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BULLETIN

OF THE

TORREY BOTANICAL CLUB.

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GENERAL INDEX.

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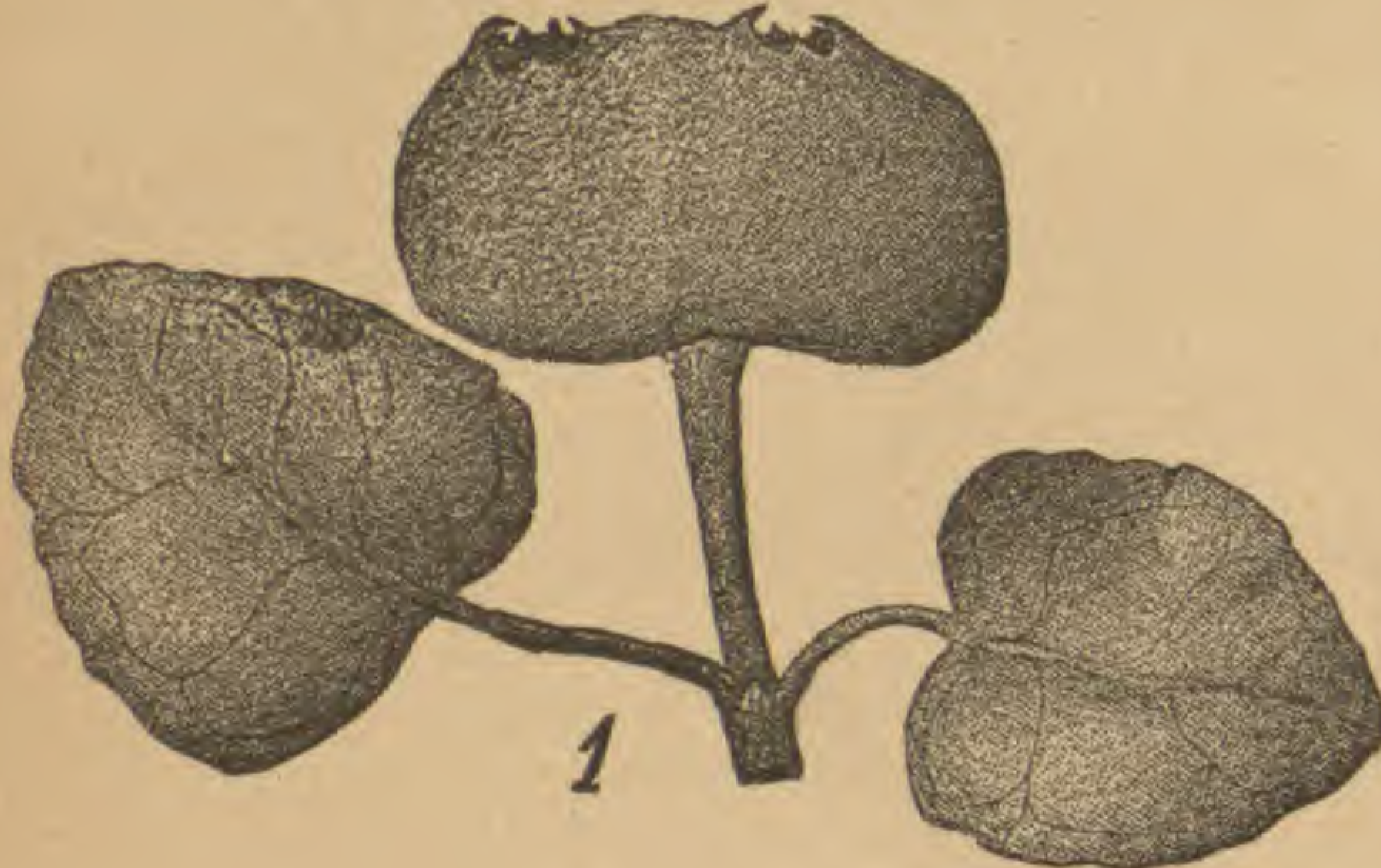

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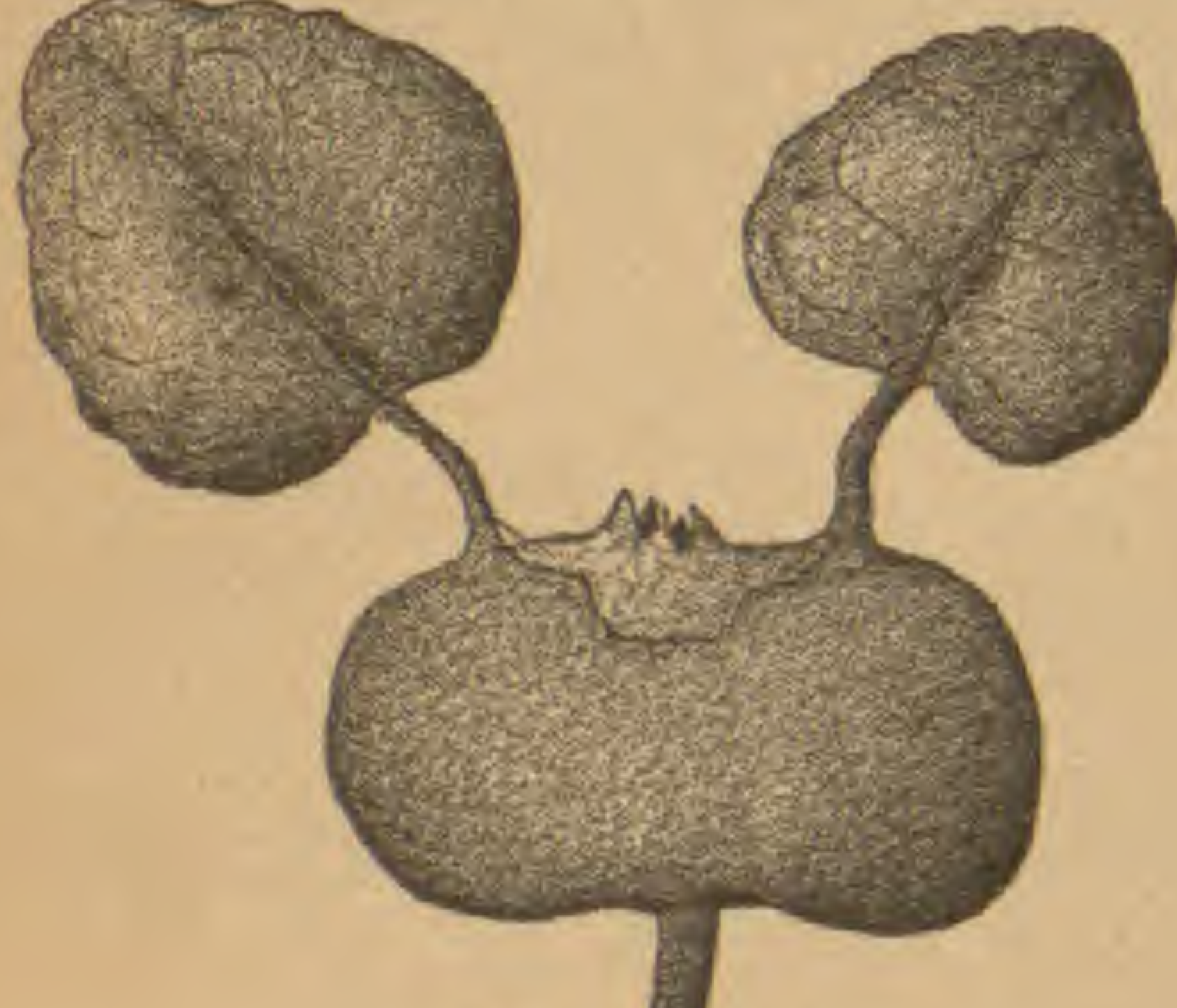

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W. R Dudley, del.

BULLETIN

OF THE

TORREY BOTANICAL CLUB.

Vol. X.] New York, January, 1883. [**No. 1.**

Leafy Berries in Mitchella repens.

By William R. Dudley.

(Plate xxvi.)

Several suggestive variations, more or less teratological, have come under the writer's observations during a few years past, and one is here offered to the readers of the Bulletin which seems to follow a line of departure apparently of rare occurrence. It is the adnation, more or less complete, occurring between the berries and the true leaves of *Mitchella repens*, L.

By reference to the accompanying plate, it will be seen that a series is made out showing all conditions, from the partial adnation of one leaf-petiole (Fig. 2) to the complete envelopment of the berry by the expanded bases of both leaf-petioles (Fig. 5). There were twelve or fifteen excellent specimens in the writer's possession at the time the drawings were made (Nov., 1881), representing all grades of this union, between those shown in Figs. 2 and 5. There is, therefore, no mistake as to the true origin of these foliar organs.

The drawings need little explanation; but there are a few characters not readily made out from a black and white drawing. First, the blades of these adnate leaves were, in all cases, of the usual green color, or only a little paler. Second, in Fig. 2, the leaf on the left seems to arise from the side of the berry; but, from the *apparent* base of the petiole, the true base is plainly seen to expand, forming a broad convex covering, clasping and organically combined with the lower part of the berry itself.

The clasping base in this case, and in those in Figs. 3, 4 and 5, has always the ordinary scarlet color of the berry, and, in every way simulates its surface. Fven the base of the petiole of the leaf on the right in Fig. 2 was tinged with red on account of its proximity to the red fruit. Third, it is well known that the *Mitchella* flowers are usually twin, producing two corollas, etc., but only one berry, which is inferior. The two calyx-scars are seen in Fig. 2, but the berry is so distorted, apparently by the diversion of the sap-currents into the detached leaf, that the calyx on the right is much below its usual position. Again, in Fig. 5, we find only one calyx, possessing, however, two styles, as will be seen in the vertical section of the same (Fig. 6).

We have been led to present this freak of the partridge-berry somewhat in detail, not simply because we believed there was no published record of its occurrence in this species, but chiefly for the following reasons: In the various teratological works and papers within reach, no example of a precisely similar malformation is given of any plant. True, among the host of recent observers, it would be strange if similar cases had not been noticed, and probably records of such exist, but they cannot possibly be of common occurrence. Again, although the origin of these foliar members is evident, the meaning of the adnation is not clear; as the meaning of the reversion of the parts of a flower to leaves is clear, in the light of our accepted theory of metamorphosis.

In attempting to find the cause of the union between parts so rarely found organically united, a few facts and features were seen to stand out prominently, and led the writer to adopt the view (not a conclusive one, however,) presented later on. These facts serially stated are:

(1). The true peduncle has entirely disappeared, and those parts of the petioles coming in direct contact with the berry have become a part of it, and have readily assumed its color, texture and general aspect.

(2). This union has not interfered with the fruitfulness or development of the ovary, the seeds being present, and the size of the berry not being under the average.

(3). The flowers become consolidated, as in Fig. 5, and an increase or suppression of parts occurs in such cases without interfering with the development of the berry.

(4). In Figs. 3 and 4, where the twin corollas and calyces are distinct, there will be observed, half-way between them, a small fleshy point or protuberance, as if some extra-floral part, possibly a receptacle-like axis, had sought to show itself.

Taking these facts together, they seem to fit one hypothesis better than any other. In consideration of these points we may remark that it is stated, on good authority (see Prof. Morren's papers and Masters's Veg. Teratology), that floral monsters are usually sterile, not only on account of the suppression of stamens or carpels, but from the general disorganizing influence of such malformations. But, as we have already stated, fertility does not seem to be interfered with in our leafy partridge-berries, not even in the cases where there is a consolidation of both flowers. This condition of things has appeared to the writer to point to the conclusion that these changes are not far out of the line of the general tendency in the plant's life; and that the adnation seen may not be between as widely separated members as at first would appear. Furthermore, the first point mentioned, viz., the ready union of leaf-petioles with the berry proper, and their simulation of it, seems to indicate a closer relationship between its external portion and the leaves than we believe to exist between the leaves and the calyx. We have supposed, therefore, that a fleshy expansion of the receptacle, or an hypanthium, such as is supposed by many to exist in the lower part of the pear and some other inferior ovaries, might be present. With such a structure we could more readily imagine the union of the leaves to take place than with the calyx. At the same time, the essential organs would be less injuriously affected by this abnormal union. In brief, the changes would be between parts more or less extra-floral, and therefore not likely to seriously affect the fertility of the essential organs.

Finally, it would not be difficult to see how the twin flowers might be consolidated through the suppression of portions of this hypanthium; especially if we suppose the protuberance mentioned to be a continuation of it existing at the sides and between the two ovaries above, though not necessarily passing between and separating them internally. It is doubtful, however, whether this last point is worth much except as an attempt to explain the presence of these curious fleshy points.

In regard to Fig. 7, it was the result of a search for additional proof that the supposed petiolar expansions were really such, and superimposed over the parts commonly present. The cross-section was made above the middle of the berry, and revealed, in this one case, indistinct bands of narrow cells alternating with roundish ones, and corresponding in number to the wall of the carpel, the calyx and the epidermis of the fleshy petiolar portion. In other and similar sections no differentiations were found.

The section shown in Fig. 7, even allowing that the bands seen are to be interpreted as above, was made at such a height on the berry that it could be expected to throw little light, one way or the other, on the presence of a fleshy axis below, such as has been suggested in this paper. Subsequent sections made through the middle and lower portions of other berries revealed no differences in the hypodermal tissue that were at all clear.

All the specimens of the leafy berries from which the above studies were made were from this vicinity—the valley of Cayuga Lake. The larger number were collected in November, 1881. One (that from which Figs. 5 and 6 were taken) was found by Hon. H. B. Lord, along Cascadilla Creek, near Ithaca. The origin of the leafy appendages was not at all clear until a few days later, when by good fortune the writer found, about six miles from the first station, specimens representing all stages of the adnation. He noticed a single similar specimen on Cascadilla Creek in October, 1882.

The partridge-berry seems to be given to interesting variations. Its dimorphism has long been known. More recently, white berries have been detected at Canaan, Conn., and Moravia, N. Y.; and Dr. Atwood, the discoverer of the latter station, states that they appear on the same plants from year to year. Variations in the numerical plan of the flower, as well as the union of the two flowers, have been noticed frequently. Lastly, we note the adnation of the petioles of the upper pair of leaves with the fruit.

A word in regard to the common names. *Mitchella* seems to be pretty generally known as partridge-berry, especially by people who have studied botany. In certain portions of New England and Pennsylvania, however, it is called squaw-plum and squaw-berry, a name certainly indigenous, one might almost say aboriginal.

Description of Plate XXVI.—*Mitchella repens*, L., Fig. 1. Berry and upper pair of leaves, normal. Figs. 2, 3 and 4. Berries with leaf-petioles more or less adnate and fleshy. Fig. 5. Fleshy petioles completely enveloping the berry. Fig. 6. Vertical section of berry shown in Fig. 5. Fig. 7. Cell-structure of upper part of berry shown in Fig. 5. *a*, epidermis of expanded petiole; *b*, fleshy portion of petiole; *a'* and *b'*, fleshy calyx; *c* and *d*, carpellary portion.

1 – Miss Kurtz, York, Pa. (Bot. Gaz., IX, 190).
B. Vaughan, Rudolph, Wis., where they reappear each year on a 2 acre area, as he ~~tells~~ me. 1883.
Meehan. (Proc. Phil. Ac. 1876, p. 383 – Bot. Gaz., IX, 207.)

Fern Notes. VI.

By George E. Davenport.

Aspidium Filix-mas, Swz., *in California.*—In the Bulletin for February, 1882, I announced the discovery of this species on Mt. Wrightson, in Arizona, by Mr. Pringle, and expressed the conviction that its discovery so near to California would stimulate the botanists of that State in their efforts to find it, as its presence there was more than ever probable. I now have the pleasure of announcing its discovery in the Halcomb Valley, in the San Bernardino Mts., at an altitude of about 9,000 feet, on the 1st of August, 1882, by those keen-eyed botanists, the brothers Parish.

This discovery is especially interesting from the fact that all previously reported discoveries of the species in California have apparently come from the very strong resemblance which some forms of the *A. argutum* of Kaulfuss bear to it; but, whatever doubts may exist in regard to other specimens, there seems to be no question as to the identity of the plant sent by Mr. Parish. The characters are unmistakably those of *Filix-mas* as distinguished from those of *argutum.*

These characters have previously been pointed out (*l. c.*), but it may be well to state here, in addition, that I have not found more than 5 fibro-vascular bundles in the stipes in my own specimens of *Filix-mas*, so far as I have examined them, although the number may reach 7 in others, as stated in Ferns of North America.

In my specimens from Canada (Mrs. Roy), Colorado (Brandegee and others), Dakota (Walter Jenney), and Arizona (Mr. Pringle), the number is uniformly 5, and there are but 5 in my specimens from England. In *argutum* I have found from 3 to 5, according to the size of the fronds, and probably the correct number for *Filix-mas*, will be from 5 to 7, according to the size of the fronds; but, since the same number (5) occurs in both species, and in specimens of a nearly corresponding size, it is evident that this character cannot be relied upon for positive determination.

The plant which I have received from Mr. Parish is small, heavily fruited—the fructification descending to the lowest pinnæ—and, on account of its deeply serrated margins, belongs rather to the form described as var. *incisum* than to the typical European form. I have also received from Mr. W. N. Suksdorf the upper portion of a large frond, apparently belonging to *A. Filix-mas*, which was collected by him in Washington Territory in July, 1882. The range of this species in the United States may now be given as extending from Canada (Owen Sound), or Newfoundland, according to Kunze (who stated positively that he had "seen true *Filix-mas* from Newfoundland"), to Washington Territory, in the north-west, by way of Northern Michigan and Dakota, and to Southern California, in the south-west, through Colorado and Arizona. Its presence, therefore, in intermediate stations is to be expected.

Botrychium Virginianum, Swz., var. *gracile*, Hook. & Grev. (*B. gracile*, Pursh.)—Mr. Suksdorf sends from Washington Territory a specimen of this little fern, which Pursh (Fl. Amer. Sept. Vol. ii.,

p. 656) originally described, and which some still regard as a distinct species.

In drawing up his characters, Pursh seems to have relied chiefly on the presence or absence of pubescence as the distinguishing features between his plant and *B. Virginianum.* But an examination of any considerable number of specimens will show that pubescence is sometimes present in *gracile* and wanting in *Virginianum*, so that this character was not well founded. The other characteristics are only such as might be expected in plants in different states of development.

The plant first appears as a variety of *B. Virginianum* in Hooker's Botanical Miscellany (Vol. iii., p. 223, 1833), where it was published as such by Hooker and Greville from specimens communicated by Dr. Torrey, who (*vide* same authorities, *l. c.*) regarded it merely as a variety. Later (1843), Dr. Torrey so published it in his Flora of New York, and, according to Milde (Botrychiorum Monographia), in 1847 Presl also published it as a variety in the Supplement to his Pteridographiæ. This disposition of the plant was afterwards confirmed by Dr. Milde (*l. c.*), and is now very generally accepted.

The probabilities are, however, that this form is rather the *young state* of *B. Virginianum* than a true variety. Clarence Lown writes me that with him it is not uncommon, but that it is impossible to tell where the so-called variety ends and *Virginianum* begins ; and such is the testimony of the specimens which have passed through my hands. It is more than probable that if we should trace the development of *B. Virginianum* from the prothallus upward, year after year, we would find the young plant at first smooth, and with an ever increasing pubescence with age. We could thus account for the infrequency of pubescence in young plants, some retaining their smoothness longer than others.

Mr. Suksdorf's specimen is typical of Pursh's plant. It is everywhere smooth, and the bud itself is wholly free from any trace of pubescence.

In the vernation of mature specimens of *B. Virginianum* the bud is invariably clothed with a hairy covering ; but, in these younger plants, the bud is but scantily clothed at the most, or is wholly smooth (as in Mr. Suksdorf's specimen)—a circumstance which does not appear to have been noticed by any one heretofore (not even by Milde, who more than once distinctly notices the hairiness of the bud in *B. Virginianum*), and which was overlooked by myself in my Notes on the Vernation in Botrychia in the TORREY BULLETIN for January, 1878 (Vol. vi., p. 193). Probably a truer diagnosis of the vernation in this species than heretofore published will be: bud smooth at first (in the youngest state), finally pubescent, the hairy covering of the mature bud having only gradually been taken on with age.

This, possibly, may also be true of the vernation in *B. ternatum*, where the bud is even more densely clothed with hairiness ; but I have not as yet seen, even in my smallest specimens, a bud of that species wholly free from pubescence. Its vernation, therefore, may remain as previously described (*l. c.*).

Asplenium Bradleyi, D. C. Eaton, *in New York State.*—The only station heretofore recorded (Ferns of North America, Vol. i., p. 40) for this rare fern in New York State is that of the hill at Newburgh, where Prof. Eaton found it in 1864. This station, there is every reason to believe, has since been destroyed. Mr. Peck, in a letter from which I am permitted to quote, says that he searched over and around the hill for nearly a whole day without finding any of this fern. The upper part of the hill, he adds, "had recently been cleared, and I suspect the station there is destroyed." New York botanists will therefore be pleased to learn that a new station has been discovered in the Shawangunk Mts. by Clarence Lown, of Poughkeepsie, who visited the mountains on the 21st of September, 1882, for the purpose of obtaining some *A. montanum*, and unexpectedly came upon *A. Bradleyi* growing near by.

Mr. Lown, who has already partially explored these mountains with good results, writes that he now has "stronger hopes than ever of finding *Asplenium pinnatifidum* in this mountain range." The consummation of these hopes may reasonably be expected.

Mr. Lown reports *A. Bradleyi* as apparently very scarce, and this appears to be the case in all of its other known localities, a fact which should be taken into serious consideration by all botanists who may at any time be fortunate enough to find it, and for which reason its exact locality is not more definitely given here.

Abnormal Asplenium montanum.—Mr. Lown sends some very curiously forked fronds of this species, also collected in the Shawangunk Mts., where, he states, forked fronds are not uncommon. I have noticed the same disposition to fork in specimens from other localities, and this little fern really seems to take delight in such freaks.

In most of Mr. Lown's specimens, the *stipes* forks near the base into two distinct stalks, each bearing a perfect lamina. In one instance, one of these double laminæ again becomes forked just above the first pair of pinnæ, dividing into two and giving to the whole the appearance of being three-fronded. In the commonly accepted mode of designation, this three-branched frond might be considered as three fronds with their stalks united at the base, but morphologically it can only be regarded as one. In other instances the forking occurs near the top, the main rachis forking and thus forming a bifid apex. This last manner of forking is frequently met with in nearly all ferns, and is especially characteristic of *Dicksonia pilosiuscula*, in which species it is often carried to such an extent that every pinna on the frond becomes bifid at the apex.

Abnormal Osmunda regalis.—Mrs. C. N. S. Horner, of Georgetown, Mass., has given me some interesting specimens of this species in which the fertile and sterile portions are strangely mixed up, the fertile panicle proper being partly sterile (in one specimen being crowned with a sterile apex) and the upper part of the sterile portion proper being fruited in a variety of ways. Some of the upper pinnules are crenately incised, others are fertile on one side, and some, strongly auricled at the base, are sterile for ⅜ or ½ an inch, and are then abruptly contracted into a narrow, double row of capsules for an inch or so, when they as abruptly expand into a broad, sterile apex. Odd freaks in this species are not uncommon. Prof. Guttenberg and others have sent me specimens of a somewhat similar character before, and many of diverse character have come under my own observation.

Abnormal Botrychium Virginianum.—Forkings of the fertile branch in this species have previously been recorded by others, as well as myself, but the only instance known to me where the fertile panicle is partly transformed into a sterile one occurs in my only California specimen—one of three specimens collected in 1873 by F. A. Miller during an excursion to the Sierras from San Francisco for seeds and plants, and, I may add, the only specimen known to me as ever coming from California. In this specimen, the branches of the fertile panicle are alternately sterile and fertile all the way up. The frond itself is of good size and there is scarcely a trace of pubescence on it ; but, as the common stalk was broken off some distance from the base, it is impossible to describe its characters below.

New North American Fungi.

By Geo. Winter.

Sorosporium Ellisii.—Glomeruli forma magnitudineque varia, mox subsphæroidei, mox oblongi, opaci, e sporis numerosis compositi, 35–70 μ diam. Sporæ rotundato-polygoniæ, episporio granuloso, fuscæ dissolventes, 12–16μ longæ, 8–12μ crassæ vel 12μ diam.

Ad *Andropogonem Virginicam*, Newfield, New Jersey, et ad *Aristidam dichotomam,* Chester Co., Pa. Legit Wm. Trimble.

Ustilago Vilfæ.—Massa sporarum fusconigra, inflorescentiam totam implectens et destruens (fere more *Ustilaginis destruentis*). Sporæ subrotundæ vel parum elongatæ et oblongatæ, amœne fuscæ, episporio granuloso, 12–16μ diam. vel usque 19μ longæ.

Ad *Vilfam vaginæfloram.* Chester Co., Pa. Legit Dr. Martin.

Gonatobotrys maculicola.—Flocci solitarii, sparsi, in macula subrotunda angulataque fusca, fusco-nigro cincta, exarida, hypophylli, longi, erecti, flexuosi, fusci, basi parum bulbosi, septati, ca. 8–12μ crassi. Sporidia in nodulis parum prominentibus sessilia, elliptica, utrinque acutiuscula, fusca, 7–11μ longa, 5–7μ crassa.

Ad *Hamamelidis Virginicæ* folia languida. Bethlehem, Pa. Legit E. A. Rau.

Hottingen bei Zurich.

Notes on Grasses.—*Trichloris*, Fournier.—It was a mistake of mine to quote Fournier as the authority for *Trichloris Blanchardiana* (see No. 54 of the List of Pringle's Grasses, Bulletin, Vol. ix., p. 146). In fact, under the circumstances, it would have been better to omit the specific name altogether. Fournier, in the Gramineæ of the Mexicanarum Plantarum Enumeratio, not yet published, has two species of *Trichloris, T. fasciculata,* from Mexico, and *T. pluriflora*, from Texas (= No. 1,430 Berlandier). Without descriptions or specimens for comparison, I cannot say which name belongs to Pringle's grass. Mr. Bentham, in a recent letter, states that both the species above quoted are evidently very near the two extra-tropical South American ones, *Leptochloris*, Munro, and *Chloridiopsis*, J. Gay, but require much closer examination to establish their specific distinctions.

I am confident that I have both of Fournier's species from within our limits—one from Laredo, Texas, communicated by Mr. Isaac Burk, and the other the grass collected by Mr. Pringle.

North American Genera of Grasses. (See BULLETIN, Vol. ix., p. 134).—*Lepturus*, Br., is represented by *L. Bolanderi*, Thurber, No. 4,669 Bolander, collected in the Russian River Valley, California. *L. incurvatus*, Trin., has been gathered by Mr. Burk and others from the ballast grounds near Philadelphia. *L. paniculatus*, Nutt., is *Schedonnardus Texanus*, Steud., *Lepturus* stands between *Agropyrum* and *Hordeum*. In the Gramineæ of the Genera Plantarum, now in press, I am advised by Mr. Bentham that *Isachne* is brought into Paniceæ between *Beckmannia* and *Panicum*. *Polypogon* follows *Agrostis*, and *Alopecurus* is placed in Phalarideæ.

Arundo, Lin., which immediately precedes *Phragmites*, should be included in my list of North American genera. Prof. G. C. Nealley, of the State College of Texas, has recently sent me specimens of *A. Donax*, L., collected in his vicinity, where it has probably been introduced, as the species is regarded as native only of the Old World.

Girard College, Philadelphia. F. LAMSON SCRIBNER.

Grasses Collected by Mr. Pringle.—Mr. C. G. Pringle sends an interesting lot of grasses which he has collected during the past season on the Pacific slope. These specimens, numbering about fifty species, fully sustain Mr. Pringle's character as a collector, for it is well known that no one makes better specimens or sends out more complete samples. Among the more desirable or interesting species in this lot, the following may be mentioned:

Phalaris amethystina, Trin.; *Hierochloa macrophylla*, Thurb.; *Stipa speciosa*, Trin. & Rupr.; *Epicampes rigens*, Benth.; *Gastridium australe*, P.B.; *Deyeuxia æquivalvis*, Benth. (*Agrostis*, Trin.); *Deyeuxia Bolanderi*, (Thurb.); *D. deschampsoides*, (Trin.), a species very distinct from Mr. Buckley's *Calamagrostis rubescens*, as will be seen by Mr. Pringle's specimens of the latter species; *Deyeuxia Aleutica*, (Trin.); *Aira caryophyllea*, L.; *Monanthochloë littoralis*, Engelman; *Lamarckia aurea*, Mœnch.; *Melica stricta*, Boland.; *Agropyrum caninum*, Reichb., a remarkable mountain form, appearing like a distinct species; and *Hordeum murinum*, L.

There are several species of *Agrostis* which have not before appeared in our western collections, and which are as yet undetermined. *Poa Pringlii* and *Diplachne viscida*, two new species discovered last year (1881), were collected in quantity in their original stations the past season.

Girard College, Philadelphia. F. LAMSON SCRIBNER.

Notes from Chemung County, N. Y.—On the 20th of July, 1882, I visited Mutton Hill Pond, Apalachin, Tioga County, N. Y., in search of *Polemonium cæruleum*, L., a station for it given me by C. D. Fretz, M.D. I failed to find it, want of time preventing as complete a search as I should have liked. The locality is peculiar, a pond, surrounded by a bog, elevated, I should think, from 300 to 500 feet above the river valley and in a depression; south and west sides wooded, the others clear, and no visible source to keep up the water supply. However, I was rewarded for my visit, as I found *Brasenia peltata*, Pursh., *Pogonia ophioglossoides*, Nutt., *Carex comosa*, Boott., *Potentilla palustris*, Scop., in flower, and two or three plants as yet undetermined. In May, I found *Jeffersonia diphylla*, Pers., and *Phlox divaricata*, L., near Dansville, Livingston County; *Cassandra calyculata*, Don., near Wayland; *Dentaria laciniata*, Muhl., and *Allium tricoccum*, Ait., at Cohocton, Steuben County. *Adlumia cirrhosa*, Raf., grows on the hills south of Addison, Steuben County. For this county, I can report the following as new finds: *Cardamine rhomboidea*, DC., very scarce; *Viola stricta*, Ait., one station on bank of Chemung River; *Vitis riparia*, Michx.; *Hibiscus Trionum*, L., escaped; *Lespedeza Stuvei*, Nutt.(?); *Ribes rubrum*, L.; *Trifolium agrarium*, L.; *Sanicula Canadensis*, L.; *Solidago Muhlenbergii*, T. & G.; *Polymnia Canadensis*, L., Chemung Narrows, rare; *Cichorium Intybus*, L., streets, N. Elmira City; *Mulgedium acuminatum*, DC.; *Pycnanthemum lanceolatum*, Pursh., Newtown Cr. Horseheads; *Fraxinus pubescens*, Lam., Chemung River; *Phlox divaricata*, L., one or two specimens, rare, and the most easterly station in the State known to me; *Scutellaria galericulata*, L., bank of Chemung River; *Quercus macrocarpa*, Michx., rare along the Chemung; *Acorus Calamus*, L., rare; *Sagittaria heterophylla*, Pursh, "Buttonwoods," Elmira, only station known to me; *Allium Canadense*, Kalm., bank of Chemung, Ashland township, with *Viola stricta*, Ait.; and *Carex pallescens*, L.

I have over six hundred duplicates, from this county mostly, and would be glad to exchange with other botanists, or sell sets if desired.

Elmira, N. Y. THOS. F. LUCY.

Notes.—*Juncus acuminatus*, Michx., var. *legitimus*, Gray.—The form with proliferous heads has been very common during the past season. More specimens were found in this condition than otherwise, which I believe to be something unusual. These heads are almost invariably inhabited by large numbers of a species of aphis, which seems to find something peculiarly attractive there.

Elymus Canadensis, L.—Specimens of this also were found with proliferous heads.

Osmunda cinnamomea, L.—In the month of September I found in a meadow, from which a crop of hay had been removed early in the season, a large number of the sterile fronds of this fern, with the pinnæ contracted to a greater or less degree and bearing sori, but still distinctly retaining their foliaceous character. This condition seems to be something akin to the var. *obtusilobata* of *Onoclea sensibilis*, L. Its appearance, I have no doubt, is explained by the cutting off of the frond during its period of most vigorous growth, and the consequent shock to the vitality of the plant.

Raphanus Raphanistrum, L.—A double seed-pod was found, with each of the divisions perfect and filled with seeds, but united at the base and having a common stalk.

"*Twin" apples* were unusually numerous during the past autumn. These offer excellent examples of syncarpy, or the adhesion of fruits.

Houghton Farm, Mountainville, N. Y. W. E. STONE.

Botanical Notes.

The Lignified Snake from Brazil.—In a brief note in the December number of the BULLETIN, Dr. Gray, referring to an illustrated account of a lignified snake published in our November number, expressed an opinion that there was no snake in the case, and stated that, at the moment of writing, he had not time to offer the two credible explanations of the phenomenon that had suggested themselves to him. In the current number of the *American Journal of Science* we find these two explanations given, and we quote them herewith:

"Through the kindness of the Brazilian Minister," says, Dr. Gray, "we have seen and examined the original specimen, and have been presented with an electrotype of it. It is a great curiosity. The resemblance to a snake is wonderfully close, although 'the scales and cephalic plates,' which M. Olivier identifies with those of a particular Brazilian snake, exist only in a lively imagination. The snake-like surface is covered by delicate meshes of woody fibres; and here and there particular fibres of woody threads can be traced from the body to the woody surface. The adopted explanation requires us to suppose that a snake had forced his way between the bark and the wood of a living tree in a position exactly under a grub or a larva; had perished there when within half an inch of its prey; was somehow preserved from decay, even to the eye-sockets and the markings of the skin, until a woody growth had formed, the elements of which replaced the whole superficial structure of the animal—until the animal was lignified!

"Two other and more probable explanations have suggested themselves. One is that the snake-like body is of the nature of a root, an aerial root, like those of a *Clusia* or a *Ficus*, which was making its way between bark and wood; and that the supposed larva is an incipient root of the same kind. The other supposes that the sinuous course is the track of a wood-eating larva or some kind of insect, the burrowing of which had not destroyed the overlying liber: consequently the new growth filling the space (except at certain points) has naturally assumed the likeness of a snake. This explanation was suggested by Professor Wadsworth, of Cambridge, examining the specimen along with the writer; and it is to be preferred. Still, that head and neck should be so well outlined, and the former so well represent a pair of orbits, were surely most wonderful. But a close inspection of the electrotype showed that there had been some cutting away at the right side of the neck, and that the narrowing there was in part factitious; and less decisive indications suggested that other outlines had been touched up. The subsequent inspection of the original confirmed this; and likewise enlightened us about the eyes. For the left orbit was found to occur, not in a woody structure, like that of the right side, but in a dark material having the appearance of pitch or cement of some sort.

"We may rest assured that whatever there may be which is factitious in this most curious *lusus naturæ* originated before it came into the hands of His Excellency the Brazilian Minister at Washington. If these marks were not discerned by any of the Parisian *savants*—which we are slow to believe—they are less likely to have been noticed by Señor Lopez Netto, whose honor and good faith are incontestible."

The character of the object might, it seems to us, have been at once determined by making a transverse section to ascertain whether the serpentine form contained within it a bony frame-work, which, in the situation where the alleged lignification was detected, would naturally have proved imperishable.

Action of Poisons on the Petals of Flowers.—A. Anthony Nesbit, F.C.S., states in the *Journal of Science* that he has made some experiments on the action of various substances on the life of flowers, and for this purpose selected some of the best known alkaloids, viz., strychnine, solanine, digitaline, quinidine, atropine, quinine, cinchonine, picrotoxine, aconitine, brucine and morphine, using one-quarter per cent. and one per cent. solutions. The alkaloid of tobacco being very difficult to obtain pure, owing to its rapid oxidation, 5 per cent. and 20 per cent. solutions of tobacco (bird's eye) were used in its stead. The flower chosen for experiment was the *Narcissus*, and the results showed that there was here a wide field for long and patient investigation.

Of all the twelve solutions, tobacco proved, in a very marked manner, to be most destructive to the life of the flower of the *Narcissus;* the remaining eleven poisons, though but slowly injurious, nevertheless in some instances showed marked difference of effect, or, it may be said, symptom. Thus strychnine, next in poisonous power to tobacco, drew the petals upward, and made them dry and brittle, symptoms also exhibited by solanine poisoning, while quinidine and several other alkaloids rendered the petals limp and rotten. Morphine, one of the least poisonous (to the *Narcissus*) of the alkaloids experimented with, without destroying the flower, curiously enough imparted to the petals a flaccidity resembling that of the petals of the poppy.

The Fungi of Cincinnati.—The Catalogue of Plants collected in the vicinity of Cincinnati, Ohio, during the years 1834–44, by Thomas G. Lea (Cincinnati, 1849) contains a list of fungi, with notes on the species and descriptions of many new ones by Rev. M. J. Berkeley. The Cincinnati Society of Natural History has rendered a great service to the many students of mycology in this country by republishing, in the current number of its *Journal* (Vol. v., No. 4), all that pertains to fungi in the above-named catalogue, which has long been out of print and is now inaccesssible. We are indebted for a copy of the paper in pamphlet form to Mr. Davis L. James, through whose instrumentality, we presume, the Society was induced to reproduce it.

Proceedings of the Torrey Botanical Club.—At a meeting of the Club, held at Columbia College Tuesday evening, December 12th, Prof. E. H. Day, in the absence of the presiding officers, occupied the chair.

The Librarian reported on the books and periodicals received for the library since the last meeting.

Mr. B. B. Chamberlin exhibited a specimen of *Rubus* with a fasciated stalk.

Acrostichum aureum Growing by Fresh Water.—Prof. Day exhibited specimens of *Acrostichum aureum*, L., collected by him in Cuba, and one of *Aneimia adiantifolia*, Sw., from New Providence, W.I. The specimens of *Aneimia* had four fertile segments on the frond.

With regard to the *Acrostichum*, Prof. Day remarked that Prof. Eaton, in Ferns of North America (Vol. ii., p. 95), writes of this species as "being perhaps the only known fern which grows only within the influence of salt water;" and he quotes Dr. Garber as corroborating this statement in regard to the localities to which it is restricted in Florida. Several authorities referred to agree with this view; though J. Smith, in the Historia Filicum (p. 146), says it is found "in most fern regions throughout the tropics of both hemispheres." The specimens exhibited were found growing luxuriantly by the side of a fresh-water stream, several miles inland, at an elevation of at least one hundred to one hundred and fifty feet above the sea and on the southern side of a range of hills, the side away from the ocean, where there was no suspicion of brackish water or of marine influence. It is thus an interesting question whether this fern had migrated up the stream, or whether it had survived the geological change which had elevated the range of limestone hills on which it occurs, gradually adapting itself to the change of soil and conditions.

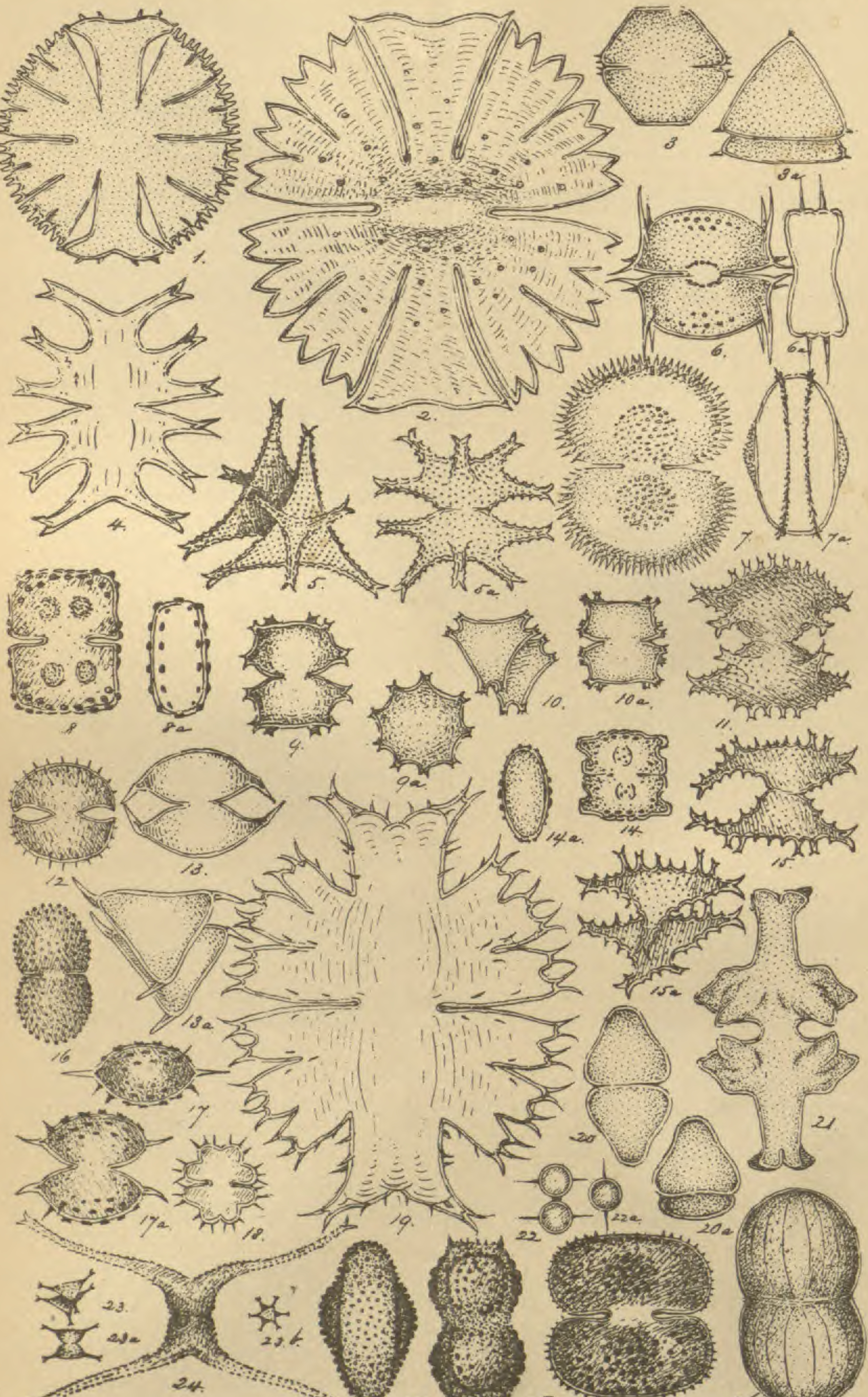
Mr. Britton called attention to a specimen of the same species, in the Torrey Herbarium, from Pine Key, Florida, collected by the late C. F. Austin, which is labelled "fresh-water pools." This, however, does not necessarily indicate that it was out of reach of marine influence.

Mr. Britton reported that he had observed an instance in New Jersey where *Andromeda Mariana*, L., had flowered a second time during the season.

Mr. Hollick read a paper on the Flora of Richmond County, N. Y., giving a list of the additions that had been made thereto, and of the new stations that had been observed during 1880, 1881 and 1882.

The Chairman of the Herbarium Committee reported that the collection of plants left by the late M. Ruger had been incorporated with the Club's herbarium, and that the latter at present contains 1,203 species, represented by about 1,400 specimens, all of which have been properly labelled and arranged, and catalogued for reference. The Committee recommended that the field of the Club's herborizations be extended from a radius of 30 to one of 100 miles around New York City. The suggestion was agreed to.

One person was elected an active member.



NEW AMERICAN FRESH-WATER ALGÆ.

BULLETIN

OF THE

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Fresh-Water Algæ. VII.

By Francis Wolle.

(Plate xxvii.)

The following latest information concerning fresh-water algæ is submitted for the benefit of numerous friends to the cause of microscopical botany, as well as of botanical research in general.

During the past summer there have been abundant additions made to this particular division of the flora of the United States—a result largely due to the kindly assistance of volunteer collectors in the more distant parts of the country, as also of others nearer home. Indeed, but for these, the microscopist would often be at a loss for specimens worthy of his attention. I take pleasure in connection with this in acknowledging the valuable aid received from Rev. H. D. Kitchel, D.D., in working up the material that was gathered from various sources.

As the number of American students of the fresh-water algæ has greatly increased during the past few years, I have yielded to a general desire, and given the diagnosis of new species in the English language. Hitherto our students have been greatly outnumbered by European, and therefore the descriptions were given in a language familiar to all, irrespective of their nationality. With this change I adopt also the metric system of measurements.

In the appended list of new plants, all those credited to Minneapolis, Minn., were collected and forwarded by Miss Eloise Butler of that place. Miss Butler, first a student under Prof. C. E. Bessey of botanical fame, then a member of the Summer School of Science, under Prof. J. C. Arthur of the Iowa Agricultural College, Charles City, has, in her contributions sent me for microscopical investigation, furnished much more that is new than has any other collector this year.

Mr. A. D. Balen, of Plainfield, N. J., has been particularly fortunate in establishing beyond controversy the fact that the tropical alga *Pithophora*, Witt., is not confined to the tropics. Hitherto I have found it only in one small pond in this vicinity, where it was supposed to occur adventitiously. Mr. Balen finds it in three distinct localities within a circuit of about six miles around Plainfield.

Of new foreign literature upon the subject of fresh-water algæ, the following are the most important contributions:

Two volumes of the series Algæ Exsiccatæ have been issued by Prof. V. Wittrock and Dr. Otto Nordstedt of Sweden. The two volumes are the 9th and 10th of the series. Each number contains fifty specimens, European and American, finely mounted. No words can convey so correct an idea of a form as a view of the plant itself.

The third number of Cooke's British Fresh-Water Algæ has appeared.

N. Wille, of Norway, has published a good paper (in Norwegian) on the transitions and developing forms of the Confervaceæ.

M. Ed. Bornet, of Paris, has published a valuable article (in French) on *Mazæa*, a new genus of algæ of the order Crytophycees.

Dr. J. Rostafinski, of Cracow, has published a monograph (in Polish) on *Hydrurus* and its connections.

Prof. G. Lagerheim has made a contribution (in Swedish) to the knowledge of several orders of algæ in the vicinity of Stockholm.

Dr. Paul Richter, of Germany, has put forth a paper (in German) on the question, "Is *Sphærozyga Jacobi*, Ag., a synonym for *Mastigocladus luminosus*, Ktz."

The latest from Prof. A. Borzi, of the University of Messina, Sicily, is the third part of his valuable contributions (Italian) on the Morphology and Biology of the Phycochromaceæ.

For a work on the American fresh-water algæ, I fear the time is not yet ripe to heed the solicitations of friends. It is true, I have added over seven hundred new names to the list of the flora of the United States, but, so long as each returning summer brings an addition of fifty or more new varieties, it would seem well to defer it.

ŒDOGONIUM, Link.—*Œd. Boscii*, Witt. Collected by R. Hitchcock in a pond at Weehawken, N. J. *Œd. Tyrolicum*, Witt. In a pond, Pennsylvania. *Œd. crassiusculum*, Witt. Pennsylvania and New Jersey. *Œd. obsoletum*, Witt. Pennsylvania. *Œd. concatenatum* (Hass.) Witt. Plainfield, N. J., collected by A. D. Balen; also near Bethlehem, Pa. *Œd. Landsboroughi* (Hass.) Witt. Elmira, N. Y. *Œd. princeps* (Hass.) Witt. Minneapolis, Minn.

BULBOCHÆTE, Ag.—*B. Monili*, Witt. & Lund. Collected by A. C. Stokes, Trenton, N. J.

GONATOZYGON, D. By.—*G. asperum*, Ralfs. Ponds, Eastern Pennsylvania.

VAUCHERIA, DC.—*V. tuberosa*, A. Br. Collected by Prof. S. A. Forbes, of the State Laboratory of Natural History, Normal, Ill. The plant was dredged from Lake Michigan, four miles from Chicago, from a depth of 36 feet. This form was first described by the late A. Braun, of Berlin, from specimens found in deep waters, and also in marshy places on the continent of Europe. I have another form, collected by Capt. J. D. Smith in a marsh in Georgia in 1878. The filaments are less than half the size and devoid of the tuber-like stolons; and it is three to five times as dichotomous as the typical form. I will call this var. INTERMEDIA, *n. var.* A third form, var. DELICATISSIMA, *n. var.*, is found on wet planks here, and, during the past summer, occurred in a small pool on the banks of the Susquehanna River, Harrisburg, Pa. The filaments are very thin and measure only 10μ–12μ. The branching is not so frequent, but the constrictions at the base of the branches, and interstitially, are the same. Dr. Rabenhorst questioned the propriety of classifying the typical form, the only one known to him, as a *Vaucheria*. It is very unlike all other forms in the dichotomous branching, in the constrictions, and in the fruit.

OPHIOCYTIUM, Næg.—*O. cuspidatum* (Bailey) Rab. Pond, Mt. Everett, Mass. This plant was discovered by Prof. Bailey more than thirty years ago in a pond in Rhode Island; but it has probably not been seen since. It never received a record in an American publication, and hence this note. The proportions are very unusual for a plant of this genus, the measurements being: diameter, 50μ; length, 150μ; length of aculei at ends of cell, 15μ.

PROTOCOCCUS, Ag.—(A questionable genus.) *P. vestitus*, Reinsch. Ponds, New Jersey and Pennsylvania.

POLYEDRIUM, Næg.—*P. gigas*, Wittr. Ponds, Pennsylvania and New Jersey.

SPIROGYRA, Link.—*S. calospora*, Cleve. Collected by J. Reighard, Ann Arbor, Mich. *S. varians* (Hass.) Ktz. Mountain springs. *S. laxa*, Ktz. Ponds, Pennsylvania.

S. setiformis, var. INEQUALIS, *n. var.*—A peculiar variety of this species, consisting of two sizes of filaments, the one 125μ, the other 80μ in diameter; the two in conjugation. The smaller form has the thickness and the appearance of *S. nitida*, but must be counted a variety of *setiformis*. Sometimes two larger filaments are in conjugation, sometimes two smaller ones; but more frequently a larger and a smaller one are united. The spores in both cases are of the same size; a fruit-bearing cell of the larger filaments is not quite filled with the spore, but a spore-cell of the smaller filaments is usually considerably swollen.

S. Hantzschii, Rab., and *S. fusco-atra*, Rab., the latter probably a form of *decimina*, Mül., both from pools near Harrisburg, Penn.

ZYGOGONIUM, Ktz.—*Z. Ralfsii* (Hass.) Ktz. Ponds and marsh lands of Bucks County, Penn.

PLAGIOSPERMUM, Cleve.—*P. tenue*, Cleve, var. CRASSIUS, *n. var.* Shallow water, Bethlehem, Penn., and Florida.

MOUGEOTIA, D. By.—*M. glyptosperma*, D. By. Pond, Minneapolis, Minn.

GONATONEMA, Wittr.—*C. ventricosum*, Wittr. In shallow water on river shore. *G. notabile* (Hass.) Wittr. In a pond. Both species in the vicinity of Bethlehem, Pa.

These forms agree well, in size of filaments, length of articulations and dimensions of spores, with the plants described; but neither has the geniculate character of the fruiting-cells fully developed; some are perfectly straight and others only slightly crooked.

CLOSTERIUM, Nitzsch.—*C. costatum*, Corda. Ponds, New Jersey and Pennsylvania. *C. nasutum*, Nord. *C. acuminatum*, Ktz. *C. decussatum*, Ktz. The latter agrees with the description, except in size, having only about one-half the dimensions of the form described. It is true to its name.

C. angustatum, Ktz., var. RETICULATUM, *n. var.*—This form differs in having the striæ more or less spirally elongated, often producing a reticulated appearance.

All the above, except the first, are from ponds, Mt. Everett, Mass.

CALOCYLINDRUS, D. By.—*C. diplospora*, Lund. Pond, Mt. Everett, Mass.

C. COSTATUS, *n. sp.* (Plate XXVII., Fig. 26).—Cell ovaliform, with central constriction, nearly twice as long as wide; front view a constricted oval; end view circular. Constriction slight, forming an obtuse angle; membrane longitudinally costate; costæ distinct, 5–7, converging at apices. Diameter of cell 50μ ; length, 90μ.

In a pond, Mt. Everett, Mass.

According to some authors, this plant might be classed with *Docidium;* but, lacking the usual inflations at the base of the semicells, it is more properly placed as above.

DOCIDIUM, Bréb.—*D. verrucosum*, Ralfs. Frequent in ponds, Mt. Everett, Mass.

COSMARIUM, Corda.—*C. galeritum*, Nord. Marshes, Pennsylvania. *C. speciosum*, Lund., and *C. pulcherrimum*, Nord.; both rather rare, but they occur occasionally in ponds in New Jersey, Pennsylvania, Massachusetts, and no doubt in all States of the Union. *C. spectabile*, DeNtris. Pennsylvania. *C. reniforme*, (Ralfs.) Arch In Florida, and at Minneapolis, Minn. *C. grande*, Lund. Minneapolis. *C. tithophora*, Nord., and *C. DeBaryi*, Arch.; both from ponds, Mt. Everett, Mass. *C. pyramidatum*, Bréb., var. *stenonotum*, Nord. Minneapolis, Minn.

C. TRIPLICATUM, *n. sp.* (Plate XXVII., Figs. 8 and 8*a*, front and end views).—Cell about one-fourth longer than wide, subrectangular; angles obtuse; sinus between the semicells linear; margins irregularly granulate, crenate; membrane rough with larger and smaller granules; the larger ones arranged in series of three; three on the margin of each of the superior rounded angles; three within the margins and three near the margin, between the angles; at the margins of the inferior angles two larger granules, and, within the margins, a few smaller scattered granules; end view quadrangular-oval, two series, usually of six longer granules, on each of the longer sides; one series on the margin and one within. Diameter of cell, 40μ; length about 50μ. Sporangium spherical, with long spines, acute at the ends.

Ponds, Pennsylvania and New Jersey.

The nearest approach to this plant is *C. Ungerianum*, Næg. It differs in its smaller size, the details of outline, and arrangement of the longer granules.

C. SEELYANUM, *n. sp.* (Plate XXVII., Figs. 14 and 14*a*, front and end views.)—Cell small, quadrangular, deeply constricted; sinus narrow, linear; semicells twice as wide as long, with a small rounded notch in the middle of the sides; the superior angles slightly produced laterally; ends in middle about half the breadth, somewhat produced and crenated; membrane at the superior and inferior angles, and near the margin of the ends, with 3 or 4 granules. Diameter of cell, 25μ–30μ.

Frequent in a pond at Elmira, N. Y.

C. ELOISEANUM, *n. sp.* (Plate XXVII., Figs. 7 and 7*a*.)—Cell rather large, one-third longer than wide; constriction forming a deep, linear, outwardly widening sinus on each side; semi-cells semicircular, margins set with long pointed teeth or aculei; centre inflated and granularly rough, intermediate area smooth or punctate; end view oval; tumor in the centre granular; two distinct longitudinal, nearly parallel rows of teeth or aculei. Diameter, 75μ; length, 100μ.

Pond near Minneapolis, Minn.

C. ACULEATUM, *n. sp.* (Plate XXVII., Fig. 12).—Medium size, suborbicular, length slightly less than the diameter; constriction deep, forming, by the incurving of the angles of the semicells, two elliptical sinuses; membrane primarily more or less densely aculeated; later, the aculei drop off and leave short granule-like stumps. Length of cell, 30μ; breadth, 33μ; breadth of constriction, 10μ.

Pond, Minneapolis, Minn.

