during flowering; it

attains its maximum of extension at five to seven o'clock P.M., and then returns again backwards. During that interval it increases 2 to $2\frac{1}{2}$ centimetres, the extremity pushing itself out of the spathe. It increases most in the middle portion in the part occupied by the staminodia.

3*d.* It develops during flowering a considerable heat in the spadix. The temperature is least in the inferior portion, where the ovaries are found, increases in the upper part occupied by the anthers, but attains its maximum in the central part where are the staminodes.

4*th.* The development of heat embraces two calorific undulations. The first day the greatest temperature is towards six to half-past seven P.M. It then abates and falls to zero* during the night. The next day the calorific movement attains its culminating point at eight to ten A.M., and ceases towards noon. These observations were made on a plant which flowered from the 16th to 17th November 1864.

5*th.* The culminating points of the calorific undulations do not coincide with the time when the temperature of the air is at its maximum, viz., 2.30 P.M. However, there has been observed a certain dependence between them of this kind, that when the temperature of the spadix was more or less high so also was the temperature of the air.

6*th.* The first period of heat presented the greatest intensity. Not only did the temperature last much longer time, but it was more elevated than in the second period. The greatest heat which Dr Warming has observed was $39\frac{1}{2}^{\circ}$ centigrade; the temperature of the air was $23\frac{3}{4}^{\circ}$, showing a difference of $15\frac{3}{4}^{\circ}$. The difference in the part occupied by the staminodes was even more marked, being $18\frac{1}{2}^{\circ}$ C.

7*th.* The anthers did not open and discharge the pollen until the evening of the second day, after which the calorific movement ceased.

8*th.* Simultaneously with the development of heat, the inflorescence gave forth an aromatic odour, which was much stronger when the temperature was more elevated. The spadix is constantly surrounded and occupied by

* By this M. Warming means, of course, the normal temperature of the plant.

swarms of cockchafers (hannetons), bees, and little flies, which certainly assist the fructification.

Among other papers by Warming, I may mention one entitled, "Nogle Bemærkninger om *Scopolia atropoides* og andre *Salaneer*"* (Some Observations on *S. atropoides* and other *Solanaceæ*); and another on the spiral arrangement of the leaves in *Cucurbitaceæ*, in the Natural History Society's Proceedings for 1870 (p. 2)—("Et Par Ord om *Cucurbitaceernes* Slyngraad").

Professor Ørsted has also published some very elaborate researches upon the Morphology of the *Coniferæ*, in the "Naturh. Foren. Vidensk. Meddel., 1869," and in the same work for 1862, some remarks on *Bidens platycephala*, Ørd., both of which I can only refer to.

Professor Lange has also, in addition to his excellent "Handbog" to the Danish Flora, published in the "Botanisk Tidsskrift" for 1869, an appendix to it, containing species and stations, discovered between 1867-8, the date of the last edition of the work mentioned.

Among other papers in late parts of the Botanical Society's Journal, are Branth and Bostrup's "*Lichenes Daniæ*,"† papers by R. Pedersen, Didrichsen, Baagoe, Jensen, Grönlund, Heiberg, Nielsen, Mortensen, and M. T. Lange, and a long one on the sculpture of seeds by Professor Lange, entitled, "Bemærkninger om frøenes form og Skulptur hos beslægtede arter i forskellige slægter" (pp. 230-271, fjerde bind, 1870), with three plates.

Mr Grönlund, the secretary of the Society, has during the summer of 1869 visited Iceland, and made large collections of plants, which I hope will, with the large and authentic collection of plants made by the various Danish botanists who have visited Iceland, go far to supply materials for a new and accurate flora of that interesting, long visited, long known, but little understood island.

I am also led to understand by Professor Lange, that he intends, with the assistance of Dr Berggren of Lund, who visited Greenland this summer, and others, to expand his list of Greenland plants in "*Rinks Grönland*" into a more complete synopsis of the Greenland Flora. Until then I

* Botanisk Tidsskrift tredje Bind, 1869, p. 39.

† Also published separately, pp. 158, with two plates.

have delayed preparing the Geographical Summary of the Phytography of that country, which I have for some time meditated. A publishing botanist may serve science in two ways:—1st, by adding to our stock of knowledge, and thereby appealing to the critical but limited audience of his fellow-botanists; or, 2d, by popularising the knowledge already obtained to a wider if less learned circle of readers, and thereby adding to the cultivation of our science. Considering that obscurity of style and unintelligibility of language is not a mark of true science, Mr A. Rosstrup, a learned cryptogamist, has published several works in the Danish language with a view to popularise the science. Among such may be mentioned his “Veiledning i den danske Flora,” a popular introduction to a study of the Danish Flora, now in a third edition; his “Blomsterløse Planter,” a similar introduction to the cryptogamia of Denmark; and his “Afbildning og Beskrivelse af De Vigtigste Fodergræsser,” an introduction to the study of the common pasture grasses, well illustrated, and sold at sums surprisingly small.

II. *On the Phyllotaxis of Lepidodendron.* By Professor ALEXANDER DICKSON.

The fossil remains of *Lepidodendrons* are often so compressed that it is difficult, or even impossible, to trace the secondary spirals round the circumference of the stem. In those cases, however, where there is comparatively little compression, *i.e.*, where the stem is more or less cylindrical, the determination of the phyllotaxis is easy. Of such stems I have examined fifteen specimens, which may be classed according to the series of spirals to which the leaf arrangement belongs:—

A. Ordinary series, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{2}{5}$, $\frac{3}{8}$, $\frac{5}{13}$, &c.

(a.) Single spirals (D turning to the right, S to the left).

(1.) *Lepidodendron* (Possil Ironstone series). Stem about $\frac{3}{4}$ of an inch in diameter. Secondary spirals 8 D, 13 S, 21 D. Divergence = $\frac{1}{3}\frac{3}{4}$ (or possibly $\frac{2}{5}\frac{1}{5}$).

(2.) *Lepidodendron* (Knightswood, near Glasgow, Mr J. Young). Stem about $1\frac{1}{2}$ inch in diameter. Secondary spirals 13 D, 21 S, 34 D. Divergence = $\frac{2}{5}\frac{1}{5}$