The outline of this species bears a resemblance to that of *C. Smolandicum*, Lund., but it is aculeated and devoid of the papilla at the angles of the semicells.

C. amœnum, Bréb., var. TUMIDUM, *n. var.* (Plate XXVII., Fig. 16).—Usually somewhat larger than the typical form; proportions the same, but the sides of the semicells tumid, not "rectis parallelis."

Occasional in ponds in Pennsylvania and New Jersey.

C. EVERETTENSE, *n. sp.* (Plate XXVII., Figs. 25, 25*a* and 25*b*, end, side and front views).—Cell as long as wide; constriction deep linear; semicells broadly rounded at the ends, inferior angles obtuse and close; membrane granular, with large verrucæ arranged in concentric series; apex usually nude, surrounded by short, acute, conical teeth or aculei; end and transverse views showing a decided central inflation. Length and breadth, 50μ–51μ.

Ponds, Mount Everett, Mass.

C. Brebissonii, Menegh., comes nearest, but differs in the form of the verrucæ, their uniform shape, and their even distribution over the cell; it is also without the central inflation.

XANTHIDIUM, Ehrb.—X RECTOCORNUTUM, *n. sp.* (Plate XXVII., Figs. 6 and 6*a*).—Cell as long as wide; constriction linear, somewhat gaping; semicells semicircular, finely punctate, or smooth; two rows of beads above the central protuberance, the one with 6–10 and the other under it with half the number; another series of beads on the base, forming a ring around the isthmus; ends broadly rounded, nude; basal angles armed with two pairs of aculei, one horizontal, subulate, the other vertical, straight, neither curved nor divergent; having the form of an hour-glass when viewed transversely, truncate, crenate at the ends, with two vertical aculei in the centre. Diameter of cell, without spine, 55μ–60μ.

Frequent in ponds, Mount Everett, Mass.

This form differs from *X. antelopæum*, Bréb., its nearest of kin, in having the end of the cells bare, the aculei not incurved or divergent, but straight and erect, attached to the sides and springing from the basal angle. It is also quite unlike that species in the three series of beads and in its transverse view.

ARTHRODESMUS, Ehrb.—A. RAUII, *n. sp.* (Plate XXVII., Figs. 17 and 17*a*, end and front views).—Cell slightly longer than wide, aculeated or verrucose; aculei short and stout, deciduous, leaving, after falling off, large verrucæ, usually six on the margin of each end, and two curved series of six each on the membrane within the margin ; semicells broadly elliptical, with a single straight or diverging aculeus at each end. Diameter of cell, without aculei, 38μ; with aculei, 63μ.

This plant was gathered with *Sphagnum* (bog-moss) by Mr. E. A. Rau in a pond near Newfield, N. J., in the month of August last. It bears some resemblance to *A. divergens*, Rab., but it is not "subtilissime verruculosus ;" also to *A. quadridens*, Wood, but it is twice the size of that plant, and is not *quadridens*.

A. OVALIS, *n. sp.*—Cell small, smooth, about one-fourth longer than wide ; semicells oval, armed at each end with a straight or divergent aculeus. Diameter, without aculei, 20μ.

Ponds, Mount Everett, Mass.

A. Incus, Bréb., comes near this form in size, but is unlike it in its truncate ends.

A. ORBICULARIS, *n. sp.* (Plate XXVII., Figs. 22 and 22*a*, front and end views).—Cells very small, smooth, orbicular ; semicells united by a narrow isthmus ; aculei on opposite sides nearly parallel. Diameter, without aculei, 12μ.

Pond, Mount Everett, Mass.

EUASTRUM, Ehrb.—E. MAMMILLOSUM, *n. sp.* (Plate XXVII., Fig. 21).—Cell large, in length twice the diameter ; semicells three-lobed ; basal lobes wide and nearly half as high as the semicell, drawn out in the centre into a narrow column about one-fourth the width of the body, dilated at the end, sinuate, four-parted ; base with six mammiform protuberances ; membrane punctate ; end view oval, with three diverging mammiform prominences at each end. Diameter of centre of cell, 68μ; of the ends, 28μ ; length, 118μ.

Pond, Mount Everett, Mass.

A distinct species ; the protuberances a prominent feature.

E. CUSPIDATUM, *n. sp.* (Plate XXVII., Fig. 18).—Small ; diameter slightly less than the length ; semicells distinctly three-lobed, basal lobes extending laterally their own width ; end lobe subrectangular, twice the width of the other lobes, obtusely sinuate in the centre ; ends of the rounded basal lobes, and of the two sections of the end lobe, surmounted each with three firm, diverging aculei. Diameter of cell, without aculei, 25μ ; length, 33μ.

Pond, Absecom, N. J. Contributed by H. D. Kitchel.

E. binale, var. MAJUS, *n. var.*—In all its details, except size, like the typical form, the dimensions being double the ordinary measurement. Diameter, 40μ ; length, 55μ.

In a pond near Newfield, N. J. Collected by E. A. Rau.

E. inerme, Lund., var. DEPRESSUM, *n. var.*—The standard form is nearly twice as long as wide, but the present form is only one-third longer than wide, and this difference produces a depressed appearance. Diameter, 36μ–40μ; length, 50μ–55μ.

Newfield, N. J. Collected by E. A. Rau.

MICRASTERIAS, Ag.—*M. brachyptera*, Lund., var. AMERICANA, *n. var.* (Plate XXVII., Fig. 19).—Distinguished from the form found in Sweden and described by Lundell, the polar lobe not being inwardly distended, but more or less tapering. The curved points on the apices of the lateral lobules are usually in pairs, not in threes.

The arrangement of the aculei on the membrane of the cell is also distinct. The size is very nearly the same, the width being 150μ and the length 190μ.

Collected in a pond near Minneapolis, Minn.

M. conferta, Lund., var. HAMATA, *n. var.* (Plate XXVII., Fig. 1).—The polar lobe is not *conferta*, compact, close against the adjoining lobes, as in the original form, but widely separated in the middle by a deep notch or contraction below the apex, thus giving the lobe a hamate form. Diameter, 88μ–100μ, slightly longer than wide.

Ponds, Mount Everett, Mass.

M. PSEUDOTORREYI, *n. sp.* (Plate XXVII., Fig. 2).—Large, circular, five-lobed; basal and intermediate lobes bisected, sections more or less conical, ends truncate and deeply furcate; polar lobe broadly cuneate, end truncate, slightly sinuate, angles cuspidate. Diameter of cell, 180μ.

Mount Everett, Mass.

Separated from *M. Torreyi*, Bailey, by its smaller size and the less number of lobules, and their greater similarity of form.

M. pseudofurcata, Wolle, var. MINOR, *n. var.* (Plate XXVII., Fig. 4).—Only half the size of the typical form, and in structure firmer. Diameter, 63μ–75μ.

Minneapolis, Minn.

STAURASTRUM, Mey.—*St. striolatum*, Næg., and *St. pygmæum*, Bréb., var. *obtusum*, Wille, in quiet waters, Pennsylvania. *St. spinosum*, Bréb., and *St. aculeatum*, Ehrb., both from Minneapolis, Minn.

ST. PANICULOSUM, *n. sp.* (Plate XXVII., Figs. 3 and 3*a*, front and end views.)—Cell sexangular, as long as wide; semicells truncated triangles, angles rounded; inferior angles bearing two short, straight aculei; end view triangular, one aculeus visible on each rounded angle; sides moderately convex; membrane punctate, punctules in radiating lines. Diameter, 40μ–50μ.

Marsh pool near Bethlehem, Pa.

ST. DUPLEX, *n. sp.* (Plate XXVII., Figs. 10 and 10*a*).—Of equal length and breadth, subquadrangular; constriction deep, enlarged outwardly; angles rounded, furnished with two short, stout processes, ends truncate, granulate or spinous; end view triangular, sides straight or concave, angles divided and drawn out into two short, somewhat divergent processes, ends furnished with three or four very small teeth. Diameter, 20μ–25μ.

Pools on shore of river, Bethlehem, Pa.

The end view has a resemblance to Nordstedt's *St. gemelliparum*, but the front view is distinct.

ST. EXIGUUM, *n. sp.* (Plate XXVII., Figs. 23, 23*a* and 23*b*.)—Very small, smooth or punctate; semicells subcuneate, sides slightly rounded, ends truncate; superior angle produced into straight, divergent arms nearly as long as the diameter of the cell; ends forked; viewed from the end, triradiate. Diameter, including arms, 20μ–25μ.

Frequent in ponds, Mount Everett, Mass.

This minute form is nearest *St. gracile*, Ralfs, but differs in its smaller size and smoother membrane.

'*St. leptocladum*, Nord., var. SINUATUM, *n. var.* (Plate XXVII., Fig. 24).—Differs from the typical form in the arms being more divergent, and in the emarginate apex.

ST. ELOISEANUM, *n. sp.* (Plate XXVII., Figs. 9 and 9*a*, front and end view.)—Small, equal in length and breadth, smooth or finely punctate; sinus produced by the constriction an acute angle; semicells subhexagonal, basal and superior angles produced into two short processes; bifurcate at the ends; end view circular, margin with nine (usually) short processes, ends notched. Diameter, 22μ–30μ.

Minneapolis, Minn.

This plant has some resemblance to *St. spinosum*, Bréb., but the processes are less conspicuous and the apices less distended. The end view is entirely distinct in being circular.

St. megacanthum, Lund., var. CONVERGENS, *n. var.* (Plate XXVII., Figs. 13 and 13*a*, front and end views.)—Unlike those of the typical form, the aculei are convergent and sometimes cross each other, being set nearly at right angles with the long axis of the semicells. The plant is also somewhat smaller. It reminds one of *St. Dickiei*, Ralfs, but it is not so turgid, and the aculei are much longer and stouter. Diameter, without the aculei, 38μ–45μ.

Minneapolis, Minn.

ST. TRIHEDRALE, *n. sp.* (Plate XXVII., Figs. 20 and 20*a*, front and oblique views).—Small, punctate granulate; semicells, in front view and in end view, triangular, angles rounded, sides concave, sinus narrowly linear. Diameter, 30μ.

Pond, Mount Everett, Mass.

This species, in its front view, partakes much of the appearance of a *Cosmarium*, near *retusum*, Perty, and *angustatum*, Nord., but the side and end views are distinct. The semicells are three-sided pyramidal forms unlike those of a *Cosmarium.*

St. vestitum, Ralfs., var. DISTORTUM, *n. var.* (Plate XXVII., Figs. 15 and 15*a*).—Separated from the typical plant by its unsymmetrical form, irregularly arranged vesture, and deeply notched margins.

Collected in the vicinity of Minneapolis, Minn.

St. Sebaldi, Reinsch, var. SPINOSUM, *n. var.* (Plate XXVII., Fig. 11). —The spine protruding near the margin of the sides of each semicell is a peculiarity worthy of note.

Minneapolis, Minn.

St. furcigerum, Bréb. (Plate XXVII., Figs. 5 and 5*a*, end and front view).—This plant is figured as a specimen of a variety. It differs from the many forms observed heretofore, in the triradiate arrangement and the long arms on the centre of the cells in the end view. The arms are usually six in number, and much shorter.

Minneapolis, Minn.

TOLYPOTHRIX, Ktz.—*T. tenuis*, Ktz. Ann Arbor, Mich., collected by J. Reighard; and Plainfield, N. J., collected by A. D. Balen.

CALOTHRIX, *Ag.—C. mirabilis* (Dillw.) Ag. Minneapolis, Minn. Thuret claims this plant for his new genus *Plectonema.* The present plant is a true *Calothrix* and answers to the diagnosis of *mirabilis.*

HYPHEOTHRIX, Ktz.—*H. luminosa*, Rab. Ponds, Pennsylvania.

ANABÆNA, Bory.—*A. circinalis*, Rab. Floating on a pond, Minneapolis, Minn. A distinct variety.

New Species of Grasses.

By GEORGE VASEY.

AGROSTIS TENUIS.—Perennial, loosely tufted. Culms 6 to 10 inches high, slender, somewhat geniculate below; leaves 1 to 2 inches long, narrow, about 2 on the culm; ligule short. Panicle pyramidal, open, 2 to 3 inches long and 1 to 1½ wide; rays in threes or fives below, above in twos or single, capillary, the longest an inch or more in length, flowering above the middle, spreading or erectish. Spikelets very small (less than a line long); glumes acute, purplish, lower one a little shorter and broader; flowering-glume thin, obtusish, 3-nerved above, a little shorter than the outer glumes, unawned; palet very minute or wanting.

Collected on the San Bernardino Mts., California, by the Parish Brothers.

AGROSTIS HUMILIS.—Perennial, tufted. Culms 4 to 6 inches high, naked above, 1 to 2 leaves below the middle; leaves mostly at the base, 1 to 2 inches long, narrow, not rigid, mostly erect; ligule short, auricled. Panicle 1 to 1½ inches long, narrow and few-flowered, branches short, mostly in threes below, above in twos or single, appressed, the larger branches subdivided and with two to five spikelets. Spikelets purple, less than a line long, outer glumes ovate-lanceolate, acute, smooth; flowering-glumes nearly as long as the outer ones, five-nerved, minutely toothed at the apex, unawned; palet hyaline, two-thirds as long as its flowering-glume.

Has the appearance of small forms of *A. varians*, but that species has *no* palet. Found by W. N. Suksdorf on Mt. Paddo, Washington Territory, and by Mr. Howell on Mt. Adams. Grows in compact tufts in moist places.

New Western Lichens.

By EDWARD TUCKERMAN.

LECIDEA BRANDEGEI, *sp. nov.*—Thallus rugose-plicate, straw-colored; apothecia ample ($1^{mm.}$,5 to $3^{mm.}$ in width), beneath mostly free, flat, soon becoming wavy, the disk very black and opake, the originally pale margin soon blackening and lobulate-crenate, bright, and then demiss and disappearing, the hypothecium colorless. Spores short-ellipsoid, simple, 0,06–$11^{mm.}$ long, and 0,004–$6^{mm.}$ wide. Spermatia short-acicular, more or less bowed, 0,010–$16^{mm.}$ long, and less than $0{,}001^{mm.}$ in thickness. Paraphyses distinct at length, and bluish- then brown-capitulate.

Upon rocks, Rocky Mountains, near St. Elmo, Colorado, T. S. Brandegee, in herb. Sprague. With the features, originally, of *Lecanora*, and the apothecia always showing, in section, the gonidial layer; but the natural affinity of the lichen is none the less with the next following; to which, indeed, it is as close, as it is well-marked in its differences from it.

Lecidea Pringlei, *sp. nov.*—Thallus pulvinate (reaching, in the specimens, about half an inch in height), composed of crowded, branched trunks, which are dilated above and densely plicate-rugose, and pass at the base into root-like branchlets, from pale to dark green, and finally black and shining; apothecia ample to very large (2–6 mm. in width), a little elevated, flat, soon wavy and lobed, and at length variously irregular, the disk from rufous–fuscescent very black, excluding the demiss, at first pale, but soon black and shining, stout margin, the hypothecium colorless. Spores from broad- soon oblong-ellipsoid, simple and pseudo-bilocular, 0,010–12$^{mm.}$ long, and 0,003–5$^{mm.}$ wide. Spermatia filiform, now bowed, 0,018–24$^{mm.}$ long. Paraphyses conglutinate.

Rocks, Sierra Nevada, California, C. G. Pringle, in herb. Sprague. On the eastern slope of the Cascade Mountains, Washington Territory, Brandegee, in the same herbarium. The lichen last-named is strikingly differenced from that of the Sierra Nevada by the extension of the trunks upward into slender, naked stems, only at the summits expanding into the plicate state, with something of the habit and at length color of *Alectoria ochroleuca*, f. *nigricans*. The hypothecium in this species, as in *L. Brandegei*, rests on the gonimous layer, and the feature is much more pronounced and constant here than it seems to be in *Lecidea conglomerata* of Europe. But I take the latter (in which also the apothecium is originally lecanorine, though ultimately quite lecideine) to be the key to the position of both these better developed American lichens.

Acolium Sti. Jacobi, *sp. nov.*—Thallus of white granules soon compacted into a chinky crust; apothecia of middling size in this genus (in the solitary specimen 0$^{mm.}$,5–8 in width, and about the same in height), of the substance and color of the thallus, more or less turbinate, the interior exciple yellow, the disk more or less protruded, black, but yellowish-green at the surface. Spores (no thekes observed) rounded and short-ellipsoid, bi-locular, 0,020–40$^{mm.}$ long, 0,016–30$^{mm.}$ wide.

On the earth in "mesas," San Diego, California, C. G. Pringle, in herb. Sprague.

PYRENOTHAMNIA, *Genus nov.*

Apothecia immersed in the thallus, the perithecium fuscescent, the amphithecium colorless, the paraphyses diffluent and obsolete. Spores in saccate-clavate thekes, ellipsoid, solitary, or in twos, or in fours, 0,030–56$^{mm.}$ long, and 0,016–24$^{mm.}$ wide. Hymenogonia oblong, guttated, 0,010–24$^{mm.}$ long, and 0,003–4$^{mm.}$ wide. Thallus fruticulose, cæspitose (about half an inch high, the width of the branches 2–4$^{mm.}$, the thickness 0,002–3$^{mm.}$), fragile, from a teretish base dilated above, and dichotomously much-branched, the obtuse tips crenate-dentate; the color from cinerascent fuscescent. Hyphæ forming a confused layer; the thalline gonidia 0,006–0.012$^{mm.}$ in diameter.

P. Spraguei.—On the earth, "growing in masses on the eastern slope of the Cascade Mountains, Washington Territory, alt. 3,500–6,000 ft.;" T. S. Brandegee, in herb. Sprague. Spermogones do not appear. The general aspect is distantly comparable with that of *Siphula torulosa*, and the nearly akin *S. coriacea* (Tayl.) Nyl. A fruticulose manner of growth is so very remarkable in the Verrucariacei that the present lichen must be separated from all sections of *Endocarpon*, whether or not the generic rank be maintained. It is appropriately inscribed to the unwearied cryptogamist, my ever liberal friend, C. J. Sprague, Esq., who has especially directed research into the lichen-flora of the Pacific coast.

A New Species of Oxytheca.

By C. C. Parry.

Since the summer of 1881 the writer has had under inspection, from two successive years' collections, in abundant specimens showing all stages of development, an anomalous plant of the Eriogoneæ group, found in that district of curious vegetable forms, the Mojave Desert of Southern California.

Unwilling to decide on its true relations with the other members of this extensive and peculiar Western American family without a careful examination of all the accessible allied genera, I was for some time inclined to regard it as the type of a new genus, to which, at the suggestion of Prof. Asa Gray, I applied the provisional name of *Gymnogonum spinescens*, ined. Under this name, herbarium specimens have been sparingly distributed.

Later, in correspondence with Mr. Sereno Watson on this subject, he suggested that by a very slight modification of the generic character of *Oxytheca*, the plant might appropriately come into that genus. In deference to his judgment, as well as in accordance with my own more matured convictions, I have finally adopted this view, and, suppressing the unpublished herbarium name of *Gymnogonum spinescens*, I present herewith a description of the plant as follows:

Oxytheca luteola, *n. sp.*—Plant prostrate (3 to 10 inches broad), dichotomously branched from the base, smooth, or with scattered pubescence on the slender branches; leaves orbicular to oblong-obovate, 1½ to 2 lines in width, with slender petioles three or four times as long, covered below with dense woolly pubescence, smoother above, the cauline in one-sided pairs (the third at each node obsolete or nearly so), one or both passing into linear-aciculate bracts; involucres sessile, 5-parted, the spreading unequal divisions resembling the bracts, the longer 2 to 5 lines in length (including the slender awn) and about equalling the bracts; flowers pubescent, crowded (7 to 15), developing centripetally, the short pedicel jointed at the base of the perianth and subtended by two bractlets, one linear, the other broader and scarious; perianth 6-cleft nearly to the middle, greenish-yellow; filaments short; anthers short-oval; styles short, with spreading capitate stigmas; akenes smooth; cotyledons orbicular, accumbent to the longer radicle.

Habitat.—Growing on moist, sandy soil near Lancaster Station, on the Mojave Desert, June to August; No. 259, C. C. Parry, Pacific

Coast Flora, 1881. Distinguished from other species by the more rounded long-petiolate leaves, which, as well as the bracts, are mainly in pairs instead of ternate (as occurs more or less frequently in some other species), by the closely sessile and unequally parted involucres, and by the yellowish flowers; in all other respects according with the the generic character, thus increasing the accepted species of the genus to eight.

The Bulbs of Epilobium palustre.—Those who wish to see the bulbs of *Epilobium palustre*, L. (the *E. squamatum* of Nuttall) may find them in moist low grounds when they first appear in spring. Later, the fleshy scales of the bulbs decay and disappear. In autumn, they are found at the ends of slender stolons attached to the parent root. They are then about an inch long, of a dusky flesh-color, the scales regularly overlapping each other along the axis of growth, with the bud at the end. The roots spring from between the scales, and, as the latter decay as soon as their nutriment is absorbed by the growing plant, there are no bulbs to be seen by the time the flowers appear. The same bulbs appear on *E. molle*, Torr., and possibly on all the rest of the family.

LUCY A. MILLINGTON.

Distribution of Weeds.—Among the means whereby weeds are distributed, their being generally objectionable to cattle should not be overlooked. When in North Carolina, I noticed that wherever *Verbesina Siegesbeckia* had to struggle unaided with other native vegetation there were only plants here and there among scores of other species of vegetation. When it was growing in a pasture or along the roadside where cattle ate, it soon took possession of the whole surface, simply because cattle kept other species from seeding, while avoiding this, and thus it had the whole ground to itself. It is very often an argument that an introduced plant is better adapted to the new location than the native, because it seems to spread so rapidly ; but in most cases it may be because cattle will not touch it, and there happen to be few other competitors of its class. It gets the whole field to itself. The ox-eye daisy and the buttercup spread so amazingly quite as much because cattle let them go to seed as that the climate or soil is unusually favorable. Around our large cities, *Stramonium*, wild chamomile, Canada thistle, wormseed and other well-known weeds spread only because goats, sheep, cows and geese avoid them, and they have thus nothing to interfere with their rapid spread. These remarks are suggested by an idea thrown out in a foreign periodical I have just been reading, that the great spread of some European weeds in America is a proof that they have found a soil and climate superior to those "for which they were specially created."

THOMAS MEEHAN.

New Species of Ferns.—In our next number, Prof. D. C. Eaton will describe some new United States ferns, give new stations for a number of old species, and notice Prof. Lemmon's very interesting discoveries made last August in Arizona.


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Marx del.

BULLETIN

OF THE

TORREY BOTANICAL CLUB.

Vol. X.] New York, March, 1883. [**No. 3.**

On Three Hybrid Oaks near Washington, D. C.

By George Vasey.

(Plates xxviii.—xxx.)

Hybrid No. 1, *or "Saul's Hybrid.*" (Plate xxviii.)—This tree is growing on the premises of Mr. John Saul, a nurseryman and florist, ahout two miles north of the city. It is growing in a thicket mostly composed of white and red oaks and chestnuts. The tree towers up to the height of some fifty feet. The general appearance of the trunk and branches suggested to me a young *Quercus rubra*, but a glance at the leaves and fruit referred it at once to the white oak group. But the bark does not have the usual whitish color and scaly character of the white oak. The bark of *Quercus stellata* (post-oak) is closer and less scaly than that of the white. The bark of the true *Quercus Prinus* is still closer, harder and darker colored, and on the branches is quite smooth. The bark of this hybrid appears to combine the qualities of *Quercus alba* and *Q. Prinus.* The leaves are mostly five or six inches long, with an average breadth of about two inches, mostly acute and narrowed at the base, and with a pretty uniform width of outline. There are six or seven lobes on each side, pointing with a strong and uniform angle toward the apex. The sinuses are mainly about an inch deep, reaching within half or three-fourths of an inch of the midrib. The lobes are remarkably uniform in size, breadth and direction. The upper surface is of a dark, glossy green, the under surface of a bluish-white or glaucous color, and smooth. The petiole is an inch to one and a half inches long, flexible, and of a yellowish color, as in *Q. rubra.* In texture, it is a little thicker than in *Q. alba.* The acorns are like those of *Q. Prinus*, averaging nearly as large, and with the same tuberculated cup. There is seldom more than one matured on a twig, and they have a pretty stout pedicel of half an inch in length. Growing under the tree there are two young trees or bushes about eight feet high, which apparently are seedlings from it. In this, as in most other oaks, the leaves on the lower branches and the leaves of the sprouts differ considerably from those of the upper and fertile branches, being broader and more irregular in lobation. It is difficult to fix the parentage of this tree, but the acorns point unmistakably to *Quercus Prinus*, and the leaves we may suppose to combine the characters of *Q. Prinus* and *Q. alba.* Dr. Engelmann thinks it may be a new variety of *Q. Prinus.*

Hybrid No. 2. (Plate xxix.)—This tree is growing about six miles north of Washington, near Silver Spring Station, and close by the roadside. In fact, there is a clump of three trees, evidently sprouts from an original tree, which was cut down probably twenty-five years ago. The three trunks are of about equal size—about twenty feet high—and branch within six feet of the ground. The bark is closer and darker colored than that of the white oak. The leaves in outline, but not in lobation, are much like those of the Saul's hybrid, being six or seven inches long, and narrow, with about four pairs of lobes; most of the sinuses reaching within half an inch or less of the midrib. The base of the leaf is generally obtuse and rounded, gradually widening for an inch or more to the first pair of lobes, which are scarcely more than coarse teeth. The remaining lobes are rather irregular, there being usually two or three pairs of large ones of about an inch in length each, then a pair of small short ones or teeth, ending in a narrow acutish point of about half an inch. The middle pair of lobes is the longest and broadest, making the greatest breadth of the leaf, which is about two inches. The under surface of the leaf is of a light gray, with a minute and sparse pubescence. The lobes generally point strongly forward, but frequently one or two diverge nearly at right angles. The upper surface is smooth, dark green, and the texture is considerably thicker and firmer than in *Q. alba.* The petiole is about an inch long, narrow, but less flexible than in No. 1, and destitute of the yellowish color. The acorns mature mostly in twos, and the common peduncle is about half an inch long, and thick. The acorns are about the size and form of those of *Q. alba*, the cup covering about one-third, with a thin edge, and with close smoothish scales. This tree seems to show a mixture of *Q. alba* and *Q. stellata*, with a preponderance of *Q. alba.*

Hybrid No. 3. (Plate XXX.)—This tree grows close by the roadside about two miles north of the city, near what is called Piney Branch. It is, perhaps, twenty-five feet in height, and the trunk a foot in diameter. The bark and general habit of the tree is much like that of *Q. stellata*, the bark being close and dark in color. The leaves, in length, are five or six inches, slightly shorter than in hybrids numbers one and two, and broader. There are about five pairs of lobes, of which the third and fourth are the largest and broadest. They are coarser and wider, and have greater divergence than in the others, and the central part of the leaf is broader. The lower surface is grayish, rougher and more pubescent than in number two. The upper surface is of a dark shining green. The leaf is firmer in texture than in either of the others; the petiole is stiffer; and in outline, rigidity and roughness it shows an evident approach toward *Q. stellata.* The same relationship is manifested in the acorns, which are broader and more depressed than those of *Q. alba*, evidently approaching those of *Q. stellata*, but much larger. In other respects it is *Q. alba.*

New or Little-Known Ferns of the United States. No. 13.

By D. C. Eaton.

43. *Polypodium thysanolepis*, Al. Braun.—Rootstock creeping, densely scaly; stalks two to six inches long; fronds as long as the stalks, ovate in outline, sub-coriaceous, slightly scaly above, clothed

beneath with ovate reticulated ciliate scales, pinnatifid into rather few oblong or oblong-spatulate entire segments separated by broad rounded sinuses; veinlets anastomosing in a single series of large areoles, each areole enclosing a sorus, outer veinlets free.—Baker, Syn. Fil., ed. 2, p. 512.

Collected on the Huachuca Mts., Arizona, by Prof. and Mrs. Lemmon in August, 1882.

This is a well-known Mexican fern of the same group with *P. incanum*, from which it differs by its usually larger size, its fewer, broader and more distant segments, and especially by the heavier covering of larger, laxer and beautifully ciliated scales. It is No. 971 of Parry and Palmer's collection of 1878, from San Luis Potosi, and No. 210 of Ghiesbreght's Chiapas distribution.

44. NOTHOLÆNA CALIFORNICA, *n. sp.*—Rootstock short; stalks clustered, two to four inches long, black, wiry, when young scaly with lanceolate dark-brown rigid scales; frond one to two inches long, broadly deltoid-ovate or pentagonal-ovate, from a quadri-pinnatifid base gradually simpler to the apex; ultimate segments oblong or triangular-oblong, small (1–2 lines long) and very numerous and crowded; upper surface minutely glandular; lower surface copiously farinose with yellow or whitish powder, except on the strong blackened rachis and midribs; margins more or less recurved, but not covering the copious dark-brown sporangia.

San Diego Co., California, Miss Burbeck, Mr. Cleveland and Mr. Stout. Colorado desert, Dr. Parry. Arizona, Prof. Lemmon.

This plant I have for a long time confused with *N. candida*, Hook., as at pp. 22 and 23 of the second volume of Ferns of North America, where it is spoken of as the Californian form of that species. It has smaller and more compound fronds than *C. candida*, and occupies in the genus a position about midway between that species and *N. Chilensis*. The powder is so abundant that it is sometimes difficult to glue a specimen to paper.

45. *Notholæna Aschenborniana*, Klotzsch.—Rootstock short, creeping; stalks clustered, dark-chestnut, copiously beset at the base with rigid blackish ciliated lanceolate-acuminate scales, which become more delicate higher up the stalk, and pass into a dense whitish or pale-ferruginous tomentose mass which covers the frond; fronds 4–10 inches long, pinnate, the pinnæ an inch long or less, rarely more, pinnatifid into very numerous sessile, oblong, entire or crenately lobed obtuse segments, upper surface at length becoming smoothish, the lower indistinctly farinose beneath the heavy coating of ciliately cleft scales; sporangia forming a dark line around the edges of the segments.—Klotzsch, in *Linnæa*, xx., p. 417.

This was first gathered near Chepultepec, in Mexico, by Alwin Aschenborn. Fournier (Pl. Mex., Crypt., p. 124) gives among the localities "Texas, Trécul, No. 1,456, Drummond, No. 354." Dr. Edward Palmer found it in the mountains east of Saltillo, Nuevo Leon, Mexico, in 1880; and now it is found and identified by Mr. Davenport among some unnamed ferns sent by Prof. Lemmon from the Huachuca Mts. It has a decidedly less compound frond than *N. Newberryi*, and may be easily recognized by the beautifully ciliated scales, soft and tomentose on the pinnules, but gradually more and more rigid towards the rootstock, where they are hard and nearly black.

46. *Pellæa marginata*, Baker.—Stalks tufted, slender, castaneous, shining; fronds four to six inches long and nearly as broad, deltoid in outline, tri-quadri-pinnatifid, segments linear-oblong, chartaceous; smooth; involucre broad, continuous, delicate, the margin slightly erose.—Syn. Fil., p. 151. *Cheilanthes marginata*, Hooker.

Huachuca Mts., Arizona, Prof. and Mrs. Lemmon, August, 1882. Common in Tropical America from Mexico and the West Indies to Peru. It is often difficult to distinguish between this and *P. angustifolia*, though the latter has commonly a less decompound frond, and longer and more distant ultimate segments.

47. *Cheilanthes Alabamensis*, Kunze.—Huachuca Mts., Arizona. Prof. and Mrs. Lemmon, August, 1882. A more western station than any before reported.

48. *Cheilanthes lendigera*, Swartz.—Rootstock cord-like, creeping, covered with soft narrow scales; stalks rather distant, 4–8 inches long, at first loosely tomentose with ferruginous hairs, at length castaneous and nearly smooth; fronds as long as the stalks, ovate-oblong, thrice to four times pinnate, ultimate pinnules cuneate-obovate, less than a line long, the margin recurved and the white involucre leaving but a small opening in the middle, making the pinnules pouch-like; upper surface green and naked, the lower hairy.—Hooker, Sp. Fil., ii., p. 95, t. civ., B.

Huachuca Mts., Prof. and Mrs. Lemmon.

This is another well-known species of Mexico and the Andes of Colombia and Ecuador. It is much less woolly than *C. tomentosa*, and the pouch-like ultimate pinnules are very noticeable.

49. *Asplenium montanum*, Willd.—This must now be considered a New England fern. One day last April three students of the Academy at Norwich, Conn., started out for a day's search for "trailing-arbutus, lichens and rocks.' Messrs. Fuller and Setchel found this fern in clefts of rocks on Lantern Hill, which rises between the towns of Ledyard and North Stonington. Mr. Fuller first saw the plant, Mr. Setchel identified it, and Mr. Collin has the honor of being one of the party.

About Christmas, 1882, Mr. C. B. Graves, of New London, also discovered the plant on the same mountain, and also on a smaller hill distant a little way to the north-east. Mr. Graves says it is not uncommon in holes and crevices of the rock. It is to be hoped that the difficulty of getting to the place will long prevent the extirpation of the fern.

50. *Asplenium monanthemum*, L., was found among Prof. Lemmon's Huachuca ferns by Mr. Davenport, who has sent me three fronds. They are all rather smaller than common Mexican specimens. One of them has uniformly monosorous pinnæ, one shows here and here a second sorus, and the third has regularly three or four sori on most of the pinnæ. Usually this fern has decidedly larger and more erect fronds than *A. Trichomanes*, and the few large sori are along the lower edge of the pinnule.

51. *Asplenium Glenniei*, Baker, described at p. 488 of the second edition of Synopsis Filicum, was scantily collected on the Huachuca Mts. by Prof. Lemmon. It is a small fern growing in little tufts like *A. montanum;* but the fronds are lanceolate, tapering both ways, 2–6 inches long, pinnate, with many pairs of oblong, toothed or pinnately lobed deep-green pinnæ. The sori are abundant, rather large, slightly curved outwards, and placed mostly very near the midrib of the pinnules. The fern comes near the old world *A. fontanum*, but is not closely allied to any of our common species. I am obliged to Mr. Baker for the identification.

52. *Aspidium juglandifolium*, Kunze.—The free-veined form which has been called *Phanerophlebia nobilis*, is in Prof. Lemmon's Huachuca collection. This was found in Western Texas many years ago, but has never been distributed to herbaria from any station within the borders of the United States. With this, Prof. Lemmon secured a few fronds of *Aspidium Filix-mas* and a few of an *Aspidium* with decompound fronds, the species not yet clearly recognized.

A List of Grasses collected by Mr. C. G. Pringle in Arizona and California, with descriptions of those species not already described in American publications.*

62. *Cottea*† *pappophoroides*, Kunth, Gram., i., 84.281. t. 52 ; Enum. Pl. i. 256 ; Steud, Syn. Pl., i. 201.

Perennial. Culms erect, branched at the base, 2 feet high, smooth below, pubescent above, especially at the joints and on the main axis and branches of the panicle. Leaves flat, 2–3 lines wide, 5–8 in. long, involute towards the tip ; sheaths loose, pubescent like the leaves ; ligule a ciliate ring of short hairs. Panicle lanceolate in outline, 6–8 in. long, the more or less spreading branches solitary, the lower ones about 2 in. long, branched a little below the middle, the branchlets 1–3-flowered. Spikelets about 4 lines long, exceeding their pedicels ; outer glumes lanceolate, 2½ lines long. Flowering-glume 2 lines long, striate with 9 prominent nerves and several intermediate less prominent ones, the two lateral divisions more deeply cut than the others and somewhat divergent ; the three longest awns a little over a line in length. The edge of the flowering-glume, for a short distance above the base, is densely pilose with hairs a line long.

Near Tucson, Arizona, Dec. 7th.

This is the same as No. 2,057 of Wright's N. Mex. collection, 1851–2. Mr. Pringle found only a single specimen, which is an old one, but sufficiently perfect to show the above-enumerated charac-

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* Continued from page 145, Vol. ix.

† COTTEA, Kunth.—Panicle open ; spikelets 6–9-flowered, the upper imperfect. Outer glumes 2, membranaceous, concave, many-nerved, the lower one 3-lobed at the tip, lobes acute-mucronate, the upper one a little smaller, entire, acute. Flowering-glume 5-cleft, the lateral lobes deeper than the others, concave, sub-11-awned, awns continuous, straight, unequal, three longer than the others. Palea bicarinate, apex bifid, lobes acute-mucronate. Stamens three. Ovary smooth. Styles 2, terminal. Stigmas plumose. Grain oblong, nearly terete, smooth and freely enclosed within the palea.

ters. The genus has but the one species, which extends southward into Peru.

63. **Triodia mutica*. *Tricuspis mutica*, Torr., Bot. Whipple, p. 156; Porter and Coulter, Syn. Flor. Colorado, p. 148.=No. 2,046, C. Wright, N. Mex., 1851–2.

No locality given for Mr. Pringle's specimens.

64. *Triodia pulchella*, HBK., Nov. Gen. i., 155, t. 47; *Tricuspis pulchella*, Torr., Pac. R. R. Surv., iv., 156; Thurber, Bot. Cal., ii., p. 301.

65. DIPLACHNE VISCIDA, *n. sp.*—Similar in habit and inflorescence to *D. fascicularis*, P.B., but smaller throughout and "covered with acrid viscid glands." Panicles from one to three inches long, sessile in the axils of the leaves, and mostly enclosed by the inflated sheaths, densely flowered, the erect or ascending branches rarely exceeding an inch in length. Spikelets about 2 lines long, nearly sessile, 4–6-flowered. Outer glumes lanceolate, acute, the lower a line long, the upper a little longer and larger. The first flowering-glume about 1¼ lin. long, shortly ciliate below on the central and lateral nerves, scabrous above, two-lobed at the tip, lobes rounded-obtuse, the central nerve produced between them into a scabrous awn one-half a line long. Spikelets often reddish or purplish, as well as the culm and leaves.

Santa Cruz Valley, near Tucson, Arizona. June 28th, 1881.

This grass may have been introduced from Mexico or from regions farther south, since, as Mr. Pringle states, it grows in valleys which are inhabited. Mr. Pringle is inclined to the opinion, however, that it is indigenous to the region where he gathered it. It is not improbable that it has already been described in works not accessible, treating of more Southern plants.

66. *Diplachne dubia*. *Leptochloa dubia*, Nees in Mart. Brazil, ii., p. 433; Chapman in Flor. So. States, p. 559.

Fuller's Ranch, Arizona. July.

67. **Diplachne imbricata*. *Leptochloa imbricata*, Thurber, Gram., Mexican Bound. ined.; Bot. Calif., ii., p. 293.

Santa Cruz Valley, near Tucson. July.

This is the same as No. 404 of E. Palmer's Coll., 1875.

68. *Eatonia obtusata*, Gray, in Manual, 5th ed., p. 626.

Near Tucson, Arizona.

69. **Eragrostis Purshii*, Bernh., var. *delicatula*, Munro. *E. diffusa*, Buckley, in Proc. Phil. Acad., 1862, p. 97.

Santa Cruz Valley, near Tucson.

This grass was distributed as var. *diffusa* of *E. Purshii.*

70. *Eragrostis pilifera*, Scheele. Steudel, Syn. Glum., p. 278.

Santa Catalina Mts., Arizona. April.

This grass has been proposed as a variety of *E. pectinacea*, Gray, some forms of which it resembles in habit and inflorescence, but the spikelets are narrow and less flattened, and the lateral nerves of the more obtuse flowering-glume are obsolete.

71. *Melica aristata*, Thurber, in Bolander's revision of the Meliceæ, in Proc. Calif. Acad. Sci., iv., part 2, p. 102; Bot. Calif., ii., p. 305.

Mt. Shasta, Cal., alt. 6,000 feet. August.

72. *Melica fugax*, Boland., Proc. Calif. Acad., iv., p. 104; Thurber Bot. Calif., ii., p. 304.

Mt. Shasta, Calif., alt. 6,000 feet. August.

A tall form with a racemose few-flowered panicle.

73. *Distichis maritima*, Raf. Thurber, Bot. Calif., ii., p. 306; *Brizopyrum spicatum*, Hook.; Gray, Manual, p. 628.

Santa Cruz Valley, near Tucson.

74. *Poa Californica*. *Atropis Californica*, Thurber, Bot. Calif., ii., p. 309.

Santa Rita Mts., Arizona, alt. 4,500–6,000 feet. April.

Both the male and female plants are represented.

75, 76. *Poa*—probably forms of *P. tenuifolia*, Nutt. The first, from the mountains about the head-waters of the Sacramento River, has a stout culm with flat radical and cauline leaves, 2-4 in. long, the outer glumes obtuse, the upper one over 2 lines long, equalling the first floret; the second, from Mt. Shasta, more nearly approaches the typical form of the species.

77. **Poa annua*, L., var. *stricta*, Vasey. Panicle narrow, 3–5 in. long with erect branches. Truly indigenous.

Banks of the Rillita.

78. POA PRINGLII, *n. sp.*—Culms about 6 in. high, slender and scape-like, with a single leaf below the middle, densely tufted from a creeping root-stock, the base surrounded by the loose sheaths of the radical tuft of short (1–2 inches) convolutely folded, smooth and narrow leaves. The cauline leaf about ½ an inch long, narrow and folded like those at the base, minutely scabrous at the somewhat pungent tip. Panicle about an inch in length, narrow and few-flowered; lower branches in pairs, bearing one or two spikelets which they about equal in length. Spikelets 3–4 lin.long, 3–5-flowered. Outer glumes broadly lanceolate, three-nerved below, with broad scarious margins, the upper one about as long as the spikelet, the lower a ltttle shorter and smaller. Flowering glume about 3½ lines long, broadly lanceolate, with a broad scarious margin above, 5-nerved, minutely punctulate-scabrous all over and strongly scabrous on the midnerve above, smooth below. Pale one-fourth shorter than its glume. Scales broad and irregularly cut or toothed.

Mountains about the head-waters of the Sacramento River, California. September.

There is considerable variation in the size of the spikelets, which, in most specimens, are purplish in color and have a membraneous appearance. It is apparently diœcious. The staminate plant is more slender, with more acute glumes.

The species is allied to *Atropis Californica*, Munro, but appears to be sufficiently well marked to be kept distinct.

79. *Festuca tenella*, Willd., Sp., i., 419; Gray, Manual, p. 633.

By streams of the Santa Catalina Mts.

80. **Festuca microstachys*, Nuttall, Plant. Gambel, 187; Thurber, Bot. Calif., ii., p. 317.

By streams of the Santa Catalina Mts.

81. *Bromus Hookerianus*, Thurber, Bot. Wilkes's Exped., 493; *B. virens*, Buckley, in Proc. Phil. Acad., 1862, 98; *Ceratochloa grandi-*

flora, Hook. Flor. Bor. Am., ii., 253, t. 235; Thurber in Bot. Cal., ii., p. 321.

Mountains about the head-waters of the Sacramento River, alt. 7,500 feet. August.

This seems to be the same as No. 648 of E. Hall's Oregon collection, ticketed "*Bromus* (*Ceratochloa*) *carinatus*, Hook., var."

82. *Agropyrum caninum*, Reichenb., Icon. Fl. Germ., t. 119; *Triticum caninum*, L.; Gray, Manual, p. 638.

Santa Rita Mts., Arizona. July.

This is the form "differing from the type in its large and spreading, usually much crowded spikelets, and its long, stout and divergent awn," referred to by Dr. Thurber in his remarks under *Triticum caninum*, in Bot. Cal., p. 324. It is certainly very distinct from the ordinary forms of the species, and should at least have a varietal name—say var. MAJUS.

83. *Hordeum nodosum*, L. Thurber Bot. Cal., ii., p. 325; *H. pratense*, Huds.; Gray, Manual, p. 638.

Santa Cruz Valley, near Tucson.

84. *Elymus Canadensis*, L. Gray, Manual, p. 639.

By streams of the Santa Rita Mts.

85. **Elymus Sitanion*, Schult. Thurber, Bot. Cal., ii., 327; Watson Bot. King's Exped., 391; *Sitanion elymoides*, Raf.; *Ægilops Hystrix*, Nutt., Gen., i., 86.

Santa Rita Mts., Arizona. May.

Girard College, Philadelphia. F. LAMSON SCRIBNER.

Note on Cyperus refractus, Eng.—For several years past I have frequently collected in this locality a *Cyperus* which I could not make correspond with any species in Gray or Chapman. On a recent visit to Cambridge I took occasion to look up the subject, and found, in Dr. Gray's herbarium, specimens of the same species with the manuscript name of *Cyperus refractus*, Eng. On calling Mr. Watson's attention to it, he recalled the fact of its publication under that name in *Linnæa*, Vol. xxvi., p. 369, in the description of the Cyperaceæ of the Berlin Herbarium, the type specimen having undoubtedly been furnished by Dr. Engelmann. It is probably the same plant as is described in Steudel as *Cyperus retrofractus*, Eng., but is not the *C. retrofractus* of Torrey. It is a tall, strong plant, 2 to 3 feet high, with from 5 to 10 unequal rays, the longest frequently 10 inches, naked except 1 or 1½ inches at the extremity. The spikelets are 8 to 10 lines long, about 6-flowered, spreading horizontally and becoming retrofracted. The nutlets are triangular, linear-oblong, about 1¼ lines long. It is undoubtedly pretty widely diffused in the country.

Washington, D. C. GEO. VASEY.

Notes from Utah.—In "Fern Notes, VI.," Mr. Davenport speaks of *Aspidium Filix-mas*. This plant was discovered by me in August, 1882, in quantity in the Wasatch Mts., Utah, and it undoubtedly ranges through all the higher mountains of Colorado, Utah, Nevada, etc.

In the same locality, I found in great abundance the rare Utah ferns *Aspidium Lonchitis*, *Polypodium vulgare* (typical form and var. *occidentale*) and *Adiantum pedatum*. The last has remained till this year unseen since its discovery by Mr. Watson ten years ago. The specimens are the same robust ones that are so familiar in the dells of Iowa.

Cleome sparsifolia, Wats.—I have this in excellent specimens. Mr. Watson's specimens were evidently too old, as the figure in Bot. King does not represent the species accurately. The bracts (so conspicuous in the figure) are inconspicuous; they are seldom elliptical, and are always acute. The leaves (which should appear all over the figure, except at the very base) have petioles 6″ to 9″ long, and three oblanceolate, acute leaflets. The petioles gradually lengthen toward the base of the stem, where they are 1′ to 2′ long. The leaflets toward the base become shorter and less acute, till at the root they are spatulate-linear, very obtuse and mucronate. The siliques are often 18″ long. The plant is 2° or more high.

Salt Lake City, Utah. MARCUS E. JONES.

Notes on Michigan Plants.—At Adair, about eight miles west of St. Clair, I spent several weeks last summer, and made a series of notes relative to the flora of that region.

It is said to have been once covered with forests of the white pine (*Pinus Strobus*), but these were thinned out by the lumberers, and finally destroyed by a great fire which ravaged this section of country. I found, however, a few trees, 20–30 feet high, which may have grown from seeds dropped after the fire.

Instead of the old forests, dense growths of *Populus tremuloides*, *grandidentata* and *monilifera* have sprung up in many places and become characteristic of the burnt regions. An occasional *Betula lenta* and *lutea* is sometimes found. The result has been an irregular growth of timber, allowing the passage of the sun's rays and a consequent growth of many sun-loving plants, offering a striking contrast to the ancient sombre forests which usually meet our eyes at this time of the year. In marshy places are found *Ranunculus alismæfolius*, *Ludwigia polycarpa*, *Samolus Valerandi*, var. *Americanus*, *Myosotis laxa* and *Aspidium Noveboracense*. In clearings, *Gnaphalium purpureum* is not uncommon. *Epilobium spicatum* and *Erechthites hieracifolia* are the first to occupy burnt grounds. *Hypericum Canadense*, var. *majus*, *Rubus hispidus*, *Lonicera parviflora*, var. *Douglasii*, *Pyrola elliptica*, the crimson form of *Monotropa Hypopitys*, *Collinsonia Canadensis*, *Hedeoma pulegioides*, *Euphorbia hypericifolia*, *Spiranthes Romanzoviana*, *Oakesia sessilifolia* and *Osmunda regalis* belong to the flora. *Daucus Carota* has become naturalized in the country west of Adair. Only two trees of *Liriodendron Tulipifera* were observed. I also found an *Elodes* which, I think, explains the *petiolata* (?) in Wheeler and Smith's catalogue. It was sent at the time to Prof. Thos. C. Porter, and I think that the facts cannot be better stated than by copying the words he used: "It is the same thing which I collected years ago in Central Pennsylvania, and Garber on Lake Conneaut, Crawford Co., in 1868.

The broader and paler leaves give it an aspect different from *E. petiolata* of Maryland and further south ; but then the *lower leaves taper into a distinct petiole*, and the upper, though broader at base and almost sessile, are *not clasping*. The calyx is only one-third the length of the mature capsule, and the sepals are more obtuse. I have no flowers to examine the union of the filaments. And yet, with all the characters of *E. petiolata*, I agree with you in suspecting it to be a variation of *E. Virginica*."

Diligent search by our Michigan friends for the flowering plant would soon settle the doubt.

Dayton, Ohio. AUG. F. FOERSTE.

Submersed Leaves in Limnanthemum.—The fact that thin root-leaves occur on *Nuphar pumilum*, Smith, and occasionally on *N. advena*, Ait., has long been known and is on record; but, that the floating heart (*Limnanthemum lacunosum*, Griseb.) may bear similar leaves, has, I believe, been hitherto unnoticed. However, in two specimens of this plant collected at Wellington, Nova Scotia, in 1879, there are found four such leaves, 3 by 2½ in., of a delicate texture, diaphanous, and of a light green color with a tinge of red. They show a well-marked venation, have a broader sinus than the floating leaves, and are borne on short petioles.

ELIZABETH G. KNIGHT.

The Flora of the Franconia Mountains.—I have just read in the September BULLETIN Prof. Bailey's notes concerning the flora of the Franconia Mountains.

After preparing the list to which he refers—published by Mr. Prime in the *Journal of Commerce*—I left the north country and did not return until late in the summer. But I then made some interesting additions to my catalogue.

On the borders of Lonesome Lake grows in great profusion the *Utricularia cornuta*. On the edge of Echo Lake, near the boathouse, I found the *Subularia aquatica*, mentioned in Gray as found there by Tuckerman. In addition to the orchids named in my list, and those mentioned by Prof. Bailey, I gathered *Habenaria psycodes*, *H. fimbriata*, *H. tridentata*, *Goodyera repens* and *Spiranthes cernua*. On the top of Bald Mountain, the bear-berry (*Arctostaphylos Uva-ursi*) grows plentifully ; and I also found there the alpine variety of *Solidago Virga-aurea*. On the Bethlehem road, quite near Franconia village, I gathered the finest specimens of *Solidago squarrosa* I have ever seen, the stems fully five feet in height, and the spike of flowers more than a foot long. The prevalent *Aster* is the *acuminatus*, and I found its "depauperate, narrow-leaved variety on Bald Mountain, and the *macrophyllus* near the base.

Between the Profile House and Echo Lake I saw two *Nabali*, the *albus* and *altissimus*. *Lobelia Dortmanna* grows on the borders of Profile Lake.

Hartford, Conn. ANNIE TRUMBULL SLOSSON.

Bentham and Hooker's Genera Plantarum.—Part 2 of Vol. iii., completing the work, is nearly ready for publication. Those who wish to obtain this part, like the preceding, at trade price, through us, will please to send a notification to that effect to "The Curator of the Harvard University Herbarium, Cambridge, Mass., without delay.

ASA GRAY.

(The trade price in London for the new part is £1, 4, 0.—ED.)

Botanical Literature.

Supplement to Dr. Chapman's Southern Flora. University Press. Cambridge: John Wilson & Son. 1883.

Since the publication of Dr. Chapman's Southern Flora, in 1860, a large number of species has been discovered by various collectors within the region it embraces, and botanists have long felt the need of a work describing these additions. This *Supplement* is intended to include these, as well as certain species which were omitted in the Flora, and forms a most valuable contribution to North American botany. It contains 96 pages, with index, is printed in the same form and type as the Flora, and is paged in continuation with the latter, making a total of 698 pages. Seventy-eight genera are added to the Flora, and about 450 species and varieties are described. Some of these, however, must count as corrections to the first edition. *Scutia ferrea* is *Reynosia latifolia*, Griseb., in the Supplement; *Gallactia spiciformis*, var., is *G. filiformis*, Benth.; *Schœnolirion Michauxii* is *S. Elliottii*, Feay; *Panicum sanguinale*, var., is *P. serotinum*, Mx., and *Andropogon tetrastachys*, var., is raised to the rank of a species under the name of *Andropogon arctatus*, Chapman.

The following are proposed as new species: *Polygala Reynoldsæ*, Chapm.; *Petalostemon Feayi*, Chapm.; *Pinguicula Floridensis*, Chapm.; *Euphorbia Garberi* and *deltoidea*, Engel., ined.; *Croton Alabamensis*, E. A. Smith, ined.; *Tillandsia Houzeavi*, Morren, ined.; *Xyris setacea*, Chapm.; *Paspalum reimarioides*, Chapm., and *Andropogon maritimus*, Chapm.

Seven genera and fifty-five species of grasses are described. "*Pharus latifolius*, L. (?)," from the description, must be *P. glaber*, Kth. (*P. latifolius*, Trin., non L.); "*Sporobolus Domingensis*, Sw.," was distributed in Mr. Curtiss' sets as *S. purpurascens*, Hamilt. Although synonyms are very generally cited, adding much to the value of the work, they are omitted in the case of *Thurberia Arkansana*, Benth., a grass long known under the names *Greenia*, Nutt., and *Sclerachne*, Torr. "*Paspalum monostachyum*, Vasey, ined.," was referred by General Munro to *P. rectum*, Nees., "spicis longiore." "*Paspalum obtusifolium*, Raddi," No. 3,565 of A. H. Curtiss, is *P. platycaule*, Poir. No. 813 of E. Hall's Texan collection is the same.

A very satisfactory attempt is made to separate the various forms of *Panicum* that have been lumped together under *P. dichotomum* by Dr. Gray and others, and the following are recognized as species:

Panicum commutatum, Schultes (*P. nervosum*, Ell.), *P. sphærocarpon*, Ell., *P. consanguineum*, Kth. (*P. villosum* and *angustifolium*, Ell.), *P. laxiflorum*, Lam., and *P. ramulosum*, Mx., in part.

In the first edition, *Andropogon maritimus* was included in *A. scoparius*, with which it is closely allied. It is, however, a well-marked species. Mr. Isaac Burk has collected this grass at Cape May, New Jersey, and specimens of it are in hand.

The gentlemen who, from the frequent mention of their names, seem to have been most active in the discovery of the plants enumerated in the Supplement are Dr. A. P. Garber (since deceased), Messrs. A. H. Curtiss and Charles Mohr and Dr. Gattinger. Credit is due the two first named for the discovery of the greater part of the 180 species found only in Florida.—F. L. S.

Origine des Plantes Cultivées. Par Alph. De Candolle. 8vo., pp. 377. Paris: Germer Baillière et Cie. 1883.

Michigan Agricultural College. Report of the Professor of Botany and Horticulture for 1881 *and* 1882. By Dr. W. J. Beal. 8vo, pamph., pp. 57.

Proceedings of the Torrey Club.—The regular meeting of the Club was held at Columbia College Tuesday evening, Jan. 9th, the Vice-President presiding.

The Herbarium Committee reported contributions to the herbarium from Messrs. Day and Britton.

The Librarian read the titles of the books and periodicals that had been received since the last meeting.

This being the Annual Meeting, the Treasurer presented his report for the preceding year.

The New Jersey Flora.—Mr. Britton exhibited specimens of *Rudbeckia speciosa* and *Senecio tomentosa;* the former found in Cumberland County, N. J., by Mr. Commons, and new to the State, and the latter found by the same gentleman at Cape May, and by Mr. C. A. Gross at Landisville.

Albinism.—White-flowered forms of *Habenaria psycodes*, *Sisyrinchium Bermudiana* and *Cirsium arvense* were shown by Prof. Day.

New New York Stations.—Mr. Willis gave Mt. Kisco as a station for *Potentilla fruticosa*, a plant new to the Westchester County flora. Mr. Britton reported a locality near East Chester, on the Boston Turnpike, as a new station for *Leontodon autumnale.*

Officers.—The following officers were elected for the present year: President, J. S. Newberry; Vice-President, Addison Brown; Recording Secretary, Arthur Hollick; Corresponding Secretary, Benjamin Braman; Treasurer, W. H. Rudkin; Editor, W. R. Gerard; Associate Editor, N. L. Britton; Librarian, N. L. Britton; Curator, P. V. Le Roy.

One corresponding member was elected.


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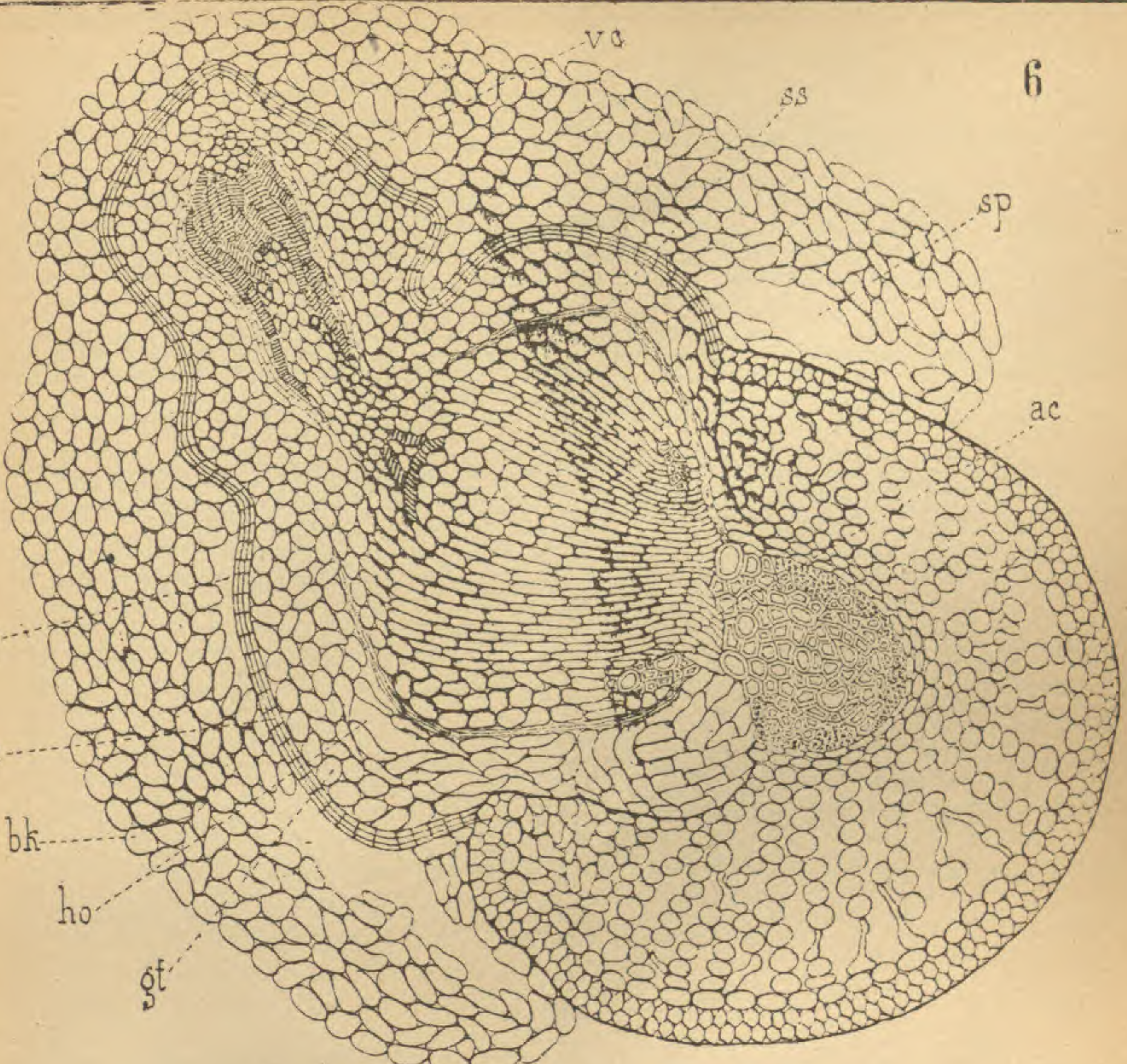
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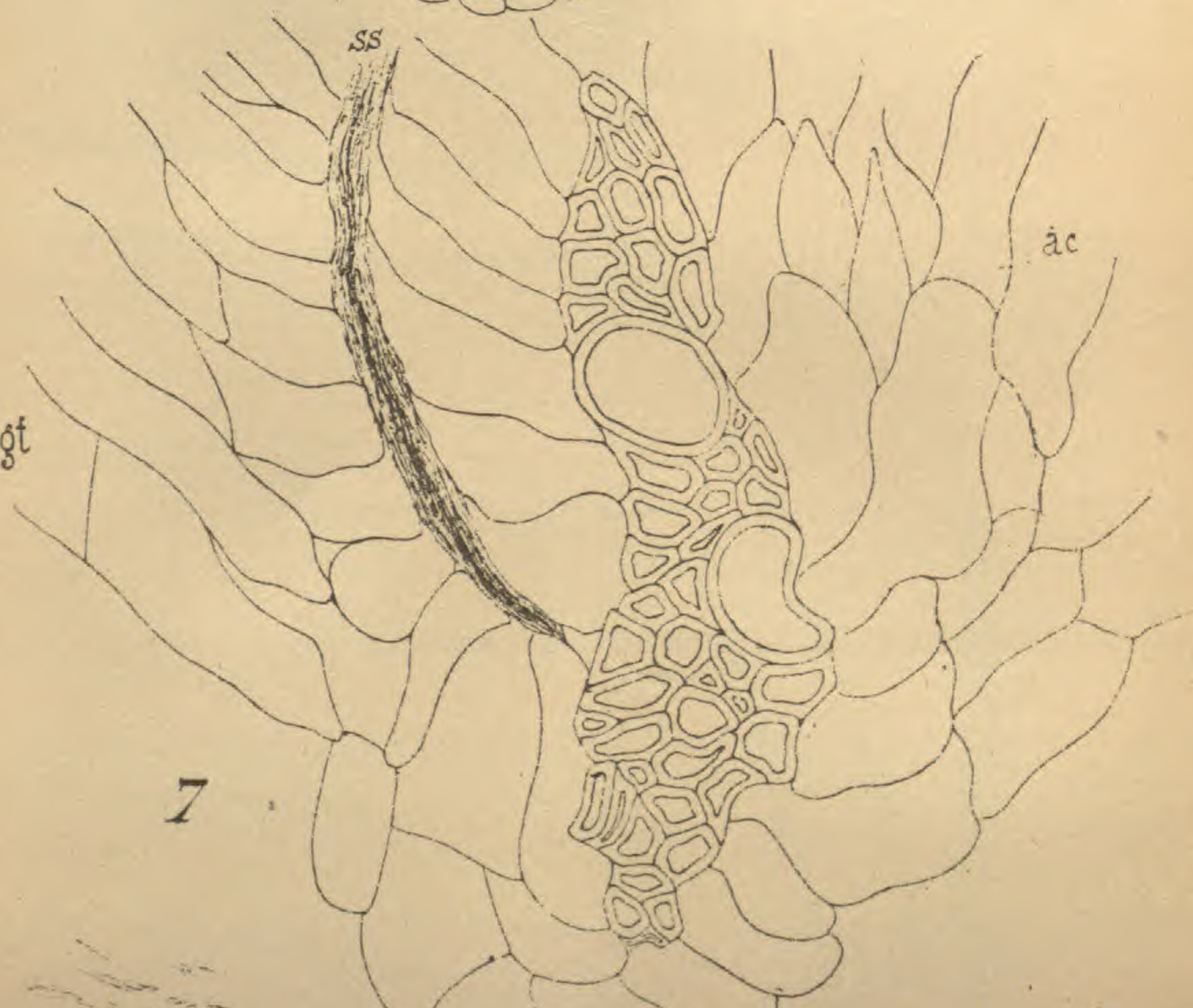
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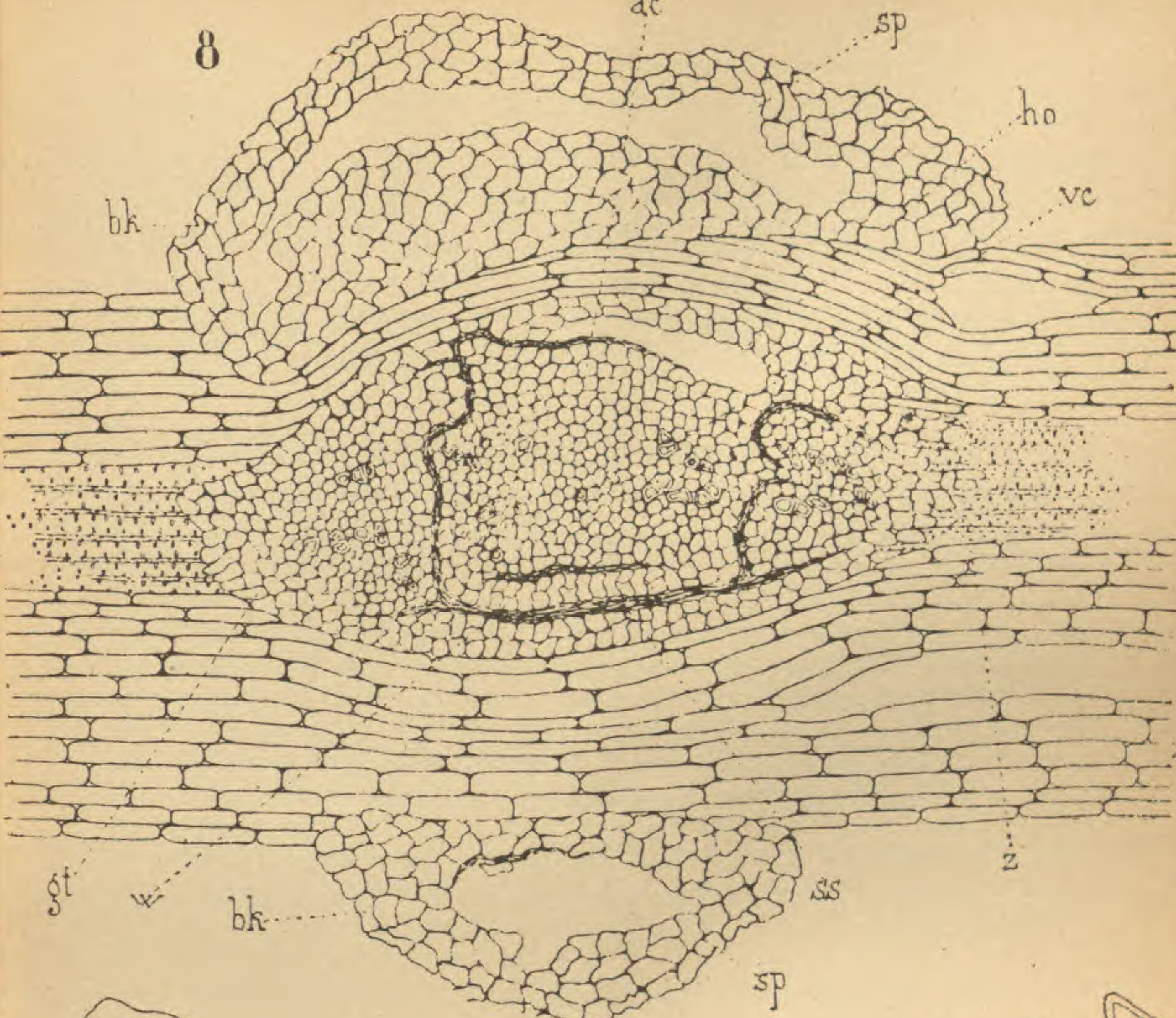

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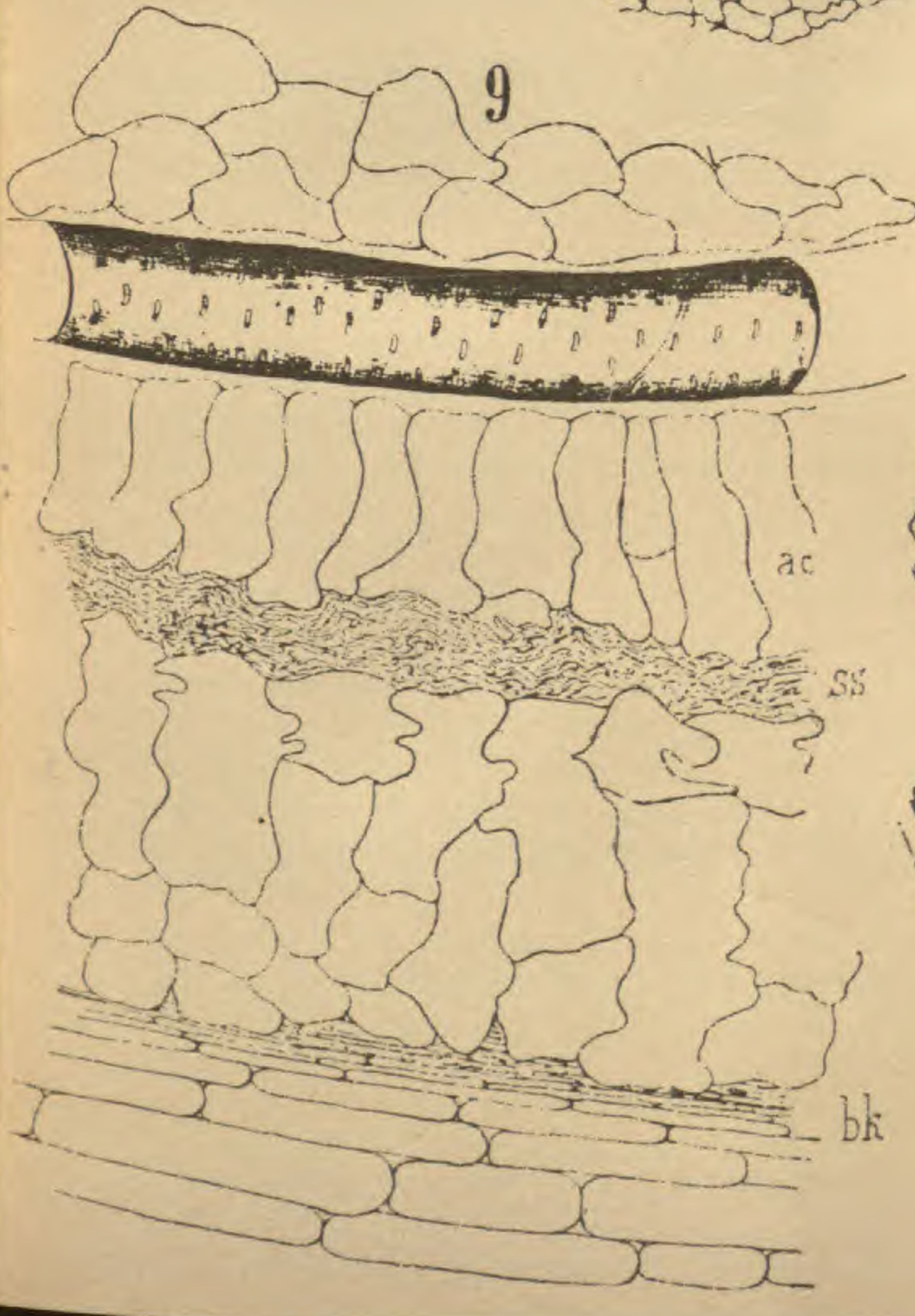

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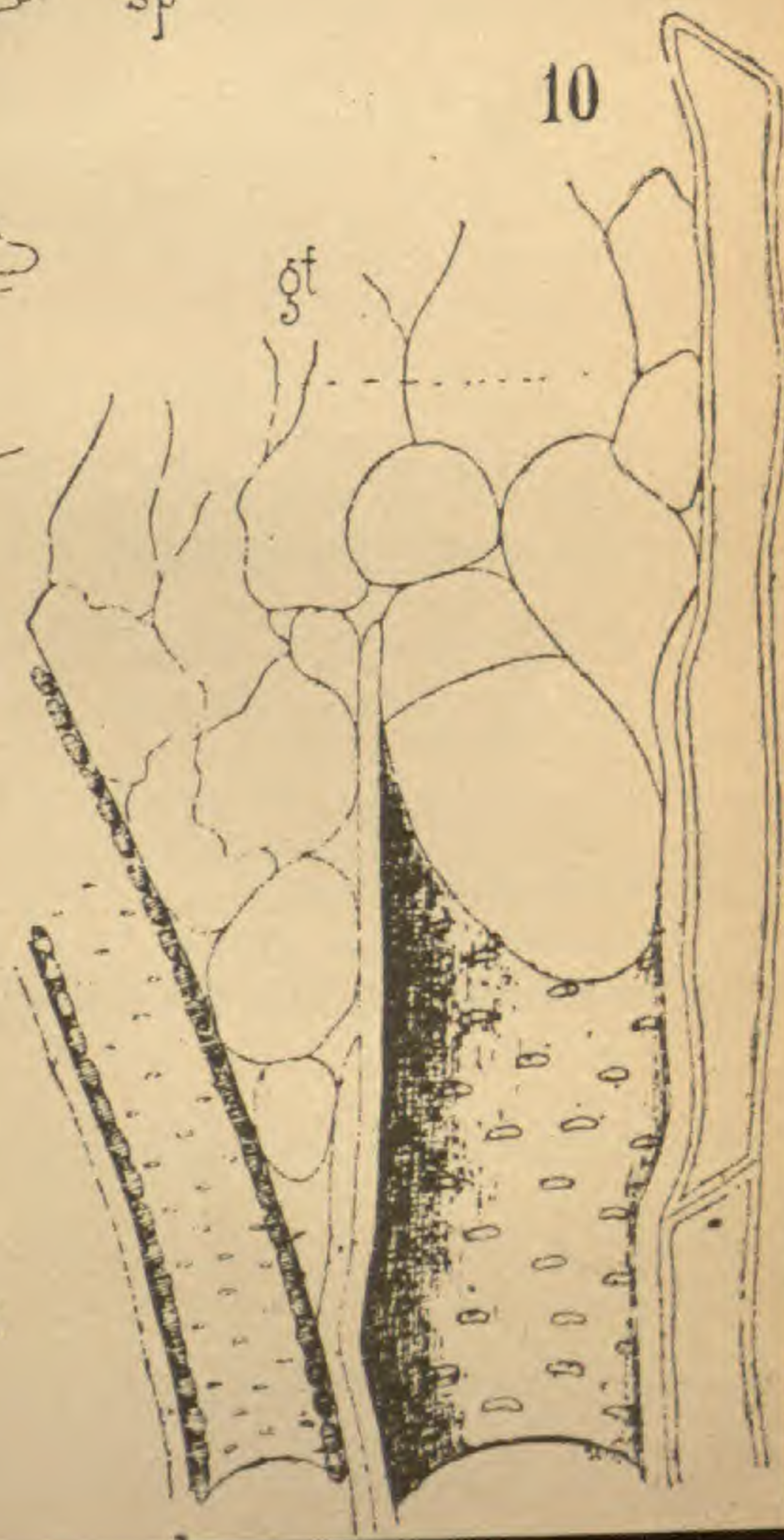

BULLETIN

OF THE

TORREY BOTANICAL CLUB.

Vol. X.] New York, April, 1883. [No. 4.

Notes on the Haustoria of some N. A. Parasitic Phanerogams.

By Jos. Schrenk.

(Plates XXXI–XXXIII.)

Comandra umbellata, Nutt.—The following description of the haustorium of *Comandra* is based on specimens that grew on the roots of *Aster Tradescanti*, L. The figures on the accompanying plates (except Fig. 5), were all drawn from such haustoria; those from other dicotyledonous foster-plants, however, are not at all essentially different. In Figs. 3, 6 and 8 the *outlines* of the various tissues are magnified 80 times, while the individual cells are made to represent the type of those tissues by employing higher powers. In the figures of the other sections the cells appear magnified about 500 times, and the perspective illustrations of the entire haustorium with its foster-root, Figs. 1*a*, 1*b*, and 2*a*, 2*b*, 8 and 12 times respectively. For the sake of brevity, I shall, with reference to the foster-root, call the sections represented by Figs. 3, 6 and 8 respectively, the longitudinal, the transverse, and the tangential (the last being a cross-section of the haustorium itself).

The *haustoria* (suction-organs) of *Comandra* grow on thin, short branches of the root, and usually appear as if stalked. Sometimes they seem to be terminal (Fig. 2*a*), but their internal structure, as well as the common mode of their growth, illustrated by Fig. 1*a*, show that they are lateral organs. The rootlet bearing the haustorium may run parallel with the foster-root (Fig. 1*a*), or in a different direction (Fig. 2*a*). The form of the haustoria is half-ellipsoidal or bell-shaped, somewhat laterally flattened, the longer diameter of their cross-section being parallel with the axis of the foster-root. Their size varies according to age and other circumstances. The smallest are quite minute ; the ones figured on the plates (a little over $1^{mm.}$ high and about $1.5^{mm.}$ wide), I found to be of a common size, but there are some that are twice as large, or even larger.

Viewed externally, the haustorium appears to grasp the root of the foster-plant as a hand, deprived of its thumb, would grasp a large cylindrical object; or, still better, as one's lips would take hold of a finger-joint to suck the blood from a wound (Figs. 1*a*, 1*b*, 2*a*, 2*b*).

In describing the structure of the haustorium, we have to distinguish the interior tissues, which penetrate into the body of the foster-root, from the external covering. The latter, which we might call the *bark* of the haustorium (*bk* in all the figures), reaches from the top of the haustorium to the bark of the foster-root, which it partly encircles, thus playing the part of the lips in the above comparison. At its lower edge, we find a number of papillose cells, reaching, or endeavoring to reach, the surface of the foster-root (Fig. 3). This "bark" consists of large, rounded, parenchymatous cells, which are usually distorted or torn at the outer surface, and in the vicinity of certain cavities, which will be mentioned hereafter. It is often formed of two or more shell-like layers, which grow successively longer, overlap one another, and thus make the surface of the haustorium appear as in Fig. 1*a*.

Under this outer covering there is a zone of oblong, prismatic cells, that are radially arranged in several close rows (*pc* in Figs. 3 and 6). This tissue does not penetrate into the foster-plant; we do not notice it in a tangential section taken as deep as the one in Fig. 8, but in sections higher up toward the top of the haustorium it is always seen encircling the central portion. Its peculiar cambium-like structure, and the manner in which the cells outside and inside of it seem to proceed from it, induce me to consider it as a kind of meristem from which, on one side, the bark (eventually with its successive layers) may originate, while on the other it may contribute to the development of the parenchymatous outer part of the central portion.

Very often there are empty spaces, caused by the stretching and tearing of the tissues, between the zone of prismatic cells and the bark (Fig. 6, *sp*), and also between the successive layers of the bark. Besides, an empty space is usually to be found extending along the curved surface of the foster-root, where the bark is attached by a few rows of cells only (Figs. 6, *sp* and 8, *sp*).

The *central portion* of the haustorium, which lies within the two zones described, and enters the body of the foster-root, consists of several distinct kinds of cells. Most conspicuous among them by their reticulated walls, their zigzag course and peculiar arrangement, are the vascular cells (*vc* in all the figures). They arise singly (Fig. 8), or in groups (Figs. 8 and 3), either at the apex of the haustorium, closely attached to the vessels of the foster-root, often even entering them, or at some distance from them. Continuing their course in zigzag lines they meet other vessels of the same kind, and unite with them in bundles, the butt ends of which form a rather compact ring in the centre of the haustorium. From the different groups of this ring, numerous *single* ducts proceed upward and converge into a large bundle, more or less distinctly divided longitudinally into two halves, and finally join the plerome of the *Comandra* rootlet (see Fig. 3, and for the upper half, Fig. 6). It usually happens that a zone around the lower part of the vertical axis of the haustorium contains no vessels. (Figs. 6 and 8). In Fig. 6, therefore, we see no vascular cells in the lower half, except a small portion of an arc (joining two groups of vessels) which was sliced off by the knife.

In the upper part of their course the vascular bundles are enclosed by a few rows of elongated, narrow prismatic cells (see Fig. 6), which are similar to the prismatic cells inside of the bark, but are much narrower and with thinner walls. There is little doubt that they perform the functions of the cambium of stems and roots.

Another kind of elongated (but not prismatic) active cells accompanies and surrounds the vessels in their lower course, where, in fact, they form the bulk of the haustorium (*ac* in all the figures). The transformation of these cells into vessels by the deposition of the reticulated thickening on the cell-wall, and the subsequent union of several cells into one duct, can be plainly traced.

The space in the central portion not occupied by the tissues mentioned is filled with a ground tissue of parenchymatous cells, not unlike those of the bark in form, but, for the greater part, of smaller size (*gt* in all the figures). In the lower half, especially in close proximity to the foster-root, these cells become also narrow and elongated. But at the two lateral extremities, where they curve outward to insert themselves longitudinally between and into the cells of the foster-root, many of them assume an inflated, club-shaped form (at *x* in Fig. 3, *gt* in Figs. 4, 8 and 10).

In all the sections we notice peculiar, striate bands dividing the parenchymatous tissue into shell-like layers (*ss*). Along these bands, cavities like those between the bark and the zone of prismatic cells are frequently met with, as in Figs. 3, 6, and 8. Similar structures were called "stripes of separation" by Solms-Laubach in his excellent description of the haustorium of *Thesium*, the Old World near relative of our *Comandra*.* Solms-Laubach has shown that they consist of parenchymatous cells, crowded together and crushed by the multiplying neighboring cells into a compact mass, in which the component individual cells are recognizable only with difficulty or not at all. As these notes are to furnish merely an anatomical description, I will reserve my opinion in regard to the origin of these "stripes," and will simply state that in *Comandra* they seem to be of a more complex nature than in *Thesium*; for, in the former, we find them not only in more or less concentric zones, as in *Thesium*, but every larger group of vessels with meristem tissue appears partly surrounded by such a shell of compressed cell-membranes.

The difference in the manner in which the cells of these two parasites are attached to those of their foster-plants deserves special attention. Solms-Laubach says (*l. c.* p. 545) that the terminal cells of the haustorium are *separated* from those of the foster-plant by an irregularly developed layer of a homogeneous, yellow mass, possessing high refractive power; and (p. 547) that this mass is evidently intended to *isolate* the haustorium from its foster-root, and that wherever this mass is but poorly developed or entirely wanting, the foster-root endeavors to replace it by producing a more or less massive corky layer. In the haustorium of *Comandra* I could detect no such mass nor any corky layer. Figs. 4, 5, 7, 9 and 10 show the points of contact in sections carried out in the three principal dimensions.

Fig. 4 is a longitudinal section, showing a group of cells from the vicinity of the point *x* in Fig. 3. Three cells, *gt*, belonging to what I have called the ground-tissue of the haustorium, enter some phloëm of the *Aster* root; the walls of all the cells can be plainly distin-

* Hermann Graf zu Solms-Laubach, über den Bau und die Entwickelung parasitischer Phanerogamen, in Pringsheim's Jahrb. für wissensch. Bot., Vol. vi.

guished without any intervening substance between them. The same is the case in Fig. 5, taken from a longitudinal section of a *Comandra* haustorium on a *Vaccinium* root. The location of this group of cells corresponds to the point *y* in Fig. 3. Here one cell of the parasite, having struck a tracheïd of the *Vaccinium* at right angles, has penetrated it, and within its cavity has formed a peculiar, capitate expansion. The other *Comandra* cells are about to break throngh the wall, while the adjoining cells of the foster-plant have already been partly disintegrated.*

Fig. 7 represents a cross-section of some vessels that have been entirely separated from the plerome of the *Aster* root by the rapidly growing apex of the haustorium, which, like a wedge, exerts a downward and sidewise pressure. Some of the cells (pitted vessels) are very much indented or compressed laterally. The same group, less magnified, will be found in Fig. 6, and another similar one, on the other side of the same haustorium. In this case, too, the cells of the parasite are seen in *close contiguity* with those of the foster-root.

Fig. 10, from a point *z* in the tangential section, Fig. 8, shows some cells of the parasite, that have descended vertically, and then have curved outward, to the right (compare Fig. 3), as they meet a large pitted vessel of the *Aster* and crowd into it, their walls closely pressing against those of the vessel. Some other descending cells are breaking the connection between this cell and the neighboring one.

A similar vascular cell of the *Aster* root, from a place corresponding to the point *w* in Fig. 8, but somewhat nearer to the apex of the haustorium, is shown in Fig. 9. It has been detached from the other vessels and is now wedged in between the actively growing peripheral and central cells of the interior haustorium. This figure, at the same time, explains the structure of the "stripe of separation," *ss*. We see the cells on both sides of it, but especially toward the circumference, yielding to the expansive force of the haustorium, and we can easily imagine that some of them will soon be totally crushed, and that their membranes will help to increase the mass of the "separation stripe." We also notice, at *bk*, some layers of bark-cells. They appear very much reduced in width, the innermost exceedingly so. Using a lens of lower power we might easily take this layer of partly and totally collapsed cells for the "homogeneous, yellow mass" spoken of above, especially after treating the section with alkalies for the purpose of making it transparent.

I think what I have said in explaining the five last figures will be sufficient to show that, in *Comandra*, there exists a direct and unobstructed communication between the cells of the haustorium and those of its foster-root.

Hoboken, March, 1883.

Aspidium Lonchitis, Swz.—The range for this fine fern is now extended to California, it having been collected by Mr. Pringle at Castle Lake, Siskiyou Co., September 5, 1882.

GEO. E. DAVENPORT.

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* By the shading it is simply intended to show the wall of the tracheïd perspectively.

New Plants.

By Edward Lee Greene.

Œnothera Hilgardi. — Annual, canescently puberulent, 3–6 inches high, divaricately much branched; leaves linear, spatulate, entire, 1–2 inches long, including the petiole, the lamina deflexed; branches corymbose in flower, densely spicate in fruit, the spikes leafy; petals 2½ lines long, obovate, entire; capsule ½ inch long, straight, sharply angled, attenuate from base to apex; seeds strongly clavate, pale, smooth and shining.

Collected on moist alkaline soil of the Klickitat Swale, Washington Territory, in July, 1882, by Prof. E. W. Hilgard.

It is nearly related to *Œ. andina*, Nutt., but is a larger plant, with a depressed habit of growth, much larger flowers, sharply angular capsules, and clavate seeds. The seeds of *Œ. andina* are linear-oblong, darker colored, and not so smooth.

Corethrogyne detonsa.—Suffrutescent (?), branches very leafy up to the base of the loose panicle; leaves sub-coriaceous, oblong-oblanceolate, 2–4 inches long, their whole margin coarsely serrate-toothed, densely white tomentose beneath, less so above, the uppermost linear-oblong and finely serrate; involucres large, campanulate, of numerous, rigid, densely woolly scales, in many ranks; receptacle without chaff; style-tips without bristles, but coarsely short pubescent under a lens.

The single rigid, leafy branch, apparently that of a more or less shrubby plant, is in the herbarium of the California Academy, without a note to indicate whence or through whom it was obtained. Though unmistakably a *Corethrogyne*, it lacks the main technical character of the genus, *i. e.*, the bristly style-tips; or at least the long bristly hairs of the other species are, in this, shorn down to a mere pubescence, which is not apparent to the unaided eye. The specimen has the appearance of being very old, and may have come from some island of the Californian coast long ago.

Encelia stenophylla.—Shrubby, glabrous and apparently somewhat glutinous; leaves two or three inches long, narrowly linear, entire, crowded on the branches; heads small, rather numerous, in a rather close and mostly long-peduncled corymb; involucre less than half the length of the disk, its closely imbricated scales lanceolate, with sparingly hispid-ciliate margins; akenes cuneate-obovate, densely villous throughout, each margin bearing a stout awn.

Collected many years since on the Cedros (wrongly written "Cerros") Islands, by Dr. Veatch, whose copious specimens have remained in the herbarium of the California Academy of Science, hitherto unnoticed.

Hemizonia (Hartmannia) Kelloggii.—Diffusely paniculate, 1–3 feet high, stout and somewhat hispid; cauline leaves pinnatifid, 1–3 inches long; those of the branchlets smaller and entire; heads numerous and scattered, of 5–6 ray- and only 3–4 disk-flowers; both stipe and beak of ray-akenes very prominent and strongly bent; pappus of disk-akenes mostly united at base, or even to the middle, forming a tube.

Very abundant, according to the observation of Dr. Parry and myself from the railroad cars, throughout the region of the lower San Joaquin, yet not appearing to have been collected except by Dr. Kellogg, whose labels say "Near Antioch, on dry hills, April 22d, 1870," and who referred the plant to *H. fasciculata*, the more branching states of which it well resembles; but the much larger size, and different habitat, and more especially the very prominent stipe of the ray-akenes, and the united scales of those of the disk, show it easily distinct.

ARTEMISIA (ABROTANUM) FRANSERIOIDES.—Stems two or three feet high, solitary, from a perennial root; leaves bipinnatifid, broad and very large, the lower and those of sterile offshoots often 6 to 10 inches long (including the petiole) and two-thirds as broad, the upper gradually reduced and those of the long, narrowly racemose panicle simple, lanceolate, all of very thin texture, green above and pale beneath with a very minute, appressed tomentum; heads very large, nodding; scales oblong, obtuse, with sparingly lacerate-ciliate, scarious margins, and the greenish back dotted with roundish, white glands; receptacle conical; corolla glabrous; style-tips truncate, densely panicillate.

In deep shady woods of *Pseudotsuga* near the summits of the Pinos Altos Mountains, New Mexico, flowering in the middle of September, 1880; pleasantly fragrant and rather handsome, with the aspect of certain species of *Franseria*. Dr. Gray informs me that it has been collected by Gunnison, in Colorado, and by Rothrock, in Arizona, and that it was referred to *A. discolor*.

Two New Species of Grasses.

By GEORGE VASEY.

STIPA STRICTA.—Culms 1 to 1½ feet high, erect, slender; radical leaves setaceous, more than half as long as the culm; cauline leaves 3 or 4, the lower 5 to 6 inches long, the upper short, its sheath dilated and enclosing the base of the panicle, ligule very short; panicle 4 to 8 inches long, strict, erect, the lower rays in twos or threes, above single, appressed, one an inch long, the other nearly sessile; outer glumes narrowly lanceolate, acuminate, 3-nerved, thin; flowering-glumes about 3 inches, including the stipe, pubescent all over, awn 10 to 14 inches long, twice bent, the lower half strongly pubescent, but not plumose.

Oregon, W. N. Suksdorf, and through the Sierra Nevada Mountains.

It has been mistaken for *Stipa occidentalis*, which has longer *plumose* awns, broader 5-nerved glumes, a *conspicuous* ligule, and a shorter, looser panicle. It differs from small forms of *Stipa viridula* in the shorter, more slender culms, shorter rays of the panicle, narrower glumes and shorter awns.

ARISTIDA PALMERI.—Culms erect, slender, 1½ to 2 feet high, smooth, simple or branched at the base; radical leaves very short, setaceous; cauline leaves 4 or 5, somewhat equidistant, 2 to 4 inches long, ligule a ring of short ciliate hairs; panicle 6–10 inches long, erect, the branches mostly in pairs, 2 to 3 inches long, becoming divergent, below sheathed in the upper leaf, sparingly flower-bearing above the middle, branches and pedicle slightly scabrous; spikelets, including the awns, 9–10 inches long; glumes 4 to 5 lines long, nearly equal, narrow, 1-nerved, acuminate, slightly scabrous on the keel, rather shorter than the flowering-glume, which is 5 to 6 lines long, including the short pubescent stipe, narrow, smooth, the awns nearly equal, 5 to 6 lines long, erect.

Collected in Southern Arizona in 1869 by Dr. E. Palmer.*

A New Ramalina.

By EDWARD TUCKERMAN.

RAMALINA CRINITA, *sp. nov.*—Thallus cæspitose, rigid, compressed, sub-dichotomous, linear-laciniate, at length much dilated, greenish-glaucous, the divisions smooth, interruptedly white-striate, and becoming lacunose, attenuate at the summits, and clothed at the margins more or less thickly with strong, solitary or clustered, finally branched, black fibrils; apothecia middling-sized to large ($3–10^{mm.}$ in width), subterminal and lateral, subpodicellate, varying as to smoothness as the thallus, the margins blackened; spores oblong-ellipsoid, $\frac{15-20}{5-6}$ mic.

On low shrubs of *Euphorbia misera*, in company with *Roccella leucophæa*, *Physcia erinacea*, etc., on the coast, San Diego, California, C. R. Orcutt, in herb. Sprague; found also by the same collector, at Todos los Santos, Lower California; spermogones not observed. In the only other known species comparable with this, inasmuch as the slender divisions pass above into, and are beset with black fibrils (*R. melanothrix*, Laur., known only from the Cape of Good Hope, Drège!) the spermogones are described as black. The tufts of our plant vary from one and a half to three inches in height in the specimens seen as yet, and the width of the divisions from $2^{mm.}$ to more than an inch. The general aspect of the lichen suggests the stock of *R. calicaris*.

Notes on the Adirondacks.—The recent action of the Legislature having brought the great North Wilderness into prominent notice, some general notes made on a recent hurried journey through a portion of that region may not be devoid of interest. Commencing at North Creek, some sixty miles by rail from Saratoga, a stage journey of twenty miles, followed by a buck-board progression—one could hardly call it a journey—of ten miles further through a wooded and broken country, brings us to Blue Mountain Lake. This sheet of water, with its irregular and deeply indented shores and numerous islands, is perhaps the most picturesque of the almost numberless lakes which constitute so prominent a feature of the whole region. The vegetation of

* I have a letter from Mr. Suksdorf, of Washington Territory, in which it is stated that Mr. Howell is entitled to the credit of the discovery of *Agrostis humilis* (described in the February number of the BULLETIN), although he (Mr. S.) also collected on the same mountain—*Paddo* being the Indian name for Mt. Adams.—G.V.

the locality is varied, apparently representing a large number of species common to the Northern and Eastern States; but its whole aspect indicates a severe climate and sterile soil. A notable feature at the time of our visist, August 15th, was the wonderful size and abundance of the fruit of many species. Everywhere on lower ground was *Cornus Canadensis*, with bunches of bright red berries, making the ground in places fairly brilliant. Many of the plants were also in bloom, but the depauperate appearance of the flowers showed them to be plainly out of season. *Clintonia borealis*, though less abundant, was even more striking. Here and there it occupied the ground in patches, to the exclusion of nearly all other plants, while every scape bore several, often a half dozen, berries usually a half inch or more in diameter. The color was of the intensest cobalt-blue, which to my knowledge is not anywhere equalled in fruit or flower. Other species also remarkably conspicuous for their fruitfulness were *Streptopus roseus*, *Medeola Virginica* and *Trillium erythrocarpum*. A number of species, which, further South are found only in swamps, were seen flourishing here on steep and comparatively dry hill-sides. Among undershrubs, *Viburnum lantanoides* was very abundant, and, on lower ground was everywhere laden with great broad cymes of beautiful coral fruits. Far up the mountain-side the plants were still abundant, but bore no fruit.

The ascent of Blue Mountain, instructive in the opportunity it affords for the study of mountain vegetation, offers a perhaps still greater reward in the way of magnificent scenery. The mountain is about 4,000 feet in height, and stands comparatively isolated in a vast amphitheatre of hills and low mountains. A forest stretches in every direction, apparently unbroken except by the lakes and ponds of various sizes, of which about twenty are in sight. In general aspect the forests appear to be made up largely of conifers, but a closer inspection shows that such is not the case. Indeed, nowhere in the Adirondack region did I encounter any exclusively coniferous forests, or any where the conifers were not equalled in number by broad-leaved species. The grand feature of the view from the summit of Blue Mountain, however, is the group of mountains of which Mt. Marcy is the centre, lying some thirty miles to the east. Few mountain views, I apprehend, are grander than this.

On the few acres of cleared land in the vicinity of Blue Mountain Lake it was interesting to note the promptness with which nature sets about clothing the open spaces with vegetation. Left to itself for a single year, a clearing, especially if it has been burned over, yields a luxuriant crop of the two fire-weeds, *Epilobium angustifolium* and *Erechthites hieracifolia*, the former largely in excess. In clearings two or three years old, as also along the sides of roads, *Prunus Pennsylvanica* begins to appear in great abundance. Many of the plants were fairly vigorous, while a large number was seriously affected by the black-knot. So far as these clearings are intended to give space for cultivated fields, they appear altogether unpromising, judging by the few efforts at gardening here and there visible. Whatever else may be in store for the wilderness as a whole, it is safe to predict that no considerable areas will ever be devoted to agricultural purposes.

A canoe journey through Blue Mountain, Raquette and Long Lakes and connecting streams and ponds, is an event of rare interest. The vegetation of the shores is everywhere sufficiently attractive, but one's interest and admiration culminate at various points along Raquette River. Nowhere have I ever seen more beautiful natural planting. Very often the commingling of the vegetation is such as to produce the most striking effects, which linger long afterwards as pleasant pictures in the memory. At certain especially noteworthy spots the principal species on the river banks appeared to be *Acer dasycarpum*, *Pyrus Americana*, *Abies balsamea* and *Lobelia cardinalis*. The maples, of rather small size and bushy form, were in greatest numbers. Mingled with these were shrubby forms of mountain ash with branches appearing like fronds, and producing an airy and graceful effect; and the back-ground was filled in with rather sombre but beautiful specimens of balsams, while in front of all and close to the water's edge were great masses of luxuriant cardinal flowers laden with a profusion of bloom.

Of the numerous aquatic species encountered, none was more attractive than the water-lilies. The patches met with here and there presented marked differences in the size and color of the flowers, the size and general appearance of the leaf, and in the whole aspect of the plant. The forms in the Raquette system of lakes and streams answered best to the descriptions of *Nymphæa odorata*, while after crossing the divide at Stony Creek and entering the Saranac system all the plants observed answered more nearly to *N. tuberosa*. The whole appearance of the Nymphæas was such as to suggest the need of a modification of the description of the species as now given, and perhaps the recognition of several well marked varieties.

The wise action of the Legislature in refusing to sell any more of the nine hundred square miles still owned by the State in the Adirondacks ought to be supplemented by the purchase of perhaps an equal area, or at least by the passage of a law securing its control, so that the further removal of timber may be prohibited, or at all events properly regulated. Perhaps the greatest damage to the natural beauty of the region has thus far resulted from the damming up of streams and the outlets of lakes. The object is sometimes to facilitate the getting out of timber, at others to deepen the water so as to permit the use of small passenger steamers, which are unhappily becoming quite numerous. In either case the result is the permanent flooding of the banks and the death of all timber on the flooded areas. Even some parts of the beautiful Raquette have been already doomed. The devastation from this source ought also to receive legislative attention, and be as far as possible prohibited. In general, it seems to me that the vast importance of the Adirondack forests to the State, and the irreparable injury, even from the utilitarian standpoint alone, which their destruction would bring, has never been overstated, or even fully stated.

Cornell University, Ithaca. A. N. PRENTISS.

Notes from Central New York.—*Equisetum littorale*, Kühlewein, discovered by Mr. Pringle on the shores of Lake Champlain, Vt., grows very abundantly at the foot of the high shady banks of the Oswego river, just this side of the Oswego Water Works Company's pump-house. The locality, being saturated continually from the Company's reservoir above, is entirely covered with the light green, branched stems of this long, tender *Equisetum*. I found good specimens in fruit as late as the middle of October. I have no doubt that the plant grows farther up the river, above Minetto, where the low shores are covered with *Hydrocotyle umbellata*, L., and where I found, between the island and the canal, a beautiful specimen of *Lythrum alatum*, Pursh.

Since the only locality for *Eleocharis quadrangulata*, R. Br., at the outlet of Oneida Lake, is exhausted, it will prove of interest to botanists in this State to learn of another station for it, this being six miles east of this city, at Paddy's Lake, near South Scriba P. O. On the eastern shores of this lake, where the water is shallow, this rare rush fills the water and forms a safeguard for *Bidens Beckii*, which grows in the deeper water behind it. Here I found a monstrous form of *Nymphæa tuberosa*, Paine. There were 3–4 perfect flowers, each with green sepals and white petals, upon one stem and within the usual flower, on different plants.

Potentilla recta, L., dropped from the later editions of Gray's Manual, is perfectly naturalized east of the city, along roadsides and in pastures, along with *Hieracium aurantiacum*, L. I have found specimens of both these plants even as far as four miles out in the country.

Coreopsis discoidea, T. & G., abounds on the borders of a pond on Lake Ontario, three miles north-east of the city, where are also found *Cakile Americana*, *Euphorbia polygonifolia*, *Lathyrus maritimus*, *L. palustris*, *Artemisia Canadensis* and *Sporobolus cryptandrus*.

Scirpus lacustris, L., var. *occidentalis*, Watson, grows on the sandy shore of Lake Ontario, west of Twelve-mile Bluff, on the border of a small pond.

To the many rare plants found in Lodi Swamp, Syracuse, N. Y., I may add: *Solidago linoides*, Solander, *S. neglecta*, Torr. and Gray, *S. Ohioensis*, Riddell, *Viola renifolia*, Gray, *Valeriana sylvatica*, Richards, *Tofieldia glutinosa*, Willd., *Arethusa bulbosa*, L., and *Mitella nuda*, L. I think this is the most interesting small swamp, for botanists, in Central New York, but, alas! the new West Shore Railroad and the growth of the near city will soon destroy this little botanical paradise.

The much talked of "Cicero Swamp," some six or seven miles north-east of Syracuse, was visited by me in July last. This dismal forest, visited only by berry-pickers in the fall, and lumbermen in winter, does not pay for the trouble and danger that it requires to obtain access to it. Such plants as grow there (*Woodwardia Virginica*, orchids, *Dalibarda*, etc.) can be found easier in more accessible localities, and far from the numerous rattlesnakes of that green desert, from out of which even an expert guide succeeded in finding his way only by listening for the sound of a locomotive whistle on the

Central Railroad. Great Latin orator, what a disgrace to your immortal name!

Oswego, N. Y. J. H. WIBBE.

Notes on the Coniferæ of Washington Territory.—The following observations are limited to the eastern slope of the Cascade Mountains, between the parallels of 46° 30′ and 47° 30′ north latitude. It is difficult to give any fixed altitudes for the range of a species, as this is in a great measure regulated by the amount of moisture, these two factors of altitude and moisture combined determining the composition of the forests in the different localities. The damp winds from Puget Sound, after passing over the crest of the mountains, are gradually deprived of their moisture until, at a distance varying from thirty to forty miles from the summit, the soil becomes too dry to support a growth of timber. This line between the forest and sage-brush areas varies in altitude from 1,500 feet, along river valleys, to 3,000 feet. The lowest and perhaps the most extensive, at least the most valuable forests, consist of an open growth of yellow pine (*Pinus ponderosa*, Dougl.) and Douglas spruce or yellow fir (*Pseudotsuga Douglasii*, Carr.), the former extending to an altitude of 4,500 feet, and in dry situations even to 5,000 feet, while the latter ranges somewhat higher. The yellow pine is never found in the denser and damper forests towards the summit, even at as low an elevation as 3,000 feet. The whole timbered area can be well divided into the lower and dry or yellow pine forest, and the upper and damp or fir (*Abies*) forest. The term upper in this sense means proximity to the summit rather than altitude. Probably nine-tenths of the upper area are composed of fir—*Abies grandis*, Lindl., (white fir) first appearing, then becoming mixed with *Abies amabilis*, and finally the first species disappearing and the latter forming the bulk of the forest area at the summit. Another species of fir probably occurs here, *Abies concolor*, Lindl., or perhaps *A. subalpina*, Engelm., but its distribution was not well determined. A few trees of *Abies nobilis*, Lindl., (red fir) were seen near Natches Pass at an elevation of 6,000 feet. *Pinus contorta*, Dougl., var. *Murrayana*, (black pine, tamarac) grows throughout the upper yellow pine area. In this situation it often forms dense thickets, the trees being small and with trunks as straight as arrows. The black pine is also often seen on high exposed summits with *Pinus albicaulis*, the latter ranging higher than any other of the coniferæ of the region, except perhaps *Juniperus communis*, L., var. *alpina*, (juniper) which carpets the alpine peaks. The white pine (*Pinus monticola*, Dougl.) is found scattered throughout the upper yellow pine and lower fir forests, and the beautiful light green foliage of the larch (*Larix occidentalis*, Nutt.) is often a conspicuous object at low elevations. *Picea Engelmanni*, Engelm., (spruce) is often a companion of the fir at high elevations, but is rather local in its distribution. The two hemlocks of the region, *Tsuga Pattoniana* and *Tsuga Mertensiana*, Carr., the latter much resembling the eastern species, *T. Canadensis*, Carr., grow through the upper fir forests. The cylindrical, oblong cones of the former are, after falling, very conspicuous by their reflexed scales. The yellow or Sitka cedar (*Chamæcyparis Nutkaensis*, Spach.) is a middle-sized tree along streams and on lake shores, but on high exposed summits at over 6,500 feet it is hardly more than a shrub, and forms dense thickets. The arbor vitæ, the red cedar of Oregon (*Thuya gigantea*, Nutt.) is the largest tree of the region, some specimens being over ten feet in diameter. The yew (*Taxus brevifolia*, Nutt.) is frequently seen in the dense damp forests, but rarely exceeds a height of 25 feet. Some few specimens of *Juniperus Virginiana*, L., (red cedar) were seen at low elevations. The main summit of the Cascade Range, in the region where the above observations were taken, has an altitude varying from 6,000 to 6,800 feet, and is generally bare of timber. Its immediate slopes are covered with grass and flowers of every hue interspersed with bunches of willows and groves of fir.

Newport, R. I. FRANK TWEEDY.

Fasciation in Rubus.—A curious case of fasciation was brought to my notice a short time since. The specimen was a cane of the cultivated black-cap raspberry, which, at the extremity, had become strongly flattened and coiled upon itself in the form of a flat spiral. The width of the cane was seven-eighths of an inch, and the thickness about one-third of an inch near the outer circumference of the coil, while on the inner side it was much thinner. The four complete coils were from one and one-half to three and one-half inches across. From the beginning of the first coil the cane bore an unusual number of abortive foliar organs, which increased in number toward the extremity until the entire tip was of a thickened and foliaceous character.

A cross-section of the cane showed it to consist of two regions of entirely different tissue. The thickened portion which followed the periphery of the curve was of normal woody structure, while the opposite side was composed almost entirely of parenchyma. This differentiation of tissues, with their unequal rates of growth, doubtless explains the phenomenon of curving. The coil became more distinct and its radius shorter as the difference between the two regions became more marked, until, at the extremity, the parenchyma predominated and expanded into a sort of flattened membrane. At the time of collection the woody region was still fresh and active, but the parenchyma was dead and withered. This, no doubt, assisted in the curvature, since several transverse fissures across the parenchyma showed that it had been subjected to considerable tension.

I believe the cultivated species of *Rubus* are especially liable to oddities of growth, but I have never seen so striking a departure as this before.

Houghton Farm, Mountainville, N. Y. W. E. STONE.

Genus Labels.—Mr. H. N. Patterson, of Oquawka, Ill., desires us to state that the first box of his North American genus-labels, from Ranunculaceæ to Compositæ, 650 genera (3 of each), is now ready for delivery. Price $1.30.

Note.—We send out with this number three plates, which are to be substituted for the badly printed ones that accompanied our March issue.

BULLETIN

OF THE

TORREY BOTANICAL CLUB.

Vol. X.] New York, May, 1883. [No. 5.

New North American Fungi.

By G. Winter.

Pleonectria denigrata, Winter, *nov. spec.*—Perithecia cæspitulos, densissimos, errumpente-superficiales, pulvinato subhemisphæricos, usque $5^{mm.}$ diam., metientes formantia, stromatis pulvinati, intus rufescenti-lutei superficie insidentia, fere globosa, extus grisea, eleganter nigro-papillata, demum vertice depressa et umbilicata, nigrescentia, 360–470μ diam. Asci cylindracei, breviter pedicellati, 8-spori, ca. 70μ longi, 8–10μ crassi, (in aqua demum usque 110μ elongati). Sporæ plerumque monostichæ, valde difformes, rotundato-angulatæ, 3-5- plo transverse septatæ et muriformes, ad septis plus minus constrictæ, pallidissime flavidulæ, 10–16μ longæ, 7–10μ crassæ. Paraphyses filiformes, longissimæ.

In ramis corticatis *Gleditschiæ triacanthi* prope Lexington, Ky., June, 1882; legit W. A. Kellermann. (No. 9.)

Calloria rubro-coccinea, Rehm et Wint., *nov. spec.*—Apothecia sparsa vel gregaria, sessilia, patellariformis, rubro-coccinea, sicca urceolata varioque modo plicata, humida explanata, 1–$3^{mm.}$ diam. Asci clavati, apice incrassati, 8-spori, 40–45μ longi, 5μ crass. Sporæ clavatæ, hyalinæ, unicellulares, submonostichæ, 12–15μ longæ, 3μ crassæ, hyalinæ. Hymenium dilute rubro-coccineum, in lamellis tenuissimis, fere hyalinum.

In ramis *Gleditschiæ* cum antecedente.

Diaporthe Kellermanniana, Winter, *nov. spec.*—Stroma nullum, Perithecia profunde immersa depresso-globosa, membranacea, atra, 210–260μ lata, errumpente prædita. Asci oblongo-fusoidei, 8-spori, 35–40μ longi, 5–7 crassi, sporæ oblongæ, sæpe inæquilaterales, utrinque rotundatæ vel parum acutiusculæ, medio uniseptatæ, non constrictæ, 4-guttulatæ, 9–11μ longæ, 3–3.5μ crassæ.

Ad *Zeæ Maydis* culmos putridos prope Lexington. Dr. W. A. Kellermann, cui hanc speciem dedicavi. (No. 2).

Phyllosticta Podophylli (Curtis), Winter.—(Synon.: *Ascospora Podophylli*, Curtis, in 23 Rep. of the New York State Cabinet, p. 65, sec. Cooke, *in litt.*)—Maculæ amphigenæ, angulosæ, sæpe irregulares, determinatæ, usque $12^{mm.}$ (et ultra) latæ, interdum confluentes, fuscæ, Perithecia amphigena, gregaria, plerumque secus nervos disposita, globosa, atra, ca. 100–120μ diam. Sporidia fere globosa vel ellipsoidea, unicellularia, hyalina, guttulo oleoso magno prædita, 8–9μ longa, 5–6μ crassa.

In foliis vivis *Podophylli peltati*, sæpe in consortione *Septoriæ Podophyllinæ*, Peck, in *Bot. Gaz.*, Vol iv., p. 170. Prope Lexington, Ky., leg. Dr. W. A. Kellermann. (No. 13.)

CERCOSPORA SEYMOURIANA, Winter, *nov. spec.*—(Synon. : ? *Helminthosporium olivaceum*, B. & R., in *Grevillea*, iii., p. 102.) Cæspites hypophylli, maculas indeterminatas, vel effusas et totam fere foliorum superficiem obducentes, fuligineas formantes. Hyphæ fasciculatæ, breves, 40–55μ longæ, torulosæ, parce septatæ, simplices, brunneæ. Sporæ obclavato-filiformes, sursum plerumque longissime attenuatæ, multum denseque septatæ, amœne brunneæ, interdum ad septa constrictæ, usque 100μ longæ, inferne 7μ crassæ.

In foliis vivis *Gleditschiæ triacanthi*; Fulton Co., Ill.; leg. A. B. Seymour. (No. 1,780.)

Hottingen bei Zurich, Switzerland.

Cucurbita Californica, Torr.

By C. C. PARRY.

In the BULLETIN for March, 1882, the writer presented a notice of certain diagnostic characters, heretofore overlooked, derived from an examination of mature fruit of three of the peculiar perennial species of *Cucurbita* indigenous to Western North America, with outline sketches of the same. The fourth remaining species, *Cucurbita Californica*, Torr., then imperfectly known, has been lately brought to my notice by Mr. S. B. Parish, of San Bernardino, and, from very complete material kindly furnished by this enterprising collector, I am now able to complete the account, including all the recognized species of Western North America, viz.:

Cucurbita Californica, Torr.—Fruit orbicular-pyriform, 3–3¼ inches in diameter, 2¾–3¼ inches in length, on peduncles 2½ inches long; peduncles curved, thickening upwards, and marked by about ten prominent ridges, which are prolonged in longitudinal lines to the apex of the fruit, other intermediate, less prominent lines intervening on the light green, rugose-hispid surface, irregularly spotted with dark green blotches; external rind thin and flexible, becoming lobulated and deeply wrinkled when dry, and losing its orbicular shape.

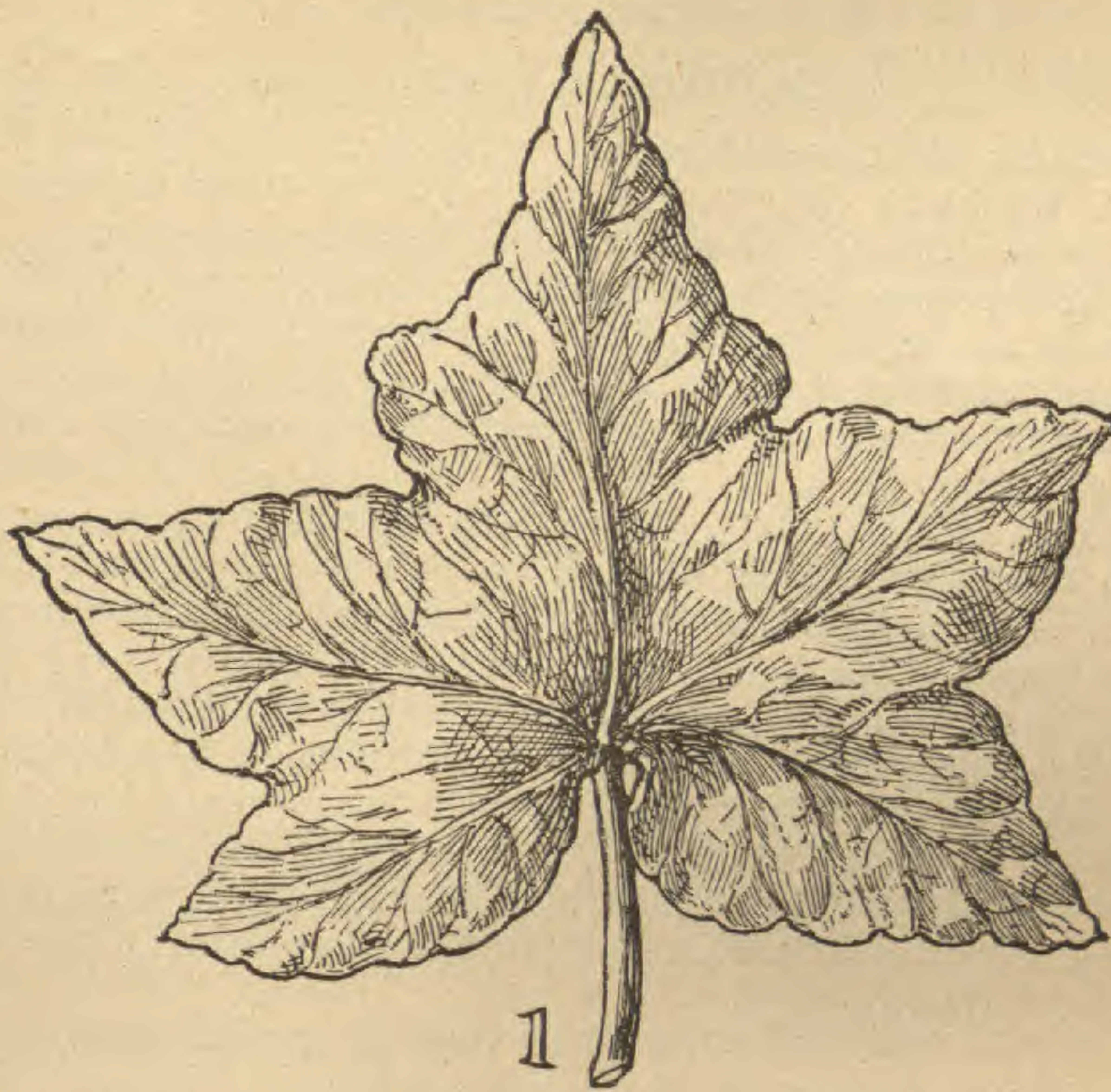
Internal cellular tissue fleshy (not fibrous); placentæ in 5 pairs, shortly curved, and bearing medium-sized, light brown seed on the outer edge.

Plant with thick, fleshy, perennial root, annual branches 3–5 feet long, spreading, hispid-scabrous; leaves quinate-lobed, margins more or less undulate, dull green, mottled, with conspicuous branching veins, petioles 1–2½ inches long, blade about the same length, tendrils divided to the base; flowers 2 inches long, similar to those of the other species.

Habitat.—Collected by S. B. Parish, August, 1882, on the foothill slopes of Red-lands adjoining San Bernardino. Readily distinguished from *C. palmata*, growing in the same district, by its smaller size, diminutive foliage, and especially by its dull green, thin-rinded fruit becoming lobulated when dry.

It agrees with the description of *Cucurbita Californica*, Torr., in Botany of California, Vol. i., p. 240, from "imperfect specimens."

DESCRIPTION OF THE FIGURES.—Fig. 1. Medium-sized leaf. Fig. 2. Section of mature fruit. Both natural size.



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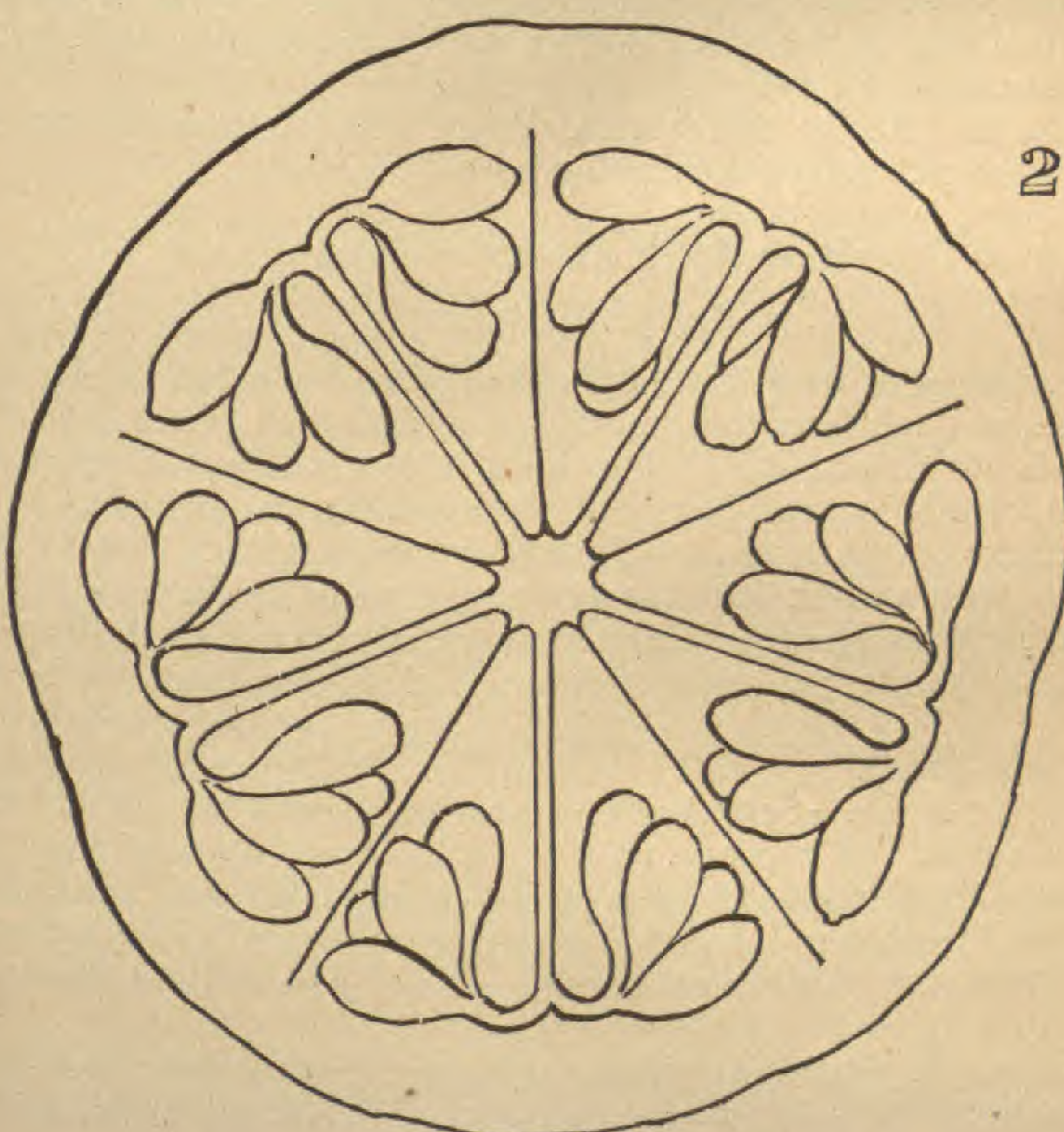

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New Species of Grasses.

By George Vasey.

Sporobolus Wolfii.—This was published and figured in the Botany of Wheeler's Survey, Vol. vi., 1878, as *Vilfa minima*. As *Vilfa* is now united with *Sporobolus*, and as the specific name is preoccupied, it therefore becomes necessary for our plant to have a new name, as above, in honor of the discoverer, Mr John Wolf. It was collected at Twin Lakes, Colorado, in 1873. It is much more diminutive than *Sporobolus gracillimus*, Thurb., with the spikelets only half as large.

Danthonia intermedia.—Culms 1–1½ ft. high, leafy below, radical leaves 6–10 inches long, narrow, cauline leaves 2 to 6 inches, pubescent, especially on the sheaths, ligule merely a narrow hairy ring, with longer hairs at the margins; panicle narrow, 1–2½ inches long, rays alternate, mostly short, the lower generally with 2 or 3 spikelets, the upper with single spikelets; spikelets 6–8 lines long, about 5-flowered, empty glumes somewhat longer than the flowers, about 5-nerved, acute; flowering-glumes 3–4 lines long, mostly smooth on the back, hairy on the margins, nerves not prominent, teeth about 1 line long, broad, awn stout, about 3 lines long, palet slightly shorter than the flowering glume.

This may be readily distinguished from *D. sericea*, with which it has been confounded, by its shorter and smoother culms and leaves, closer and fewer flowered panicle, flowering-glume smooth or smoothish on the back, by the much shorter and broader teeth, and shorter, stouter awns.

California, Rocky Mountains, Plains of Br. America to Mt. Albert, Lower Canada (O. D. Allen).

New North American Fungi.

By J. B. Ellis.

The species of fungi here described were collected by Mr. S. J. Harkness in Utah Territory, mostly at an elevation of 7,600 to 8,000 ft. It should also be stated that the species described on pp. 123–4, Vol. viii. of this journal, were collected at this same altitude.

Alternaria hispidula.—Forming olivaceous tufts shaped like a *Helotium*, with a thick stem composed of closely compacted, branching, minutely roughened threads, expanding at intervals of 15–20μ into oval-elliptical, 3–4-septate, minutely roughened spores, 12–20 x 8–12μ.

On sage-brush.

Peziza oleosa.—Scattered or gregarious, small, subglobose when fresh, orbicular and concave, with a thick, obtuse margin when dry, substance oily-gelatinous, color bright orange-red; asci sessile, sublanceolate, broadest in the middle (75–90 x 10–12μ); paraphyses none; sporidia biseriate, fusiform-navicular, uniseptate, hyaline, 18–22 x 3–3½μ.

Allied to *P. fusarioides*, Berk. On dead herbaceous stems.

Lophiostoma pallidum.—Perithecia subhemispherical, 25$^{mm.}$ in diameter, collapsing above; ostiolum only slightly prominent and not strongly compressed; asci sessile, subcylindrical, 90–100 x 12–15μ; paraphyses filiform; sporidia more or less biseriate, oblong-cylindrical, nearly hyaline, about 7-septate, ends obtuse, slightly curved and one end broader, 18–24 x 5–6½μ.

On weather-beaten wood of service-tree.

SPHÆRIA (MELANOMMA) SULCATA.--Superficial, densely gregarious, perithecia ovate (.33$^{mm.}$), black, not polished; ostiolum tuberculiform, large, with a rather large and nearly circular opening; asci clavate-cylindrical, 130 x 22μ; paraphyses abundant; sporidia biseriate, broad navicular-fusiform, septate, straw-yellow, becoming brown, 35–45 x 11–15μ.

On dead sage-brush.

CUCURBITARIA UMBILICATA.—Scattered, depressed-hemispheric, black, rough (.33–.5$^{mm.}$), collapsing above when dry; asci cylindrical, 114 x 11μ; sporidia mostly uniseriate, elliptical, constricted in the middle, 3-septate and straw-colored at first, becoming muriform and brown, 22–28 x 9½–13μ.

On decorticated sage-brush.

LEPTOSPHÆRIA OLIVACEA.—Perithecia submembranaceous, about .25$^{mm.}$ in diameter, buried in the substance of the stem and covered by the cuticle, which is slightly elevated, stained olive-brown and pierced by the broad, rough, obtuse ostiolum; asci clavate, 75–85 x 15–18μ; sporidia fasciculate yellow-brown, vermiform, 6–7-septate, and, when mature, slightly constricted at the septa, third joint from the tip slightly swollen, 75 x 3½–4μ.

The spore is generally slightly bent just below the last-named joint. On dead herbaceous stems.

PLEOSPORA AUREA.—Perithecia gregarious, subcuticular (.25–.33$^{mm.}$ in diameter), soon collapsing, of coarse cellular structure and surrounded at the base with a coarse, fringe-like mycelium of brown, septate, sparingly branched, creeping hyphæ, which are plainly visible through the transparent cuticle; asci broad, obtuse, sessile, about 114 x 3μ (spore-bearing part); sporidia biseriate, elliptical, flattened, 4-septate, with all but the terminal cells divided by a longitudinal septum, golden-yellow, 27–30 x 11–15μ.

On dead herbaceous stems.

PLEOSPORA PLANISPORA.—Perithecia gregarious, collapsing when dry (.25–.33$^{mm.}$), covered by the scarcely discolored epidermis; asci 114–120 x 25–28μ; sporidia biseriate, oblong-elliptical, flattened, 5-septate, with a longitudinal septum on each side running through all but the terminal cells, yellow, becoming brown, 30–40 x 15–20 x 11μ; paraphyses abundant.

On dead culms of some grass, apparently a species of *Elymus*; mostly on the sheaths.

This is closely allied to the preceding species, but the mycelium is less abundant, the sporidia larger and quite constantly 5-septate.

PLEOSPORA BACCATA.—Perithecia subcuticular, hemispheric, collapsing, rough (.33–.5$^{mm.}$), fringed around the base with abundant, brown, creeping hyphæ; ostiolum papilliform; asci oblong-cylindrical, 114 x 23μ; sporidia biseriate, oblong-elliptical, 3-septate, with a partial longitudinal septum. The spore is often composed of only six divisions or cells, loosely attached to each other, the four middle ones placed in a subquadrate manner, with a single nearly globose cell at each end. These different cells are so slightly attached to each other that they easily separate and the sporidium breaks up like a crumbling raspberry.

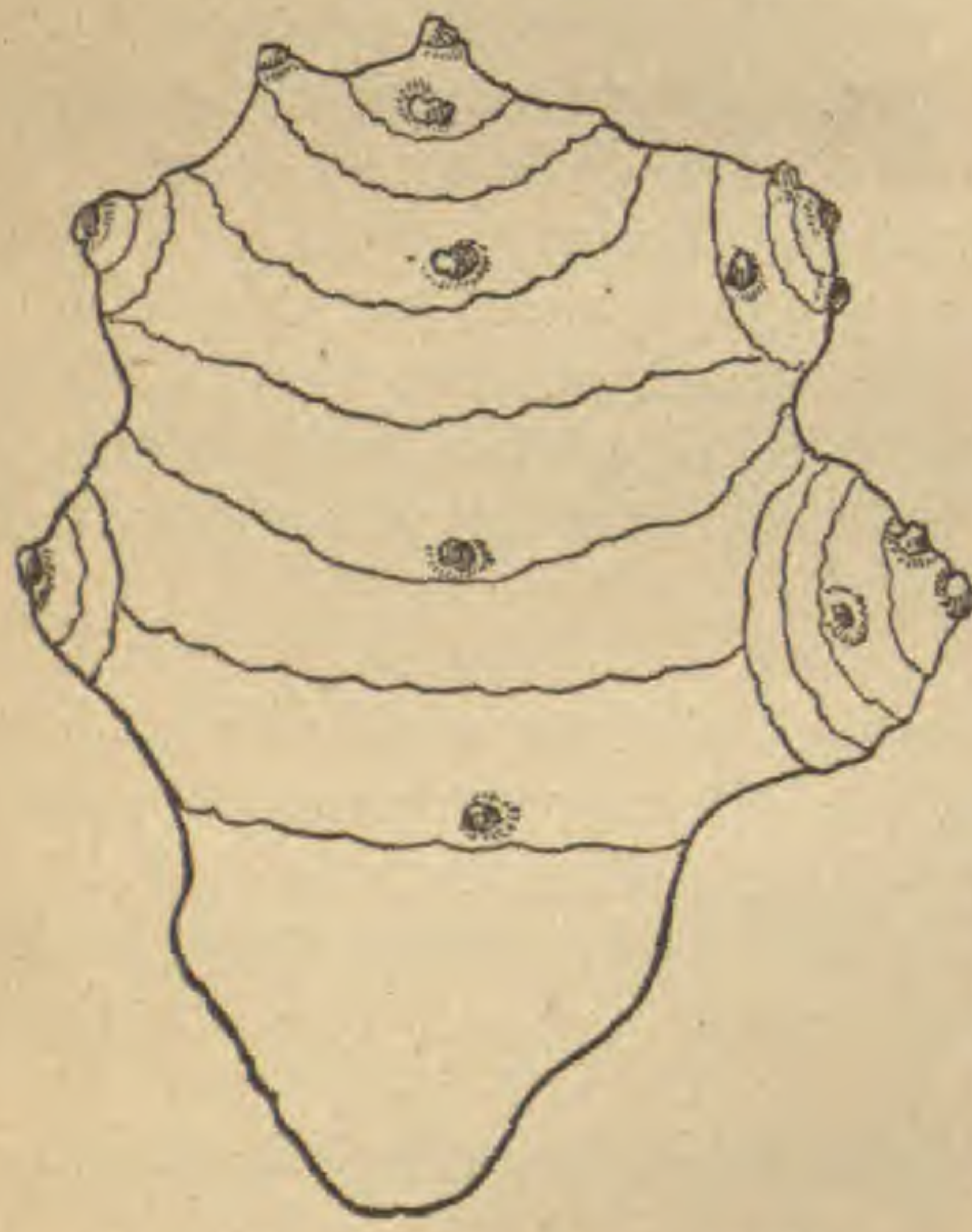
On the dead stems of some species of *Cirsium*.

SPHÆRIA (ANTHOSTOMELLA) PHOLIDIGENA.—Perithecia subcuticular, erumpent, hemispheric, rough ($.33-.5^{mm.}$); ostiolum slightly prominent, with a rather large aperture; asci linear, $114 \times 7\mu$; paraphyses abundant; sporidia uniseriate, narrow, elliptical, continuously brown, $7-10 \times 5-6\mu$. Some of the perithecia contain stylospores, which are much like the ascospores, but a little shorter. This differs from *Amphisphæria conorum*, Fckl., only in its smaller sporidia and differently shaped stylospores, and may, perhaps, be more properly considered as a mere variety of that species.

On cones of red pine. On the back of the scales and mostly covered by the overlapping point of the next scale below.

Morphology in the Tuber of Jerusalem Artichoke.—Picking up, in my garden, a tuber of Jerusalem artichoke which had been thrown out on the surface by recent spading, I was attracted by the prominence of the buds, and the distinct markings on the tuber, showing the position of the buds, leaves and branches in the order of their phyllotaxis. The accompanying sketch, which I made at the time, will exhibit this arrangement.

On the growing stem, the artichoke (*Helianthus tuberosus*) has the



leaves opposite during the early part of its growth, the upper leaves gradually becoming alternate. In this tuber, or underground stem, the opposite-leaved arrangement is plainly visible. On the right side are two arrested branches from the axils of suppressed leaves, corresponding to two others on the left side which are not so fully developed. The alternate buds, occupying the front face (and to which there are others corresponding on the opposite face) seem not to have developed into branches, but remain only as buds. The wavy lines of exfoliating membrane or skin seem morphologically to belong to the leaf-system, and mark the division of the nodes, corresponding in this with the ridge formed by the expansion and adnation of the bases of the opposite leaves as seen in the stem above ground. The internodal spaces are very much contracted, and their wavy, undulating course is due to

NOTE.—*Valsa didymospora*, described on p. 98, Vol. ix., of the BULLETIN, proves to be only an imperfectly developed state of *Valsa subcuticularis*, C. & E.

the irregular cell-growth in the different portions of the tuber. I have not been able to trace the leaf-arrangement from positions of the buds, either in the Irish or sweet potato (both underground stems) so well marked, as in this of the artichoke, probably due to greater irregularity in cell-growth of these tubers. This of the artichoke offers a fine illustration of the underground tuber following the character of the growth above ground.

Aiken, S. C. H. W. RAVENEL.

Notes on New England Marine Algæ. II.—*Calothrix parasitica*, Thuret.—This species, previously reported at Wood's Hall, Mass., was very abundant last September at Cottage City, completely covering the *Nemalion multifidum* growing at low water-mark between the Oak Bluffs and the Camp Meeting landings. The natural color of the *Nemalion* was entirely lost, giving place to a very dark bronze-green, turning almost black in drying. This species also occurs at Marblehead, but quite sparingly; the plants are so scattered through the *Nemalion* as to be observable only under the microscope, not with the naked eye. I have also found what appears to be the same species growing on plants of *Batrachospermum vagum*, collected in fresh water at Billerica, Mass., by Mr. Edwin Faxon.

Codiolum longipes, Foslie.—In July, 1881, I found at Peak's Island, Portland Harbor, Maine, a form of *Codiolum*, differing considerably from the typical *C. gregarium*, A. Br., the only species recorded in America. The unicellular fronds in the Portland plant are longer and slenderer, the stipe longer in proportion to the "clava." Dr. F. R. Kjellman, of Upsala, Sweden, kindly examined a specimen, and reported it identical with *C. longipes*, a species founded on a plant recently discovered in Norway, and described and figured in Christiania Videnskabs-Selskabs Forhandlinger, 1881, No. 14. Several species of *Codiolum* have been described, but, as the development is little known, some of them may be merely stages of growth of others. My specimens appeared to be entirely in a vegetative condition, showing no indication of the formation of spores. The plant grew on boulders at about half tide, and was not mixed with any other alga. *Ulothrix isogona* grew in the vicinity, but in distinct patches, and generally not on the same rock. When wet, the two were hardly distinguishable by the naked eye, but, when dry, the *Codiolum* showed a curious mottled appearance, the tufts falling apart so that the transparent stipes showed in minute white dots among the green of the upper parts of the cells.

Chorda tomentosa, Aresch.—Though not recorded, this species has probably been collected in this country, but confounded with *C. filum*, the spring state of which it considerably resembles. It is, however, shorter and stouter, and has longer and denser hairs, which continue till after the fruit is formed, in May and June. The hairs of *C. filum* fall off in the spring, while the fruit is not formed until August. The sporangia of *C. tomentosa* are about double the length of those of *C. filum*, and are cylindrical rather than ovate. The former are figured in Areschoug's Observationes Phycologicæ, Part iii., Tab. ii., Fig. 1; the latter in Farlow's Manual of the New England Marine Algæ, Pl. vi., Fig. 1. My specimens were collected in June, at Nahant, Mass., where the plant seems not to be very rare.

Ralfsia deusta, Ag., reported in America only from Eastport, Maine, I found at Marblehead, Mass., near the Clifton House. It grew just at and a little below low water-mark, in company with *Corallina* and *Lithothamnion*. The growing plant is rather handsome, and quite distinct from other species of the genus, but in drying it loses much of its character.

Ralfsia verrucosa, Aresch., I found at East Chop, Martha's Vineyard, last September; and also

Petrocelis cruenta, Ag. Neither species has been reported as found south of Cape Cod. I found them after a severe gale, which had washed up large quantities of algæ. These two species were on pebbles on which *Phyllophora Brodiæi* was growing, and had apparently come from deeper water. Both were without fruit, and were smaller than the common northern forms.

Callithamnion membranaceum, Magnus.—This curious species, which is quite common in Massachusetts Bay, is much the smallest of the genus, and its habitat is a very unusual one for one of the Florideæ. It grows in the interior of polyzoa, sponges, and sometimes of siphonaceous algæ. In spring and summer, Laminarias and Agarums will not uncommonly be found covered with a *Sertularia*, which, instead of being white or yellowish, is bright red, being filled with a dense mass of *Callithamnion*. This species was discovered in 1872 in the German Ocean, by Dr. P. Magnus, and described and figured by him in Die Botanischen Ergebnisse der Nordseefahrt, Berlin, 1874. What is probably the same plant was found on the Massachusetts coast by Dr. P. F. Reinsch, and described and figured in the *Botanische Zeitung* for Jan. 10, 1879, but no name was given to it. The position of the tetraspores in Reinsch's figure differs somewhat from that in Magnus's. All the fertile specimens I have found agree with the latter, and a specimen which I sent to Dr. Magnus is pronounced by him perfectly identical with the European plant. It is reported by Hauck as found in the Adriatic, and is probably quite generally distributed, but has escaped notice from its minuteness and place of growth.

Malden, Mass. FRANK S. COLLINS.

Thalictrum anemonoides or Anemone thalictroides, which?—Dr. Gray, in his Manual, has placed the rue-anemone in the genus *Thalictrum*, and he has been generally followed in this country. Wood, however, places it, in his Botanist and Florist, in *Anemone*, and he is, I think, correct in doing so. It differs essentially from *Thalictrum* in having an involucre, and agrees in all respects with *Anemone* except that Dr. Gray makes the arbitrary distinction "achenia * * * not ribbed." Omit the *not*, and let it read "achenia pointed or tailed, flattened *or* ribbed," and the generic description of *Anemone* of Dr. Gray will fit admirably the rue-anemone. It resembles in a striking manner the *Anemone nemorosa*, and is certainly more nearly related in every respect than *Anemone Hepatica* is. Since making my note to this effect, I find that Bentham and Hooker have placed *Syndesmon*, Hoffm., under *Anemone*, though Dr. Gray considered it a subgenus under *Thalictrum.* Taking all circumstances into account, it would seem a wise policy to go back to the old Linnean name of *Anemone thalictroides* and settle our rue anemone in the place where it can find its closest connections.

Cincinnati, Ohio. JOS. F. JAMES.

Abnormal Trillium.—A specimen of *Trillium sessile* was lately brought to me which was quite interesting because of its departure from the normal type. Instead of having the parts all in threes, they were mostly in fives. There were five leaves, five sepals, five petals, eight stamens, four stigmas and a four-celled ovary. One of the petals had partly developed an anther on one side. The plant is very common here, but I have never seen a specimen like this before.

Cincinnati, Ohio. JOS. F. JAMES.

Violet with Runners.—Does any one know whether it is common to find *Viola striata* producing long runners? I have found, in a locality near here, many specimens which have runners from 12 to 18 inches long, and I should like to know whether this is a common thing with white violets.

Cincinnati, Ohio. JOS. F. JAMES.

Alfred Robson Young died in Brooklyn, N. Y., April 12th, 1883, aged 54 years.

Mr. Young was born in York, England, January 14th, 1829, received his early education in Scarborough, and, at the age of fourteen, came to this country with his uncle, Mr. John Johnson, of Brooklyn. For more than forty years he was a collector and student of marine algæ, and made large collections in Europe, America and Australia, having resided in the latter country for a considerable time some thirty years ago.

Perhaps no man of the present generation was so intimately acquainted with the marine flora of New York Bay and adjacent waters as Mr. Young. An acute and accomplished botanist in this department, he was a gentleman of many graces and virtues of mind and character, and will be long and pleasantly remembered by all who shared his friendship. Though suffering from painful diseases, through many months and years, and which first deprived him of sight and at last of life itself, he was remarkably cheerful to the end, and never ceased to take a lively interest in his favorite plants.

Taunton, Mass. A. B. HERVEY.

Carices Wanted.—Mr. Sereno Watson writes us that Dr. H. Christ, Rue de l'Arbre, 5, Basel, Switzerland, is engaged upon a revision of the European *Carices*, and desires to procure, by exchange or purchase, American specimens for comparison.

Austin's Musci Exsiccati.—Mrs. C. F. Austin, of Closter, N. J., writes us that she still has remaining two sets of the *Musci Appallachiani* and five of the *Supplement*, which she will dispose of at a low price to any one who desires to purchase them.

Plants Growing in Trees.—A long list might be made of the plants that domesticate themselves in trees. The elms of New Haven, Connecticut, furnish some interesting examples: currant bushes bearing fruit occur in many places, as on Hillhouse Avenue and the College grounds. A matrimony-vine (*Lycium vulgare*), flourishes in one of the huge trees in front of the Scientific School. I have seen gooseberry bushes in similar situations. Grass often figures as an air-plant, and a hollow in a trunk, some fifteen feet from the ground, is filled with a beautiful growth of ferns. I refrain from giving the specific locality for fear the progressive aldermen may cut the tree down.

Brick Church, N. J. HENRY BALDWIN.

Botanical Notes.

The Distribution of Ferns in the United States. In a paper upon this subject in the *Proceedings* of the American Philosophical Society (Feb. 2, 1883, p. 610), Mr. George E. Davenport says:

So far as now known, New York, Michigan, Florida, Vermont and California, in the order named, have the greatest number of species of ferns within their respective limits.

In the first, second and fourth of these States, the number has, in all probability, reached, or very nearly reached, its maximum, while in the third and fifth it is likely to be largely increased, and those States, from their favorable situations, climate, and comparatively extensive, unexplored territory, will undoubtedly lead all other States in the future, Arizona and Texas alone being at all likely to compete with them for the highest place.

If, however, we distribute our ferns according to the number of square miles of territory which each of the five first-named States contains, then Vermont will lead the others, her ratio being as 1 to every 226⅘ square miles, that for New York as 1 to 814, Michigan 1 to 1,191½, Florida, 1 to 1,289, and California 1 to 4,295½ square miles of territory.

Taking the extremes of the territorial limits, excluding the District of Columbia, which has 1 species to each 2¼ miles of territory, Rhode Island gives us 1 species for each 38¼, and Delaware 1 to 75, as compared with Pensylvania's 1 to 109¼, Colorado's 1 to 4,200 and Texas's 1 to 7,878⅝, square miles.

If we take an average of the fern-flora for the different geographical sections of the United States, on the basis of the present list, New England gives us an average of 40 species for each State, the Middle Atlantic States 40, the South Atlantic 27, the Gulf States 27, the Central States 25, the Pacific States 23, and the Territories an average of 19.

The returns from most of the Territories are altogether too meagre at present to permit of any comparisons, and those already made will necessarily undergo considerable modification as the gaps in the lists for other States fill up.

But, while no absolutely reliable comparisons can be made, nor the precise limits of each species be determined from the present incomplete tables, we may ascertain from them with a tolerable degree of certainty the range of certain species, and find material for some interesting observations.

Thus, we find the cosmopolitan *Asplenium trichomanes* and *Pteris aquilina* in thirty-five and thirty-nine out of the forty-eight States and Territories respectively, while their actual presence in a greater number may be safely assumed. *Polypodium vulgare* appears in thirty-three, with the same, or an even greater probability of its occurring in others in its favor, while its near congeners, *P. Californicum*, and *P. falcatum*, as well as *P. Scouleri*, are restricted to two or three States. Of the remaining Polypodiums, all but *incanum*, which appears in twelve States, are restricted to the single State of Florida, which furthermore monopolizes all the species we have in six genera, the tropical character of these being at once indicated by this fact.

The only other State (since the discovery of *Scolopendrium* in Tennessee has divided with New York the honor of that fern's presence) which may now claim a monopoly of a genus is New Jersey, the very local *Schizæa* being restricted to a portion of its limits, and again restricted to a single species.

Adiantum pedatum occurs in thirty-five States or Territories, while its congener, *A. Capillus-Veneris*, is restricted to thirteen, and the tropical *A. tenerum* to a single State.

The Osmundas are represented by one or more species in twenty-nine, *Onoclea* in twenty-eight States or Territories, and these probably occur in more, although not reported west of the Rocky Mountains. *O. sensibilis* extends as far west as Dakota and Montana, and, in the last-mentioned Territory, is said to have been discovered in a fossil state.

Cystopteris fragilis extends from Maine to California, through thirty-three States and Territories, apparently avoiding the South Atlantic and Gulf States, with the exception of North Carolina, while *C. bulbifera* occurs in twenty-five, covering a more unequal, but broader range south and west, the limits of which terminate in Louisiana and Dakota. *C. montana*, so recently discovered in Colorado by Brandegee, is reported elsewhere in the United States only from Alaska. The Aspidia are represented in forty-four, the Asplenia and Bortrychia in forty-one States orTerritories each, while the drought-resisting Gymnogrammes, Notholænas, Cheilanthes and Pellæas are almost wholly restricted to the arid regions west of the Rocky Mountains, a few scattering species only coming east, north, or south.

It is interesting to note the changes which have taken place in the number and distribution of our ferns since Redfield published his valuable paper on the "Geograhhical Distribution of the Ferns of North America," in the TORREY CLUB BULLETIN for January, 1875, and Mr. Watt his admirable review of Mrs. Lyell's Hand-Book in the *Canadian Naturalist* for 1870. Mr. Redfield enumerated 125 species, which have been increased up to the present time to 153 or 156, according as we may consider the claims of certain ferns to specific rank, or their right to a place in our fern-flora, while the range of the older species has been more or less extended.

Taking the number in the list accompanying this paper for a base, viz., 155, we have since 1875 an increase of 30 species.

Proceedings of the Torrey Club.—The regular meeting of the Club was held at Columbia College, Tuesday evening, February 13th—the President in the chair and forty-two persons present.

The following Committees were appointed for the present year:

Finance Committee.—Addison Brown, John L. Wall and Lawrence Johnson.

Committee on Admission of Members.—W. R. Gerard and Benjamin Braman.

Herbarium and Library Committee.—N. L. Britton, Elizabeth G. Knight, Arthur Hollick and P. V. Le Roy.

Miss Knight exhibited specimens of *Limnanthemum lacunosum*, Griseb., having large, pellucid, submerged leaves.

A communication was read from Dr. R. J. Southworth, of Yonkers, in which the writer offered his herbarium to the Club. On motion, the gift was accepted, and the Secretary instructed to return the Club's thanks therefor.

Dr. J. S. Newberry delivered an interesting and instructive address upon the "Botany of the Arid Regions of Northern Mexico and Southern United States," which was illustrated by lantern slide views of the localities and objects mentioned in the course of his remarks.

At the regular meeting of the Club on Tuesday evening, March 13th, the chair, in the absence of the presiding officers, was occupied by Mr. Braman. There were thirty persons present.

Dr. Kunzé showed a specimen of *Casteria pulchra*, exhibiting an abnormal mode of growth; *Mamillaria stellaris*, in flower and fruit; and fruit of *Cereus serpentinus*, a cactus which is not known to have hitherto perfected its fruit in the United States. The flower was fertilized with pollen a year old taken from *Cereus Macdonaldiæ*. Dr. Kunzé stated that some of these night-blooming *Cerei* sometimes flower in the day-time, an occurrence probably due to a fall in the temperature.

Mr. Chamberlain read a paper on the algæ of New York Harbor and vicinity, illustrating it with a collection of mounted specimens.

Mr. Schrenk, referring to a note on tuckahoe in the BULLETIN for October, 1882, remarked that he had, contrary to a statement made therein, discovered cellular structure in the object, and exhibited mounted sections under the microscope which plainly showed this.

Mr. Britton, referring to an article in the BULLETIN for May, 1873, on the movement of pollen-grains in the calla, exhibited mounted specimens of the pollen under the microscope.

Four persons were elected active members, one person was elected a corresponding member, and four names were proposed for membership.

The Syracuse Botanical Club.—At the Annual Meeting of the Syracuse Botanical Club, March 19th, the following officers were elected for the ensuing year:

President, Mrs. Lillie Barnes; Vice-President, Mrs. Nellie Goodrich; Recording Secretary, Miss Mary Hotchkiss; Corresponding Secretary, Mrs H. S. Gifford; Treasurer, Miss Hattie Leach.

C. E. Faxon, del.

A. Meisel, Lith.

CHEILANTHES PRINGLEI, n. sp.

BULLETIN

OF THE

TORREY BOTANICAL CLUB.

Vol. X.] New York, June, 1883. **[No. 6.**

A New Fern.

By George E. Davenport.

(Plate xxxiv.)

Cheilanthes Pringlei, *n. sp.*—Rootstock slender, creeping, clothed with linear-lanceolate, acuminated brown scales with darker midnerves; stipites $1\frac{1}{2}'$ to $4\frac{1}{2}'$ long, reddish or chestnut-brown, furrowed along the face, clothed at the base with scales similar to those on the rhizoma, but lighter, less acuminate and oftener without midnerve, above sparingly with paler deciduous scales and chaff; laminæ $1'$ to $2\frac{1}{2}'$ long, nearly as broad, triangular or irregularly deltoid or ovate-deltoid, bi- to tripinnately divided into 5 to 7 pairs of opposite and spreading—in the smaller and sterile fronds—or, in the larger and fertile ones, alternate erecto patent pinnæ, lowest pair distant, sometimes shorter than the next, apex deeply pinnatifid, obtuse, both surfaces naked, dark green, rachises beneath clothed with light, nearly transparent—whitish brown becoming darker with age—ovate or linear-lanceolate scales with entire or sparingly toothed margins, those of the main rachis the narrowest; pinnæ $\frac{5}{8}'$ to $1\frac{1}{8}'$ long, lower unequally deltoid or ovate, obtuse, bipinnate, obliquely and pinnatifidly cleft toward the apex, uppermost oblong, pinnate or deeply pinnatifid; pinnules $\frac{1}{4}'$ to $\frac{3}{8}'$ long, the lower series usually the longest, ovate or oblong, obtuse, pinnately divided, or deeply cleft into cuneate-ovate or obovate, oblique segments which are again deeply cleft into cuneate, strap-shaped divisions, those of the largest segments again deeply cut into narrow, obtuse or blunt, cuneate lobes, the recurved tips in the fertile fronds forming distinct herbaceous involucres with entire or slightly crenulate margins; sori one to each ultimate lobe on the apex of a free veinlet; sporangia few, light brown, with about 18 rings. Spores light colored.

Habitat. Base of rocks, mountains of South-eastern Arizona. Collected by Mr. C. G. Pringle, May 2d, 1883.

I take pleasure in dedicating this beautiful fern to my friend Pringle, to whom I am under many obligations. Its delicately cut fronds, exquisite grace and loveliness suggest to my mind something of the refined tone and delicacy of its discoverer's own nature, and this dedication therefore seems to me doubly appropriate. The species is one of the most distinct and satisfactory that has been discovered for a long time, and is wholly unlike any known to our flora or heretofore described. The true form of the frond appears to be triangular, or at least the tendency is toward that form, although in some fronds the greatest breadth is across the second pair of pinnæ, as seen in those drawn by the artist, and, while the lower series of pinnules are generally the longest, sometimes the upper series vary alternately with one or two as long as or longer than the lower, making an irregular outline. The shape of the segments and ultimate divisions varies considerably, but, in holding a fertile frond to the light, the general appearance is that of being finely cut into numerous ligulate divisions with cuneate bases. The young fronds before being unrolled (crosiers) are completely enveloped in a dense covering of whitish scales. The dimensions given for this species will no doubt be found to vary as more of it is collected. My thanks are due to Mr. Faxon for the pains he has taken with the drawing. The excellence and accuracy of his work is now too well known to need any special commendation, and the present drawing speaks for itself.

By a happy coincidence I am able to announce a double discovery by Mr. Pringle, and to accompany my description of his charming fern with a description by Mr. Peck of a new species of fungus found growing on the epidermis of the lamina in the form of pretty orange-colored dots, which, under the glass, resemble little cups filled with bright yellow spores. Mr. Peck has very kindly sent me his manuscript description, and expressed a wish to have it accompany my own description of the fern upon which the fungus grew, and it is accordingly given hereafter.

EXPLANATION OF PLATE XXXIV.—1. Plant, natural size. 2. Enlarged pinnule (second lower pinnule on second pinna). 3. Segment enlarged. 4. Lobe with one indusium turned back. 5. Scale from back of frond. 6. Scale from rhizoma. 7. Sporangium. 8. Spore.

A New Fern Rust.

By CHAS. H. PECK.

CÆOMA CHEILANTHIS, *n. sp.*—Spots indefinite, pallid or pale yellow ; sori minute, rotund, slightly prominent, hypophyllous or occasionally amphigenous ; spores globose or broadly obovate, regular, bright luteous or orange-colored, .00065 to .0009 of an inch long.

Living fronds of *Cheilanthes Pringlei*, Davenport, Arizona. May. Collected by C. G. Pringle ; communicated by G. E. Davenport.

This fungus, though closely resembling *Cæoma filicum* Lk., (*Uredo filicum*, auct.), in external appearance, is readily distinguished from that species by its smaller, more regular and mostly globose spores. In *C. filicum* the spores are more or less angular and .0008 to .0011 of an inch long. In *C. Aspidiotus* (*Uredo Aspidiotus*, olim) which is regarded by some mycologists as a form of *C. filicum*, not only is the external habit different from that of both the preceding species, but also the prevailing form of the spores is more elongated and their length ranges from .0012 to .0017 of an inch.

Arceuthobium in New Hampshire.—I recently found near this place, in a swamp, on spruce trees, *Arceuthobium pusillum*, Peck (*A. minutum*, Engl.). The plants were in fruit (last season's plants), and the trees to which they were attached were in a dying condition. I have looked for *Arceuthobium* here before, but must have overlooked it, or it may be that it is of recent introduction here, which I doubt.

Hanover, N. H. HENRY G. JESUP.

A List of Grasses from Washington Territory.

By F. Lamson Scribner.

(By the wise liberality of Mr. Villard and his associates, who now control the Northern Pacific Railroad system, a very extended and complete economic survey of the territory tributary to these enterprises has for the past two years been prosecuted under the able direction of Professor Raphael Pumpelly. A year since a Division of Forage Plants and Statistics was organized, and Mr. T. S. Brandegee, who has for years done excellent botanical service, was appointed as observer and collector with the party operating in the Yakima River region and the adjacent parts of the Cascade Mountains in Washington Territory. Mr. Frank Tweedy was also with the party as topographer, and found time to make a fine collection of excellent specimens. The grasses obtained by these gentlemen have been critically studied by Mr. Scribner, and the result as given below shows the excellent outcome of their united labors.—W. M. Canby.)

Paspalum distichum, Lin.

Beckmannia erucæformis, Host.

Panicum capillare, Lin.

Panicum Crus-galli, Lin.

Panicum scoparium, Lam. Thurber, in Bot. Cal. ii., p. 259.

Spartina gracilis, Trin.

Alopecurus aristulatus, Michx.

Hierochloa borealis, R. & S.

Stipa comata, Trin. & Rupr.

Stipa viridula, Trin. Montana; Wm. M. Canby.

Oryzopsis cuspidata, Benth. (*Eriocoma*, Nutt.)

Phleum alpinum, Lin.

Sporobolus asperifolius, Thurber. Montana; Wm. M. Canby.

Sporobolus cryptandrus, Gray.

Sporobolus cuspidatus (*Vilfa*, Torr.) Montana; Wm. M. Canby.

Sporobolus depauperatus (*Vilfa*, Torr.)

Agrostis alba, L.? There is no *palea* manifest, but the general characters of the plant point rather to *A. alba* than to *A. elata*.

Agrostis tenuifolia, Bieb., Trin. Icon., 3. t .65. This appears like a slender, narrow-leaved, awnless form of *Agrostis exarata*, and has been so referred (No. 1,127, Kellogg & Hartford). It seems to be a well marked species, however, and so well accords with Trinius's figure of *A. tenuifolia* that I have little hesitation in referring it to that species. As I understand *A. exarata*, I am not prepared to unite this species with it.

Agrostis geminata, Trin., Uniflor. 207; Icon. 3. t. 28. A very delicate and pretty alpine species about a foot in height, the hair-like, spreading branches of the panicle few-flowered at the ends, and the flowering-glume slender awned.

Agrostis varians, Trin.

Agrostis foliosa, Vasey, ined. Equals Nos. 1 and 47 of Howell's Oregon coll.

Agrostis exarata, Trin. The same form as represented by No. 619 E. of Hall's Oregon collection. There is also a larger, more densely flowered and awned form, with strongly scabrous leaves.

Polypogon Monspeliensis, Desf.

Cinna latifolia, Griseb. (*C. arundinacea*, var. *pendula*, Gray.) A large form, with the rather small spikelets crowded at the ends of the branches, and having a rudiment a fourth of a line long.

Deyeuxia æquivalvis, Benth. (*Agrostis*, Trin.)

Deyeuxia Canadensis (*Calamagrostis*, Beauv.)

Deyeuxia Langsdorfii, Kth. (*Calamagrostis*, Trin.)

Deyeuxia neglecta, Kth. (*Calamagrostis*, Gærtn.; *C. stricta*, Trin.)

DEYEUXIA TWEEDYI, *n. sp.* Culms stout, 2—4 ft. high, smooth; leaves flat, ½ an inch wide or less, 2—4 in. long, with acute, rigid tips, minutely scabrous above, smooth beneath; ligule elongated, lacerated; panicle narrow, dense, 3—4 in. long, often interrupted below; spikelets crowded on the short (1 in. or less), more or less spreading, very compound branches; outer glumes 2½—3 lin. long, lanceolate, acute or sub-acuminate, membraneous and finely scabrous on the back, the upper 3-nerved below; flowering-glume a little shorter than the outer ones, of similar texture, and, like them, minutely scabrous (becoming firmer and sub-rugose in fruit), 5-nerved, two-cleft at the tip, with the lateral nerves sometimes projecting into four unequal teeth; awn stout, attached a little below the middle of the glume, about 3 lines long, twisted below, bent near the middle, and projecting beyond the glumes; palea broad and equalling its glume; hairs few, those at the side, which are longest, scarcely ½ line long; rudiment, with its hairs, about one-half the length of the floret; anthers large, 1½ line long.

(Fig. 1. Outer glumes. Fig. 2. Floret, with rudiment. Fig. 3. A stamen. All enlarged.)

Cascade Mountains, Washington Territory. Collected by Mr. Frank Tweedy of the Corps of Topographical Engineers in the service of the Transcontinental Survey. Mr. Tweedy has been a careful and zealous collector of the plants of the various sections of our country which he has visited, and it is with pleasure that I dedicate this species to him.

Deschampsia elongata, Munro. (*Aira*, Hook.)

Deschampsia calycina, Presl. (*Aira danthonioides*, Trin.)

Deschampsia cæspitosa, Beauv. (*Aira*, Lin.)

Deschampsia latifolia (*Aira*, Hook.)

Trisetum cernuum, Trin.

Trisetum canescens, Buckley. A slender, few-flowered form.

Trisetum subspicatum, var. *molle*, Gray.

Trisetum Wolfii, Vasey. (*T. subspicatum*, var. *muticum*, Bolander.)

TRISETUM BRANDEGEI, *n. sp.* Culms rather stout, erect or geniculate at the base, 1—2 ft. high, smooth, leafy; sheaths loose, longer than their internodes, smooth below, scabrous near the throat; leaves flat, about 6 inches long (the upper one 3—4 inches long and from 3—4 lines wide), scabrous on both sides with a few scattered hairs;

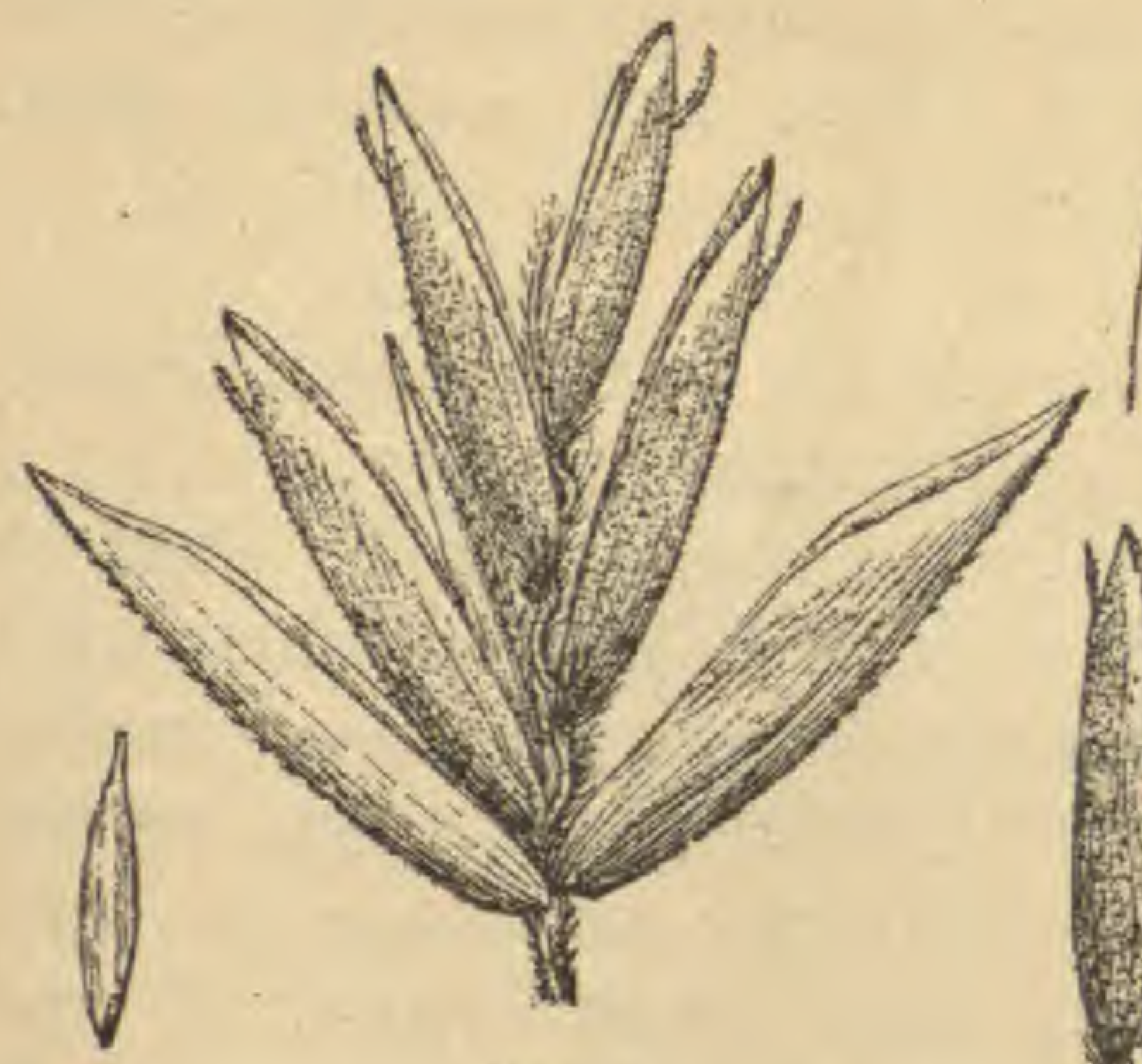


Fig. 6.

Fig. 4

Fig. 7.

Fig. 5.

margin very rough and occasionally ciliate near the base; ligule about a line long, ciliate; panicle, 4—6 inches long and less than an inch wide, densely flowered, more or less interrupted at the base, the erect and strongly scabrous branches in fascicles or half-whorls of five or more, 2 inches long, or less; spikelets flattened, about 3 lines long, 3—4-flowered, the flexuose and hairy rhachis prolonged into a slender pedicel above the upper floret; outer glumes broadly lanceolate, nearly equal in length, the lower frequently, the upper always, 3-nerved, scabrous on the keel from near the middle; flowering-glume 2½ lin. long, surrounded by a tuft of short hairs, minutely rough-tuberculate and rounded on the back, firm in texture, indistinctly 5-nerved, bearing just below the scarious and obtusely 2-lobed apex a short, scabrous and straight awn equalling or shorter than the lobes; grain smooth, linear, a line long.

(Fig. 4. Spikelet. Fig. 5. Floret, with portion of rachis. Fig. 6. Grain. Fig. 7. Apex of flowering-glume.)

Cascade Mountains, T. S. Brandegee and Frank Tweedy, August, 1882.

Allied to *Trisetum Wolfii*, Vasey, (*T. subspicatum*, var. *muticum*, Bolander), but much more robust in habit, outer glumes more nearly equal in size, flowering-glume less flattened, of firmer texture, rougher and constantly awned.

Danthonia Californica, Bolander.

Danthonia Californica, var. *unispicata*, Thurber.

Danthonia intermedia, Vasey. (*D. sericea*, Thurber, in Bot. Cal., Vol. ii., p. 294.)

Bouteloua oligostachya, Torr. Montana; Wm. M. Canby.

Phragmites communis, Trin.

Munroa squarrosa, Torr. Montana; Wm. M. Canby.

Kœleria cristata, Pers. Both the smooth and pubescent forms.

Eatonia obtusata, Gray.

Melica bulbosa, Geyer.

Melica fugax, Bolander (?)

Melica Hallii, Vasey (*teste* Vasey.)

Pleuropogon refracta, Benth. (*Lophochlæna*, Gray.)

Distichlis maritima, Raf. (*Bryzopyrum spicatum*, Hook & Arn.)

Poa purpurascens, Vasey, in *Bot. Gazette*, 1881–82, p. 297. Probably only a form or variety of *P. alpina*, L., and now so considered by Dr. Vasey himself.

Poa pulchella, Vasey. (A large form of the species, *fide* Vasey.) A slender grass, scarcely a foot in height, with narrow leaves and an open, rather few-flowered panicle. Spikelets 3—4 lines long, 3—4-flowered, outer glumes ovate, obtuse, the upper 2 lines, a little longer than the lower and distinctly 3-nerved below; first flowering-glume 2 lines long, hairy near the base, scabrous above and scarious margined near the obtuse summit.

Poa cæsia, Sm., var. *strictior*, Gray.

Poa Nevadensis, Vasey, ined. (*P. tenuifolia*, var. *scabra*, Vasey, in herb.) Equals No. 474 of E. Palmer's collection of 1877.

Culms 2 feet or more high, scabrous below the panicle; sheaths and leaves scabrous, very narrow, and carinately folded when dry, those of the radical tuft 6—12 inches long, the upper leaf 1—3 inches long, ligule about 2 lines long, scabrous; panicle narrow, rather densely flowered, about 6 inches long, branches 2 or more at each joint, the lower about 2 inches long, the longer ones branched and flower-bearing above, naked below; spikelets 3—5 lines long, 3—8-flowered; glumes scabrous, the outer ones 1½—2 lines long, nearly equal or the lower a little shorter, obtuse or subacute, 3-nerved; first flowering-glume 2 lines long, a line broad, obtuse, nerves obscure, scarious margined above, and with a few very short hairs at the base; palea ciliate on the keels and scabrous between them.

The characters of this grass agree in many points with those of *Atropis scabrella*, Thurber, in Bot. Cal. ii., p. 310, but whether it be the same I am unable to say, having never seen any authentic specimens of that species.

A propos of Cicero Swamp.—By my last BULLETIN I learn that the Rev. Mr. Wibbe thinks poorly of this swamp. We of the Syracuse Botanical Club entertain different sentiments regarding it.

During the past two years we have visited it six times—once in May, twice in June, once in July, once in August, and once in September. We have encountered only one rattlesnake, and he gave us long and timely warning of his presence, so that several of us felt safe in watching him coil twice, in counting five of his rattles, and in listening till he began his third rattle (which, by the way, sounds like a bumble-bee under a glass, and no louder), then we walked away, he making no attempt to pursue us.

From the accounts of the dwellers in that vicinity, these snakes never attack one unless they are injured, and always give three warning rattles.

In our six visits we have seen but one other snake, and this neither troubled us nor we it.

Lodi Swamp, commonly called Tamarack Swamp, has been a rich field for botanists, yet not a very pleasant one for ladies to visit, as it borders on the Erie Canal, and one can never go there without meeting tramps or rough boys, who, to do them credit, have proved, like the rattlesnakes, not at all troublesome to us. But in "Tamarack" we always see many and large snakes. We have collected there, for years, all the plants Mr. Wibbe mentions, excepting, perhaps, *Solidago linoides* and *Viola renifolia*. I can find no description of the latter, so am not sure about it.

Mitella nuda is very common in Onondaga County. We first found it on a rocky hillside near Marcellus Station; since then we have found it in swamps and on hills. It can be collected in the woods nearly the whole length (some six miles) of the Jamesville road.

In Cicero Swamp we have collected the following plants, which seemed rare to us, not finding most of them elsewhere in the County: *Drosera longifolia*, L., *Pyrus arbutifolia*, L., *Nyssa multiflora*, Wang., *Lonicera oblongifolia*, Muhl. (with pure white flowers), *Viburnum nudum*, L., *Solidago neglecta*, Torrey, *Vaccinium macrocarpon*, Ait., *Chiogenes hispidula*, Torr. and Gr., *Andromeda polifolia*, L., *Kalmia glauca*, Ait., *Lysimachia longifolia*, Pursh, *Menyanthes trifoliata*, L., *Abies nigra*, Poir, *Lemna trisulca*, L., *Scheuchzeria palustris*, L., *Calopogon pulchellus*, R. Br. (with pure white flowers), several other orchids rare here, *Smilacina trifolia*, Desf., *Juncus nodosus*, L., *Eriophorum vaginatum*, L., *E. Virginicum*, L., *E. Polystachyon*, L., and *E. gracile*, Koch (with their varieties), *Rhynchospora alba*, Vahl., *Carex trisperma*, Desv., *C. limosa*, L., *C. irrigua*, Smith, *C. folliculata*, L., *Botrychium simplex*, Hitch., and *Lycopodium inundatum*, L. Then, in the Clay Swamps, which are merely a continuation of Cicero Swamp, containing many more rattlesnakes if the reports we heard of them be true, we gathered *Geranium maculatum*, L. (with pure white flowers), *Trifolium hybridum* (which will probably be common soon), *Mikania scandens*, L., *Dalibarda repens*, L., *Chrysosplenium Americanum*, Schwein., *Epigæa repens*, L., *Ilex monticola*, Gray, *I. verticillata*, Gr., *I. lævigata*, Gr., *Nemopanthes Canadensis*, D. C., *Bartonia tenella*, Muhl., *Pogonia pendula*, Lindl., *Cypripedium arietinum*, R. Br., *C. acaule*, Ait., *Trillium erythrocarpum*, Mich., *Lilium Canadense*, L., and var. *aureum*, *L. superbum*, *L.*, *Ophioglossum vulgatum*, L., *Botrychium ternatum*, varieties.

If the manes of the ancient Romans return to visit the localities in Central New York that have been named for them they must suffer. Still, I think were I even Cicero I could endure to have the most miserable parts of that swamp named for me, could I return to see what we saw there one lovely day in June—a large mat of pale citrine *Sphagnum*, over which swayed a hundred or more maroon flowers of the pitcher-plant, while clustered at their feet were their quaint leaves of a deeper citrine, veined with maroon. If one were fond of fine coloring it was a sight to rejoice in, and one never to be forgotten.

Syracuse, N. Y. MARY OLIVIA RUST.

Contributions toward a List of the State and Local Floras of the United States.

IV. THE SOUTHERN STATES.

List of foreign Plants introduced into the Gulf States. By Charles Mohr. (B.)
In Bot. Gazette, Vol. iii. Logansport, 1878.

KENTUCKY.

Catalogue of the native phænogamous Plants and the Ferns of Kentucky. By C. W. Short, M.D. (A.)
In Transylv. Journ. Med.. Vol. vi. Louisville, 1833.
(Supplementary catalogues by Profs. Short and Peters in the same journal, Vols. vii. and viii. 1834–1836.)

The Ferns of Kentucky. By John Williamson. (D.)
12mo, pp. 154. Louisville, 1878.
List of Timber Trees found along the south-central part of the State, from Columbus to Pound Gap. By L. H. De Friese. (A.)
In Geol. Surv. Ky., Part x., Vol. v., 2d ser. Frankfort, 1876.
Jefferson County.
Florula Louisvillensis. By H. D. McMurtrie, M.D. (A.)
In McMurtrie's History of Louisville, 8vo. Louisville, 1819.
Fayette County.
Florula Lexingtoniensis; or, a descriptive Catalogue of the phæno-gamous Plants indigenous to this portion of Kentucky. By C. W. Short, M.D. (D.)
In Transylv. Journ. Med., Vols. i. and ii. Lexington, 1828.
Barren and Edmonson Counties.
Report on the Botany of Barren and Edmonson Counties. By John Hussey. (A.)
In Geol. Surv. Ky., Part ii., Vol. i., 2d ser., pp. 32. Frankfort, 1876.
Greenup, Carter, Boyd and Lawrence Counties.
Report on the Forest Timber of Greenup, Carter, Boyd and Lawrence Counties. By N. S. Shaler and A. R. Crandall. (B.)
In Geol. Surv. Ky., Vol. i., new series. Frankfort, 1876.
Grayson, Breckenridge, Ohio and Hancock Counties.
Report on the Timber Trees of Grayson, Breckenridge, Ohio and Hancock Counties. By L. H. De Friese. (A.)
In Geol. Surv. Ky., Part ix., Vol. ii., 2d ser. Frankfort, 1876.
Boyle and Mercer Counties.
List of the flowering Plants and of the Ferns of Boyle and Mercer Counties. By W. M. Linney. (A.)
In Geol. Surv. Ky., Part xi., Vol. v., 2d ser. Frankfort, 1876.
North Cumberland, Bell and Harlan Counties.
List of Timber Trees of North Cumberland, Bell and Harlan Counties. By L. H. De Friese. (A.)
In Geol. Surv. Ky., Part ix., Vol. iv., 2d ser. Frankfort, 1876.

TENNESSEE.

List of Timber Trees of Tennessee. By J. B. Killebrew and Prof. J. M. Safford. (B.)
In Report on Resources of Tennessee.

ALABAMA.

Preliminary List of the Plants growing without cultivation in Alabama. By Charles Mohr. (A.)
24mo, pamphlet, pp. 56. Tuscaloosa, 1880.

MISSISSIPPI.

Flora of Mississippi. By C. L. Wailes. (A.)
In 1st Rep. Agric. and Geol. Miss. 1854.

LOUISIANA.

Catalogus Floræ Ludovicianæ. By J. L. Riddell, M.D. (A.)
In N. O. Med. and Surg. Journ., Vol. viii. New Orleans, 1852.
Flora Ludovicianæ. By A. Featherman. (B.)

In Rep. of Bot. Surv. South. and Cent. La. New Orleans, 1871.

Plaquemines County.

List of Plants, native and introduced, of Plaquemines County, La. Collected by A. B. Langlois. (A.)

8vo., pp. 4. No date.

ARKANSAS.

Collections towards a Flora of the Territory of Arkansas. By Thomas Nuttall. (C.)

In Trans. Am. Philosoph. Soc., Vol. v. Philadelphia, 1837.

A Catalogue of the Plants of Arkansas. By Leo Lesquereux.

In 2d Rep. of a Geol. Recon. of Midd. and South. Counties of Ark. Philadelphia, 1860.

TEXAS.

Plantæ Lindheimerianæ; an enumeration of the Plants collected in Texas, with remarks and descriptions of new Species. By George Engelmann, M.D., and Asa Gray, M.D. (C.)

In Journ. Bost. Soc. Nat. Hist., Vols. v. and vi.

Plantæ Wrightianæ Texano-Mexicanæ. An account of a Collection of Plants made by Chas. Wright, A.M., in an Expedition from Texas to El Paso in the summer and autumn of 1849. By Asa Gray. (C.)

In Smithson. Contrib. to Knowledge, Vols. iii and v.

Beiträge zur Flora von Texas. Von Adolf Scheele. (D.)

In Linnæa, Vols. xxi., xxii. xxiii., and xxv.

Plants collected during Capt. Marcy's Exploration of the Red River of Louisiana in 1852. By John Torrey, M.D. (C.) Washington, 1852.

List of the Fungi of Texas. By M. C. Cooke. In Ann. N. Y. Acad. Sci., 1878.

W. R. G.
N. L. B.

Notes from Nevada and Utah.—Mr. Watson identifies as *Podosciadium Bolanderi* a plant which has obcordate petals, and bracts tipped with an awn 4″ long.

I was fortunate in getting good specimens of the extremely rare *Mentzelia congesta* at Hawthorn and Empire City, Nevada.

Antennaria Geyeri occurs in the mountains south of Reno, Nevada.

Pectocarya setosa occurs rather abundantly at Empire City, Nevada, and has geminate nutlets.

The Idaho plant, *Gentiana simplex*, occurs in the mountains of Southern Utah, as do also *Philadelphus microphyllus*, *Zygadenus glaucus* and *Iris Missouriensis*.

Sometime since, Dr. Gray directed the attention of botanists to the species of *Mentzelia* as fly catchers. Soon after, I had occasion to examine the leaves of *M. lævicaulis* late in the fall. The leaves are thickly beset with coarse hairs, which are furnished with several pairs of barbs pointing downward along them, while the top has an anchor-shaped summit twice as large as the other barbs. These hairs stand so close together that the barbs almost touch. Thickly studding the leaf were many dead and dying mosquitoes, specimens of aphis, and other small insects. Some of these were caught by the head, but most of them were held by the legs or proboscis, as their heads were too large to slip between the barbs. All were more or less mutilated, probably by other insects. A sweet fluid was secreted by the leaf, and this attracted the insects. There was no evidence of any digestion going on, as none of the victims could get close enough to the surface of the leaf to be touched by the fluid.

A good character lies in the seed of *Acer grandidentatum.* The cavity in which the embryo lies is spherical, and always remains so, while the cotyledons are simply folded. In *Acer glabrum* the seed-cavity is compressed and deeply reticulated, so that the seed is crumpled. The cotyledons are strongly coiled.

Salt Lake City. MARCUS E. JONES.

Notes from Chemung County, N. Y.—In May, 1880, I collected an Umbellifer, which for some time I could not satisfactorily identify. The Rev. J. H. Wibbe, of Oswego, has now identified it for me as *Chærophyllum procumbens*, Lam. The only station known to me is in the town of Ashland, along the Chemung River, and it now is spreading along the south-west bank of the D. L. & W. Railroad track. This is its northernmost station, since Prof. Gray gives its geographical range as New Jersey, Illinois, and southward. I also found, last season, *Kœleria cristata*, Pers., on Sullivan Hill in this County. Correspondence and exchange are desired. I wish a specimen each of *Lygodium palmatum*, Swz., and *Asclepias rubra*, L.

Elmira, N. Y. THOS. F. LUCY.

A large Amelanchier.—I have recently discovered a shad-tree (*Amelanchier Canadensis*) standing in a meadow in the town of Glastonbury in this State, of the size, proportions and general appearance of an uncommonly fine old sugar-maple. The tree was subsequently measured by my friend Dr. G. W. Russell, of this city, who found its girth to be 8 ft. 8 inches, at 3 ft. 6 inches from the ground, and the spread of its branches to be 48 feet in diameter. The tree was in full bloom on the 19th inst.

Hartford, Conn., May 30th. G. P. DAVIS.

Funnel-shaped Leaves in Trifolium.—Miss Grace S. Hadley sends to us from Middlesex, Mass., specimens of *Trifolium pratense* which are provided, between the leaflets, with petioles that bear one or two smaller leaflets whose margins have cohered so as to form a conical cup or funnel.

Dr. Masters (Veg. Teratology) states that he has frequently met with specimens of *Trifolium repens* in which, on each side of the base of the petiole, the stipules had the form just indicated.

Abnormal Flowers.—Mrs. C. T. Tracy sends to us from Ripon, Wis., a sketch and description of a flower of *Trillium cernuum*, L., which has one petal and two sepals of the ordinary form and color, while the third sepal has been replaced by a perfect leaf, and the other two petals have a green stripe through the centre. Mrs. Tracy says: "A member of my botany class found a flower of *Sanguinaria Canadensis* with twenty-five petals, and a corresponding diminution of stamens. It was found among others that were in normal condition."

Botanical Notes.

On the Relation of Heat to the Sexes of Flowers.—At a meeting of the Botanical Section of the Philadelphia Academy of Natural Science, on April 9, Mr. Thomas Meehan referred to his past communications to the Academy, showing that in monœcious plants female flowers would remain at rest under a temperature which was sufficient to excite the male flowers to active development. Hence a few comparatively warm days in winter or early spring would bring the male flowers to maturity, while the female flowers remained to advance only under a higher and more constant temperature. In this manner the explanation was offered why such trees were often barren. The male flowers disappeared before the females opened, and the latter were unfertilized. He referred especially to some branches of *Corylus Avellana*, the English hazle-nut, which he exhibited before the Section last spring, in which the male flowers (catkins) were past maturity, the anthers having opened and discharged their pollen, and the catkins crumbling under a light touch, but there were no appearances of action in the female flower-buds. There were no nuts on this tree last season. The present season was one of unusually low temperature. There had not been spasmodic warmth enough to bring forward the particularly excitable maple-tree blossoms. The hazle-nut had not, therefore, had its male blossoms brought prematurely forward. He exhibited specimens from the same tree as last season, showing the catkins in a young condition of development, only half the flowers showing their anthers, while the female flower-buds had their pretty purple stigmas protruding from nearly all of them.

Mr. Meehan remarked that his observations the past few seasons had been so carefully made that he hardly regarded confirmation necessary, but believed the further exhibition of these specimens might at least serve to draw renewed attention to his former communications.

Cooke's Illustrations of British Fungi.—American subscribers to this work will regret to be informed that the premises of the plate-printers were recently destroyed by fire, and, with them, all the work in progress, including Part xviii. of the "Illustrations," which had just been completed. This will cause uncertain and unavoidable delay, but, as soon as possible, some arrangement will be made to continue the works on fungi and fresh-water algæ.

Botanical Literature.

We acknowledge, with thanks, receipt of the following papers from their authors :

The Bacteria: An Account of their Nature and Effects, together with a Systematic Description of the Species. By T. J. Burrill, Ph. D. 8vo, pamph., pp. 65. (From the 11th Rep. of Illinois Indust. University.)

The Mycologic Flora of the Miami Valley, Ohio. By A. P. Morgan. 8vo, pamph., pp. 30. (Reprint from the *Journal* of the Cincinnati Society of Natl. History.)

The Physiology of Protoplasmic Motion. By F. H. Engelmann, M.D. Translated by C. S. Dolley, M.D. 8vo, pamph., pp. 40. Rochester : Davis & Leyden.

Comparative Tables showing the Distribution of Ferns in the United States. By Geo. E. Davenport. 8vo, pamph., pp. 8. (From the *Proceedings* of the Amer. Philosoph. Society.)

The Growth and Structure of a Tree. By Prof. W. J. Beal. 8vo, pamph., pp. 8.

Cases of Mushroom Poisoning. By James D. Trask, M.D. 8vo, pamph., pp. 8. (Reprint from the *American Journal of the Medical Sciences.)*

Some Microscopic Distinctions between Good and Bad Timber of the same Species. By Dr. J. T. Rothrock. 8vo, pamph., pp. 6. (From the *Proceedings* of the Amer. Philosoph. Society.)

On the Structures which favor Cross-Fertilization in several Plants. By William Trelease. 8vo, pamph., pp. 31. (From the *Proceedings* of the Boston Society of Natural History.)

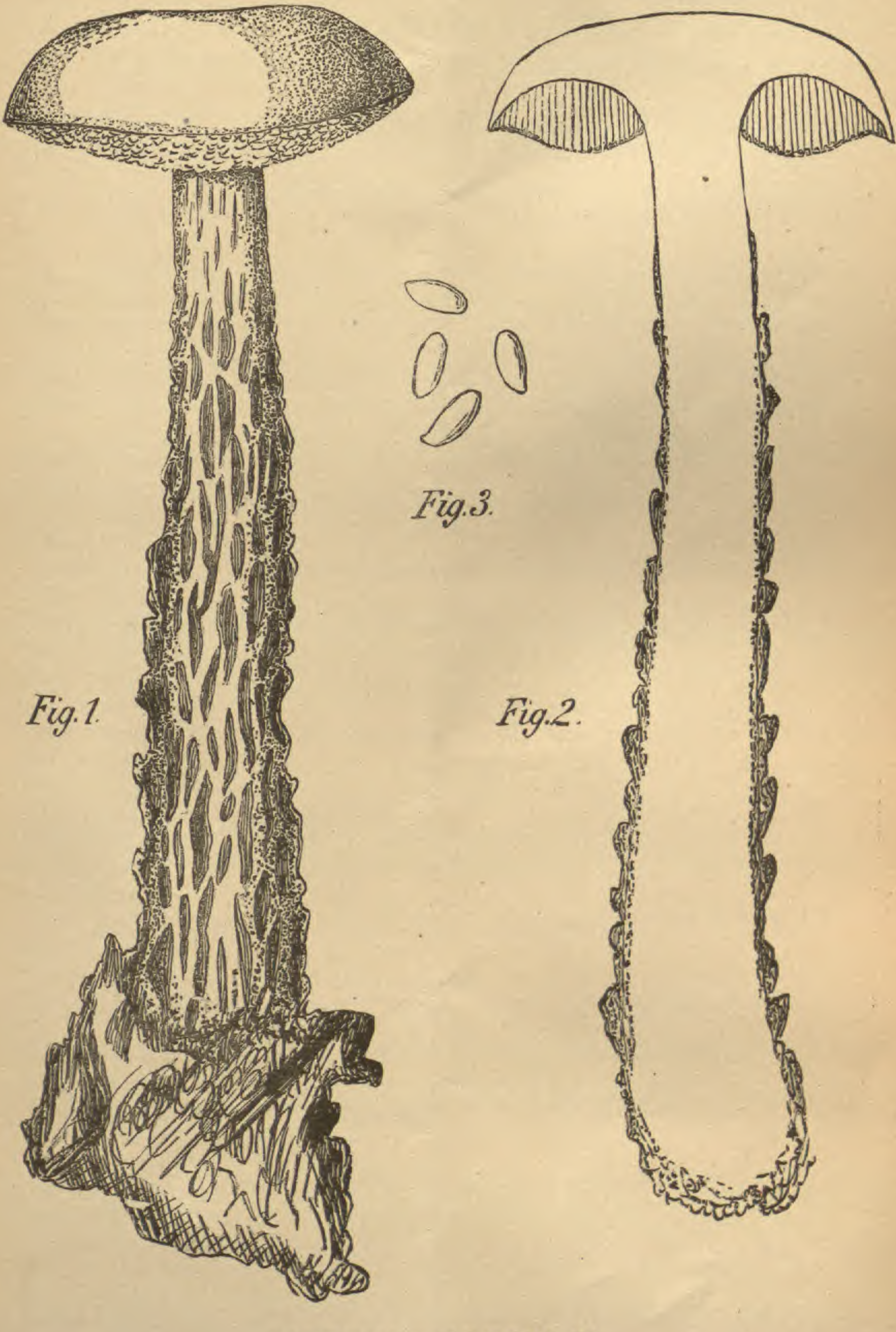
Catalogue of the Davenport Herbarium.—Supplement. March, 1883. By George E. Davenport. 8vo, pamph., pp. 8.

A Revision of the Genus Clematis of the United States, embracing Descriptions of all the Species, their Systematic Arrangement, Geographical Distribution and Synonymy. By Joseph F. James. 8vo, pamph., pp. 19. (From the *Journal* of the Cincinnati Soc. Nat. Hist.)

Some Algæ of Minnesota supposed to be poisonous. By J. C. Arthur. 8vo, pamph., pp. 12. (From the *Bulletin* of the Minnesota Acad. Nat. Sci., Voi. xi.)

Descriptions of Iowa Uromyces. By J. C. Arthur. 8vo, pamph., pp. 37. (From the *Bulletin* of the Minnesota Acad. Nat. Sci., Vol. xi.)

Correction.—Mr. Ravenel wishes to correct an error which he inadvertently committed in his note on the Jerusalem artichoke (p. 55), and which we carelessly allowed to pass unobserved, and that was the classing of the sweet with the Irish potato as an underground stem. All reference to the sweet potato should, of course, be erased from the article.



BOLETUS MORGANI, Pk.

BULLETIN

OF THE

TORREY BOTANICAL CLUB.

Vol. X.] New York, July, 1883. [**No. 7.**

New Species of Fungi.

By CHAS. H. PECK.

BOLETUS MORGANI (Plate XXXV.)—Pileus pulvinate, soft, glabrous, viscid, red or yellow, or red fading to yellow on the margin; tubes convex, depressed about the stem, rather long and large, unequal, subrotund, bright yellow becoming greenish yellow; stem elongated, tapering upward, adorned with long, narrow reticulations, yellow, the depressions red; the flesh of stem and pileus whitish tinged with red and yellow; not changing color when cut or bruised; spores olive-brown, .0007 to .0009 of an inch long, about half as broad.

Plant 4 to 6 inches high, pileus 1.5 to 2.5 inches broad, stem 3 to 6 lines thick.

Rocky hillsides, in woods of chestnut, oak and tulip-trees. Norwood, Kentucky. August. A. P. Morgan.

The color of the pileus is usually red on a yellow ground, and that of the stem is yellow on the elevations or ridges, and red in the depressions. The red disk of the pileus sometimes fades into yellow on the margin. In wet weather the anastomosing ridges of the stem swell out and become broadly winged, thereby giving the stem a peculiar shaggy or lacerated appearance. The species is related to *B. Russellii*, Frost, from which it is readily separated by its glabrous, viscid pileus and its longer spores. The two species constitute a natural section or subgenus, which is, so far as now known, peculiar to this country, and to which may be ascribed the following name and diagnosis:

§ LACERIPEDES. *Stem elongated, strongly venose-reticulated, the veins intumescent in wet weather.*

Pileus dry, hairy or tomentose-hairy, - - - *B. Russellii*, Frost.
Pileus viscid, glabrous, - - - - - - - - *B. Morgani*, Peck.

HEXAGONA FAVOLOIDES.—Pileus thin, coriaceous, sessile, narrowly and concentrically zonate, slightly sulcate, glabrous, somewhat shining, brown; pores pallid, then brownish, shallow, hexagonal, .028 to .042 of an inch across.

Decaying wood. Roatan Island. J. J. Brown, M.D.

Allied to *H. polygramma*, Mont., and *H. tenuis*, Hook., but unlike either in color and in the character of the margin of the pileus. In its color, and in the character of the zones of the pileus, our species very much resembles fresh specimens of *Dædalea confragosa*, Pers., from which it is separated by its thin pileus and the character of the hymenium. The pores are scarcely half a line in diameter and are so regularly hexagonal as to be suggestive of the cells of a honey-comb. The zones of the pileus are narrow and subconcolorous.

MELANCONIUM POPULINUM. — Pustules prominent, erumpent through a longitudinal chink; stroma whitish, minute or obsolete; spores oblong, black, .0006 to .0007 of an inch long, oozing out and staining the matrix black or forming a black globule.

Dead branches of poplar-trees. Iowa. J. B. Ellis. (No. 3,637).

MELANCONIUM COLORATUM.—Pustules small, scarcely prominent; stroma minute, greenish-yellow; spores oblong or oblong-ovate, often slightly curved, nearly colorless, .0005 to .0006 of an inch long, .00025 to .0003 of an inch broad, oozing out and formimg a dull-reddish mass.

Bark of the tulip-tree, *Liriodendron Tulipifera*, Pennsylvania. J. B. Ellis. This species is related to *M. pallidum*, Pk., but the spores are smaller and the spore-masses of a different color.

UROMYCES UNITUS.—*Hymeniferous form :* Spots suborbicular, sometimes confluent, varying in color from yellow to sanguineous; peridia amphigenous, short, sometimes crowded and occupying the entire spot, sometimes concentrically arranged near the margin; spores subglobose to subelliptical, orange-yellow, .0008 to .001 of an inch long.

Teleutosporous form: Sori amphigenous, on the same spots as the *Æcidium* and intermingled with its peridia, slightly prominent, orbicular, blackish-brown; spores globose, minutely granular, .001 to .0011 of an inch in diameter; pedicel very short, hyaline.

Living leaves of *Calandrinia Leana*, Porter. Washington Territory. T. S. Brandegee.

RŒSTELIA INTERVENIENS.—Spots suborbicular, pallid or yellowish; peridia hypophyllous, short or moderately elongated, whitish or pale yellow, lacerated and splitting to the base, the cells thick and rough with striations; spores (when dry) very pale or whitish, subglobose, .0008 to .0012 of an inch in diameter, minutely rough, the epispore thick, .00016 to .00025 of an inch; spermogonia on the same spots, epiphyllous.

Living leaves of *Malvastrum Thurberi*, Lower California. April. C. G. Pringle. Also on leaves of *Erodium* (?) in Southern California. May. M. E. Jones.

The spores, in the dried specimens, are nearly white, but in the fresh state they are probably yellow or orange. The fungus at first sight might be taken for an *Æcidium*, a genus with which its pale spores and short peridia connect it, but the latter split to the very base as in the genus *Ræstelia*. The species, however is probably only the hymeniferous state of some teleutosporous fungus. This last remark is also applicable to the following *Æcidia*.

ÆCIDIUM AURIELLUM.—Peridia numerous, short, crowded, generally occupying the whole lower surface of the leaf, pale or yellowish, the mouth entire or subcrenulate; spores subglobose or subelliptical, golden-yellow, .0008 to .0011 of an inch long, usually containing one to three large, shining, yellow oil-globules, epispore thin.

Living leaves of *Cheiranthus Menziesii*, B. & H. Carson, Nevada. June. M. E. Jones.

This is a pretty fungus and very showy, even in the the dried state, by reason of the clear golden-yellow color of its spores.

ÆCIDIUM ISOMERINUM.—Spots pallid, thickened; peridia amphigenous, short, scattered or crowded; spores subglobose, ovate or elliptical, whitish (when dry) .0008 to .0011 of an inch long, epispore thin.

Living leaves of *Isomeris arborea*, Nutt. San Diego, California. March. M. E. Jones.

Sometimes the fungus occupies nearly the whole leaf, which, in such a case, is considerably thickened and distorted.

ÆCIDIUM ANISACANTHI.—Spots none or indistinct; peridia amphigenous, elongated, pinkish-gray, crenately lacerated at the apex; spores very variable in shape, subglobose, ovate, elliptical, oblong or oblong-pyriform, sometimes pointed at one end, yellowish or brownish yellow (in the dried state) .0009 to .0018 of an inch long, .0008 to 00095 broad.

Living leaves of *Anisacanthus Thurberi.* Arizona. June. C. G. Pringle.

SPHÆRELLA ARBUTICOLA.—Maculicolous, spots suborbicular, unequal, blackish or subcinereous, brown on the lower surface of the leaf; perithecia minute, black, epiphyllous, scattered or collected in small groups, piercing the whitened epidermis; asci oblong, sometimes narrowed above, .0016 to .005 of an inch long; spores crowded, narrow, colorless, uniseptate, .00045 to .0006 of an inch long, .00016 broad.

Dead leaves of *Arbutus Menziesii*, Pursh. Santa Cruz, California. July. C. G. Pringle.

The septation of the spores is rather obscure, but this is probably due to their being immature. The epidermis is slightly elevated around the perithecia and has there a whitish appearance.

MICROSPHÆRIA ERINEOPHILA.—Mycelium arachnoid, subpersistent; perithecia .003 to .004 of an inch broad, sometimes collapsed or pezizæform; appendages 6 to 12, shorter than or about equal to the diameter of the perithecia, colored, the tips paler and two to three times dichotomous; asci 4, sometimes 3 or 5, eight-spored; spores .0008 to .0009 of an inch long, .00045 to .0005 broad, usually containing one or two large nuclei.

On the *Erineum* of beech-leaves. Illinois. F. S. Earle and Prof. A. B. Seymour.

This fungus is closely related to *M. penicillata*, of which perhaps it may be a mere variety, but it is readily distinguished by its colored appendages and nucleated spores. Its habitat is very peculiar. In all the specimens seen it occurs only on the *Erineum*.

Proterogyny in Spartina juncea.—Has this been noticed? My attention was attracted tó it this morning on the beach here. The plumose stigmas of all the spikes on a particular plant are protruded, while the stamens are still full and retained in the palets. In other plants where the purple anthers are prominent, I find the stigmas withered.

Buttonwoods, R. I. W. W. BAILEY.

New Species of Fungi.

By J. B. Ellis and Benjamin M. Everhart.

Steganosporium formosum. — The receptacles enclosing the spores imbedded in the inner bark and resembling true perithecia, depressed-globose ($1^{mm.}$), the apex adnate to the epidermis, which is there perforated to form an outlet for the spores, which are expelled at maturity in slender cirrhi, like fine black hairs, or collected in an incrusting mass around the orifice; spores broad, oblong-fusiform, $60-100 \times 20-26\mu$, yellowish at first, soon becoming dark brown and muriform, the obtusely pointed ends subdiaphanous, borne on the apices of hyaline, jointed basidia, which spring from the inner surface of the cavity, the whole involved in mucus, and the spores at first with a broad, gelatinous envelope.

On dead branches of *Magnolia acuminata*, West Chester, Pa. On the same branches there is a *Melanconium* (?) with elliptical, uniseptate, $10-12 \times 4\mu$. spores. E. H. S. & G., No. 411.

Stictis decidua.—Scattered, membranaceous, cup-shaped, elliptical, $.3-.5^{mm.} \times .6^{mm.}$ reddish brown, nearly closed at first by the incurved margin, at length open and finally deciduous; asci oblong, $35-40 \times 6-7\mu$; paraphyses branched (?) and matted above, and bearing at their tips minute globose conidia; sporidia biseriate, fusiform, nucleolate, nearly straight, hyaline, $6-10 \times 1-15\mu$.

On decorticated and decaying pine limbs lying on the ground. Newfield, N. J., March 1883.

Closely allied to *S. foveloaris*, Rehm, but distinguished by its different habitat, darker disk and deciduous habit.

Glonium triblidioides.—Emergent, oblong, ends obtuse, $1-2^{mm.} \times .5-.75^{mm.}$, lips incurved, smooth, distant, leaving the sooty disk more or less permanently exposed; asci clavate-cylindrical, sessile, $80-90 \times 9-12\mu$, overtopped by the densely matted paraphyses, whose closely compacted, dark colored tips give the sooty color to the disk; sporidia uniseriate or partly biseriate above, ovate, uniseptate hyaline, $12-16 \times 5-7\mu$. In the fresh state the swollen disk entirely hides the margin.

On old fence-rails. Washington Territory. W. N. Suksdorf.

Cenangium asterinosporum.—Erumpent, forming tuberculiform clusters $2-3^{mm.}$ in diameter and composed of 6–10 individuals closely crowded together so as to become angular and distorted from mutual pressure; disk convex or plane, black, smooth, immarginate, ($.5-1^{mm.}$), dirty white within; asci subglobose, 35μ in diameter; paraphyses (?); sporidia oblong-elliptical or subpyriform, subhyaline, granular, constricted in the middle, becoming 3-septate and submuriform, $15-20 \times 6-8\mu$.

On living stems and branches of *Vaccinium corymbosum*. Newfield, N. J., throughout the year. The clusters are erumpent from the inner bark and do not appear to affect the wood beneath.

Peziza crinella.—Scattered, stipitate, pruinose, white, thin and very delicate; disk $.25-.375^{mm.}$ in diameter, margin fringed with short hairs, stipe scarcely equal in length to the diameter of the disk; asci oblong-cylindrical, $38-40 \times 4-5\mu$, sessile; paraphyses (?); sporidia biseriate, clavate-fusiform, hyaline $9-12 \times 2\mu$.

The tips of the fibres which form the cup project and form the marginal fringe. From *P. caricinnella*, Karst., to which this is closely allied, it differs in its narrower asci and smaller, simple, clavate sporidia. *P. Caricis*, Desm., has sporidia cylindrical, straight or curved, $6 \times 1 \mu$.

On dead leaves of *Carex crinita* lying partly in water, on the banks of a rivulet in shady woods. West Chester, Pa., June, 1882. E. H. J. & G., No. 381.

NECTRIA CONIGENA.—Minute, membranaceous, smooth, orange-yellow, lighter and collapsing when dry; asci about $50 \times 7 \mu$; sporidia uniseriate or partially biseriate above, acutely elliptical, 2-nucleate, becoming uniseptate (?) $7\text{–}8 \times 3\text{–}35 \mu$; ostiolum papilliform, minute. Perithecia with a few weak, white, radiating hairs at base.

Differs from *N. vulpina*, Cke., in its habitat, smaller and paler perithecia and rather narrower and more acute sporidia.

On old decaying cone of *Magnolia glauca*. Newfield, N. J., Oct., 1882.

A List of Grasses from Washington Territory.*

By F. LAMSON SCRIBNER.

GLYCERIA CANBYI, *n. sp.*—Perennial ; culm 2—3 ft. high, stout, erect, simple, smooth ; sheaths shorter than their internodes, smooth ; leaves of the culm 3, flat, between 2 and 3 lines wide, the upper about 6 in. long, scabrous on both sides and especially rough on the back near the briefly involute, pungent tip ; ligule broad, obtuste, 2—3 lin. long ; panicle narrow, about 6 in. long, densely flowered, usually interrupted below, branches from 3—5 in a half-whorl, short (1—2 in.) and erect or ascending ; spikelets 3 lines long, 3—5-flowered, the rhachis readily breaking up ; outer glumes unequal, obtuse or acute, 3-nerved, the upper and larger one between 1 and 2 lines in length ; flowering-glume about 2 lines long, strongly scabrous and rounded, 5-nerved, nerves terminating below the scarious and obtuse summit ; palea a little shorter than its glume, shortly ciliate on the nerves.

Fig. 1

Fig. 3

(Figs. 1 and 2. Spikelets. Fig. 3. Outer glumes. Fig. 4. Anterior view of floret.)

Cascade Mts., Washington Terr., Frank Tweedy and T. S. Brandegee, August, 1882.

Allied to *Atropis tenuifolia*, Thurber, and closely resembling some forms that have been referred to that species, as No. 634 of E. Hall's Oregon collection, but differing essentially from descriptions of that species and very unlike the specimens in the herbarium of the Philad. Acad. Nat. Sci. ticketed *Poa tenuifolia* by Nuttall himself.

Fig. 2.

Fig. 4

* Continued from page 66.

Glyceria nervata, Trin.
Glyceria pauciflora, Presl.
Glyceria pallida, Trin.
Festuca microstachys, Nutt.
Festuca ovina, Lin.
Festuca rubra, Lin.
Bromus racemosus, Lin.
Bromus secalinus, Lin.

Bromus breviaristatus, Thurber, Bot. Wilkes's Exped., 493; *Ceratochloa*, Hook.; Thurber, Bot. Cal. ii., p. 321.

Bromus Hookerianus, Thurber, Bot. Wilkes's Exped., 493; *Ceratochloa grandiflora*, Hook.; Thurber, Bot. Cal. ii., p. 321.

Agropyrum repens, Beauv. (*Triticum*, Lin.) Represented in the collection by several forms, one of which has the sheaths and leaves, as well as the lower portion of the culm, clothed with a soft pubescence.

Agropyrum dasystachyum (*Triticum*, Gray; *Triticum repens*, var. *dasystachyum*, Hook.) The specimens accord well with the description of *A. dasyanthum*, Schultes, and, if kept distinct from *A. repens*, perhaps should be referred to that species. The spikelets are sometimes developed abnormally, and one of these is shown in the annexed figure.

Agropyrum caninum, Reichenb. (*Triticum*, Lin.) Both the ordinary or typical form and the mountain form referred to by Dr. Thurber, in Bot. Cal., ii., p. 324, characterized as having large and spreading, usually much crowded spikelets with long, stout divergent awns. Equals No. 656 of Hall & Harbour's coll., 1862.

Agropyrum divergens, Nees. (*Triticum strigosum*, Lessing.) Equals 657 of Hall & Harbour's coll., 1862.

Hordeum nodosum, Lin. Thurber, Bot. Cal., ii., p. 325, (*H. pratense*, Huds.)

Hordeum murinum, Lin.

Elymus Canadensis, Lin.

Elymus Sibiricus, Lin.; equals No. 651 of E. Hall's Oregon coll.

Elymus condensatus, Presl.

Elymus Sitanion, Schult. (*Sitanion elymoides*, Raf.)

The Forms of Leaves.—Mr. Grant Allen's interesting papers on this subject must have engaged the attention of all evolutionary botanists, and very many serious doubts must be felt as to the alleged adequacy of his theory to explain the multiform and composite variations in leaf-forms. Having been attracted lately by the modifications of form to be found in the leaves of *Rhus toxicodendron*, it appeared to me possible to find in this common plant a point of exception to Mr. Allen's hypothesis. Mr. Allen assumes, putting the supply of atmospheric moisture out of the question, or assuming it to be uniform and sufficient, that a competition between neighboring leaves for the possession of carbon molecules, represented in the air by carbonic anhydride gas, causes unequal growth along their mutual limits and their outlines become broken and assume irregular shapes; segments growing faster than others produce the diversified serrations, elongations, partings and fimbriations which characterize the leaves of different plants, all this however taking place in subordination to the ancestral peculiarities of the plant by which a general ground form or architectural type is preserved. Looking at the leaves of *R. toxicodendron*, we find them arranged in pedunculated, terminal sets of three, one distal and two lateral leaflets. The distal or central leaflet normally, and putting aside the divergent shapes found in this plant, is rhombic-ovate, equilateral, and symmetrically toothed on each side, the two side and proximal leaflets are subrhombic-ovate, inequilateral, and toothed conspicuously on only one side of the free margin. In other words, along the edges of the two lateral leaves where they come in conflict, especially with the edges of the terminal leaf, a restriction of growth takes place, and the usual lobation seen in the end leaf, and which may be considered typical, is suppressed; and on the margin, which is relieved from any competition, this lobation appears. Does not this contradict Mr. Allen's assumption? That there is a struggle for nourishment and that the terminal leaf, in the direct line of the sap's flow, is favorably placed, is seen by the slight growth of the halves of the side-leaflets facing the former, and the natural character of the halves away from it. But the tendency is to obliterate serration at the parts mentioned, and might, we should suppose, under persistent repetition, form an entire edge. A very similar condition of things, with some interesting details, is seen in the leaf-clusters of *Negundo aceroides*.* An interesting change of form in the leaves of the poison ivy takes place when they have been stung by a species of gall-insect (?) at the apex of a leaf. In the terminal leaf it produces an arrest of growth, a deep cleft, and lateral enlargement, which destroys the notched outline, enveloping the lobes in a rounded full blade.

Of course it is not difficult to explain the abortive character of the one side of the leaflets mentioned above. It is due to the predominant shade caused by the expanded sides of the terminal leaflet, which owes its vigour to its favorable position. The conditions presented here are apparently what Mr. Allen would wish, two neighboring leaves contending for the molecules of carbonic anhydride and evidently unequally matched, as appears from the result; but the result does not seem desirable for his theory, as the characteristic toothing is suppressed, not exaggerated in the weaker, and this notching, which he seems to regard as due to impeded growth, is best shown in the stronger competitor.

L. P. Gratacap.

The Fertilization of Opuntia.—For the purpose of adding brilliancy of color to the window-garden in front of my house, I planted in two separate boxes a large number of plants of *Opuntia vulgaris*, which I obtained from near Hartsdale, Westchester County, N. Y.,

* Mr. A. Hollick gave me the name of this tree, which I had previously observed in connection with this subject.

on the 15th of June last. All the plants when taken up were well set with large flower-buds, which opened a week later and lasted until the middle of July. During that time I watched about one hundred and thirty flowers out of a total of two hundred and ten during their period of flowering, and noticed with much interest the great sensitiveness of the stamens, which are very numerous in this prickly-pear.

The window-boxes have an eastern exposure, and consequently the sun passes out of view about one o'clock in the afternoon. The flowers opened about seven in the morning and closed shortly after two, or about an hour after the sun passed away, although they would have remained open two hours longer under its direct influence. During sunshine each flower would open for two consecuive days, but in cloudy weather for only one day. On the first day of the opening of a flower the pointed stigmas were hardly separated sufficiently to admit of the passage of a small-sized straw. But on the following day, under the influence of the sun's rays, the stigmas expanded to their fullest capacity.

Less pollen was observable on the anthers during the first than on the second day of flowering. Or, in other words, the longer a flower remained open the greater the number of pollen grains that were discharged from the anthers. And yet fructification seems to have been effected in nearly every case in which a flower opened for either one, or two days in succession. I now count about one hundred and ninety promising fruits.

The beautiful lemon-colored flowers of this *Opuntia* attracted many honey-bees, and their movements I carefully watched with a pocket-lens in hand on every fair or sunny day. A bee would alight on the mass of anthers, then push its forelegs down among the filaments, which were sufficiently compressed to admit of the body of the insect passing more readily down to the nectaries of the flower.

As soon as the filaments were released from the grasp of the insect, the stamens were suddenly thrown against the pistil, from which they slowly receded to their former position. I should judge that sometimes more than a dozen stamens were thus rudely seized by a honey-bee in its endeavor to reach the nectaries, the insect frequently making the circuit of the whole arrangement of stamens, and always coming up again to the surface of the anthers before taking a second plunge to the base of the corolla. Although the feet (legs) of the insect were covered with masses of pollen after visiting a flower, yet at no time do I remember seeing one crawl *over the stigmas*, whereby fertilization might have been insured. It seems to me that the pollen grains are thrown between the stigmas after the sudden movement of the stamens following the retreat of an insect.

I have also noticed flies of several species visit these flowers on a similar errand, this apparently being followed by the same movements of the filaments. On the 12th of July, I was collecting in Pelhamville, Westchester County, and there also observed a few late-flowering specimens of *Opuntia vulgaris*, on one of which I observed a large humble-bee going for his nectar; and how he did make the dust (pollen) fly!

From one of the joints of my plants there has exuded a straw-colored gum. The gum found on *Opuntiæ* is edible like that secreted by *Acacia vera* and *Prunus cerasus*.

New York, July 18th. RICHARD E. KUNZÉ.

Among the Palms and the Pines.—On the 28th of May, 1883, my father, H. C. Orcutt, and myself left San Diego City, Cal., on what proved a short trip into Lower California.

The first day rewarded us with two beautiful Abutilons with orange-colored blossoms and velvety leaves (*A. Berlandieri*, Gray, var., and another) and a new species of *Cordylanthus* found at the head of Tia Juana Valley near the boundary.

A little beyond, among the hills, was *Lupinus gracilis* among the rocks in company with *Phacelia Parryi*, both struggling for existence in so "dry a year," while further along we found *Acanthomintha ilicifolia*, the beautiful *Chorizanthe procumbens*, *Breweria minima*, and others, thriving on the adobe hills (the whole surface of the latter cracked like the bottom of a dry mud-puddle), and, on similar ground, acres were covered with the red-flowered *Chorizanthe fimbriata*, forming a beautiful feature in the landscape as we entered Valle de los Palmas where we made our next camp among the mesquite, screw-bean and other trees—but no palms!

The next morning we proceeded through the valley till we noticed at our right, in a large cañon, two novel trees which proved to be palms, *Washingtonia filifera*, and on further exploration we found twenty still standing, but over fifty lying dead—cut down by the enterprising ex-governor that he might cover his house with their leaves!

Beneath the few remaining palms flowed a cool stream of water, enabling *Epipactis gigantea* and *Juncus xiphioides* to exist, while near by we found the last flower of *Lathyrus splendens*, *Lupinus albicaulis* as a small shrub, *Bœrhavia viscosa*, *Galium pubens*, Gray, and others. *Mentzelia micrantha*, Torr. & Gray, with *Physalis crassifolia* were growing on the side of the cañon, the *Mentzelia* covering my clothes with its very tenacious brittle leaves which it was impossible to wholly remove.

May 31st found us in the evening at rancho Guadaloupe, 75 miles from San Diego by road, where we made our headquarters for a day, till our return. Here, in the evening, we found a new (?) *Phacelia* with white flowers and yellow centre which had strayed to the dry bed of the San Antonio Creek, where in the morning I also found an abundance of *Astragalus Sonoræ*, Gray, in fruit, and *Lupinus gracilis*.

Late in the morning of June 1st we left the camp and proceeded up the valley till we came to a cañon which led to Guadaloupe Mountains, credited with an altitude of 4,000 feet. Here we found many interesting plants at different altitudes. Among them were *Trichostema Parishii*, Vasey, *Mimulus Palmeri* (?), *Helianthus gracilentus*, Gray, *Actinolepis Wallacei*, Gray, at a low altitude, *Calochortus Weedii*, *C. venustus* above it, and, higher still, *C. Palmeri*, an *Allium*, *Dendromecon rigidum*, and many species of *Gilia*, one (a new species) being particularly conspicuous for its delicate, variegated blossoms.

After securing, near the top, specimens of the pine (*Pinus Coulteri*) which had attracted our attention we returned to the ranch, having walked about twenty miles in ten hours in the hot sun—repaid by over twenty interesting plants. During our return we found *Polycarpon depressum*, Nutt., *Monardella linoides*, Gray, and others, near Palm Valley, over one hundred species, two or more new, on the whole trip of eight days.

San Diego, Cal. — C. R. ORCUTT.

Pinus Banksiana, Lamb.—This tree appears to considerably exceed the size given for it in our manuals of botany. Dr. Gray gives it as "a straggling shrub, or low tree, 5 to 20 feet high"; Dr. Wood as "a small tree"; Prof. Sargent, in his Catalogue of the Forest Trees of North America, says: "a low shrub or tree, rarely exceeding 20 feet in height." The Abbé Provancher's Essences Ligneuses de la Province de Quebec gives 30 to 40 feet as its maximum size.

I noticed, in July, many trees in the vicinity of Marquette, Mich., which were at least 70 feet high, rising straight up from a base over one foot in diameter.

N. L. BRITTON.

Clematis Viorna, var. **coccinea.**—Some time early in June of this year, on a trip to Chattanooga, I was fortunate enough to find on the side of Lookout Mountain, above the line of the Chatt. & Nash. R.R., two plants of *Clematis Viorna*, var. *coccinea*. They were strong and healthy and growing and blooming freely. It was a matter of astonishment to find here a species which has not, I believe, been before recorded east of Texas. The two known localities there are Austin and New Braunfels; and it is interesting to now find the form so far away from the only place where it has hitherto been found.

Cincinnati, O., July, 1883. — JOS. F. JAMES.

Abnormal Cotyledons in Ipomæa.—I find in my garden a seedling of the morning-glory, *Ipomœa purpurea*, with what appears to be a supplementary cotyledon. The condition is better described by saying that one cotyledon is perfect, but that the other consists of *two* which are connate to near the middle. This is as if the plantlet had started with three cotyledons. The abnormal one has, in consequence, a triply retuse apex. The accompanying figure shows the condition.

Masters says, that "fusion frequently accompanies an increase in the number of cotyledons," and attributes the phenomenon, at least in some cases, to chorisis or to a cleavage of the original cotyledon. The venation in my own example would indicate the fusion of the two originally distinct leaves.

Providence, R. I. — W. W. BAILEY.

Botanical Notes.

Fertilization of the Borraginaceæ.—The change of color in various borraginaceous flowers would seem to bear relation to their fertilization. Hermann Müller remarks in *Nature* (May 24, p. 81), that he has observed that insects visit exclusively those which are red or just beginning to change to blue. All the blue flowers which he examined in a locality about 2 yards broad and 20 long, where many hundred flowers of *Pulmonaria* were in all stages of development, proved to be empty of honey, and all which he observed with the aid of a lens, had the stigma already supplied with pollen ; so that it would appear that, as in *Lantana* and *Ribes aureum*, the change of tint serves as a guide to insects visiting the flower.

Contraction of Vegetable Tissues under Frost.—At a recent meeting of the Botanical Section of the Philada. Acad. Nat. Sciences, Mr. Meehan referred to a prevalent opinion that the liquid in vegetable tissues congealed as ordinary liquid does, and expanding, often caused trees to burst with an explosive sound. Mr. Meehan made experiments with young and vigorous trees, varying from one foot to three feet in circumference. They were carefully measured in early winter when the thermometer was at about 40°, and again after they had been exposed for many days to a temperature below freezing point, and, at the time of measurement, to 10° above zero.

In no case was there the slightest evidence of expansion, while in the case of a large maple (*Acer dasycarpum*), 3 feet 11½ inches around, there appeared to be a contraction of ⅛ inch. This was the largest tree experimented with. In dead wood soaked with water, there was an evident expansion ; and the cleavage with explosion noted in the case of forest trees in high northern regions may result from the freezing of liquid in the central or less vital parts of the trunks of trees.

In some hardy succulents, however, instead of expansion under frost, there was a marked contraction. The joints or sections of stem in *Opuntia Rafinesquii* and *O. Missouriensis*, shrink remarkably with the lowering of the temperature. As soon as the thermometer passes the freezing point, the shrinkage is so great that the whole surface has the wrinkled appearance presented by the face of some very aged person. A piece of *Opuntia Rafinesquii*, which, in November measured 4 inches in length, is but 3½ now, and is not half the thickness it was in the autumn. In the winter when the thermometer was down to 10° above zero, the penknife penetrated the tissue just as easily as in summer, and no trace could be discovered of congelation in the juices of the plant. Other succulents exhibited more or less signs of shrinkage under extreme cold. *Mamillaria Nuttallii* and *M. vivipara*, with *Echinocactus Simpsoni*, a mamillose form, drew the mammæ upwards, and had them appressed as closely as the spines would allow; and some species of *Sempervivum* did the same. This could only be accomplished by the contraction of the main axis from the apex downwards. *Sedum Hispanicum*, which has not a succulent axis, contracts its leaves into longitudinal wrinkles, presenting the appearance of being withered or dead. They expand again in a few days of temperature above the freezing point. Specimens of this *Sedum* and of *Opuntia Missouriensis*, preserved just above freezing point under glass, did not shrivel; and a plant of *Echinocactus Simpsoni*, taken under cover, after the mammæ had been appressed by frost, expanded them to the summer condition in a short time afterwards.

Assuming from these facts that the liquids in plants which are known to endure frost without injury, did not congeal, it might be a question as to what power they owed this successful resistance. It was probably a vital power, for the sap of plants, after it was drawn from the tree, congealed easily. In the large maple-tree already referred to, the juice not solidified in the tree exuded from the wounded portions of branches and then froze, hanging from the trees as icicles often six inches long.

Photepinasty of Leaves.—W. Detmer proposes the term "photepinasty" for the epinastic position of leaves induced by light. The normal unfolding of the leaves is due to paratonic nutation. The light first induces stronger growth in the upper side of the leaf; and it is to this phenomenon that he proposes to apply the term. (*Journal* Roy. Micros. Soc.)

Reproductive Organs of Lichens.—The most recently published part of Minks's Symbolæ Licheno-Mycologicæ treats of the Hysteriaceæ, Acrospermeæ and Stictideæ. On the asci and paraphyses together the author bestows the term "thalamium," the "thecium" being that portion of the apothecium which includes these organs. The structure of this portion of the lichen may be referred to three different types: (1) The asci and paraphyses are both fertile hyphæ, which, in the latter case, have undergone arrest of development; and there are all intermediate stages between the two. (2) The paraphyses are formed a shorter or longer time before the fertile hyphæ. They are at a certain period indistinguishable from the hyphæ of the fundamental tissues of the fructification, and there is here no true thalamium. To this class belong the true Stictideæ and the greater part of the Hysteriaceæ. (3) Certain genera exhibit an intermediate structure between the first and second.

The structure and mode of formation of the spores are described in detail; and it is shown that in the anthonimorphous type (*Hysterium Smilacis*, *Stictis versicolor*, etc.) the mother-membrane takes no part in the abstriction of the spores, but that a new membrane is formed, the old one becoming gelatinized.

The germination of *Lophium læviusculum* is described. After the destruction of the asci, the spores remain for a shorter or longer time in the fructification, where they germinate; passing over ultimately into a chroolepis-like gonidema, and not as would be the case if Schwendener's hypothesis were true, developing into a fungus.

The two different forms of ascus correspond to the two different forms of spores. When the ascus has a double wall, the inner layer of which ultimately gelatinizes, then the spore has only a single membrane; while when the ascus has only a single wall the spores have a double membrane, the outer layer of which gelatinizes. (*Journal* Roy. Micros. Soc.)

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Notes on Spartina.

By F. Lamson Scribner.

(Plate xxxvi.)

Mr. Bentham, in his revision of the genera of Gramineæ, has removed *Spartina* from Chlorideæ and placed it in the Chamæraphis group of Paniceæ, associating it with the foreign genera *Chamæraphis* and *Xerochloa* of Brown and with *Stenotaphrum*, Trin., represented in the Southern States by *S. Americanum*, Schrank. The student whose observations are confined to American grasses will see little in common between *Spartina* and *Penesetum* or *Stenotaphrum*, the former immediately preceeding and the latter following it; and he will be little inclined to accept this new arrangement as one that is at all *natural*. He will continue to feel that the relations of *Spartina* are with the Chlorideæ, a tribe in which it has heretofore been placed, and allow the fact of the articulation of the pedicels below the outer glumes as an exceptional character in this genus, as it is allowed in some others which are included in Poaceæ.

In defining the *Chamæraphis* group Mr. Bentham states that the spikelets are nearly those of *Panicum*, but with the fruiting-glume usually less hardened; the inflorescence is nearly that of the paspaloid *Panica* or of Chlorideæ, but distinguished from the former by the rhachis of the partial spikes or fascicles or branches of the panicle being produced beyond the spikelets into a more or less rigid point. From the Chlorideæ they are separated by the articulation of the pedicel below the spikelet.

Exceptional cases presenting this leading character of the Paniceæ, *i. e.*, the articulation of the pedicel below the outer glumes, occur in Poaceæ and in other tribes besides Chlorideæ, and may not *Spartina* form an exception here? There are exceptions also to the character cited by Mr. Bentham as separating the Chamærapheæ from the paspaloid *Panica*. In *Panicum tenuiculmum*, Chapman, (non Meyer) from Florida, and in the East Indian *P. mucronatum*, Roth. (two species which may prove to be identical) the rhachis of the lateral spikes or racemes is prolonged beyond the spikelets into a rigid, subulate mucro or point.

Without entering further into the question respecting the proper position of *Spartina*, which I feel in no wise competent to discuss, I would like to record here a few cases of abnormally developed spikelets of one species of this genus that have come under my notice, drawing no conclusions more than to state that my observations have led me to regard *Spartina polystachya*, Willd., rather as a variety of

S. cynosuroides, Willd., than as a distinct species. The characters based upon the spikelets alone are not sufficient to separate them.

The spikelets represented in Figures 1 and 2 of Plate xxxvi. were taken from a specimen of *S. cynosuroides* collected at the outlet of Moosehead Lake, Maine, by Messrs A. H. and C. E. Smith in 1868. The spikes of the plant are unusually long peduncled and very loosely flowered, but that it is an abnormal growth is well shown by the spikelets represented.

Figures 3, 4 and 5 were drawn from spikelets of a specimen in the herbarium of Mr. Wm. M. Canby, collected at Atlantic City, New Jersey. In habit the plant was like *S. polystachya*. Figure 5 represents a double spikelet which has two upper outer glumes with but a single lower one. Nearly all degrees of cohesion were to be found in different spikelets on the plant.

Figures 6, 7, 8 and 9 illustrate in detail a two-flowered spikelet taken from a specimen of *S. cynosuroides* collected in Oregon by E. Hall. Most of the spikelets were normal, but all degrees in the development of a second floret were exhibited by others, the one here illustrated being the most complete. In some the opposing edges of the pales of the two flowers were united for nearly their entire length. Fig. 6 shows the 2-flowered spikelet complete. Fig. 7 exhibits the outer glumes. Fig. 8 shows the two florets removed from the outer glumes. Fig. 9 shows the florets separated.

New Western Compositæ.

By Edward Lee Greene.

Brickellia Cedrosensis.—A low shrub, with ascending, leafy branchlets bearing usually a solitary head; larger leaves a half-inch long, triangular ovate, coarsely and sharply toothed, on short petioles; those of the branchlets narrower and mostly entire, all roughish pubescent; heads 12–18-flowered; involucral scales acute; akenes smooth; pappus finely barbellate.

Collected on the Cedros Islands many years since by Dr. Veitch, and preserved in the herbarium of the California Academy. The species is allied to *B. frutescens*, Gray, of the main land, north-east of the islands, which has entire, veinless leaves, and heads with more numerous flowers.

Bæria carnosa.—Simple, or more or less branched from the base; the root somewhat fusiform-thickened, but strictly annual; stems a span high, slender but wiry, purple, and sparsely clothed with rather webby, white hairs; leaves wholly glabrous, narrowly linear, subterete and, with the involucres, thick and succulent; involucres campanulate, their large fleshy scales marked with a prominent, keel-like midrib; akenes roughish; pappus of 5 ovate, acuminate, chaffy scales which taper into a long slender awn.

Collected by the writer on the border of a salt marsh at Vallejo, April 15th, 1883. A most remarkable species, as to its succulent herbage, recalling certain similarly fleshy, maritime species in other genera of compositæ, as, for example, *Layia carnosa*, H. & A.

Lagophylla congesta.—Near *L. ramosissima*, but the stouter

SPIKELETS OF SPARTINA.

stem usually simple; heads larger and numerous, in dense, glomerate clusters; floral leaves and involucral scales very villous, and beset with short-stipitate, or more commonly, quite sessile glands; akenes twice the size of those of other known species, and of a light grey; chaff of the receptacle united to the middle, thus forming a cup.

This interesting plant was collected by Dr. Kellogg in Mendocino County, Cal., as long ago as August, 1867, and is now in July, 1883, brought in from Mt. Yamulpais, near San Francisco, by that most diligent gatherer of rare Californian plants, Mrs. Kate Curran. Resembling *L. glandulosa* in being a glandular species, if these glands were overlooked; and, if it had a branching mode of growth, it would pass for a ranker *L. ramosissima.*

SENECIO CLEVELANDI.—Glabrous and glaucous; stem rather stout, 1½–2 feet high, few-leaved above and bearing numerous middle-sized, paniculate-corymbose heads; lower leaves numerous, rather succulent, ovate-oblong, entire, 2–3 inches long, tapering to long petioles; involucre broad, sparingly calyculate, its scales with lanceolate, acuminate, green tips; rays deep yellow; akenes short and small, prominently 4- or 5- angled.

Indian Valley, Lake County, Cal., D. Cleveland.

The following species, from another district, resembles this in foliage, but not otherwise, namely:

SENECIO LAYNEÆ.—Two feet high, glabrous throughout, strict and simple leaves mostly radical, linear lanceolate, entire, 3–4 lines wide, an inch or two long, on petioles of nearly equal length; the few cauline ones similar, though less obviously petiolate heads 5–7, corymbose, all but the central one on peduncles 2–3 inches long, large and showy; involucre campanulate, many-flowered, more than ½ inch high, naked at base; rays 7–10, oblong-linear, ¾ inch long, orange-yellow; the merely convex style-tips bearing 3 or 4 conspicuous central bristles, and numerous shorter ones toward the circumference.

El Dorado County, Cal., on Sweetwater Creek, not far from Folsom; collected in May, 1883, by the very zealous and efficient Mrs. Kate Layne-Curran, to whom I gladly dedicate it. It is a near relative of the rare *S. Greenei*, Gray, thus far collected only by the writer, and that seven years ago, in the neighborhood of the geysers, in Sonoma County.

SENECIO ACTINELLA.—Acaulescent, at first arachnoid-woolly; leaves all radical, obovate to oblanceolate, spatulate, their margins strongly crenate-dentate, an inch or two long, including the broad petiole, and ½ inch or more in breadth, coriaceous, veinless, at length glabrate, and persistent through the winter; scape solitary, 6–10 inches high, bearing a single large head; involucre campanulate, ½ inch high, the calyculate scales few and wrapped in wool; rays 9–12, narrow, pale yellow; style-tips bristly-fringed.

Rocky woods in the northern part of Arizona, near Flagstaff; collected by H. H. Rusby, June, 1883. A fine new species, nearest to *S. canus*, from which it is distinguished by its crenate-toothed leaves, strictly monocephalous scapes, and large heads.

SENECIO ARIZONICUS.—Slightly webby-woolly at first, at length glabrate; leaves mostly radical, numerous, and of a fleshy texture, ovate-oblong, obtuse, often a little cordate at base, strongly cuspidate-toothed, 1½ inches broad, 3 inches long, on petioles of almost equal length; stem 1½ feet high, slender, leafless, or with a few large and small bracts; corymb lax; heads middle-sized, on slender peduncles; involucres with a few almost filiform calyculate scales or bracts at base; rays 9–12, yellow.

Lynx Creek, in Northern Arizona, May 31st, 1883; collected by H. H. Rusby.

MICROSERIS ACUMINATA.—Near *M. Bigelovii*, but larger, the scapes more than a foot high, and rather stout; leaves pinnately parted into numerous, narrowly linear division; akenes only slightly contracted at summit, ¼ inch long; pappus ¾ inch long, consisting of 5 linear-lanceolate scales, each tapering very gradually into a short, slender awn.

Collected, in a few depauperate specimens, near Vallejo, in April 1883; and also, at about the same date, in the Sacramento Valley, by Mrs. Kate Curran, her specimens being of a strong, luxuriant growth. Dr. Gray informs me that it was even long ago collected sparingly by Bigelow, on Mark West's Creek, and that it has been referred, first to *M. Douglassii* and later to *M. Bigelovii.*

TROXIMON HETEROPHYLLUM.—This will apparently have to be the name of the North American plant which has been for some years past called *T. Chilense*, Gray. (Proc. Am. Acad., ix., 216, and Bot. Cal., i., 439.) The Chilian plant, for which Dr. Gray's specific name will be retained, differs in having considerably larger akenes, which are always all alike in the same head, and a shorter stipe to the pappus.

The North American plant runs into varieties so remarkable that, on two of them, so acute and able a botanist as Nuttall founded genera; and I even now doubt if they do not merit the rank of species. However, since my venerated friend Dr. Gray (who, by the way, has lately, and independently of my fresh specimens and notes, reached also the conclusion that our species is distinct from the Chilian) regards them as mere varieties, I here so place them; namely:

var. CRYPTOPLEURA.—Outer akenes nearly globose inflated and hardly striate, the inner of normal thickness and also barely striate, not at all winged. This is the *Cryptopleura Californica*, Nutt., and *Macrorhyncus Californicus*, Torr. & Gray. Although hitherto accounted very rare, and thought to be perhaps a merely abnormal state not likely to recur, I have this year found plenty of it in two patches a quarter of a mile distant from each other, though both within the limits of the town of Berkeley.

var. KYMAPLEURA.—Outer akenes with broad and strongly and beautifully undulated wings, the inner merely striate. This is *Kymapleura heterophylla*, Nutt., and also *Macrorhyncus heterophyllus*, of the same author. It is the most common form of the species in the central part of California.

Besides these striking varieties, which do not show any signs of running together, there are other forms, namely, one with akenes all alike, and none of them much ribbed, another with the outer akenes ribbed (not corky-winged) and very hirsute.

The species should be collected abundantly in all localities where it occurs, and the specimens diligently compared. I regard it as an interesting subject of future investigation.

New Species of Fungi.

By J. B. ELLIS and B. M. EVERHART.

DIAPORTHE (VALSA) ELLISII, Rehm (*in lit.*).—Stroma cortical, without any circumscribing line; perithecia numerous (15–20), .5$^{mm.}$ in diameter, crowded, subcircinate, raising the bark into small pustules, through the centre of which bursts the brown convex disk pierced around its margin by the black, obtuse, dot-like ostiola; asci-subclavate, 57x8μ; sporidia biseriate or overlapping, narrowly elliptical, 4-nucleate, and often slightly constricted in the middle, 11–15x3.5–5.5μ.

With a *Cytispora*, the spores of which are oblong, hyaline, 4-nucleate, 8–11x2–2.5μ and issue in an orange-colored mass.

Closely allied to *Diaporthe carpinicola*, Fkl., and *Valsa Carpini*, Fr.

On dead branches of *Carpinus Americana*. West Chester, Pa. June, 1882. E. H. J. & G. No. 372.

VALSA LASIOSTOMA.—Perithecia circinating, .33–.5$^{mm.}$ in diameter, globose, and tuberculose-roughened, lying on the suface of the inner bark, or slightly bedded in it, their long (100–150μ), slender, cylindrical, decumbent necks converging and piercing the epidermis in a group, but not united in a disk; asci (spore-bearing part) 35–40x4–5μ; sporidia cylindrical, hyaline, nearly straight, 5–6 x 1.5–2μ.

The ostiola are slightly swollen above, and, with the exception of the bare, black, obtuse tips, are covered with an olive-brown pubescence as in *Sphæria barbirostris*, Dufour, from which this scarcely differs in any respect except in its circinate perithecia.

On decaying white oak limbs lying on the ground. Newfield, N. J. March, 1883.

CUCURBITARIA COREMÆ.—Perithecia at first subcuticular, but finally throwing off the epidermis, ovate, black, rough, .16–.33$^{mm.}$ in diameter, ostiola broadly papilliform on obtuse conic; asci cylindrical, 150x15μ; sporidia uniseriate and oblique or partly biseriate, elliptical or oblong-elliptical, yellow at first, becoming finally deep brown, about 7-septate, with some partial longitudinal septa, and mostly constricted in the middle, 20–25x7–9μ.

On dead branches of *Corema Conradii*. Willow Grove, N. J., November, 1883.

LOPHIOSTOMA STENOSTOMUM.—Perithecia scattered, globose, .25$^{mm.}$ in diameter, covered by the fibres of the bark, which is pierced by the narrow, slightly compressed ostiolum; asci clavate-cylindrical, 75–90x6–7μ; paraphyses filiform, abundant; sporidia biseriate, fusiform, slightly curved, yellowish, nucleate and uniseptate at first, becoming 3-septate and more or less constricted at the septa, 18–22x 3–3.5μ.

Accompanied by a *Phoma* with small, subglobose spores in perithecia scarcely different from the ascigerous ones except in wanting the prominent ostiolum. Differs from *L. subcorticale*, Fckl., in its narrow ostiolum and smaller sporidia.

On the inner surface of loosely hanging bark of grape-vines. Newfield, N. J. May, 1883.

SPHÆRIA (DIDYMELLA) RAUII.—Perithecia scattered or 2–3 together on the surface of the inner bark, and covered by the thin, loosened epidermis, which is pierced by the papilliform ostiolum; asci 35–30x6–7μ; paraphyses slender; sporidia biseriate, oblong-fusiform, uniseptate, constricted and slightly curved, with a faint, bristle-like appendage at each end, yellowish, with a nucleus in each cell, 7–8x15–2μ.

On dead branches of cultivated roses. Bethlehem, Pa. May, 1883. E. A. Rau.

SPHÆRIA (DIDYMOSPHÆRIA) CUPULA. — Perithecia scattered, innate, covered, except the papilliform ostiolum, by the blackened epidermis, convex-hemispheric when fresh, collapsed when dry; asci 75x7μ; sporidia elliptical, brown, uniseptate, uniseriate, 9.5–11.5x 4.5–5μ.

Sphæria diplospora, Cke., has sporidia 13–16x5–7μ, and perithecia not collapsing.

On dry oak-leaves still hanging on the limbs. Newfield, N. J. May, 1882. Found also on *Phytolacca* and *Desmodium*.

SPHÆRIA (THYRIDIUM) ANTIQUA.—Perithecia mostly solitary, globose, .25–.33$^{mm.}$ in diameter, buried in the substance of the bark, sometimes two or three together, their thick walls united and covered by the fibres of the bark, which is blackened above them and raised into little tuberculiform pustules; ostiola papilliform, at length perforated; asci cylindrical, 75–80x10μ; paraphyses filiform, abundant; sporidia uniseriate, oblong-elliptical, at length 3-septate and submuriform, 17–19x7μ, brown.

On the inner surface of loosely hanging bark of grape-vines. Newfield, N. J. May, 1883.

Some New Texan Plants.

By S. B. BUCKLEY.

ZANTHOXYLUM TEXANUM.—Unarmed, leaves trifoliate, leaflets ovate, obtuse, repandly crenate, subrevolute, smooth on both sides, punctate, petioles 4″–6″ long, lateral leaflets serrate, petiole of terminal one 3″–6″ long; racemes terminal, compound, pedicels short, with minute, acute, bracts and bractlets; divisions of calyx broadly ovate, acute, ovules 1–2, seeds not seen.

A large shrub 4–6 feet high, thickly branched; younger branches greyish brown, much punctated. The branches when broken have the aromatic odor peculiar to many species of the genus.

Differs from *Z. ternatum* of the West Indies in its terminal racemes and crenate leaflets. Near Corpus Christi, Texas.

BUMELIA TEXANA.—Leaves ovate or subcuneate, smooth on both sides, and of the same pale green color, 1′–1½′ long and about ½′ wide, petioles longer than the pedicels, being about 4″ long, smooth; calyx broadly ovate, subobtuse; corolla yellowish white, but little longer than the calyx; petioles and midrib of the under sides of some of the leaves showing a slight pubescence under the microscope; fruit ovoid-ovate or elliptic in outline, 3″–4″ long and about 3″ broad.

A shrub or small tree. Smaller branches with dark reddish brown bark, rigid and sub-spinose, the leafy and fruit-bearing spines 1′–3′ long.

Mountains near the lower crossing of the Pecos River on the road from Fort Stockton to old Fort Lancaster and the head of Devil's River.

BUMELIA MONTICOLA.—Very spinose; leaves smooth on both sides, a little paler beneath, oblong-ovate, cuneate at the base, petiolate, 1′–1½′ long and ¼′–½′ wide, their under surface reticulately veined; petioles 3″–4″ long, about equal in length to the pedicels; calyx broad ovate, acute or sub-acute, smooth; fruit globose, the longitudinal diameter a little the greater, being about 3″ long; spines 1′–2′ long, often bearing leaves and fruit; smaller branches smooth, greyish brown, forming obtuse angles opposite their junction with the spines, with generally a warty protuberance at the base of each spine; flowers not seen.

A straggling shrub 3–9 feet high, with smooth reddish brown bark. Moutains of El Paso County, N. W. Texas.

Quercus Durandii, var. SAN SABIA.—This is a small oak seldom more than ten feet high, generally only from four to six feet, growing in dense thickets on some of the limestone hills of San Saba and its adjacent counties, Texas.

It has small, obtusely lobed leaves, which, when old, are nearly of the same color and smooth on both sides; when young, glaucous and sub-pubescent beneath; acorn oblong-ovoid, cup shallow, one-third the length of the acorn. Bark of trunk and branches light grey and scaly. Called "shin oak." Bark, acorns and cups very much like those of *Q. Durandii*, and so much so that it can only be considered as a well marked variety of it.

It has been called by Engelmann a variety of *Q. undulata*, and is placed thereunder in Prof. Sargent's Synopsis of the Trees of North America, and, in the same work, on the same authority, *Q. Durandii* is called a variety of *Q. stellata*; but these authorities now admit *Q. Durandii* to be a good species.

QUERCUS VASEYANA.—Leaves apparently deciduous, with shallow, repand, acutely toothed lobes and sub-mucronate teeth, smooth on both sides, or slightly downy and paler beneath, mostly cuneate at the base, rarely rounded, lanceolate or lance-ovate, petiolate, 1′–2′ long and ⅓′–1′ wide; petioles 1″–2″ long; acorns oblong-ovoid, smooth, shining and of a pale chestnut color, 6″–7″ long and about 4″ wide; cups sessile, their greyish-brown scales tumid, triangular ovate, acute.

A shrub or small tree of the class of black oaks. On the mesas of the cretaceous limestone mountains near the lower crossing of the Pecos, and also in the valley of the Devil's River of Western Texas.

Named in honor of Dr. Vasey, botanist of the Agricultural Department at Washington, D. C.

Potamogetons in Western New York.—While spending a few days of the summer of 1882 in Western New York, I examined some of the lakes and streams of Wyoming, Genesee and Livingston Counties for species of *Potamogeton.* The results are given below, with the reservation, however, that they do not profess to be exhaustive, since time enough was not at my command at every locality to attain this end. The examination was carried far enough to see that the waters of that region still need to be searched more carefully than has yet been done to obtain a complete knowledge of the geographical distribution of these difficult and somewhat neglected plants.

The localities chiefly noticed were Silver Lake and its outlet at Perry, Wyoming County, Hemlock and Conesus Lakes, Livingston County, and Oatka Creek and several smaller streams of Genesee and Wyoming Counties. Fourteen species were found with considerable variation on the part of some, and are as follows:

P. natans, L., Silver Lake and Oatka Creek.

P. Claytonii, Tuckerman. Same localities, and Hemlock Lake and its outlet.

P. spirillus, Tuckerman. Hemlock and Conesus Lakes.

P. lonchites, Tuckerman. Hemlock and Conesus Lakes.

P. amplifolius, Tuckerman. Oatka Creek and the three lakes.

P. graminius, L. Some forms belonging to the variety *heterophyllus*, Fries, and others that are difficult to bring under the head of any varieties given in the books, the species being so polymorphic. Conesus Lake and Oatka Creek.

P. lucens, L. Oatka Creek.

P. perfoliatus, L. Either the variety *lanceolatus*, Robbins, or inclining to this, though some forms have very short leaves. The three lakes and Oatka Creek.

P. zosteræfolius, Schumacher (*P. compressus*, L. [ex Fries.]) Silver and Hemlock Lakes.

P. pauciflorus, Pursh. Silver Lake and Oatka Creek; also abundant in brooks and pools.

P. lateralis, Morong. (*Bot. Gaz.*, May, 1880.) Hemlock Lake.

P. pusillus, L. Principally the variety *vulgaris*, Fries. Silver, Hemlock and Conesus Lakes.

P. pectinatus, L. Silver, Hemlock and Conesus Lakes.

P. marinus, L. Hemlock and Conesus Lakes.

NOTES.—*P. Claytonii.* Those taken from Oatka Creek, near the village of Wyoming, had remarkably long floating leaves like some I had found at Ludington, Mich. They were in some cases 4–4½ inches long, and the petioles of these and of specimens from Silver Lake were usually from 1–2 inches long.

P. amplifolius was one of the most common species, being found quite generally in all mill-ponds and lakes, and streams whose depth was sufficient for its growth.

P. pauciflorus. This was the only species seen in brooks and in Oatka Creek, between Warsaw and Wyoming, with one exception (*P. Claytonii*). It commonly occurred in nearly all pools and brooks where the water, supplied by springs, or oozing out from neighboring hills, did not fail on account of the summer heat. All the forms were of the coarsed-leaved kinds, the leaves frequently having a length of 2–3½ inches, and a corresponding width, being 3–5-nerved. The fruit, in capitate clusters, and with the keel more or less crested and notched, was very abundant. In these characters it approaches *P. Niagarensis*, Tuckerman; but, according to Mr. Morong, to whom some of the most marked specimens were submitted for comparison with type specimens in Robbins's herbarium, they are not quite identical. This great variability of leaves, and to some extent of fruit, both of which were carefully studied in specimens gathered in many localities, and under diverse conditions of growth, seems to lead conclusively to the opinion that no well marked line of separation can be drawn between *P. Niagarensis*, Tuckerman, and *P. pauciflorus*, Pursh; and that the former should be regarded as a variety of the latter. The same is true if based on a comparison of specimens collected in several quite widely separated localities in the West and North-west.

P. pusillus. Specimens of this would have to be classed with the variety *vulgaris*, Fries, sometimes approaching var. *major*, Fries, but more often var. *tenuissimus*, Mertens & Koch. In Silver Lake three forms were noticed, a common one with stems often 4½ feet long, but with fruit immature; a second with stems also long, of a reddish or pink color, and spikes of fruit emersed; a third with fruit larger and longer than usual, somewhat oblong, with a rather long, recurved style, the sides of the fruit impressed; spikes interrupted; stems 3–5 feet long.

P. marinus. This was very abundant in Hemlock Lake, in water 1½–3 feet deep, frequently in beds completely covering the bottom. The stems were usually long for the species, being about one foot in length, and the fruit copious. It was detected nowhere in the shallowest water nearest the shore, this ground being occupied almost invariably by *P. spirillus*, equally common but not in so dense beds. That found in Conesus Lake was not so tall, nor very common, as far as examination was made.

It may be of interest to state in connection with this as an evidence of the purity of the water of Hemlock Lake, from which the city of Rochester takes its water supply, that Potamogetons gathered there were almost wholly free from the earthy sediment which usually clings to these plants and is very troublesome to the collector, marring the looks and cleanness of his specimens. Chemical analysis has shown that the water of this lake ranks with the purest in the State. Species of *Potamogeton*, found in the neighboring Conesus Lake, whose water looks equally pure to the eye, were, however, quite thickly coated with an earthy deposit.

The time of these examinations was between July 22d and Aug. 9th, and the greater part of the species found showed some mature fruit, generally essential for complete identification.

Englewood, Ill. E. J. Hill.

Pinus Banksiana.—In the July number of the Bulletin (p. 82), Mr. N. L. Britton calls attention to the fact that our botanical writers have commonly understated the size of Banks's Pine (*Pinus Banksiana*, Lambert), Gray describing it as "a straggling shrub or low tree," and other authors giving its maximum height at from twenty to forty feet. Mr. Britton then states that he has found trees, in the vicinity of Marquette on Lake Superior, that measured seventy feet in height; but he overlooks the detailed observations of Mr. Bell, who tells us that on the southern branches of Albany River, south-west of Hudson's Bay, he saw "large groves of these trees about seventy feet in height, and two feet in diameter at butt, with straight trunks nearly free from branches for the first twenty or thirty feet."

I have myself seen Banks's pine growing in abundance at various places along the lower River and Gulf of St. Lawrence, and at Newfoundland; and have found many trees at Godbout and Seven Islands that were upwards of fifty feet in height, and some that exceeded sixty feet. In the Province of Quebec it is largely used as a fire-wood, and along the north shore of the river it has become an article of commerce of no inconsiderable value, thousands of cords being shipped annually to Quebec. It is here called "cypress"!

In our manuals the species is commonly, though very improperly termed the "northern scrub pine." Its habitat is in the far north, where it attains its maximum development, constituting one of the larger forest trees. Only beyond the limits of its proper range does it occur as a "straggling shrub," or merit the appellation of "scrubby."

Mr. J. A. Allen, in treating of the correlation of size with geographical distribution in mammals, has tersely formulated the following law, which is as strikingly applicable in the present case as in any member of the group for which it was particularly framed: "*The maximum physical development of the individual is attained where the conditions of environment are most favorable to the life of the species.* Species being primarily limited in their distribution by climatic conditions, their representatives living at or near either of their respective latitudinal boundaries are more or less unfavorably affected by the influences that finally limit the range of the species."

Locust Grove, N. Y. C. HART MERRIAM.

Lonicera grata.—Does any New York or New Jersey botanist know aught of the station for this plant, "in the cedar swamps of New Durham, about three miles from Hoboken, New Jersey," cited by Torrey in his Flora of the Northern and Middle States, or, if the plant and the swamp are now extinct, is any other locality known? There is no specimen from New Jersey or New York in the Torrey Herbarium. This herbarium has a specimen from Dr. Darlington, and his stations, as given in the second edition of the Flora Cestrica (it is not in the first edition), are "on Ridley Creek, by Mr. George W. Hall, in 1831, also along the Brandywine, above the Forks, in 1835, by John Rutter." Now there is nothing in the character, nor in Darlington's specimens, to distinguish the species from the *L. Caprifolium* excepting that the leaves are perhaps more glaucous beneath and that the flowers are said to "have almost too strong an odor to be agreeable." I am not aware that this has ever been said of the

European honeysuckle. Dr. Hale's Louisiana specimen, in Herb. Torr., I must suppose to be the European species. No other specimens purporting to be indigenous are known to me. Is there really an indigenous species of this sort? As Darlington cites *Lonicera Virginiana*, Marshall, Arbust., as a synonym of *L. grata*, and as Marshall, who lived in Darlington's district, assigns no particular habitat for his species, one may suppose that he had in view a wild species of his own region. But if so he would hardly have named it *L. Virginiana;* and his description answers rather to *L. sempervirens*, the flowers "having long scarlet tubes with short borders." We get no more satisfaction by referring to the original sources of the species. It was founded, in the Hortus Kewensis, on *Periclymenum Americanum* of Miller's Dictionary. Miller merely says it is from America. Pursh would seem to have known all about it. He says: "On the mountains, rambling among rocks, in shady, moist situations, New York to Carolina; rare." But in such matters Pursh is not to be trusted. Can any American botanist throw further light upon the matter?

ASA GRAY.

Magnolia glauca, L., **on Long Island.**—This tree, reported in the N. Y. State Flora as occurring on Long Island, and which has hitherto eluded the search of recent explorers, including the authors of the Catalogue of the Plants of Suffolk Co., has been found by Mr. Robert W. Newbery, of this city, growing spontaneously on both sides of the L. I. Railroad culvert at Tuttle's Pond, a short distance east of Speonk Station, Suffolk Co.

Brooklyn, N. Y. W. H. RUDKIN.

Botanical Notes.

Diospyros Kaki.—According to J. Ishikana, in a paper on the materials containing tannin used in Japan, a remarkable liquid, called "kaki-no-shibu," prepared from the astringent fruits of the persimmon (*Diospyros Kaki*), is used for giving strength and durability to paper, which is applied to many more uses in Japan than in other countries. This property appears to be due to the deposit from the film of liquid, with which the paper is covered, possessing somewhat of the character of lacquer. while the tannin acts as an antiseptic. The film formed by this liquid on materials coated with or immersed in it is almost insoluble in water or alcohol and is not perceptibly attacked by boiling with dilute sulphuric acid. The kaki-no-shibu is prepared from the fruits gathered early in the summer and beaten in stone mortars. The mass, transferred to wooden tubs, is covered with water for half a day, and then filtered through a straw bag. The liquid so prepared is a milky fluid of a light or dark grey color and evidently holds minute particles of solid matter in suspension.

The Development of Chlorophyll.—In recent works published by Messrs. Schimper and A. Meyer on the development of chlorophyll and color-bearing granules of plants, it is stated that instead of these bodies being formed free in the protoplasm of the cell, as hitherto supposed, they arise from distinct structures or "plastidia" present in the young cell from its earliest existence, and that any pigment, starch grains, etc., found in connection with the structure named arise by later changes produced by continuous growth and division of the few minute plastidia foun in the young cells. Those which are deeply seated and not as yet colored are called by Schimper "leucoplastidia"; those which are nearer the light and in which a green coloring matter is developed, "chloroplastidia;" and those which in dividing give rise to needle- or spindle-shaped bodies or triangular ones with sharply pointed corners, and pass through various shades from green to carmine-red, he calls "chromoplastidia." These forms appear to be due to the crystallization of certain of the proteid contents of the plastidia. All the plastidia of the stem and leaves appear to rise by division of the plastidia in the *punctum vegetationis* of the young stem, and those of the root from the division and differentiation of those of the *punctum vegetationis* of the radicle. As they are found at a very early age of the embryo, even when only eight cells old, as in *Linum Austriacum*, Schimper thinks it probable that they arise from primitive plastidia in the oosphere. Starch grains may arise from the leucoplastidia, also, at a very early stage, as they may be observed in the oosphere. The Characeæ would seem to be the earliest plants in which all three forms of these bodies occur, the apical cells containing leucoplastidia, and the antheridia owing their color to chromoplastidia.

Botanical Literature.

Sylloge Fungorum omnium hucusque cognitorum. By P. A. Saccardo.

The second volume of this work is now issued. It contains 813 pages, besides 69 pages of Addenda, carrying the number of species up to 6,180, which is supposed to include all the Pyrenomycetes thus far known. At the end this volume there is an alphabetical index of all the specific names in the two volumes; the generic name being added in parenthesis after each specific name.

Whatever may be thought of the many new genera into which the old genus *Sphæria* is here divided, there can be but one opinion as to the practical value of the work, which should be in the hands of every thorough student of mycology. Vol. iii., describing the "imperfect" fungi, will appear next year.—J. B. E.

Contributions to American Botany. XI. By Sereno Watson. 8vo, pp. 100. (From the *Proceedings* of Amer. Acad. of Arts and Sciences. Vol. xviii).

This instalment of Mr. Watson's Contributions to American Botany, issued on the 15th inst., contains: (1) List of Plants from South-western Texas and Northern Mexico, collected chiefly by Dr. E. Palmer in 1879–80; Gamopetatalæ to Acotyledones; and (2) Descriptions of some new Western species (*Greggia linearifolia*, *Sagina crassicaulis*, *Montia Howellii*, *Astragalus Matthewsii*, *A. Wingatanus*, *A. hypoxylus*, *Spiræa occidentalis*, *Ribes ambiguum*, *Sedum radiatum*, *Gayophytum pumilum*, *Eryngium discolor*, *Suæda minutiflora*, *Eriogonum Shockleyi*, *E. Havardi*, *Euphorbia Plummeræ*, *Microstylis purpurea*, *M. corymbosa*, *Allium Plummeræ* and *Bouteloua Texana*.)

BULLETIN

OF THE

TORREY BOTANICAL CLUB.

Vol. X.] New York, September, 1883. [**No. 9.**

New Species of Fungi.

By J. B. Ellis and Benjamin M. Everhart.

Haplaria chlorina.—Forming thin, greenish-yellow patches, .5–1$^{cm.}$ in diameter, hyphæ erect cæspitose, 3–4 together, brownish under the microscope, slender, 4–5-septate, tips minutely roughened and bearing numerous subglobse or slightly elliptical, 1.5–2x1–1.5μ hyaline conidia.

On rotten wood of *Magnolia*, Newfield, N. J. July, 1883.

Virgaria olivacea.—Hyphæ erect, simple, olive-brown, faintly septate below, slightly enlarged and paler, with a wavy outline, above, 125x2.5μ; conidia solitary, obovate, brown, terminal, 4x3.5μ. Forming an olive-brown, velvet-like coating extending for 1–3$^{cm.}$ along the surface of a dry dead oak-limb.

Newfield, N. J., Aug. 1883.

Differs from *V. globigera*, S. & E., in its olivaceous color and smaller conidia, without any granular contents.

Spicaria fumosa.— Hyphæ erect, solitary, smoky-brown, obscurely septate and mostly swollen at intervals, attached by a small, disk-like expansion at base, 70–80x3μ, subverticillately divided above into 2–5, short (7–8μ) hyaline branches, swollen at base and bearing at their tips a series of oblong, hyaline, continuous, 2.5–.75μ conidia, placed end to end so as to form a continuous chain or necklace, 20–40μ long and appearing, when examined in the dry state, as a faintly septate continuation of the terminal branches of the hyphæ, but quickly separating into its component conidia on the application of water.

On the spines of old chestnut-burs. Fairmount Park, Philadelphia, Pa. July, 1883. Hugo Bilgram.

Septoria flagellaris.—On orbicular, reddish-brown spots (1–2$^{mm.}$), definitely limited and often concentrically wrinkled, sometimes whitening out on the upper surface, apparently by the peeling off of the cuticle; perithecia either solitary in the centre of the spots or 2–3 together, sublenticular, 80–120μ in diameter; spores 35–114x1.5μ, nucleate, or oftener 4–8-septate, broader at one end and gradually attenuated to the other.

On living leaves of *Calystegia Sepium*. Newfield, N. J., Aug. 1883.

S. Convolvuli, Desm., has spores only 35–50μ long, and larger perithecia on less definitely limited spots. *S. Sepium*, Desm., also differs in its spores being twice as broad, and in the different appearance of the spots.

Phyllosticta sphæropsoidea.—Spots reddish brown, with a light yellow border, varying in size and shape, 1–2$^{cm.}$, or, by confluence, larger; perithecia scattered, punctiform, immersed, opening above, but also projecting on the lower surface of the leaf, though covered by the cuticle; spores globose or short elliptical, hyaline, filled with small nuclei, or with one or two large nuclei and many small ones, 12–15.5 x 8–10μ, on stout basidia like a *Sphæropsis*.

On living leaves of *Æsculus Hippocastani*. Vineland, N. J., August, 1883. Dr. E. C. Bidwell.

This appears to be quite injurious, many of the trees appearing at a little distance as if they had had their leaves scorched by fire.

PEZIZA (SARCOSCYPHA) CHLAMYDOSPORA.—Cæspitose, 1–2$^{cm.}$ across, sessile, dark brown, minutely granular outside, margin obsoletely toothed, involute when dry ; asci cylindrical, 170–200x10–11μ; paraphyses linear, stout, scarcely thickened above; sporidia uniseriate, elliptical, with a rough epispore, 1–2-nucleate, 11–12x7μ.

On the ground, West Chester, Pa., June, 1882–3,

Everhart, Haines, Jefferies and Gray.

Allied to *P. badia*, Pers., but differing in its rougher sporidia and the very large cells of the intermediate layer of the cups.

HELOTIUM SULFURELLUM.—Light lemon-colored or very nearly sulphur-colored with a slight tinge of green, farinose; stem firm, brownish at the base, gradually enlarged above, 3–7$^{mm.}$ high; disk darker, pale cinnamon-brown when dry, concave or nearly plane, sometimes distinctly umbilicate, 2–4$^{mm.}$ broad, margin subacute and even; asci cylindrical, 75x7–8μ; paraphyses filiform, slightly enlarged and yellowish above; sporidia uniseriate, partly overlapping, navicular, elliptical, 2-nucleate, nearly hyaline or with a faint tinge of yellow, 10–12x3.5–5μ.

On fallen petioles of *Fraxinus Americana*.

West Chester, Pa., August, 1883. Everhart and Haines.

Helotium Limonium, C. & P., and *H. gracile*, C. & P., which this somewhat resembles, have quite different sporidia.

DIAPORTHE ASCLEPIADIS.—Stroma forming black patches on the surface of the stem, .5$^{cm.}$ long, or, by confluence, much longer, limited within by a deeply penetrating, black, circumscribing line; perithecia scattered globose (.25$^{mm.}$), buried in the substance of the stem, but not deeply; ostiola rather stout, cylindrical, subobtuse, .25–.33$^{mm.}$ long; asci (spore-bearing part) 35–40x9μ; sporidia biseriate, elliptical, constricted in the middle, 3–4-nucleate, subobtuse, 10–12x 3–4μ.

On dead stems of *Asclepias tuberosa*. Newfield, N. J.

GNOMONIA SASSAFRAS. — Perithecia erumpent, hemispherical, about 200μ in diameter, scattered over the lower surface of the leaves and along the midrib; ostiola filiform, 200–250μ long, of fibrous texture, subhylaline above, mostly a little bent; asci lanceolate, curved; paraphyses none; sporidia spiculiform or filiform, with a faint yellowish tinge, indistinctly multinucleate, 35–40x.75μ.

On fallen leaves of *Sassafras officinale*.

Fairfield Co., Ohio, June, 1883. W. A. Kellermann.

SPHÆRELLA SASSAFRAS. — Perithecia minute, semi-immersed, scattered over the lower surface of the leaf, or collected in groups, but not on any discolored spots; asci 35x5μ; sporidia biseriate, oblong-elliptical, uniseptate, 4x1.75μ, hyaline.

With the preceding.

On the Fruit of Eustichium Norvegicum, Br. Eu.

By Elizabeth G. Knight.

The rare moss, *Eustichium Norvegicum*, has long been known to bryologists, but, up to the present time, no description of its fruit has been published. It has been my good fortune to find the plant in fructification, and a description of the fruit, illustrated by figures showing the details of its structure, is here appended.

The moss was found in great abundance on the Potsdam sandstone in the dells of the Wisconsin River, near Kilbourn City, Wis., on July 8th of the present year, and, after careful search, seventeen fertile specimens were obtained. It grew on moist, vertical faces of rock forming large patches.

Description of the Fruit.—Capsule terminal, pendent, pyriform, $1^{mm.}$ long and about half as broad when moist, noticeable by its yellow color, supported on a curved pedicel which slightly exceeds the length of the capsule; teeth none in the specimens collected, their place being occupied by a thin, transparent membrane; columella a straight rod persistently attached to the operculum; operculum long-rostrate, conic when moist, flattening in drying by the contraction of the elastic annulus, leaving the oblique rostrum prominently projecting, itself parting from the expanding mouth of the capsule and carrying with it shreds of the ruptured membrane; calyptra cuculliform, $.75^{mm.}$ in length, tipped with a long whip-like awn, which equals or exceeds in length the rest of the calyptra.

The other characters agree with the description given in Sullivant's Mosses in Gray's Manual (4th ed., 1863, p. 629), as follows:

"Stems frond-like, flat, mostly simple (about 1′ long and 1″ broad), rooting only at the bulb-like base; leaves 2-ranked, complicate, closely imbricating, erect; those on the middle of the stem elongated-oblong, obliquely truncate, shortly acuminate, increasing in size as they ascend, the perichætial leaves attenuated into a long and linear, flexuous, pellucid, flat, equitant and slightly serrulate point, longer than the lamina; areolation above sub-rotund, below oblong, that of the point of the perichætial leaves linear; costa percurrent, its upper part narrowly winged; diœcious; flowers of both kinds terminal."

In the Memoirs of the American Academy (n. ser., p. 57. t. i.) Sullivant says: "The genus of our moss must remain uncertain until the discovery of its fruit, which we may now expect," etc. If further examination of more mature specimens proves the lack of teeth, then the South American *Eustichia longirostris*, Brid., should be transferred to another genus. For description of *E. longirostris*, see G. Mitten, *Jour. Linn. Soc.*, xii., p. 603 and Brid. Bry. Univ. For descriptions of *Eustichium Norvegicum*, see Br. Eu., fas. xlii.; Brid., Vol. ii., p. 674; and C. Müller, Syn. Musc. Frond, i., p. 42.

Explanation of the Figures.—Fig. 1. Calyptra magnified 50 diameters. Fig. 2. The fresh capsule, with conical operculum, magnified 50 diameters. Fig. 3. The same dried, with detached and contracted operculum. Fig. 4. Calyptra and columella seen through a natural rupture in the wall of the capsule. Fig. 5. Another view of the same. Fig. 6. An entire plant magnified 5 diameters.

Fig. 1

Fig. 2

Fig. 3

Fig. 6

Fig 4

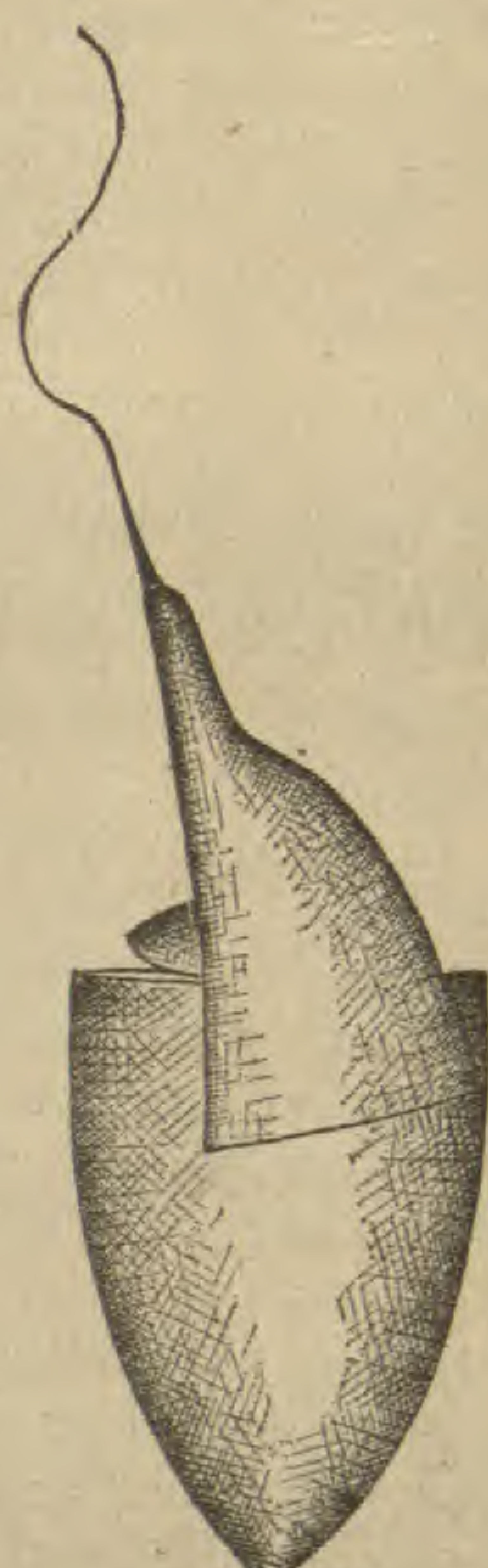

Fig. 5

A New Eleocharis.

By CHARLES WRIGHT.

ELEOCHARIS DIANDRA.—Culms nearly terete (8′–10′ high) from tufted, fibrous roots, rather slender; spike ovoid, very obtuse (2″–4″ long); scales numerous (80–120) ovate, rounded at the tip, one-third longer than the achenium, imbricated in many rows; stamens two; achenium cuneate-obovate, pale stramineous becoming castaneous, shining, scarcely half a line long; bristles few and short, or mostly wanting; tubercle depressed, tranversely oblong, the ends rounded and slightly elevated, the top shortly apiculate; style usually bifid.

On high sand-bars of the Connecticut River, between Hartford and Wethersfield, growing in company with *E. obtusa*, which it closely resembles in appearance. A tabular statement of the differences is appended.

	Eleocharis obtusa, Shultes.	*Eleocharis diandra*, n. sp.
TUFTS mostly	larger, annual.	smaller, annual.
SPIKE	very blunt.	bluntish or acutish.
SCALES	rounded at top; one-third longer than the achenium.	narrowed towards the blunt apex; twice as long as the achenium.
STAMENS	three.	two.
BRISTLES	exceeding the tubercle.	few and short or mostly O.
ACHENIUM	larger, tapering evenly to the base.	smaller, tapering more abruptly into a narrower base.
TUBERCLE	crest-like and thin, curved on the lower edge, which rests its whole length on the achenium, and is almost as broad, the two other sides forming about a right angle.	transversely oblong, its end rounded and raised above the achenium, and little more than half as broad, shortly apiculate.
STYLE	3-cleft, rarely bifid.	bifid, rarely 3-cleft.

The main differences are: first, *two* stamens, for which in our floras there is no generic allowance; secondly, the usually bifid style; thirdly, the tubercle wanting the *cusps* which run down the top of the achenium of *E. obtusa*; and, fourthly, the few small bristles, or mostly none at all.

New or Little-known Ferns of the United States, No. 14.

By D. C. EATON.

53. *Phegopteris reptans*, (*Polypodium reptans*, Swz.; *Aspidium reptans*, Mett.),—Rootstock short, creeping; stalks clustered, gray-stramineous, slender, naked, a few inches to a foot long; frond as long as the stalk, membranaceous, softly hairy with branched or stellate hairs, oblong lanceolate, pinnate with nearly or quite sessile oblong or sometimes rounded obtuse crenately pinnatifid pinnæ, the apex pinnatifid and often elongated and rooting; veins pinnate, simple, the basal veinlets often anastomosing; sori rather small, seated on the middle of the veinlets, naked or with a minute rudiment of an indusium.

Pendent on the face of cavernous calcareous rocks in a hammock on the left bank of the Withlacoochee River, 15 miles N. E. from Brookesville, Hernando Co., Florida; Captain John Donnell Smith, March 22, 1883.

This is another common West Indian fern, now known to inhabit Florida. Mettenius, who referred it to *Aspidium* on account of a barely perceptible rudiment of an indusium, recognized four varieties: *cordata*, *hastæfolia*, *radicans* and *asplenioides*. Captain Smith's specimens represent the first and third of these forms, which are often found on the same plant, and cannot properly be separated even as varieties.

54. *Adiantum tenerum*, Swz.—Fine specimens from the same station, a new locality.

55. *Asplenium firmum*, Kze.—The same station.

56. *Asplenium rhizophyllum*, Kze.—The same station. These fronds are over a foot long, and have much coarser segments than the plants heretofore separated under the name of *A. myriophyllum*. The intermediate forms now sent in by several collectors show that the latter can not be kept distinct, and that, with Mr. Davenport (Catalogue, Supplement, March, 1883, p. 46), we must be content with the older name for both.

57. *Aspidium trifoliatum*, Swz.—The same station. Several other well known Florida ferns are in Captain Smith's collection of the present year, and are represented by fine specimens, as usual.

Plants New to the Connecticut Flora.—Mr. Charles Wright, the veteran botanist, has found the following plants additional to the Berzelius catalogue:

Ludwigia polycarpa, Short & Peter.—Abundant in wet places in Hartford.

Crantzia lineata, Nutt.—Salt marshes at Fenwick, near the railway station.

Alopecurus geniculatus, L.—Common in wet places about Wethersfield.

Mrs. Emily J. Leonard, of Meriden, has noticed a few newly introduced plants:

Sarothamnus scoparius, Wimmer.—Near Meriden, some ten square rods of it by the roadside.

Phacelia Purshii, Buckley.—At Short Beach, Branford.

Phacelia viscida, Torrey.—Spontaneous with *Impatiens fulva* and other brook-plants, in a spot on which muck had been deposited.

To these I add:

Glycyrrhiza lepidota, Nutt.—Established and spreading on a roadside in New Haven.

Cycloloma platyphyllum, Moquin.—Hamden, Miss Edwards.

Chætomorpha melagonium, Kützing.—On rocks at low water mark on Black Point, East Lyme; an alga not before noticed south of Cape Cod.

Daniel C. Eaton.

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Contributions toward a List of the State and Local Floras of the United States (X-65)

V. THE WESTERN STATES.

Synopsis of the Flora of the Western States. By J. L. Riddell, M.D. (B.)

8vo, pamphlet, pp. 116. Cincinnati, 1835; also in Western Journ. Med. and Phys. Sci., January and April, 1835.

Flora of the Lake Superior region. By W. D. Whitney. (B.)

In Foster and Whitney's Report, Part ii., Washington, 1851.

Notice of the Plants collected by Prof. D. B. Douglass, of West Point, in the expedition under Governor Cass during the summer of 1820, around the great lakes and upper waters of the Mississippi. By John Torrey, M.D. (C.)

In Sillimans Journal, i series, Vol. iv., 1822.

Catalogue of Plants collected by Mr. Charles Geyer, under the direction of I. N. Nicollet, during the exploration of the region between the Mississippi and the Missouri Rivers. By John Torrey, M.D. (C.)

Appendix B, Senate Doc. 237, 26th Congress, Washington, 1843.

(The list embraces plants collected in portions of Minnesota, Iowa, Nebraska and Dakota.)

Plants collected during the exploration of the Upper Missouri by F. V. Hayden. By George Englemann, M.D. (B.)

In Trans. Amer. Philos. Soc., Vol. xii., Philadelphia, 1863.

(The plants enumerated are mostly from Nebraska, with some from Iowa, Dakota and Montana.)

Notice concernig the late Mr. Drummond's Journeys and his collections made chiefly in the Southern and Western parts of the United States. By W. J. Hooker. (D.)

In Comp. to Bot. Mag., i., p. 39, et seq.

Systematic Catalogue of the Plants of Wisconsin and Minnesota, made in connexion with the Geological Survey of the North-west, during the season of 1848. By C. C. Parry, M.D. (C.)

In Rep. Geol. Surv. Wisconsin, Iowa and Minnesota by David Dale Owen, p. 606, Philadelphia, 1852.

(Includes localities for some Iowa Plants.)

The Grasses of Wisconsin and the adjacent States of Iowa, Illinois, Indiana, Ohio and Michigan, the Territory of Minnesota and the regions about Lake Superior (D.) By I. A. Lapham.

In some state publication of Wisconsin, the title of which we have been unable to ascertain.

OHIO.

Supplementary Catalogue of Ohio plants, embracing the species discovered within the State in 1835. By J. L. Riddell, M.D. (D.)

In Western Journ. Med. and Phys. Sci. Vol. ix. 1836.

List of the Medicinal Plants of Ohio (with brief accounts of their properties.) By J. M. Bigelow.

8vo, pp. 47. Columbus, 1849.

List of Grasses found in Ohio. By J. H. Klippart. (B.)

In Ohio Agricultural Report for 1859.

List of the native Forest Trees of Ohio. By J. H. Klippart. (A.)
In Ohio Agricultural Report for 1860.

Catalogue of the flowering Plants and Ferns of Ohio. By J. S. Newberry, M.D. (B.)
8vo, pamphlet, pp. 41. Columbus, 1860.

List of Forest Trees found growing indigenously in Ohio. By John Hussey. (B.)
In Ohio Agricultural Report for 1872, pp. 32–40.

Catalogue of the Plants of Ohio, including flowering Plants, Ferns, Mosses and Liverworts. By H. C. Beardslee, M.D. (B.)
8vo, pamphlet, pp. 19. Painesville, 1874; also in Ohio Agricultural Report for 1877.

List of Hepaticæ growing in Ohio. By H. C. Beardslee. (A.)
In Botanical Gazette, Vol. i., p. 22. 1876.

Woody Plants of Ohio. By John A. Warder, M.D., assisted by D. L. James and Jos. F. James. (D.) Presented at the meeting of the Agricultural Convention of Ohio in Columbus, January, 1882.
8vo, pamphlet, pp. 40.

Darke County.

Common forest Trees noticed in Darke County. By A. C. Lindemuth. (A.)
In Rep. Geol. Surv. Ohio, Vol. iii., p. 511. 1878.

Defiance County.

List of Trees of Defiance County. By N. H. Winchell. (A.)
In Rep. Geol. Surv. Ohio, Vol. ii., p. 424. 1874.

Delaware County.

Trees, Shrubs and woody Vines found growing in Delaware County. By Rev. J. H. Creighton. (A.)
In Rep. Geol. Surv. Ohio, Vol. ii., p. 274. 1874.

Fairfield County.

Florula Lancastriensis, or a Catalogue comprising nearly all the flowering and filicoid Plants growing naturally within the limits of Fairfield County, with notes of such as are of medicinal value. By John M. Bigelow, M.D. (A.)
In Proc. Med. Convent. of Ohio at Columbus, May, 1841. Columbus, 1841.

Florula Lancastriensis; a Catalogue of the Plants of Fairfield County. By John M. Bigelow and Asa Hor. (A.)
8vo, pp. 22, Lancaster, 1841.

Franklin County.

Catalogue of the Plants growing spontaneously in Franklin County, Central Ohio. By John L. Riddell, M.D. (A.)
In Western Med. Gaz., Vol. ii., 1834.

Catalogue of the Plants, native or naturalized, in the vicinity of Columbus. By W. S. Sullivant. (A.)
8vo, pamphlet, pp 63. Culumbus, 1840.

Hamilton County.

Catalogue of the Plants of Cincinnati. By Thomas G. Lea. (C.)
8vo, pp. 77. Philadelphia, 1849.

Catalogue of the flowering Plants and Ferns observed in the vicinity of Cincinnati. By Joseph Clark. (A.)
16mo, pamphlet, pp. 40. Cincinnati, 1852.

Catalogue of the flowering Plants, Ferns and Fungi growing in the vicinity of Cincinnati. By Joseph F. James. (A.)
In Jour. Cincin. Soc. Nat. Hist., Vol. ii., 1878. (Additions and corrections by Davis L. James. (B.) Vol. iv., 1881.

Henry County.

List of Trees characteristic of Henry County. By N. H. Winchell. (A.)
In Rep. Geol. Surv. Ohio, Vol. ii., p. 416. 1874.

Miami, Montgomery, Butler, Warren and Hamilton Counties.

Flora of the Miami Valley. By A. P. Morgan. (A.)
Published by the Literary Union, Dayton, Ohio.
16mo, pamphlet, pp. 68. Dayton, 1878.
(List includes Phænogams, Ferns, Mosses, Liverworts, Lichens and Fungi.)

W. R. G.
N. L. B.

Notes on a Botanical Excursion to Sam's Point, Ulster Co., N. Y. —Sam's Point is a rocky promontory of the Shawangunk Mountains, about five miles east of Ellenville, New York, overlooking the Wallkill Valley between the Shawangunk and Highland ranges, at a height, as marked on a ledge at its summit, of 2,340 feet above the sea. This promontory is composed of a very close conglomerate rock, made up of white quartz pebbles, nearly horizontally bedded, the top being a flat table-land. Geologically, this rock is known as the Shawangunk Grit, the equivalent of the Oneida Conglomerate of the Upper Silurian strata. Thinly bedded, Lower Silurian shales of the Hudson River Group, underlie this conglomerate rock, forming the base of the hill on which it rests.

The woods surrounding this table-land are made up of the pitch pine, with some few common deciduous trees, and an occasional white pine and hemlock. The undergrowth of these woods consists of *Quercus ilicifolia*, Wang., *Nemopanthes Canadensis*, D. C., *Sambucus pubens*, Michx., *Rhodora Canadensis*, L., *Viburnum pubescens*, Pursh, *V. nudum*, L., *Cornus circinata*, L'Her., and *C. sericea*, L., *Acer spicatum*, Lam., and *A. Pennsylvanicum*, L., *Aralia hispida*, Michx., *Viburnum lantanoides*, Michx., and great quantities of *Gaylussacia resinosa*, T. & G., and of *Vaccinium Pennsylvanicum*, Lam.

My visit was made in the latter part of August when little else than Compositæ was in bloom. Besides the commoner plants of this order, *Solidago squarrosa*, Muhl., and *S. latifolia*, L., were plenty. A few specimens of *Gentiana quinqueflora*, Lam., were found towards the base of the hill. *Spiranthes gracilis*, Bigelow, grows abundantly among the bushes, both on the table-land and at its base, often with but a single tuber, instead of "roots clustered" as in its specific description. Two specimens of *Botrychium lanceolatum*, Angst., were found in woods near the Point.

The flora of the top of this elevated ridge is characterized by an abundant growth of *Pinus rigida*, Miller, very much stunted in growth, fruiting indeed at two feet from the ground and forming low, straggling bushes, few of them more than five feet high, the leaves also shortened to half the length of those borne by ordinary trees of this species. *Arenaria Grœnlandica*, Spreng., grows on all the exposed rocky ledges, and *Clintonia borealis*, Raf., in a sphagnous swamp and also in the woods at the base of the hill. The shrubs mentioned above are also found on the summit.

A broad, shallow pond, a mile or so north-east of the Point, on the table-land, well repaid exploration. Here the small form of the white water-lily, (*Nymphæa odorata*, Ait,, var. *minor*, Sims) grows plentifully. *Eriocaulon septangulare*, With., *Lobelia Dortmanna*, L., and *Isoetes echinospora*, Durieu, var. *Braunii*, Engl., were found in shallow water near the shore, and *Drosera rotundifolia*, L., with *D. intermedia*, Hayne, var. *Americana*, D. C., in fine condition in the *Sphagnum* along the margin.

N. L. BRITTON.

Arthrocladia villosa, Duby.—This beautiful species, which is nowhere very abundant, has been considered especially rare in America. A specimen found many years ago gave it a place in the Nereis Boreali Americana of Dr. Harvey. It was not reported again until a single specimen was found by Mr. Collins a few years since at Falmouth Heights, Mass. In 1881 I found another solitary specimen near the same place at Menanhant, a summer settlement in Falmouth. In 1882 I looked in vain for it all summer long, but a single plant was found that year by Mrs. Chambrè. But the latter part of July this season, after a severe south-west wind which lasted several days, this rare plant was washed up quite abundantly. I secured and mounted over eighty specimens, and might have collected many more. Some of these are about fifteen inches in length and several are complete, having the holdfast. It seems probable that it grows in the deep water in the narrow part of Vineyard Sound, and is torn up only when there is an unusual disburbance of the water.

Springfield, Mass.

GEORGE W. PERRY.

Notes from N. Lower California.—On a recent trip into the mountains of Lower California, my father, H. C. Orcutt, and myself found *Quercus Palmeri*, *pungens* and *Emoryi* abundant at an elevation of 4,000 to 6,000 feet, and as far south as San Rafael Valley, near where we found *Pholisma arenarium*, Nutt., on the roots of *Q. Palmeri*. From north of the boundary, and south over a hundred miles by road, we found *Adenostoma fasciculatum* and *sparsifolium* still abundant, and, with them, *Arctostaphylos pungens* and *Garrya flavescens*, var. *Palmeri*, Watson. The latter we found from 2 to 10 feet high. In general appearance of leaves and stalk (although the bark does not exfoliate, and is grayish) it closely resembles the manzanitas, and we found it to have a similar large root, which only differed from that of our *Arctostaphylos* in being black instead of reddish colored. Among the graceful piñons (*Pinus Parryana*), we found the "sotole" (*Nolina Palmeri*) abundant and presenting the appearance of coarse grass growing near water, but in reality growing in the dryest places. Its root is used by the Spaniards as a substitute for soap in washing their garments. Among the rocks on dry hills, to the south of the piñons, we detected *Agave Pringlei*, Engelm. (ined.), in bloom July 28, 1883, and found the fibre of its long and slender leaves to be preferred by the Indians, for making ropes and other articles, to that of the more abundant *A. deserti*. The root, leaves and flower-stalk of both species are, after being roasted, eaten by the Indians, who also asserted that they ate the golden lichen, *Evernia vulpina*, which grows in small quantities, especially on dead manzanitas, among these mountains.

Among the large pines or piñons (*Pinus Jeffreyi?*), to the south of the piñons, we found the pretty *Ivesia Baileyi*, Watson, in the crevices of the granite boulders that form the immense rocky ridges through this district; and, at the base of these rocks, were many pretty plants, among them the familiar *Aquilegia truncata* and *Pteris aquilina*, and also *Geranium cæspitosum*, *Arenaria alsinoides*, Willd., *Eriogonum Parishii*, *Galium pubens* and *angustifolium*, etc., and on the grassy plains or meadows, between the stretches of pine forest, were *Verbena littoralis*, HBK., *Cnicus Drummondii*, var. *acaulescens*, *Eriogonum foliolosum*, Wats., *n. sp.*, and a variety of *Horkelia Californica*. On little pools or lagoons we found *Potamogeton natans*, L., and *Polygonum Hartwrightii*, Gray.

San Diego, Cal. C. R. ORCUTT.

Autumn Foliage.—A comparison of notes on the local condition of foliage, made on October 5th, with similar notes of October 1st, 1882, shows an interesting difference. This is so marked in many cases that it is worthy of note, especially since the opinion has gained some ground among botanists that the appearance and fall of the leaves occur at nearly the same dates each year. From my notes it appears that the season, as regards foliage, is at least ten days later this year than last. A few species, the black and red cherries, the apple, pear, peach and plum are at about the same stage. The difference appears slightly in the golden willow, sugar-maple and silky cornel; to a marked degree in the ash, chestnut, shagbark, American and slippery elms, all the oaks (eight species), and the fox-grape, while it is very decided iu the flowering dogwood, beech and pignut. The three last were perfectly fresh and green on the above date, while my notes for 1882 describe them as largely brown and dead at that time.

Of course the explanation of this difference is to be found in meteorological conditions, which I am able to give for both years as follows:

	AUGUST.			SEPTEMBER.		
	Temp.	Rel. Humidity.	Rain.	Temp.	Rel. Humidity.	Rain.
1882....	67.3°	66.1	0.99	63.7°	77.2	16.56
1883....	66.3°	69.2	2.91	59.9°	71.0	2.27

The ash and sugar-maple have borne an unusual abundance of fruit this season throughout all this region (Orange County, N. Y.) Has anyone noticed a similar fertility elsewhere?

Mountainville, N. Y. W. E. STONE.

Botanical Notes.

Motion of Stamens in Centaurea.—At a recent meeting of the Philadelphia Academy of Natural Sciences, Mr. Meehan called attentention to fresh specimens of the flowers of *Centaurea Americana*, a native of Texas, which had been sent to him from Newport, accompanied by a letter from Miss Mary Powell, in which she describes a peculiar motion of the stamens. After describing and illustrating the structure of the flower in detail, the speaker remarked that if the point of the united stamens be touched, the pollen will begin to overflow and the pistil appear above the mass. If the pistil be now touched, the entire floret bends from side to side or makes a circular motion. Sometimes the motion will be communicated to other florets, which may bend in different directions. The *Centaurea* is closely allied to the thistles, and Mr. Meehan had found in all the species of the latter which he had examined the same kind of motion, although in our common field thistle it is quite feeble.

The irritability of the anthers had been partially described by Sachs and other German botanists, although none of them alludes to a movement of the entire floret. They believe the movement to be due to contractility, but the speaker suggested that some other mechanism is probably involved, as the motion is only to be observed when the pollen is present. If the latter be all brushed off the motion ceases.

Proceedings of the Torrey Club.—The regular meeting of the Club was held at Columbia College, Tuesday evening, April 10th. In the absence of the presiding officers, Mr. B. F. Braman occupied the chair. There were twenty-six persons present.

Field Committee.—The chairman appointed Messrs. Day, Rudkin and Hollick a committee on field excursions for the current year.

The Rev. A. B. Hervey, on invitation of the chair, made some remarks on the study of algæ.

Four persons were elected active members.

At the regular meeting held Tuesday evening, May 8th, the President occupied the chair and twenty-one persons were present.

Mr. Braman exhibited specimens of *Pistia spathulata*, Mx., from Florida. The President remarked that fossil specimens of this genus were found in the cretaceous rocks of Wyoming.

Mr. Britton showed specimens *Veronica hederæfolia*, L., and *Lithospermum arvense*, L., from a new locality, Kingsbridge, N. Y.

Mr. Bicknell showed specimens of *Carex Pennsylvanica*, Lam., and of *C. varia*, Muhl., which closely resembles it, and pointed out an important difference by which they may be distinguished, this being the presence in *C. Pensylvanica* of long, spreading rootstocks by means of which plants covering a considerable area are connected. In *C. varia* these are not to be found.

One person was elected an active member.

Tolypella glomerata, Leonh var. abbreviata, Allen.

Tolypella comosa, Allen.

Tolypella fimbriata, Allen.

Tolypella Californica, A.Br.

Tolypella stipitata, Allen.

Tolypella intertexta, Allen.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. X.] New York, Oct. & Nov., 1883. **[Nos. 10 & 11.**

Notes on the American Species of Tolypella.

By T. F. Allen.

(Plates XXXVII.–XLII.)

In this paper some new species of the genus *Tolypella* will be described and an account given of those already known to inhabit America, which promises to yield an unusual number of these interesting plants.

The two families into which the Characeæ may be divided are characterized mainly by the structure of the coronula of the sporangium, this being formed by a division of the cells, which, like spiral tubes, envelop the nucleus. In the *Chareæ* a *single* septum in each tube, near its extremity, gives rise to a circle of *five* cells on the top of the sporangium. In the *Nitelleæ* two septa form, and a double series, of five cells each, produces a coronula of *ten* cells; this, in some species, is detached as the fruit matures (not increasing in size, *pari passu*, with the enveloping cells) and is *evanescent*, while in others it is *persistent*. The *Nitelleæ* consist of two genera mainly differentiated by the position of the *antheridium*, which in *Nitella* is *apical*, on the primary ray of the leaf, while the sporangia are lateral on the node below the antheridium. The leaves also possess but one leaf-bearing node, though they may divide repeatedly. In *Tolypella* (A.Br.) Leonh., the leaves have 1–3 nodes, bearing leaflets and many-celled terminals; the leaflets do not equal in size the primary ray, are many-celled and often themselves have nodes which bear leaflets. *Antheridia* are one or several, *lateral on the nodes of the leaf and leaflet*, and also at the fundus of the verticil within the leaves (when, like the sporangia, they seem to arise from the cells surrounding the base of the leaf [the basilar node] T. F. A.), mostly with an elongated stipe.* In most species, the leaf-node seems to possess six principal nodal cells which encircle the leaf, three of these giving rise to fruit, and three to leaflets. Sometimes we find four fruiting cells and two leaflets, and sometimes the reverse. In a few instances the nodal cells are sub-divided, and an increased number of fruits and leaves is found. This is now and then observed in *T. intertexta* in the sub-division of a nodal cell, so that double sporangia are produced, one above the other. At first sight this looks like a circle of four sporangia with a central antheridium. The fruiting cells are always on the ventral (looking inward toward the axis of the plant) aspect of leaf, and the leaflets are always dorsal. The antheridium seems to occupy

* Prof. Braun says: "Sporangia *surrounding* the antheridium in large numbers on the nodes of the leaf" etc. Numerous preparations of fresh specimens with careful staining of the protoplasm, and good sections of the nodes, have failed to show, in any American species, that the sporangia arise from cells "*surrounding*" the base of the antheridium.

the first or central, the sporangia the lateral cells. This rule seems also to be observed in the fundus of the verticil, in which we find the antheridium on the inner aspect of the basal node, while the sporangia are lateral or even external, and, in other cases, these basal cells produce adventitious leaflets instead of sporangia, carrying out the same plan found on the leaf-node. The coronula is persistent or evanescent.* The leaves which bear fruit become compacted into more or less dense heads (or "nests"), owing, apparently, to a diminished growth of stem and leaf; the verticils are approximate, often closely so, and the leaves are incurved, forming a tangled mass.

The following key has been arranged to include the species known at this time.

KEY TO THE SPECIES OF TOLYPELLA.

I. OBTUSIFOLIA.—*Coronula evanescent. Sterile leaves undivided.*
- A. Ultimate cell of the primary ray of the leaf longer than the other cells. *T. longicoma*, A.Br.
- B. Ultimate cell not longer.
  - † Leaflets attenuate.
  - 2. Marine. Nucleus 370–500μ long. *T. nidifica*, Leonh. (Europe.)
  - 3. Submarine. Nucleus 300–340μ long. *T. Normaniana*, Ndst. (Europe.)
  - ‡ Leaflets not attenuate.
  - 4. Saline. Nucleus 300–360μ long. *T. glomerata*, Leonh.
  - 5. Fresh water. Nucleus 425–475μ long, maturing in fall. *T. comosa*, Allen.

II. ACUTIFOLIA.—*Coronula persistent.*†
- A. *Indivisa.* Sterile leaves undivided.
  - 6. Nucleus 350-375μ long, leiopyrena. *T. prolifera*, Leonh.
  - 7. Nucleus 425–450μ long, oxygyra. *T. fimbriata*, Allen.
- B. *Divisa.* Sterile leaves divided (usually into four terminal leaflets.)
  - † *Attenuata.* Leaflets attenuate.
  - § Secondary ray undivided, sterile.
  - 8. Nucleus 285–355μ, rays 4–7-celled. *T. Californica*, A.Br.
  - 9. Nucleus 330–340μ, rays 3–4-celled. *T. stipitata*, Allen.
  - §§ Secondary rays divided, fertile.
  - 10. Nucleus 360–425μ long. *T. intricata*, Leonh.
  - 11. Nucleus 450–500μ long. *T. intertexta*, Allen.
  - †† *Non attenuata.*
  - 12. Ultimate cell mucroniform; nucleus 480–500μ. *T. apiculata*, A.Br. (S.Am.)

T. longicoma, A.Br. (MS., 1855).—The following account of this species is taken from "Braun's Fragmente, by Nordstedt."

"*T. longicoma* is related to *T. nidifica* and *glomerata* from which it

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* It seems persistent in all the species having acute leaves and evanescent in all the species with obtuse ones.

† In number 11 the coronula is *sub-persistent* only.

differs in its compact, tufted growth, thin, delicate stem and leaves, want of all incrustation and flexibility. The sterile leaves are simple and very long, the ultimate segment (in the fertile leaves likewise) *always elongated*, but little attenuated. The fertile heads are small, compact, long tufted. The first segment of the fertile leaf is extremely short, and here only are very short lateral rays, *which are quite wanting on the the innermost, smallest fertile verticils*, or are so dwarfed as to be indistinguishable. Since the delicate cell-membrane tears easily on preparing the plant, it is difficult to spread it out and examine it. It forms dark green, thick tufts a hand high. Stem not over 480μ thick; leaves in the sterile verticil 6, simple, apparently 3-celled, and about 40$^{mm.}$ long. I saw, however, only two cells, often only one. The first cell is 20–25$^{mm.}$ long, 30–38μ thick, also the second cell seemed very long and but little attenuated. Fertile verticils bunched; bunches complicated by axiliary shoots; the first segment of the fertile leaf is very short, bearing seeds and some (2) small, 3-celled, lateral leaflets (rays); the terminal leaflet larger, 3-celled, *the middle or even the lowest cell the longest.* (Italics mine. T. F. A.) Terminal cell always long, curved, attenuated, rounded at the point. The innermost fertile leaves are very short and apparently (to me) without lateral leaflets, only with seeds on the first node, and monœcious, though I saw the antheridia fallen from the plant only. Sporangia with a short, blunt, rounded coronula, often with the base of the latter much swollen, several together, seldom with short stipes. Nucleus *brown*, with 9 striæ and slight angles. Sporangia 580–600μ long, 420–430μ broad, nucleus 360–400μ long, 300–320μ broad; antheridia 360μ in diameter.

"Swamps near Columbus, Ohio (com. Lesquereux, 1855). The specimens are mixed with another species, apparently *N. flexilis.*"

I have been unable to obtain specimens of this species, nor does Professor Lesquereux know the locality in which it was collected. I await its rediscovery.

Tolypella glomerata, Leonh.,—This is characterized as follows, by A. Braun in his Characeæ of Africa:

"Statura mediocris, color incrustatione glaucus vel cinerascens. Folia verticillorum sterilium indivisa, fertilia capitulorum (et nonnunquam transitoria) simpliciter divisa, radiis 3–4- cellularibus parum attenuatis obtusis. Sporangia in divisura foliorum et in fundo verticilli aggregata, nucleo ovali, 0.30–0.36$^{mm.}$ longo, fusco, 8–9-gyrato."

Var. ABBREVIATA, *nov. var.*, differs as follows:

Statura variabilis, color incrustratione cinerascens vel munda. Folia et sterilia et fertilia *abbreviata*, radiis 3-cellularibus vix attenuatis obtusis. Sporangia aggregata, coronula evanescente, nucleo fusco 300–335μ longo, striis 6–8, acutis vix prominulis. Antheridia longe stipitata 230–380μ diam.

I have thus far discovered two forms: one, *forma incrustata*, large, to 0.15$^{m.}$ high, densely incrusted, with smaller antheridia (230μ in diam.) and larger nuclei (335μ long), striæ 7 to 8. Collected by Mr. Pringle in alkaline pools in Arizona, April, 1881, and again in 1882. The other, *forma pygmæa munda*, small, 0.02–0.03$^{m.}$ high, without the slightest incrustation, with very short leaves (as above), larger antheridia (380μ in diam.) and smaller nuclei (300μ long) with only six striæ, collected by Prof. Macoun, Canada, Pacific R.R. survey, west of the Saskatchewan, August, 1881. With all these differences I do not, however, feel warranted in giving either form a distinct name, since the general habit of the plants seems the same, namely, the short leaves and rays, the persistently three-celled and not attenuated terminals, the equally stipitate antheridia, similar sporangia and nuclei with varying striæ, in both sharp and slightly prominent. Other forms will doubtless be discovered which will enable us to group them with greater certainty.

In my plants the sporangia are numerous in the fundus of the verticil, both without and within the base of the leaves; but, on the fertile node of the leaf, they are regularly disposed on the ventral aspect, two, with the intermediate, rather long-stalked antheridium, while there are regularly three leaflets or rays on the dorsal aspect. The coronula is evanescent, and the ends of the enveloping cells of the sporangium are swollen (Plate Fig. 4). Mr. Pringle's plants have mature fruit in April (the usual time for *T. glomerata*), and Prof. Macoun's are in their prime in August. This fact, together with the much larger antheridia and rather smaller nuclei of the latter, with only six striæ, may prove sufficient to distinguish the forms as distinct sub-species. Further collections are needed.

TOLYPELLA COMOSA, *nov. sp.*—Minor, monoica, statura 0.05–0.10$^{m.}$, color incrustatione cinerascens. Folia verticillorum sterilium indivisa, 3- articulata, fertilia in capitula congesta, simpliciter divisa, radiis 3- cellularibus, obtusis, non attenuatis. Sporangia in divisura foliorum et in fundo verticilli aggregata; coronula evanescente; nucleo atro, ovali 425–475 μ long., 320–360 lat., 7–8- gyrato, striis prominulis, obtusis. Antheridia sessilia, 400–425 μ diam.

This plant is allied to the European *T. nidifica*, Leonh., from which it differs in its fresh water habit, smaller size, smaller antheridia and persistent coronula. It is thickly incrusted, having a greyish color even when first taken from the water, and is quite fragile. The fertile whorls are compact and compound, from numerous short axillary shoots. The leaves of the sterile verticils are simple, long, and have three segments. The fertile leaves have a short basal segment, then a fertile node consisting usually of three leaflets of unequal length, and three fruiting cells on the ventral aspect; these produce, usually, two sporangia and one intermediate antheridium, but occasionally we find two antheridia and one sporangium. The central cell is, however, always an antheridium, and the latter is sessile or nearly so. The lateral leaflets are longer than the dorsal leaflet; the terminal division of the leaf, above the fertile node, is elongated, 2–8$^{mm.}$, and three-celled. These numerous elongated leaflets clothe the plant as with hairs, hence the specific name *comosa*. The first segment of the leaflets is the longest, and the terminal segment usually the shortest. The diameter of the leaf, below the fertile node, averages 300μ (in T. *nidifica*, 400μ), of the terminal segment near the tip 100μ, (in *nidifica*, 190μ.) The main stem, below the first fertile verticil, averages 360μ in diameter. The primary verticil consists of seven leaves with some adventitious leaflets and sporangia, which are usually developed from the cells of the basal leaf-node external to the verticil, though a few are seen within the whorl, The sporangia at the fundus of the verticil are comparatively few in this species.

This plant was gathered in company with *T. intertexta*, Allen, in Seneca Lake, N. Y., near Geneva, at a depth of about ten feet of water, in August, 1882.

Tolypella prolifera,* Leonh.—Plant large, clothed with broad and elongated green leaves, rarely incrusted. Sterile leaves simple, three to four-celled, elongated, acute. Fertile leaves with two (rarely three) fertile nodes and a three- to four-celled terminal, acute; rays of the leaf two to three at each node, 3–4-celled, mostly simple (fertile nodes have rarely been seen on the rays of the leaf in American plants), acute. The mucronate tip of the leaves and rays is somewhat elongated, never short and abrupt, from 100 to 120μ long, and 45–50μ broad at base; the leaf just below this tip is about 100μ in diameter. Sporangia numerous in the fundus of the verticil and on the ventral aspect of the leaf-nodes; coronula persistent, superior cells longer than the inferior; nucleus chestnut-colored, round-oval, 345–375μ (the largest fully mature) long, 300μ broad; striæ 8–9, inconspicuous. Antheridia short-stipitate, 300μ in diameter.

I am fortunate in possessing some of E. Hall's original specimens, determined by the late Prof. Braun, and have been able to compare other plants with this. Braun, in Nordstedt's "Fragmente," gives as localities: from Engelmann's herbarium, "Upper Missouri, Pinois Springs, Hayden's survey, *Forma munda cinerascens*, 1858," and "Athens, Illinois, E. Hall." It has been sent to me by Prof. Macoun, "Flora of the great Plains, railway survey, Canada, near Bottsford, Aug. 6th, 1879:" I have also received very young plants, having numerous, long, sterile leaves from the base, overtopping the whole plant, from Mr. Horsford of Vergennes, Vt., though there is some doubt as to their determination.

Doubtless the species will be found to be not uncommon in the northern portions of the country and in Canada.

TOLYPELLA FIMBRIATA, *nov. sp.*—Statura mediocris, 0.15–0.20$^{m.}$ alt., viridis. Folia verticillorum sterilium indivisa rarissime divisa, 2–3-articulata, acuta. Folia fertilia duplicato divisa, radiis fertilis 3–4-cellularibus. Sporangia in divisura foliorum et in fundo verticilli aggregata, coronula persistente, cellulis superiorbus longioribus quam inferioribus; nucleo fusco, ovali, 425–450μ long, 330–350μ lat., oxygyro; striis 9–10, *prominulis, acutis*; antheridio stipitato, 300–335μ diametro.

From *T. prolifera*, to which this species is most nearly allied, it differs in its smaller size, larger fruit, oval nuclei, with more numerous and prominent sharp angles.

The plant has a long, simple stem, naked (with perhaps one small verticil near the base) nearly to the compact head of fertile leaves. Just below this is usually the sterile verticil of 7–9 leaves, 0.05–0.08$^{m.}$ long, which extend far beyond the fertile head, forming a coarse fringe or involucre of leaves. Very rarely, the sterile leaves are divided, I have seen but one specimen divided:

* Description taken from American specimens. No satisfactory description of the species has as yet been given.

T. Californica, A. Br.—The following is taken from Braun's "Fragmente," edited by Norstedt, 1883.

"Color, a fine dark green, without incrustation. Habit somewhat similar to *T. nidifica*, but with more numerous verticils and heads, one above another; nothing of the long lower leaves could be seen in in the fragments. The number of leaves, whether the lower were simple and whether there were sporangia in the fundus of the verticils, must be determined by better specimens. Terminal cell 0.10–12$^{mm.}$ long, about 0.05$^{mm.}$ broad. An antheridium which had fallen off measured 0.44$^{mm.}$ in diameter, but further measurements are needed. Sporangia almost globular; nucleus dark brown, but transparent, with 8–9 visible "windings" (on one side), *smooth*, 0.38$^{mm.}$ long, 0 32$^{mm.}$ broad. Very nearly related to *T. nidifica*, but distinguished by its sharp tips; from *T. apiculata*, separated by its smaller sporangia with fewer windings, and by its general appearance; also distinct from *T. longicoma* by its many-celled segments and sharp tips, as well as by the shortness of the ultimate cells.—North America, Maria County, California, under willows, in slow-flowing streams. H. Bolander, Mar. 27th, 1865, comm. Dr. Engelmann, Aug. 1869."

I have received specimens from Dr. Engelmann from "Marion Co., Cal., H. Bolander, April, 1863," and have also examined very fine and perfect specimens in Prof. Gray's Herbarium at Cambridge, from "Swamps near San Rafael, Marion Co., Cal.," and am able to supplement Prof. Braun's description as follows:

Plant 0.10$^{m.}$, becoming much branched (bushy); the fertile verticils on elongated peduncles, not crowded into dense masses; stems grass-green, conferva-like, about 600μ in diameter. Sterile nodes two to four, of 12–15 leaves; of these, 6–8 seem to be normal and the others shorter and adventitious. Leaves about 360μ in diameter, once divided into four leaflets, which are 4–6- or 7-celled; the adventitious leaves (intermediate in the verticil and not in the normal series), are usually shorter and not divided. The measurements of the leaflets gave the following diameters: first segment 285, second 240, third 210, fourth 150, fifth 135, sixth (or mucro) 50 broad and 170μ long. The articulations are some what constricted and the walls thin and diaphanous. The fertile verticils are densely crowded with leaves and fruit, the internodes being very short (as in other *Tollypellæ*). The fertile leaf has usually two fertile nodes, each bearing three fruiting-cells (one antheridium and two sporangia) on its ventral aspect and three leaflets or rays on its dorsal. The rays and longer terminal leaflet are 4–6-celled. Sporangia nearly globular, *coronula persistent*, the ultimate cells somewhat elongated. Nucleus brown, with 8–9 striæ, which are not prominent, varying from 285–335μ long and 300–320μ broad. Antheridium rather long-stalked, 240–265μ in diameter (I saw none so large as those Prof. Braun speaks of). Sporangia in the fundus of the verticil, but not as numerous as in some other species.

T. STIPITATA, *nov. sp.*—Statura 0.10–0.15$^{m.}$ alt. Color viridis. Folia verticillorum sterilium divisa, ter-articulata, acuta. Folia fertilia divisa, nodis fructificationem gerentibus duobus, radiis indivisis 3-cellularibus acutis. Capitula fertilia laxa. Sporangia in divisura foliorum et in fundo verticilli aggregata numerosissima, longe stipitata; coronula persistente, cellulis non elongatis; nucleo fusco, 335μ longo and 260μ lat., 7–8-striato, striis acutis, sub-prominulis. Antheridio 275–300μ diametro, longe stipitato.

This interesting species appears to be intermediate between *T. Californica* and *T. intricata*. From the former it differs in the fewer segments of the terminals, and from the latter in the simple rays and smaller sporangia and antheridia. It has a loose habit of growth, the fertile verticils having comparatively long peduncles, not crowded into so dense heads as in other species. The fundus of the verticils is crowded with sporangia and antheridia on long stipes, which seem to take the place of leaves. There are but few leaves, generally four, to each verticil, with two shoots of new verticils (as shown in Plate). The peduncle of the fertile head measures 2.40$^{mm.}$ from the verticil to the first fertile whorl, 2.40$^{mm.}$ to second whorl, 1.50$^{mm.}$ to third 1.20$^{mm.}$ to fourth, showing the looseness of the compound fertile head. In *Tolypellæ* generally, the separation of the verticils of the fertile heads is very slight, so that a compact mass is formed.

I have received but one specimen of this species, collected by Mr. T. S. Brandegee, in a pond near Mt. Carbon, Elk Range, and forwarded to me by Mr. John H. Redfield of Philadelphia.

T. intricata, Leonh.—Monœcious. Robust, 0.20—0.40$^{m.}$ high; growing in mossy bunches; light green, in age becoming greyish or brown with incrustation, and brittle. Stem much branched from the base up. Lower verticils long-leaved, spreading; the upper shorter, compacted into a thick head (nest-like). Verticils composed of 6–7 large leaves, with as many more small (accessory) ones. Sterile leaves once divided, the fertile ones mostly twice divided. Fertile leaves with 2–3 nodes producing leaflets; leaflets of unequal length, 4–5-celled, those of the first leaf-node divided, fertile, attenuated to the tip, the terminal cell short and acute. Sporangia on the nodes of the leaves and rays, and very numerous in the fundus of the verticil. Coronula persistent; nucleus light brown, oval, with 10–11, prominent angles. Antheridia 320–350μ in diameter.

This species germinates in the fall and fruits in the following spring, ripening by the end of April or in May, and quite dying down and disappearing by the beginning of June (in Europe).

I have received one specimen of this species from Canada (a typical form), and it is to be expected from various parts of the country.

T. INTERTEXTA, *nov. sp.*—Statura robustior, 0.4–0.5$^{m.}$ alt., color incrustatione demum cinerascens. Verticillis inferioribus remotis, foliis sterilibus 8, 60–80$^{mm.}$ long., divisis; terminalibus 4-cellularibus, acutis. Folia fertilia duplicato (vel rarius triplicato) divisa, nodis fructificationem gerentibus duobus; radiis divisis, fertilibus 4-cellularibus (rarius 3–5), acutis, mucrone 85μ long., 55–65μ lat. Sporangia in fundo verticilli et in divisura foliorum aggregata, coronula elongata, sub-persisente; nucleo ovali, 450–475μ long., fusco, 10-gyrato, striis acutis, sub-prominulis. Antheridia brevi-stipitata, 320–350μ diametro.

This large and handsome *Tolypella* differs from its allied species, *T. intricata*, by its habit, its large sporangia, its peculiar coronula and the time of fruiting (fall). The leaves are abruptly pointed with a short and stout mucro. The sporangia are numerous, often double from a single cell (as in Plate XLII., Fig. 3). The coronula is peculiar in its oblique direction and sub-persistent character, and becomes detached when the sporangium is quite old. The dense interweaving of the divisions of the leaves surrounding the fertile heads suggests the specific name.

Gathered from deep water (10–15 ft.) in Cayuga Lake, N. Y., August, 1882. I have also received a fragment from Canada, collected by Miss Cary, and sent by A. L. Kemp, LL.D.

EXPLANATION OF PLATE XXXVII.—Fig. 1. Plant, natural size from Arizona. Fig. 2. Sketch of the base of a verticil showing the simple, sterile leaves, not longer than the compact fruiting verticils, which are incompletely outlined. Fig. 3. A portion of the stem, showing two crowded fertile whorls with numerous sporangia at the base of the leaves. Fig. 4. A mature sporangium. Fig. 5. A mature nucleus. Fig. 6. A tip of a leaf. (Figures 2 to 5 are from the Arizona plant, and Figures 7 and 8 from the dwarf Canada plants). Fig. 7. A node of a leaf, the antheridium having fallen. Fig. 8. A sporangium prior to the falling of the coronula.

EXPLANATION OF PLATE XXXVIII.—Fig. 1. Plant, natural size. Fig. 2. A fertile node magnified 25 diameters, showing the fertile cells all on the ventral aspect, usually with two sporangia and one antheridium. In some places the fruit has been rubbed off in preparing the specimen for the camera. Fig. 3. A fertile node of a leaf, ventral aspect, showing two antheridia and one sporangium. Fig. 4. Dorsal aspect of a fertile node, showing three unequal, 3-celled leaflets. In all these figures space does not permit the delineation of the long terminals of the leaves. Fig. 5. The apex of a sporangium, showing the evanescent coronula, magnified 200 diameters. Fig. 6. A mature nucleus with eight prominent, blunt angles, magnified 50 diameters.

EXPLANATION OF PLATE XXXIX.—Fig. 1. Plant natural size. Fig. 2. A portion of a fertile verticil, with two nodes of a leaf and two fertile rays on the lower node, magnified 25 diameters. Fig. 3. A fertile leaf-node showing the stipes of two antheridia, which have fallen, magnified fifty diameters. In this species we frequently find two antheridia (central) and two sporangia (lateral on the ventral aspect of a leaf; in which case there are usually but two rays on the dorsum of the leaf. Fig. 4. The coronula magnified 200 diameters. Fig. 5. A mature nucleus magnified 200 diameters. Fig. 7. Tip of leaf.

EXPLANATION OF PLATE XL.—Fig. 1. Plant, natural size (fresh specimens will modify this sketch). Fig. 2, A leaf magnified 25 diameters, showing the undivided sterile rays. Fig. 3. The tip of a sporangium, showing the persistent coronula x 200 diameters. Fig. 4. A mature nucleus, magnified 50 diameters. Fig. 5. The node of a sterile leaf, showing its division into 4 leaflets x 25 diameters. Fig. 6. The tip of a leaflet magnified 50 diameters.

EXPLANATION OF PLATE XLI.—Plant, natural size, with the fertile heads on one branch at A, the other heads having been removed (as at B) to show the arrangement of the sterile leaves. Near the bottom of the stem there is a small verticil of sterile leaves. Fig. 2. A fertile shoot, taken at A in Fig. 1, magnified 5 times to show the general form. All the sterile leaves have been removed, except from the lowest fertile verticil. Usually there are four sterile leaves, each divided into four leaflets, and two shoots bearing new fertile verticils from each verticil. Some of the normally sterile leaves of the upper verticils become fertile. There are usually 5–6 successive series of fertile verticils, the uppermost bearing fruit in the verticil, and about six fertile leaves (magnified 5 diameters). Fig. 3. A fertile verticil with numerous, long-stipitate fruits, showing at B, the basal node of a leaf that has been removed; magnified 40 diameters. Fig. 4. The dorsal aspect of a fertile ray x 40. Fig 5. The ventral aspect of a node of a fertile ray (the antheridium removed), magnified 25 diameters. Fig. 6. The apex of a ray, showing the long slender point, magnified 200 diameters. Fig. 7. The coronula of a sporangium magnified 200 diameters. Fig 8. A mature nucleus magnified 50 diameters.

EXPLANATION OF PLATE XLII.—Fig. 1. Plant natural size, showing only the upper portion. Fig. 2. A portion of a leaf, showing two fertile nodes, and fertile rays from the lower node, magnified 25 diameters. Fig. 3. Another leaf, showing two twin sporangia, each pair from one cell (divided horizontally). Figs. 4 and 5. Tips of leaves, magnified 200 diameters. Fig. 6. The elongated oblique coronula. Fig. 7. Top of an old sporangium after the coronula has become detached. Fig. 8. The nucleus magnified 50 diameters.

New Species of Fungi.

By J. B. ELLIS and BENJAMIN M. EVERHART.

SPHÆRELLA (LÆSTADIA) POLYSTIGMA.—Perithecia large, scattered thickly over the lower surface of the leaf, covered by the blackened cuticle, subhemispherical, collapsing; ostiolum papilliform, at length perforated; asci 35–40x8μ, oblong, sessile; sporidia biseriate, ovate-elliptical, continuous, subhyaline, 10–12x3–4μ, in shape very much like apple-seeds.

Allied to *S. carpinea.* On fallen oak-leaves. Ohio. Kellermann.

SPHÆRELLA PANDURATA.—Hypophyllous; perithecia globose (.17–.25$^{mm.}$), buried in the substance of the leaf, and, except the slightly projecting, rounded apex, covered by the blackened cuticle; ostiolum papilliform, minute; asci oblong-cylindrical, 50x7μ; sporidia biseriate, fusiform, 4-nucleate, yellowish, constricted in the middle and bulging out each side of the constriction, 10–12x3μ.

On fallen oak-leaves. Plainfield, N. J., September, 1883. G. F. Meschutt.

MELANCONIS EVERHARTII, Ellis.—Perithecia globose (.25$^{mm.}$) in compact clusters of 4–18, just under the outer layer of the inner bark, which is raised into little tubercles about 1$^{mm.}$ in diameter, from which arise, in a compact fascicle, piercing the epidermis, the short-cylindrical, obtuse ostiola, their tips perforated with a rather large circular opening; asci clavate-cylindrical, 114–120x19μ; paraphyses stout, sparingly septate and granular; sporidia biseriate, oblong-elliptical, uniseptate, nearly hyaline 34–38x11μ.

On a fallen sapling of maple. West Chester, Pa., June, 1882.

The ostiola throw off the epidermis, and the perithecia themselves soon after fall out, leaving light colored, circular spots which mark the place of their attachment. The fruit is almost exactly that of *M. Modonia*, Tul., but the more elongated ostiola, the smaller perithecia and deciduous habit distinguish it.

MELANCONIS (MELANCONIELLA) MESCHUTTII.—Perithecia 10–20 (.25x.33$^{mm.}$), circinating in a thin, lenticular, black, orbicular or elliptical stroma seated on the surface of the inner bark; ostiola short cylindrical, united in a dirty brown disk bursting through transverse cracks in the epidermis, their tips, in well developed specimens, distinctly 4-cleft; asci (spore-bearing part) about 75x10μ; sporidia biseriate, elliptical, very slightly curved, uniseptate and slightly constricted, subhyaline at first, with a faint, transparent, horn-shaped appendage at each end, but these soon becoming absorbed and the spore becoming brown, 14–16x6–8μ (mostly 15–16x6μ.)

On dead limbs of birch. Plainfield, N. J., June, 1883. George F. Meschutt. *Gelatinosporium betulinum*, Pk., occurs on the same branches, and where the epidermis is weaker, the appearance of the stroma is different, it being more prominent, and the epidermis being irregularly laciniate-cleft around it. The perithecia soon collapse, so that, on stripping off the epidermis, their position is indicated by little circular concavities around the margin of the stroma. This is closely allied to *M. Decoraënsis*, Ell., but differs in its smaller perithecia and narrower *appendiculate* sporidia.

MELANCONIS (MELANCONIELLA) BIANSATA.—Perithecia circinating in a stroma scarcely different from that of the preceding species, globose, .75$^{mm.}$ in diameter, soon collapsing, 6–10, their short, cylindrical ostiola with 4-angled or imperfectly cleft tips, united in a dirty brown, narrowly elliptical or suborbicular disk, which slightly rises and bursts through the epidermis by which it is closely girt; asci 190–200x300μ, evanescent, (8-spored?); sporidia oblong-elliptical, uniseptate, soon becoming brown, and generally with a short, stout, tuberculiform projection at each end, length, without appendage, 35–45x15–19μ.

Found on the same limbs with the preceding species.

VALSA FAGICOLA.—Stroma formed of the scarcely altered substance of the bark; perithecia circinating, 10–15, subglobose, membranaceous, collapsing (.33$^{mm.}$), abruptly contracted into a slender, cylindrical neck about .33$^{mm.}$ long, the necks all converging and piercing the epidermis in a small, papilliform, black disk; tips obtuse, with a rather broad opening; asci (spore-bearing part) 18–20x3μ, at first with a convex, hyaline tip which soon disappears, leaving them truncate above; (paraphyses?); sporidia biseriate, cylindrical, hyaline, curved, 2.5–3.5x.5–.75μ.

The asci are arranged in a racemose manner, like those of *Valsa ciliatula*, Fr., of which this might perhaps be considered a small form.

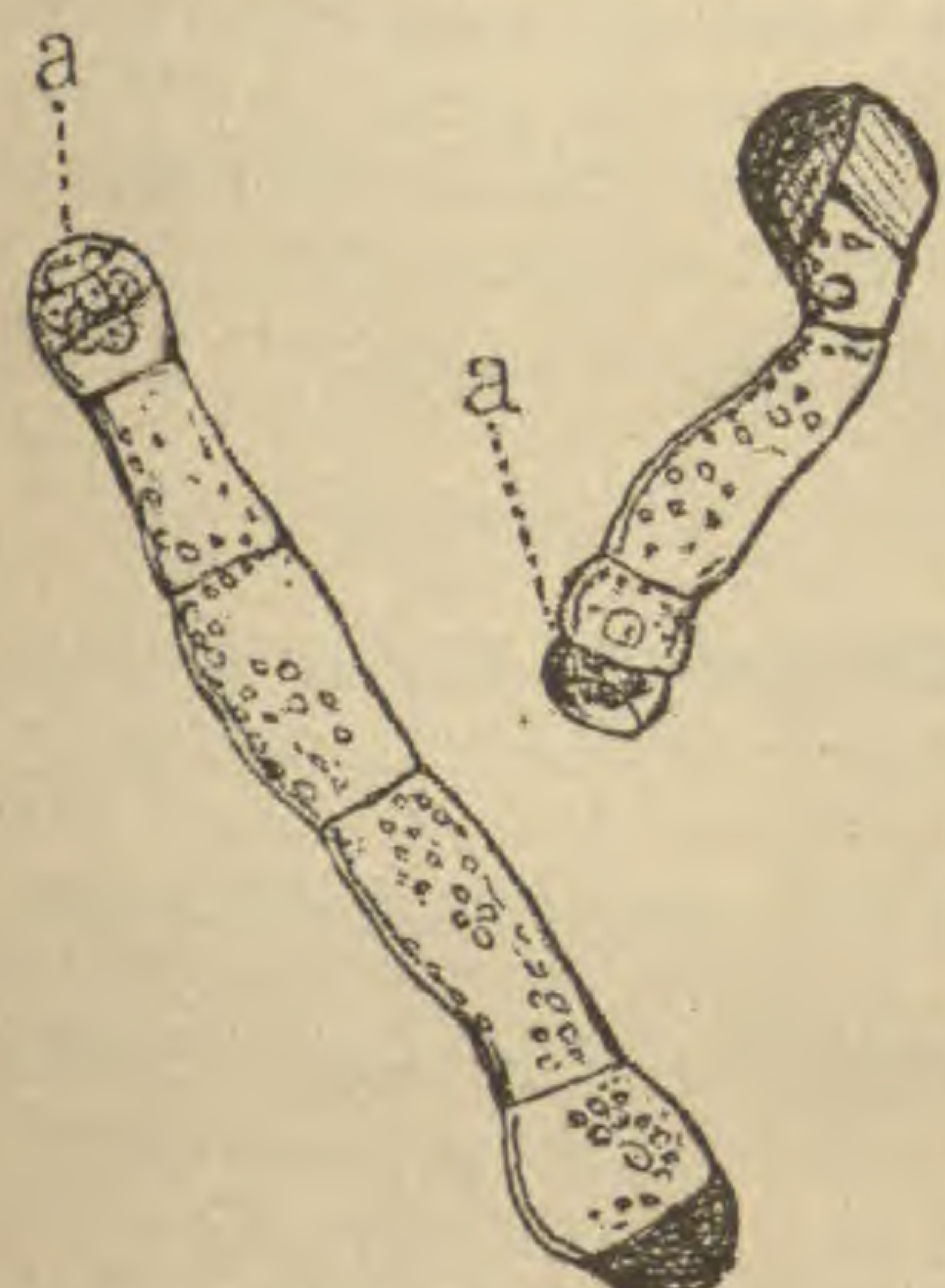
On dead limbs of *Fagus ferruginea*. West Chester, Pa., June, 1882. E. H. J. and G.

Pinus Banksiana.—The *Gardener's Monthly* for 1873 gives an account of the large size of *Pinus Banksiana* at Marquette and other places in the Lake Superior region. Coming across the continent from the Pacific coast over the Northern Pacific R. R., the first tree of the distinctively Atlantic group to meet us is *Pinus Banksiana*. At Motley, in Morrison County, Minnesota, the trees seemed to be about 40 feet high, and some were 4 feet in circumference. Soon after meeting these we came to *Pinus rigida*, black spruce, white pine and tamarack. The forests—if scattered groups of trees might be so called—had a comparatively young look, and seemed to tell of a natural march of forest growth westward.

THOS. MEEHAN.

Fern Notes.—Last spring I examined with considerable care the development of the prothallia of *Struthiopteris Germanica*, and found that they were very distinctly diœcious. In about five weeks from the time the spores were started the first antheridia were mature; but it was more than six weeks *later* before mature archegonia were noticed, and these were on different prothallia. The prothallia bearing the archegonia were like those in most ferns, and had the heart shape characteristic of the fern-prothallium. In no cases were perfect antheridia found upon these, while, on the other hand, none of the male prothallia was found to subsequently develop archegonia, although carefully watched.

The male prothallia were much smaller, and, though sometimes heart-shaped, were generally more or less irregular. In a few cases, there was observed on the prothallia an antheridium, which consisted simply of a row of four or five cells, as shown in the annexed figure.



The conditions under which they were grown may have affected their development. The spores were sown rather thickly under a small glass in an ordinary room. These gave rise principally to the male prothallia, though a few developed into the female form. A number of them was transferred, when a few weeks old, to a hot-bed, and these produced a much larger proportion of the female prothallia.

The spores were gathered the last of March, having therefore remained on the plants through the winter. They began to germinate in five days from the time they were sown.

It was found that the spores of *Onoclea sensibilis* germinated with equal promptness.

On examining a number of prothallia of *Aspidium spinulosum*, gathered on the 17th inst., one was found with a well-marked fibrovascular bundle, although the vessels were not perfect.

Detroit, Mich. DOUGLASS H. CAMPBELL.

Cleistogene flowers.—*Nemophila maculata*, Benth. At Clark's Ranch, on the Merced River in California, I found this species wholly cleistogene in June last, in the cultivated spots near the stream. As in all cleistogamous plants, every flower was fertile, and the weight of a small plant covered with-seed vessels was remarkable. Out of what must have been many hundreds of plants which came under my eye, I saw but one flower with a perfect corolla.

Impatiens pallida, Nutt.—Along the coast of Alaska, in lat. 56°, in the early part of July I found *Impatiens pallida* with all the flowers which had so far appeared, evidently cleistogene. I could find none with petals. Two weeks later, farther north, in lat. 59°, I found the same plant in apparently the same stage of flowering, with all the flowers having, or having had, corollas. I could see nothing which would suggest any satisfactory reason for the different behaviors.

Opuntia leptocaulis, D. C.—In my garden I have a large bush of the long-spined form of this species. Though several years old it has never borne a flower. Over a year ago a number of small buds appeared, but not one opened, or, indeed, advanced beyond a comparatively microscopic stage. But fruit resulted which has taken a full year to mature, and which the past month was of a pretty rosy red. Not a seed was found in any one. This is evidently not a case of cleistogamy, for it is probable that there were no perfect stamens in the buds, or else there would have been seeds. Still, the circumstance is interesting.

Viola sarmentosa, Dougl.—It seems scarcely necessary to put upon record that a violet is cleistogene, for any of them may be expected to be; but perhaps it is as well to note the actual fact. In the woods around Departure Bay, in British Columbia, *Viola sarmentosa* was very abundant, and, at the time of my visit in July last, all the flowers were cleistogamous.

THOMAS MEEHAN.

A Few Additions to the Berzelius Catalogue.—Upon seeing a list of plants reported by Prof. Eaton as new to the "Berzelius Catalogue" of plants growing within thirty miles of Yale College, I was reminded that I might give a similar list of those that I have found in this section of the circle.

Reseda Luteola, L., is given in the Catalogue as lost. I have since observed it in its old habitat, and also in another locality.

I am credited with finding *Viola pedata*, L., var. *bicolor*, Gray, but this is a mistake, it was var. *alba*. I have never seen the var. *bicolor* growing wild.

Erodium cicutarium, L' Her., grows at Stony Brook.

Polygala fastigiata, Nutt., grows at Atlanticville, beyond the limits of the Catalogue.

Amorpha fruticosa, L. Of this, reported as lost, I have found several specimens again.

Ammania humilis, Mx., is common on Long Island.

Hydrocotyle umbellata, L., is common on Long Island.

Galium boreale, L., I observed on the shore of the Housatonic, below Cornwall Bridge, Ct., in 1875, but probably not within the limits of the Catalogue.

Eupatorium hyssopifolium, L., is very common on Long Island.

Aster nemoralis, Ait., I have found in a sandy swamp near River Head.

Xanthium spinosum, L., formerly grew at Mt. Sinai, but I have not seen it for some years.

Achillea Millefolium, L., var. *roseum*, is common on Long Island.

Matricaria inodora, L., was formerly plentiful, but I have not seen it for several years,

Cirsium horridulum, Mx., is common on Long Island.

Vaccinium Oxycoccus, L., grows at one locality in Wading River.

Mentha aquatica, L., var. *crispa*, is found at Mt. Sinai.

Echium vulgare, L., is found at Port Jefferson.

Asclepias incarnata, L., (typical form) grows at Wading River.

Rumex maritimus, L., was found in abundance at Montauk Point in 1879. This is far beyond the limits of the Catalogue, but is interesting because it is new to the State of New York

Amarantus viridis, L., is plentiful at East Hampton, though beyond the limits of the Catalogue.

Callitriche heterophylla, Ph., is common on Long Island.

Quercus palustris, Du Roi., is found at Manor, Long Island.

Cupressus thyoides, L., is common around River Head, where it takes the place of the red cedar.

Potamogeton hybridus, Mx. Wading River.

Potamogeton pusillus, L., var. *tenuissimus*. River Head.

Potamogeton perfoliatus, L. Northville and River Head.

Potamogeton gramineus, var. *graminæfolius*. River Head.

Spiranthes graminea, Lindl., var. *Walteri*. Wading River.

Liparis Lœselii, Richard. Wading River.

Lachnanthes tinctoria, Ell., was found at Manorville this year by Hon. Isaac Coles, of Glen Cove.

Sporobolus serotinus, Gray. River Head.

Muhlenbergia sylvatica, T. & G. River Head.

Elymus Canadensis, L., is common on Long Island.

Panicum amarum, Ell., is common at Wading River, on the sound, and at River Head, on the bay.

Cystopteris fragilis, Bernh. In an old well at Rocky Point, and in a deep ravine at Wading River; not a dozen plants in both localities.

E. S. MILLER.

Additions to the Flora of Onondaga County, N. Y.—In spite of very adverse weather the Syracuse Botanical Club has made some botanical excursions during the past season, and very satisfactory ones too. We have found the following plants, which were entirely new to us:

Viola striata, Ait. (with cream-colored flowers); *Corydalis flavula*, Raf; *Atriplx hortensis*, L., found by Mrs. Charles Barnes by the road near High Bridge; *Aplectrum hyemale*, Nutt. (with bright lemon-colored flowers); sterile plants of *Humulus Lupulus*, L.; *Polygonum Virginianum*, L.; *Quercus macrocarpa*, Mx.; *Lappa officinalis*, Allioni, (with white flowers); *Erythræa Centaurium*, Pers.; a sedge not identified; *Aster linifolius*, L.; *Aster puniceus*, L. (with rose-colored flowers); *Aster simplex*, Willd.; *Aster puniceus*, L., var. *vimineus*, Gray; *Helianthus decapetalus*, L.; *Asclepias phytolaccoides*, Pursh; and *Cladium mariscoides*, Torr. Mr. Beauchamp sent to us from Baldwinsville, *Spergularia rubra*, Presl., var. *campestris*, Gray. Besides the above we have collected many species not represented in our county herbarium.

Syracuse, N. Y. MARY OLIVIA RUST.

Flora of Sam's Point.—The note by Mr. Britton in the last number of this journal, describing the botanical characteristics of Sam's Point, omits mention of some peculiarities which I noticed during a visit to this lovely spot in a most beautiful country, about the middle of September of the present year. I there saw, for the first time, the American mountain-ash *(Pyrus arbutifolia)*, and was impressed with its splendid appearance. The European species *(P. aucuparia)* is cultivated in Washington and vicinity, and I have often admired the beautiful orange-colored berries; but our native species far surpasses it. In fact, I have never seen anything outside the tropics which, in my opinion, would compare with the large masses of deep scarlet berries displayed by *P. arbutifolia.* The species was not abundant, but was noticed in several places, growing usually in clefts of rocks, and forming a tall shrub of 5–10 feet in height. It was observed in cultivation at two places along the road leading to the Point, in one instance forming a tree some 20 feet high. Another peculiarity of the vegetation of the Point which Mr. Britton omits to mention is the remarkable form assumed by the few hemlock-trees which grow there. One was noticed which had an elevation of not more than six feet, but which expanded a rod or more (I write from memory, no measurements having been taken), the dense flat top supported on a comparatively massive straight trunk a foot or more in diameter and several feet in height. I was told of a tree (said to be a pine), of similar shape, growing at the mouth of the "ice cave" which expanded more than 30 feet, although no taller than the one just described.

ROBERT RIDGWAY.

Teratological Notes.—In the BULLETIN of July, last year, I recorded the fruiting in my garden of an *Arisæma triphyllum* with twin spadices. I have this last summer received from my brother, Professor L. W. Bailey of Fredericton, New Brunswick, Canada, who was ignorant of my previous observation, a specimen in the same condition. The flowering portion is simple, and so is the constricted neck, but above, the club-shaped appendages are distinct. Of these, one is taller than the other. The discoverer does not indicate any change in the surrounding spathe.

I have an English walnut with three cotyledons. This reminds me to say that after sending my note on *Ipomœa* (present volume, page 82), I found one in my yard with three perfect cotyledons.

W. W. BAILEY.

Botanical Notes.

The Flora of the Country Bordering the Rio Grande, in Chihuahua and Texas.—In a paper read before the New York Academy of of Sciences. Dr. Newberry says:

The country bordering the Rio Grande, in Chihuahua and Texas, is nearly destitute of trees, a feature which marks the aridity of the climate; yet, in certain localities, as on the bottom lands of the Rio Grande and Rio Concho, a vigorous and somewhat varied forest-growth was found at the advent of the whites. No better illustration of the relation between the kind of vegetation and the water supply in a country can be found than that afforded by the luxuriant growth of trees of several kinds along the Cibola in the Chinati Mountains, Texas; while on all sides this oasis is surrounded by an apparently boundless grass-covered prairie, where the rain-fall is inadequate for trees. On the mountain-summits, south of the Rio Grande is a sparse growth of piñon (*Pinus edulis*) and evergreen oak (*Quercus Emoryi.*) The lowlands in certain localities, over thousands of acres, are thickly set with mesquite (*Prosopis glandulosa*), here a strong, spreading shrub, never a tree, but with roots disproportionately large, composed of very dense tissue and furnishing a large amount of excellent fuel. Along the arroyos, cottonwood may occasionally be seen, either the narrow- or the broad-leaved form (*Populus monilifera* or *P. angustifolia*), and more commonly the hackberry (*Celtis occidentalis*), and the nopal, the little black walnut (*Juglans rupestris*), the Mexican buckeye (*Ungnadia speciosa*), and the guayacan (*Guaiacum Coulteri*). The drier portions, especially the gravel terraces bordering the Rio Grande, are frequently covered with the creosote-plant (*Larrea Mexicana*) and *Fouquiera splendens*. The latter forms a cluster of fifteen or twenty canes, ten or twelve feet high, springing from the same root and bristling with spines an inch or more in length, of which the bases are in contact. Usually it is without leaves, and seems as though dead; but, for a brief interval in the rainy season, it is covered with small, crowded, obovate leaves, and from the summits of each stem springs one or more spikes of brilliant crimson flowers.

Among the shrubs which form the "chaparral" or thickets, the *Holacantha* is the most conspicuous, and *Salazaria* the most interesting. The former, as its name implies, is a mass of thorns, which are often as large and strong as those of the honey-locust. The branches and spines are covered with a green epidermis, which performs the functions of leaves, and, in the spring, these bear bunches of yellow flowers similar to those of *Berberis*. The *Salazaria* is a labiate allied to *Scutellaria*, and the seed is inclosed in a balloon-like capsule, similar to that of the balloon-vine (*Cardiospermum*), also found here, and having the same function, namely, dissemination by the wind. Two species of *Acacia* and one of *Berberis* (*B. trifoliata*), all spiny, help to make the chaparral as nearly impenetrable as the thickets of cactus further west. We are here fairly within the confines of the cactus country, but not in its heart. Many species differing much in habit are constantly in sight—the "nopal," an *Opuntia*, being the most common, one species growing in a mass ten feet or more in height, with each leaf-like subdivision of the stem a foot in diameter. Though covered with spines, this plant is largely eaten by cattle, and nothing is more common than to see a patch of it trampled down, half eaten, and the flattened stems notched by semicircular bites. One species or variety of *Opuntia*, growing abundantly in Chihuahua, is of a deep purple color, which makes it conspicuous and often ornamental.

The most striking feature in the botany of this region is formed by the century-plant and its allies, other species of *Agave*, *Habranthus* and *Dasylirion*, and the yuccas. In many places these are the only plants attaining any large size, and are very numerous, scattered over the plains and slopes of the mountains; the plants not crowded, but separated by intervals of a few feet, which are occupied with a luxuriant growth of gramma grass. The yuccas belong to four species, or three species and two varieties, *Yucca angustifolia* and *Y. baccata*. Of these, two rise to the height of five to fifteen feet, with trunks from six to twelve inches in diameter, the crowded, radiating leaves crowning the summit in a round or oval mass, six feet or more in diameter, the old leaves hanging perpendicularly and forming a peculiar thatch around the trunk and extending to the ground.

The century-plant is in Chihuahua represented by a variety with shorter and broader leaves than that commonly cultivated. From the centre of the tuft, the flower-stalk rises from 10 to 25 feet in height, composed of woody tissue and standing some years after bearing flowers. These persistent flower-stalks, crowning the ridges and visible for miles, give a peculiar aspect to the scenery. The century-plants are, however, nowhere as numerous as the species of *Dasylirion*, with which they are associated, and which do not die with the effort of florescence. Further south, the agave supplies from its sweet juice the material from which an intoxicating drink is produced. In this region, however, an alcoholic beverage is obtained from the "sotol" (*Dasylirion Texanum*), which, from its abundance and the use made of it, deserves a prominent place among the economical plants of the country. Hundreds of thousands of acres are covered with this sotal, and it would seem that it might be much more largely utilized than it is for the manufacture of alcohol. The leaves are three to three and a half feet long by one a half inches wide at the base, straight, flat, and garnished on either side with strong recurved hooks. The color is yellow-green, and the leaves are very numerous. From the centre rises, at a certain stage of growth, a woody flower-stalk, ten feet high and at the base as large as one's arm. The trunk rises but a few inches above the ground and is completely concealed. The top of this trunk, composed of the closely imbricated leaf-bases, which are broad, yellow, shining, succulent and sweet, with a pulpy mass at the centre, containing much saccharine matter, raw, or better roasted, is palatable and nutritious; so much so, that in the country where it grows it is said the Indians never really suffer for want of food, as this affords them an abundant if not varied aliment.

In the preparation of sotol whisky—a liquid called *mescal*, as is also that made further west from other plants—the portion of the plant which has been described is trimmed so as to resemble a head of cabbage, then roasted and fermented, the product of the vinous fermentation being distilled in the ordinary way. For roasting the sotol, a pit is dug, some ten feet in diameter and four feet deep, lined with rude masonry. In this a fire is built, and when it has been burned down, the pit is filled with several hundred sotol heads. When roasted, they are chopped in pieces and fermented in vats.

Another interesting plant, the companion of the sotol, is the "lechuguilla" (*Agave heterocantha*), of which the leaves furnish a strong fibre, universally employed for ropes, sacks, etc., in Northern Mexico. This grows on the mountain slopes, generally at an elevation of about 4,000 to 5,000 feet, is common in all Northern Chihuahua, and especially abundant on the Chinati Mountains in Texas.

The Syracuse Botanical Club.—We are informed that, owing to ill health, Mrs. Grifford has been obliged to resign the position of Corresponding Secretary of the Syracuse Botanical Club, and that Mrs. S. M. Rush has been elected to fill the vacancy.

BULLETIN

OF THE

TORREY BOTANICAL CLUB.

Vol. X.] New York, December, 1883. [No. 12.

New Western Plants.

BY EDWARD LEE GREENE.

DRABA ASPRELLA.—Roughish-pubescent with short stiff hairs, which are either simple, or parted above the middle into from two to four divaricate branches; stems a span high, from a biennial or perennial root, leafless except at base; petals showy, yellow; pedicels .5 inch long, divaricate, bearing silicles of one-third their length, which are ovate-oblong, scarcely compressed, and tipped with a long style.

Lynx Creek, Northern Arizona, May 31, 1883. H. H. Rusby. With the habit of *D. Mogollonica*, Greene (*Bot. Gaz.*, v., 157), but very different. The peculiar pubescence covers the leaves, stem and pedicels throughout, extending in shorter and simple hairs to the long-oval pods. I am informed by Dr. Gray that this was collected near Prescott by Dr. Edward Palmer in 1876, and is his No. 565; though his specimens were in flower only, and therefore the species was left unnamed and undescribed.

POLYGALA RUSBYI.—Hoary-pubescent, 2–6 inches high; stems numerous, much branched, spineless; leaves ovate to ovate-oblong, acute or obtuse, one-half inch long, sessile, or nearly so; bracts scarious; pedicels 2–4 lines long; sepals pubescent and ciliate, the outer slightly saccate at the base; wings oblong, flesh-colored, 4–5 lines long; lateral petals linear, a little longer than the yellow keel, which has a long, nearly straight beak, a little widened at the apex; young capsules broadly obovate, emarginate, nearly smooth; seed not seen.

Collected near Prescott, Arizona, April 1883, by H. H. Rusby.

Near *P. subspinosa*, Wats., but more pubescent, wholly spineless, and with a different beak. Mr. Watson informs me that it was collected by Dr. Palmer in 1870 and in 1876, and that it is referred to in the original description of *P. subspinosa* as a more pubescent form of that plant.

COTYLEDON RUSBYI.—Acaulescent, glabrous; rosulate leaves obovate-oblong, sharply acuminate, 1 inch long; flowering-branches scape-like, 3–6 inches high, leafless, but with some scattered, subulate bracts; pedicels slender, 3 lines long; sepals oblong, less than half the length of the petals; petals lanceolate, acuminate, 3–4 lines long, united only near the base, nearly coral-red.

San Francisco Mountains in South-eastern Arizona; collected by the writer in 1880, and also by Mr. H. H. Rusby in 1881. A small species.

ŒNOTHERA (CHYLISMIA) DIVARICATA.—Rather short and apparently 2–3 feet high, the stem and branches hirsute; lyrate leaves hoary; calyx-tube funnelform, a line or two long; tips of the lobes free; petals white or rose-color, 4–6 lines long; capsules linear, 2–3 inches long, divaricately spreading on bracted pedicels 1–3 lines long, surrounded by a narrow, minutely crenulate margin.

A California plant, but the exact locality unknown. The only specimen was detected in a bundle of "*Cruciferæ*" in that portion of the Geological Survey collection which was deposited in the University. The species is particularly well marked; and, by its narrowly winged seeds, is related to *Œ. pterosperma*, Watson, but in size and habit it is more like *Œ. brevipes*, Gray. The horizontally spreading, or a little deflexed capsules are peculiar, and suggest the specific name.

BIGELOVIA TRIDENTATA.—Shrubby, glabrous and glutinous; foliage densely fascicled and clothing thickly the rigid branches; leaves an inch long, coriaceous, narrowly cuneate, 3-toothed, or 3-cleft at the apex, the teeth or short lobes acute; heads short-peduncled, three-fourths of an inch long, racemosely or thyrsoidly arranged toward the ends of the branches; involucral scales in many ranks, with short, acute, more or less hispid-ciliolate and squarrose-spreading tips; akenes pubescent.

Mixed with *Bigelovia Menziesii* in the Cedros Island collection of Dr. Veitch. But it is so distinct from that species, both in general aspect as well as in technical character, that it is strange they should have been confounded. It is remarkable among *Bigeloviæ* for its densely fascicled foliage, its hard, woody stems being hidden by the abundance of leaves. Its inflorescence is nearly that of *Applopappus squarrosus*, to which it has a stronger likeness, than to any *Bigelovia*.

BIGELOVIA ACRADENIA.—Shrubby and much branched, a foot or more high, glabrous and very glutinous; leaves narrowly oblanceolate, rigid, entire, an inch or more long; heads corymbose clustered, 3–4 lines long, 6–10-flowered; involucre narrowly campanulate, its scales regularly imbricated, their tips obtuse and bearing a conspicuous resiniferous gland beneath the epidermis; akenes turbinate, very silky.

On the Mojave Desert, collected by Dr. Parry and the writer, September, 1881. Closely related to *B. Menziesii*, but of very different habit, being diffusely branched, and forming compact, rounded, broomy tufts. The heads are only half as high as those of that species, and have but half as many flowers, and the tips of the involucral scales, distended and filled with resin, are peculiar.

ANTIRRHINUM KELLOGGII.—A foot or two high, glabrous and slightly glaucous, not at all glandular or viscid; leaves broadly lanceolate, 1–1.5 inch long, tapering to a short petiole; peduncles axillary, slender, twice the length of the leaves, but not prehensile; sepals lanceolate, 2 lines long; corolla .5 inch long, merely gibbous at base.

Summit of the Sierra Nevada; Dr. H. Kellogg, July 20, 1870. An alpine species, to come between *A. Kingii* and *A. strictum*. Though simple and slender, with very long peduncles, it does not appear to be a climbing species, and Dr. Kellogg notes that it grows near snow, in patches by itself. The single specimen collected is young and without fruit; but it indicates a very distinct and interesting species.

PENTSTEMON KLEEI.—Near *P. Rattani*, 1.5–2.5 feet high, ill-scented, light green, and not glaucous, glabrous up to the glandular pubescent, narrow thyrsus; leaves sub-coriaceous, rather remotely and sharply serrulate or denticulate, the radical ones lanceolate, the cauline ovate-lanceolate, cordate and even the lowest more or less connate-perfoliate; sepals oblong and obtuse; corolla lilac-purple barely .75 inch long, the tube equalling the calyx, the lobes short-oblong, very obtuse; sterile filament long-bearded on the upper side nearly half way down.

On the summit of Ben Lomond, the highest peak of the Santa Cruz Mountains, California. Collected by Mr. W. C. Klee in the month of June, 1883.

A New Genus of Sphæriaceous Fungi.

By CHAS. H. PECK.

NEOPECKIA, Saccardo.

Perithecia carbonacea, subfragilia, superfcialia sed subiculo copioso effuso semiimmersa, globosa, papillata, denique latiuscule pertusa. Asci octospori, elongati, copiose paraphysati. Sporidia didyma, fuliginea.

A genere *Amphisphæria* subiculi copiosi presentia differt, ab *Enchnosphæria* et *Eriosphæria* sporidiis perfecte didymis, fuligineis recedit. Genus inter Pyrenomycetes phæodidymos locandum, clarissimo mycologo C. H. Peck, speciei typicæ illustratori jure meritoque dicatum.

NEOPECKIA COULTERI (Peck) Sacc.—*Sphæria Coulteri*, Peck in Hayden's U. S. Geol. Survey, 1872, p. 792; *Enchnosphæria* (?) *Coulteri* (Peck) Sacc., Syll., Vol. ii., p. 207; *Lasiosphæria acicola*, Cooke, Grevillea, Vol. viii., p. 87, 1880. *Amphisphæria* (?) *acicola* (Cooke) Sacc. Syll., Vol. i., p. 727.

Perithecia .5$^{mm.}$ diam., demum papilla amissa, perforata; asci, pars sporidifera 130–140=14–15; paraphyses copiosæ, filiformes; sporidia utrinque obtusiuscula, 20–28=9–10, intense fuliginea.

Habitu externo *Enchnosphæriæ Pinetorum* peraffinis, sed fructificatio prorsus aliena.—P. A Saccardo.

The specimens on which this species was founded were collected near Yellowstone Lake, Wyoming Territory, by Prof. J. M. Coulter, to whom the species is dedicated. The fungus has since been collected on the Sierra Nevada Mountains, California, by Mr. C. G. Pringle. The type specimens of *Lasiosphæria acicola*, Cke., are recorded: "On pine-leaves, Rocky Mountains." They are credited to Dr. Lyall.

The genus, as already stated by Professor Saccardo, is distinguished from *Amphisphæria* by its subiculum, and from *Enchnosphæria* and *Eriosphæria* by its colored spores; from *Rosellinia* by the uniseptate spores.

The subiculum creeps over the dead leaves and twigs, binding them together and forming a soft, tomentose, brown or reddish-brown stratum, in which the numerous perithecia are involved.

These are more or less closely gregarious, rather fragile and at first furnished with a distinct and usually naked apical papilla or ostiolum, which at length disappears, leaving the perithecium rather widely perforate. Sometimes the subiculum has a smooth or submembranous appearance as if collapsed from excessive moisture, and then the perithecia are more prominent, but still they retain their unpolished tomentose surface. The asci are cylindrical and obtuse at the apex. The spores are oblong or oblong-elliptical, uniseriate, uniseptate, colored, constricted at the septum, .0009 to .0011 inch long, .00035 to .00045 inch broad. In some conditions they appear as if involved in a thin colorless mucus.

New Species of Grasses.

By Geo. Vasey.

√ Agropyrum scribneri.—Culms densely tufted, geniculate and decumbent near the base, one to one and a half foot high, rather slender. Leaves very short, two or three on each culm, the upper sheath twice or thrice as long as the blade, ligule obsolete, blade 1–1.5 inch long, 1–2 lines wide, rigid, attenuate-pointed. Spike 2–3 inches long, closely or sometimes lax-flowered, but the spikelets always longer than the internodes of the spike. Spikelets 3–6-flowered, outer glumes linear-lanceolate, 3–5-nerved, extended above into a long point (.5–1 inch), smooth except the hispid point. Flowering-glumes oblong-lanceolate, the base 4–5 lines long, smooth, about 5-nerved, sometimes slightly bidentate at the apex, the midnerve extended into a strong, spreading or recurved hispid awn. Palet equalling the flowering-glume, acute, except on the hispid marginal nerves.

This plant, although in the spike resembling *Agropyrum caninum*, differs notably in its tufted habit, its low size and smooth, rigid, sometimes glaucous leaves. It is perhaps the *A. caninum*, var. *Gmelini*, Ld. Mr. Scribner remarks that it is found only high up on the mountains near the timber-line, growing in scattered tufts in crevices and among the loose rocks, recognized by its low, usually prostrate stems, short leaves, with somewhat inflated sheaths, and long, divergent, awned spikes. It was collected by Mr. C. G. Pringle in the Sierras in 1882, altitude 9,500 ft., and distributed as *Triticum caninum*, L.? It was collected the past season in Montana by Mr. F. L. Scribner, to whom I take pleasure in dedicating it.

√ Sporobolus Buckleyi.—Culms 2 ft. high, compressed below, as are the smooth, striate sheaths; ligule a short, ciliate fringe, also a ring of short hairs externally at the top of the sheath.

Panicle 9–10 inches long, oblong, very open, lax and graceful, branches erect, mostly single, occasionally in twos, capillary, the lower ones about 4 inches long, gradually shorter above, the lower third naked, the branchlets short (mostly less than one-half inch), numerous, loosely few-flowered, somewhat recurved.

Spikelets purplish, less than a line long; the outer glumes unequal, acute, the lower one one-third shorter than the upper, which is a little shorter than the flower and scabrous on the keel; flowering-glume lanceolate, acute, smooth, except on the keel near the apex; palet nearly equalling its glume.

This is a well marked species, having somewhat the general appearance of *Leptochloa mucronata*, with a more graceful panicle. It grows in Texas, and was discovered by Dr. S. B. Buckley, after whom it is named.

Contributions toward a List of the State and Local Floras of the United States (X-103)

THE WESTERN STATES.*

INDIANA.

The Trees of Indiana. By Thomas B. Elliott. (D.)
In Trans. Indianapolis Acad. Sci. 1872.

Catalogue of the phænogamous and vascular cryptogamous Plants of Indiana. By J. M. and M. S. Coulter and C. R. Barnes. (B).
8vo, pamph., pp. 38. Crawfordsville, 1881.

Catalogue of the Flora of Central-Eastern Indiana (alpine or elevated district of the State). By A. J. Phinney, M.D. (B.)
In 12th Report of the State Geologist. Indianapolis, 1883.
(Embraces the Counties of Delaware, Randolph, Jay and Wayne).

Jefferson County.

Manual of the Botany of Jefferson County. By A. H. Young. (B.)
In 2nd Ann. Rep. Geol. Survey. Indianapolis, 1871.

Partial List of the Flora of Jefferson County. By John M. Coulter. (B.)
In 6th Ann. Rep. Geol. Survey. Indianapolis, 1875.

Catalogue of phænogamous and vascular cryptogamous Plants found growing wild in Jefferson County. By Charles R. Barnes. (A.)
To which is added:

Clark County.

A List of Plants growing in Clark County, but not found in Jefferson. By John T. Baird. (A.)
8vo, pamphlet, pp. 9. Madison, 1878.

Gibson and Posey Counties.

Flora of the Lower Wabash Valley, below the mouth of the White River. By J. Schneck, M.D. (B.)†
In 7th Ann. Rep. Geol. Survey. Indianapolis, 1876.
(Additions by the author in Botanical Gazette, Vol. ii., 1877.)

Wayne County.

List of Ferns, Mosses, Hepaticæ and Lichens collected in Wayne County. By Mrs. Mary P. Haines. (A.)

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*Continued from page 105.

†Also gives localities in one or two Illinois counties.

In 8th, 9th and 10th Ann. Reps. Geol. Survey, p. 235. Indianapolis, 1879.

ILLINOIS.

Contributions towards the Botany of the States of Illinois and Missouri. By L. C. Beck, M. D. (D.)
In Amer. Journ. Sci. and Arts, i series, Vols. x., xi. and xv., 1826 and 1828.

Catalogue of a Collection of Plants made in Illinois and Missouri by C. A. Geyer. By George Engelmann, M. D. (C.)
In Amer. Journ. Sci. and Arts, i series, Vol. xlvi., 1844.

A Catalogue of Illinois Plants. By I. A. Lapham.
8vo, pamphlet, pp. 60. 1857.

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Catalogue of the phænogamous and vascular cryptogamous Plants of Illinois, native and introduced. By. H. N. Patterson. (B.)
8vo, pamphlet, pp. 54. Oquawka, 1876.

List of Illinois Lichens. By H. Willey. (B,)
In Botan. Gazette, Vol. ii. Logansport, 1877.

Lichens of Illinois. By E. Hall and J. Wolf.
In Bull. No. 2, Ill. State Lab. Nat. Hist., 1878.

Lichens of Southern Illinois. By H. Willey. (A.)
In Botan. Gazette, Vol. iii., Logansport, 1878.

Notes on the native Trees of the Lower Wabash and White River Valleys, in Illinois and Indiana. By Robert Ridgway. (C.)
In Proc. U. S. Nat. Museum, June 12, 1882.

Cook County.

Flora of Chicago and vicinity. By H. H. Babcock. (B.)
In the Lens, Vols. i. and ii., Chicago, 1872–1873.

Henderson County.

A List of Plants collected in the vicinity of Oquawka, Henderson County, Ills. By Harry N. Patterson. (A.)
8vo, pamphlet, pp. 18. Oquawka, 1874.

Peoria County.

Flora Peoriana: A Catalogue of Plants observed and collected in the vicinity of Peoria, Ill., 1852–1877. By Fred. Brendel. (A.)
In the Pharmacist, Vol. xv., Nos. 7 and 8, Chicago, 1882.

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Catalogue of the phænogamous and filicoid Plants collected on the Geological Survey of Michigan. By John Wright, M. D. (A.)
In Legislat. Rep. No. 23. Detroit, 1859.

Catalogue of the Plants collected by Wm. A. Burt in the primitive Region south of Lake Superior, in 1846. By Dennis Cooley. (B.)
In Jackson's "Lake Superior." Washington, 1849.

Catalogue of phænogamous and acrogenous Plants found growing wild in the lower Peninsula of Michigan, and the Islands at the head of Lake Huron. By N. H. Winchell. (B.)
In 1st Bienn. Rep. Progr. Geol. Survey. Lansing, 1861.

Catalogue of the flowering Plants of the southern peninsula of Michigan, with a few of the Cryptogamia. By N. Coleman.
Publ. by Kent Scientif. Inst. Grand Rapids, 1873.

Catalogue of Phænogamous and Acrogenous Plants found growing wild in Michigan. By Elmore Palmer, M. D. (A.)
8vo, pamph.. pp. 16. Dexter, 1877.
Catalogue of the phænogamous and vascular cryptogamous Plants of Michigan, indigenous, naturalized and adventive. By C. F. Wheeler and E. F. Smith. (B.)
8vo, pamph., pp. 105. Lansing, 1881.
Washtinaw County.
Flora of Ann Arbor and vicinity. By Miss E. C. Almendinger.
In Proc. Ann Arbor Scientif. Assoc. 1876.

WISCONSIN.

Trees of Wisconsin. By P. H. Hoy.
Agricult. Rep. 1852.
Localities of Plants collected in the North-western Expeditions of 1831 and 1832. By Douglass Houghton, M. D. (B.)
In Schoolcraft's "Narrative of an Expedition through the Upper Mississippi to Itasca Lake, the actual source of that River, in 1832.
Appendix. (Some of the localities given are in Minnesota.)
Plants of Wisconsin. By. I. A. Lapham. (A.)
In Trans. Wis. State Agric. Soc. 1852.
(Additions by I. A. Lapham in Trans. Wis. State Agric. Soc. 1860.)
Additions to the Flora of Wisconsin. By T. J. Hall.
Pamphlet. 1860.
Systematic Catalogue of the Plants of Wisconsin and Minnesota.* By C. C. Parry, M. D. (C.)
In Owen's Geol. Surv. Wisconsin, Iowa and Minnesota. Philadelphia, 1852.
Catalogue of exogenous, endogenous and acrogenous Plants of Wisconsin. By G. D. Swezey. (A.)
32mo, pamphlet. Beloit, 1877.
Catalogue of the phænogamous and vascular cryptogamous Plants of Wisconsin. By Goodwin D. Swezey. (B.)
In Geology of Wisconsin, Survey of 1873–1879, Vol. i.
A partial List of the Fungi of Wisconsin, with Descriptions of new Species. By W. F. Bundy. (D.)
In Geology of Wisconsin, Survey of 1873–1879, Vol. i.
List of cryptogamous Plants from the region of Lake Superior. By Charles J. Sprague. (A.)
In Proc. Bost. Soc. Nat. Hist., Vol. vi.
Milwaukee County.
Catalogue of the Plants found in the vicinity of Milwaukee. By I. A. Lapham. (A.)
24 mo, pamphlet, pp. 12, Milwaukee, 1836; and 24 mo, pamphlet, pp. 24, Milwaukee, 1838.

W. R. G.
N. L. B.

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* See BULLETIN x., 103.

A New Species of Frullania.—*Frullania Pennsylvanica*, n. sp.*—Dioica. Caulis e basi amphigastriorum repens, dichotomo-ramosus; folia imbricata, plana, ovata, mucronata, rarius obtusa, integerrima, cellulis valde chlorophyllosis, marginem versus minoribus basi valde dilatatis, plus minusve regulariter hexagonis, parietibus validis; incrassatio angulosa subnulla. Auricula denudata, e margine folii oriunda, oblique a caule distantia, majuscula, cucullato-rotunda, sub orificio leniter contracta, ultra folii marginem demissa; amph. subimbricata, plana, late ovata, caulem excedentia, profunde partita, sinu angusto obtuso, laciniis ovatis, longe acuminatis, conniventibus; amenta mascula elongata, laxe foliosa, in ramulis parvis lateralibus, bracteis complicatis, lobis subæqualibus ovatis obtusis; perichætia in ramulis longioribus apicalia, sæpe ad basin dichotomiæ, fol. inv. complicata, integerrima, lobulis (ventrale minori) ovatis, acuminatis, basi valde angustatis; amph. invol. magna, carinato-concava, profunde partita, laciniis ovatis, longe apiculatis, integerrimis vel uno alterove dente munitis. Perianthia desunt.

Hab. in rupibus umbrosis, Stony Creek, Carbon County, Pennsylvania. Leg. E. A. Rau.

The plant is of about the size of *Frullania dilatata*, but the color is a dull olive-green. The tufts are depressed, and creep over rocks or over other Hepaticæ. According to the diagnosis of Mr. Austin's *F. Leana*, our plant must stand near it. I am not, however, in possession of the latter plant, though I do not doubt that they are two distinct species.

Leipzig, Germany. F. STEPHANI.

Gerardia tenuifolia, Vahl, **parasitic.**—To my knowledge, only those species of *Gerardia* that belong to the section Dasystoma (such as *G. flava* and *quercifolia*) have thus far been proved to be parasitic (cf. Gray, Struct. Bot., p. 38, and Flora of N. A., p. 291). I have recently found that *Gerardia tenuifolia*, Vahl, section Eugerardia, has its roots amply provided with haustoria, the structure of which I hope to be able to describe at some future time.

Hoboken, December, 1883. JOS. SCHRENK.

Note on Abutilon.—The involucre, so common in *Malvaceæ*, is, as every one knows, omitted in *Abutilon*, which, however, retains an interesting reminiscence of it in the joint seen in the peduncle some little distance below the flower. To-day one of my students showed me a specimen bearing one minute bract at this joint in the *Abutilon striatum* of the conservatories.

Providence, R. I. W. W. BAILEY.

Pinus rigida in Minnesota.—In my note on *Pinus Banksiana*, incidental reference was made to *Pinus rigida*. I saw but young trees without cones in these outskirts of the forests' westward march. Prof. Sargent, who is very familiar with the forestry of that region, kindly suggests that the trees were of *Pinus resinosa*—the former species not extending so far. THOMAS MEEHAN.

* Reproduced, at the request of the author, from *Hedwigia*, No. 10, 1883.

Melanthium latifolium, Desrouss, has been found in New Jersey. It was collected on a field excursion of the Club at Swartswood, Sussex Co., and first noticed by Mr. Wm. Bower, growing on a dry limestone ledge in open woods. A single flowering specimen was seen among numerous sterile plants, and this was fully four feet high, the panicle of greenish-brown flowers and half-ripened pods being two feet long and one foot in width. The leaves were all borne on the lower part of the stem and were eight inches long by two wide.

N. L. BRITTON.

Dioclea Boykinii.—I found this plant while collecting in S. Arkansas in 1881, but, unaware of its rarity, I put two or three specimens only in my hand-press, and sent those to Cambridge to Dr. Gray, from whom I learn that the species is so rare that a very few specimens only are known in the herbaria of the country. I propose to visit the locality next summer and collect enough for everybody, providing I get enough subscribers for the species to pay my expenses —my time being thrown in for the good of science.

Those who desire specimens should send their subscriptions to me as early as possible.

Fayetteville, Ark. F. L. HARVEY.

The Notholæna Lemmoni has been successfully grown during the past year in the conservatory of the Golden Gate Park, San Francisco, and in several other conservatories in the same city, and also in Oakland. It proves to be quite hardy and makes much larger fronds than in its habitat on the Santa Catalina Mountains. The fronds are 12–15 inches high and 2 inches broad, and the broad, dark border of fruit contrasts very finely with the silvery whiteness of the powder beneath. It is becoming a very popular fern.

Oakland, Cal. J. G. LEMMON.

Botanical Notes.

The Continuity of Protoplasm.—The subject of the continuity of protoplasm by means of delicate threads through the walls of vegetable cells attracted considerable attention at the meeting of the Biological Section of the British Association at Southport. Mr. W. Gardiner, who has examined fifty species of plants and found this continuity of protoplasm in all of them, pointed out that this fact places us in a position to obtain a clearer insight into such phenomena as the downward movement of a sensitive leaf upon stimulation, the influence of a germinating embryo upon the endosperm cells, and of the action of a tendril towards its support. Professor Hillhouse suggested that the protoplasmic threads may serve to transmit impulses from one cell to another and thus act somewhat like a nervous system. Dr. Carpenter remarked that there are forms in the animal kingdom in which the cell is never arrived at, but in which there is simply a continuity of protoplasm, so that the lower forms of the animal and vegetable kingdoms are here closely approximated to one another.

A Large Apple-tree.—In a note in the *Scientific American*, Rev. H. C. Hovey says:

While visiting an orchard near New Haven not long ago, the farmer, perceiving me to be taking notes as to the dimensions of his trees, told me that probably the largest apple-tree in the world was to be seen on the farm of Delos Hotchkiss, in Marion, Conn. I need not give the size as originally stated by my informant, which was, like most such matters, much exaggerated, for I have just had exact measurements taken, as follows:

Circumference of the trunk, near the ground	15 ft. 3 in.
" " " three feet from ground	13 ft. 9 in.
" " " at the forks	16 ft. 2 in.
" " 2 main branches, from	10 ft. 4 in., and 8 ft. 8 in.
" of nine smaller branches, from	4 to 6 ft. each.
Height of tree	60 feet.
Diameter of tree top	104 feet.

A peculiarity of this tree is that it is what is termed "an alternate bearer," five limbs bearing one year and four the next. The usual yield from the five limbs is about 85 bushels, although in a single instance it reached 110 bushels; and the four limbs vary from 35 to 40 bushels. The fruit is said to be excellent for winter use, though on this point I can only speak from hearsay.

The age of this venerable apple-tree is estimated at about 175 to 180 years. Curiously enough the patriotic old tree marked the centennial year by bearing fruit on *all* its branches, the first time it has been known to do so in its life, and it has continued to do so down to the present time. Some of the limbs are now dying, others are broken down, signs of decay appear in many places, and it is thought that this noble specimen of *Pyrus malus* will soon be numbered among the things of the past.

Botanical Literature.

Catalogue of phænogamous and vascular cryptogamous Plants of Worcester County, Mass. By Joseph Jackson. 8vo, pamph., pp. 48. Published by the Worcester Natural History Society.

Mr. Joseph Jackson has for some years given assiduous attention to the collection and study of the plants of Worcester County, Mass., and has now embodied the results in the form of this neatly-printed Flora. Among the cryptogams it includes only the ferns, equisetaceæ, and lycopods, The mosses, lichens and fungi would of course greatly extend it, and we hope the enterprising author will now give his attention to these.

The Worcester County Natural History Society, under whose auspices the publication is issued, appears to be doing excellent work in many directions.—W. W. B.

The Grasses of the United States: Being a synopsis of the Tribes and Genera, with a Description of the Genera, and a List of the Species. By Dr. Geo. Vasey. 8vo, pamph., pp. 47. Washington: Government Printing Office, 1883.

In the words of the author this "paper is an attempt to give a systematic synopsis of our grasses so far as known to the present time, with a description of the genera and a list of the species. Our knowledge of some species is yet imperfect, and one object of this paper is to awaken such interest in the subject as may lead to further study and investigation of the same.

"The synopsis of the tribes and genera is chiefly a translation from the recently published Genera Plantarum of Messrs. Bentham & Hooker. The characters have been drawn up very briefly, but, it is hoped, with sufficient fulness to lead to the intended result. In drawing the characters of the genera the best authors have been consulted, a careful examination of specimens has been made, and the nomenclature conformed to the most recent views of floral structure."

Catalogue of the Flora of Oak Island, Revere, Mass.: with Notes. By Herbert A. Young. 8vo, pamph., pp. 19. From the *Bulletin* of the Essex Institute). Salem: Peabody Acad. of Science, 1883.

Oak Island, whose flora is here catalogued, is a slight, tree-covered elevation of land hardly reaching more than three or four feet above the surrounding salt-marsh, within the limits of the town of Revere, Mass., and just a few rods beyond the inlet that separates that town from the town of Saugus in Essex County. The entire number of plant embraced in Mr. Young's list, which includes phænogams, ferns and mosses, is three hundred and sixty-two.

Early Botanical Explorers of the Pacific Coast. By C. C. Parry. 8vo, pamph., pp. 8. Reprint from the *Overland Monthly* for October, 1883, (From the author.)

Deutsche botanische Monatsschrift, Organ für Floristen, Systematiker und alle Freunde der heimischen Flora. Herausgegeben von Dr. G. Leimbach.

This is a new monthly botanical journal published by the well-known botanist, Prof. Leimbach of Sondershausen. It accords the first place to systematic botany and the physiology of plants, and then to biology, morphology, teratology, etc. It is to give elaborate, and, if necessary, well illustrated articles from the pens of the most eminent members of the botanical fraternity in all parts of the world, and will contain elaborate reviews of new works, as well as of the important articles that appear in the chief botanical journals of the world. The subscription price, $1.50, is very low.—G. E.

Proceedings of the Torrey Club.—At a regular meeting of the Club Tuesday evening, Sept. 11, the chair was occupied by Prof. E. H. Day, and eighteen persons were present.

New Stations discovered on Field Days.—Prof. Hyatt reported North Yonkers as a station for *Cypripedium pubescens*, Swartz., and Tottenville, S. I., for *Asclepias variegata*, L., a plant new to the Island. Prof. Day stated that he had found *Senecio candidissima*, commonly known as dusty miller, spontaneous at Highlands, N. J.

During the excursion to Swartzwood, N. J., on Aug., 4th, *Melanthium latifolium*, Desrouss, a plant new to the local flora, was detected. The *Nelumbium* was found in flower. Prof. Day reported Waretown, N. J., as a new station for *Kosteletzkya Virginica*, Presl., and stated that *Althæa officinalis*, L., had been found in abundance by him at Sand's Point, L. I., Miss Knight remarked upon the mosses found in the dells of Wisconsin and announced the discovery by her of *Eustichium Norvegicum*, Br. Eu., in fruit,

Prof. Martin exhibited a pink variety of *Impatiens fulva*, Nutt., and an example of heterogamy in Indian corn.

At the regular meeting held Tuesday evening, Oct. 9th, the President occupied the chair and twenty persons were present.

Plants noted on Field Days.—Messrs. Wilber and Bicknell reported that they had found a white-rayed variety of *Aster Novæ-Angliæ*, L., at Van Cortlandt, N. Y. Mr. Hollick stated that he had found the var. *roseus* of the same species on Staten Island.

Dr. Britton gave Tottenville, S. I., as a station for *Trichostema lineare*, Nutt., a plant new to the Island.

Prof Hyatt remarked upon some of the more notable plants that had been observed by him during a trip between Cincinnati and Chattanooga.

Adventitious Leaves in Rhus.—Mr. Schrenk exhibited a specimen of *Rhus Toxicodendron*, L., in which the inflorescence was replaced by tufts of leaves. (The same change has heretofore been noted in the BULLETIN as occurring in three other species of the genus—*R. glabra typhina* and *copallina.*)

At the meeting of Tuesday evening, Nov. 13th, the chair, in the absence of the presiding officers, was occupied by Prof. Day. There were twenty-six persons present.

Teratological.—Mr. Brower exhibited a specimen of *Amorpha fruticosa*, L., with fasciated stem, and one of *Cocculus Carolinus*, D C., with polymorphous leaves.

Mr. Schrenk remarked upon the structure of tuckahoe and upon the parasitism of *Gerardia tenuifolia*, Vahl (see page 132.)

Late-flowering Plants.—The following plants were reported by various members as being in flower for the second time this season: *Lonicera sempervirens*, Ait. (Miss Knight); *Viola sagittata*, Ait., *V. pedata*, L., and *V. primulæfolia*, L. (Mr. Hollick); *V. cucullata*, Ait. (Mr. Bicknell); and *V. lanceolata*, L. (Mr. Bisky). Dr. Britton remarked upon and exhibited under the microscope, specimens of *Protococcus* (*vulgaris*?) taken from the bark of trees in Brooklyn.

On motion the chairman appointed a committee of three (Messrs, Britton and Hyatt and Miss Knight) to consider a plan for forming a subsection of the Club for the study of physiological botany.

One person was elected an active member.

Correction.—*Pyrus arbutifolia* in Mr. Ridgway's note on pages 121 and 122 should of course read *P. Americana.* The error is so apparent that every reader of the BULLETIN has doubtless noticed and corrected it.

BULLETIN

OF THE

TORREY BOTANICAL CLUB.

VOL. XI.

NEW YORK:
1884.

GENERAL INDEX.

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BULLETIN

OF THE

TORREY BOTANICAL CLUB.

Vol. XI.] New York, January, 1884. [No. I.

Notes on Tuckahoe.

By JOSEPH SCHRENK.

(Plate XLIII.)

For the bibliography, habitat, general appearance and chemical composition of tuckahoe I refer the reader to some editorial remarks appended to a note in Vol. ix., page 125, of the BULLETIN, and to an elaborate paper on "Tuckahoe, or Indian Bread," by Professor J. Howard Gore, in the last Smithsonian Report (for 1881). In regard to the *structure* of this substance, however, I desire to discuss some important points that have not, as yet, received due attention.

The BULLETIN (*l. c.*) says of tuckahoe: " * * * none, large or small, presents *any trace of plant structure.*" (Italics mine.) In the Smithsonian Report, page 695, we find the following passage: "There is not noticeable any membranous division between this bark [*i. e.*, of tuckahoe] and the substance within, *neither does the one merge into the other*, but there is a marked distinction between them. Within we find a compact white mass *without any apparent structure, either vascular or granular.*" (Italics mine.)

A piece of tuckahoe about $8^{cm.}$ in diameter, which I have closely examined, and which, in most particulars, answers the general description of the authors, has, on its rather smooth surface, numerous woody, fibrous, narrow shreds (from 2 to $5^{mm.}$ wide), which run longitudinally along the surface, somewhat like the strips on the trunk of the shag-bark hickory. They are firmly attached to the surface of the tuckahoe, above which they project only about $5^{mm.}$ or even less. A very thin cross-section through one of these shreds, together with a small portion of the adjoining surface, shows that the shred consists of coniferous wood-tissue, which is continued for a short distance into the body of the tuckahoe, below the general level of its surface. Fig. 1 of the accompanying plate, which represents such a cross-section, shows that there is no distinct boundary line between the woody tissue and the inner, white substance, but that the one merges into the other. The cells on the inner, centripetal side, are found in all stages of disintegration ; some have small openings in one or several of their side walls, others have lost one or several of their walls entirely, while still others have left no other traces of their existence than isolated, triangular columns, each marking the spot at which three contiguous cells have formerly met. These characteristic cell-remains (in Fig. 1 near the lower margin) are sometimes found quite a distance from the circumference, imbedded in the mass of tuckahoe. I detected them by using indol and sulphuric acid, that most beautiful reagent for lignin.*

* M. Niggl, Das Indol ein Reagenz auf verholzte Zellmembranen. *Flora*, 1881, p. 545 and p. 561.

Another specimen, about $6^{cm.}$ in diameter, has no shreds on its rough, much wrinkled surface, but has a cylindrical stick, $7^{mm.}$ in diameter, running centrally through its white mass, in the manner described by the above-mentioned authors, who consider such sticks as the remaining portions of the roots from which the tuckahoe is formed. No cellular tissue could be detected on or near the surface of this specimen; but sections from superficial portions of the central, cylindrical root and the contiguous white mass of tuckahoe displayed the very same gradual merging of the cellular tissue of the woody root into the mass of tuckahoe as described above, this time, of course, in reversed, centrifugal order.

The various stages of disintegration can also be seen in the interior portions of the root itself, for there are many places at which groups of cells, greatly varying in extent, have been partly or entirely destroyed, and replaced by the mass of tuckahoe. (Fig. 6, especially in the lower right-hand corner; also Fig. 7, three cells from *c*, Fig. 6, greatly enlarged.)

These observations seem to prove that tuckahoe does present traces of plant-structure, and also that there is a merging of the cellular tissue of the coniferous root into the mass of tuckahoe; and it is the structure of this latter substance itself that next attracts our attention.

From the above quotations it appears that this mass is thought to be compact and without any structure, either vascular or granular. The microscopical examinations recorded in the Smithsonian Report (pages 698 and 699) do not throw any light on this question; they seem to have been made with the one end in view of proving the fungoid nature of tuckahoe. I find that any section of this mass demonstrates that it consists of countless, minute, white, granular bodies of varying size and most irregular shape. All these granules have rounded outlines, but some are globular, others oblong, either stout or slender, and most of them have short branches, rounded excrescences or tubercles, which give them a very odd appearance. Not only the mass of tuckahoe proper is formed of these grains, but they are found crowding the cavities of the wood-cells described above and figured in the plate. (See Figs. 1, 5, 7 and 8.)

Perhaps it was these bodies on which the following description was based (Smithsonian Report, page 698): "The body of the fungus [*i. e.*, tuckahoe] is composed of short irregularly-jointed threads of mycelium, somewhat tuberculated, which swell considerably on heating with water." That these grains are not mycelium is evident from their very appearance, and still more so from their chemical composition. Potassium hydrate easily dissolves them, while the real mycelium, to be spoken of hereafter, remains nearly unchanged. They are also soluble in cuprammonia, causing a very copious precipitate of what I suppose to be pectate of copper. These characteristic pectin reactions* seem to leave no doubt that these granules constitute the bulk of *pectose* of which, according to all chemical authori-

* Kabsch, in Poulsen's Bot. Micro-Chemistry, translated by Prof. Wm. Trelease (S. E. Cassino, 1883), a book that cannot be too highly recommended to all students of histology.

ties, tuckahoe contains so large a percentage (from 64 per cent., R. T. Brown, to 78.4 per cent., Department of Agriculture.)

Quite distinct from these pectin bodies or grains—as I shall call them hereafter—are the *hyphæ* of some species of fungus that are found in tuckahoe. In the specimens examined, the hyphæ form a dense mycelium at and near the surface (Figs. 1, 2, 3 and 4), and also at all places where the white mass of tuckahoe shows the smallest fissures or cracks. Wherever the mass of pectin granules is compact and uninterrupted the hyphæ are either not seen at all or only very sparingly; nor could I detect any within the tissue of the central root (Figs. 6, 7 and 8). The wood-cells of the outer "bark," however, contain the hyphæ in great abundance, some, especially those nearest the surface (Figs. 1 and 4), to the exclusion of the pectose grains. The farther we proceed toward the centre, the more we find the pectin grains preponderate, until the hyphæ disappear nearly altogether. The same conditions can be observed in the interior, where each of the numerous cracks forms a sort of bed or channel for the mycelium, which sends its hyphæ right and left into the mass of granules.

Sometimes we detect the end of a hypha attached to one of the grains, either superficially (Fig. 9*a*), or entering it (Fig. 9*b*), but I have not been able to find any spores or organs of fructification.

It seems to me that too much stress has been laid on the occurrence of a fungus in tuckahoe, and that no attention has been paid to the essential difference in the substance of the fungus (fungus cellulose), and of the granular bodies (pectose). This neglect accounts for the inconsistencies contained in the latest hypothesis (Smithsonian Report pp. 695 and 697) attempting to explain the formation of tuckahoe: "These spores [found in tuckahoe] have the property of converting the woody fibre of the root into their own substance;" and, "It [*i.e.*, tuckahoe] gradually grows in this manner, appropriating the bark of the root for its own covering, until it becomes too large, during which process it forms a bark of its own, as already described." If the "spores" (*pars pro toto*, I presume) did transform the root into their own substance, we should not find *pectose* in so large a proportion, and the "bark" of the tuckahoe is nothing distinct in itself, but simply a very dense layer of mycelium either with or without a zone of peripheral cells of the tree-root within which the tuckahoe has been formed.

While studying this subject I could not help comparing the formation of tuckahoe with that secretion of the various resins and gums which is known as resinosis and gummosis.* The gums in particular present many chemical and structural similarities to tuckahoe. They contain great quantities of pectose,† and many chemists think that pectose is, in fact, nothing but metaarabin.‡ Mohl,§ Wigand,‖

*A. B. Frank, Die Krankheiten der Pflanzen, p. 75 and p. 85.

†Husemann, Pflanzenstoffe, Vol. i. (1882), p. 168.

‡W. Behrens, Hilfsbuch mikrosk. Untersuchungen (1883), p. 315.

§ *Bot. Zeitung* (1857), p. 33.

‖ Pringsheim's *Jahrb.*, Vol. iii., p. 115.

Karsten,* Frank‡ and Hofmeister§ have shown that the cell-walls within which gum is deposited disintegrate during the process of secretion, thus furnishing material for the latter. But both Hofmeister and Frank think that the gum begins to be formed in the cells before their disintegration commences, otherwise the large amount of the product could not be explained. Frank‖ gives a figure of a transverse section through a branch of a cherry-tree affected with gummosis, which in several respects very much resembles Fig. 6 of our plate. The same author has another figure¶ of a whole branch, a considerable portion of which has been changed into the gummous substance, and which could very well be compared to Fig. 1 of the plates in the Smithsonian Report representing a root encircled with a mass of tuckahoe.

Gummosis (and, to a certain extent, resinosis) is thought to be a process of degeneration accompanying the gradual cessation of the vital functions of some portion of a plant. An accumulation of plastic material takes place in the affected parts, and these are gradually absorbed and finally entirely destroyed. The causes of this process are chiefly mechanical injuries, *e.g.*, the breaking off of branches, the tearing off or bruising of the bark, etc.; but various other causes that tend to diminish or destroy the vital energy of some organ or of the entire plant may produce the same effect.

I have somewhat digressed from my subject, because it is my opinion that a close comparison of the nature and origin of the gums with those of tuckahoe will reveal many analogies which might entitle us to call the pathological process of which tuckahoe most likely is the result, *pectosis.* In that case the views of Rev. M. J. Berkeley and other mycologists (see BULLETIN, *l. c.*) would no longer be mere conjectures. It is not even necessary to assume with Currey and Keller (*l.c.*) that the fungus found in tuckahoe is the cause of its formation. As this fungus has not yet been proved to be *parasitic* on or in the living root-cells, while we have seen that it grows on the pectin granules, we might, with good reason, consider it a *saprophyte,* like hosts of its kind that thrive on disorganizing vegetable or animal substances. However, it remains very much to be desired that some competent mycologist should take this fungus in hand and throw full light upon its life-history, thereby at the same time solving the "puzzle" called tuckahoe.

EXPLANATION OF PLATE XLIII.—Fig. 1. Transverse section from the surface or "bark" of tuckahoe, magnified x 140. The large cells and cell-fragments belong to the projecting shreds of woody fibres, the small circles and corresponding parallel lines represent the hyphæ (transversely and longitudinally); the larger rounded bodies are pectin granules. Fig. 2. Radial section from the same part as Fig. 1, x 140. The cells show the characteristic bordered pits of coniferous wood, also the striation of the disintegrating walls; the edges are not so sharply defined as repre-

* *Bot. Zeitung*, 1857, p. 319.

‡ Pringsheim's *Jahrb.,* Vol. v., p. 25.

§ Pflanzenzelle, p. 234.

‖ Die Krankheiten der Pflanzen, p. 86.

¶ *Ibid.*, p. 90.

Note on Some New Species of Grasses.—In the January number of the BULLETIN (1884), under the article New North American Grasses, three species of *Bouteloua* are described, viz: *B. trifida*, Thurb., *B. Burkii*, Scribn., and *B. Havardi*, Vasey—which were characterized and published by Mr. Sereno Watson in his list of Palmer's plants in Vol. xviii. of the *Proceedings* of the American Academy of Arts and Sciences, issued August 15th, 1883.

In justice to myself I wish to state that my article in the BULLETIN was written in April, 1883. and was placed in the hands of the editor May 22d following.

Bouteloua pusilla, Vasey, ined., published by myself in the January BULLETIN, is certainly the same as No. 751 Bourgeau and No. 1,016 Schaffner, referred by Mr. Watson in his list of Palmer's plants to *B. prostrata*, Lag. (*B. humile*, HBK.)

Bulletin, Apr. 1884.

F. LAMSON SCRIBNER.

A Catalogue of North American Carices has been compiled and recently published by Mr. L. H. Bailey, Jr., of Cambridge, Mass. It includes the names of two hundred and ninety-three species and eighty-four varieties, and is intended as an exchange-list, a check list for herbaria and as a contribution to American caricography. Copies of the catalogue will be given for desiderata.

Parkinson's "Paradisus."—A good many people, we suspect, have experienced difficulty in construing "Paradisi in Sole Paradisus terrestris." The editor of *Aunt Judy's Magazine* and the venerable Rev. H. T. Ellacombe are confessedly among the number, but they have been the means of eliciting from correspondents of *Notes and Queries* the explanation that the title is a wretched pun. "Paradisus" is a park; "Paradisi" is, of course, the genitive of this; "in sole" is in (the) sun (son). Hence the title would run, "The Terrestrial Paradise of Park-in-son." Such punning titles were not uncommon in Parkinson's time.—*Gardeners' Chronicle*.

sented in the figure, but eroded and of unequal thickness, especially those on the right, toward the centre. Mycelium and pectin bodies as in Fig. 1. Fig. 3. Tangential section corresponding to Figs. 1 and 2, x 140. The ellipses indicate the former position of the absorbed medullary rays. Fig. 4. Tangential section of one of the outermost cells of Fig. 1., x 500, showing mycelium and bordered pits in cellwall. Fig. 5. One of the cells of Fig., 1 magnified x 300. Fig. 6. Cross-section from central root x 140. The large, irregular, empty space on the right, as well as all the cells, were filled with pectin granules, as shown in Fig 7, which represents the group of three cells at *c* in Fig. 6 magnified x 700. Fig. 8. Radial section of a similar cell x 700.—Somewhat higher powers than those given were used in drawing the hyphæ and pectin bodies of Figs. 1 to 5.

New North American Grasses.

By F. LAMSON SCRIBNER.

BOUTELOUA TRIFIDA, Thurber, Gram. Mex. Bound. Survey, ined. —Perennial, 6–15 in. high, tufted and geniculate at the base; leaves 2 in. or less long, very narrow and usually involute, strigose-scabrous above and more or less rigid; spikes 3 to 6, pectinately many-flowered .5–1 in. long, erect or slightly spreading on short hairy pedicels; spikelets (including setæ) 3–4 lines long; outer glumes unequal, the upper and larger one about 2 lines long, both smooth, unequally 2-toothed and short awned; flowering-glume, exclusive of awns, about 1 line long, smooth or sparsely pilose, especially near the margins above; pedicel of the sterile floret smooth, bearing three awns, which equal those of the flowering-glume.

Texas and New Mexico; G. R. Vasey. Mexico; Dr. E. Palmer, No. 1,355, 1880. Dr. Palmer's specimens are taller, slenderer and more leafy than those from Texas and New Mexico. The latter have the base of the culms densely clothed with inflated sheaths that are tipped with short mucro-like leaves; the upper leaf also is much reduced, frequently not over a line in length.

This species is closely allied to the next, but is readily distinguished by its nearly smooth flowering-glume and longer and more slender awns.

BOUTELOUA BURKII, *n. sp.*—Culms slender, tufted, 4-6 in. high, erect or geniculate below, smooth or finely glandular-pubescent; leaves divergent, short, the upper .5 in. or less long, narrow and involute, smooth or, with the sheaths, glandular-pubescent, often with a few scattered longer hairs; spikes 3–5, about .5 in. long, pectinately many-flowered, erect or ascending; spikelets, including setæ, a little over 2 lines long; outer glumes ovate, smooth, nearly equal, the upper about a line in length, both usually very short awned just below the unequally bifid tip; flowering-glume, exclusive of the three continuous and equal awns, less than a line long, pilose with stiff hairs on the back and margins below; pedicel of rudiment .5 line long, smooth, bearing three equal and minutely scabrous awns 2.5 lines long, which are more or less enlarged and flattened near the base.

Laredo, Texas; Mrs. Anna B. Nickles; communicated to me by Mr. Isaac Burk of Philadelphia, for whom the species is named. Sandy plains, Upper Concho, West Texas; J. Reverchon; =No. 3,440* Curtiss's Distribution North American Plants.

✓ Bouteloua Havardi, Vasey, *in lit.*—"(Section Atheropogon). Culms 10–15 in. high; lower leaves numerous, flat, rigid, 3–6 in. long, 1–2 lines wide, more or less pubescent on the margins below and on the sheaths, upper leaves short (1–2 in.); ligule a ciliate line; panicle 2–3 in. long, erect, composed of 5 or 6 approximate short spikes of about 10, crowded, erect 1-flowered spikelets; outer glumes lanceolate, the lower nearly as long as the flower, the upper, half as long; flowering-glume 2.5 lines long, broad-oval, 3-lobed, the lobes extending nearly half way down, the lateral ones becoming somewhat recurved; palet as long as its glume, narrow, with two stout recurved teeth at the apex; sterile flower longer than the perfect one, the pedicel 1 line long, the three awns each 4 lines, the middle one membraneous-margined nearly to the apex. The crowded rhachis and outer glumes, as also the back of the flowering-glume and palet, clothed with long villous hairs.

"Discovered in the Limpia Mts. of Western Texas by Dr. V. Havard, U. S. A., for whom it is named." (Geo. Vasey.)

Bouteloua pusilla, Vasey, ined.—Perennial(?), 2 to 3 inches high; leaves smooth, very narrow and involute, the upper an inch long; spikes solitary, pectinately 10–15-flowered, about .5 inch in length; rhachis smooth; spikelets (including setæ) about 2 lines long, outer glumes smooth, the upper broadly lanceolate, 1.5 line long; twice the length of the unequally 1-nerved lower one; flowering-glume very hairy at the base and on the lateral and middle nerves below, the long middle lobe 2-cleft, the stout central seta a line long, exceeding the two lateral ones; palet very broad, and longer than its glume; pedicel of sterile floret .5 line long, with a tuft of hairs at the top, and bearing two or three rudimentary, hooded glumes or scales and three equal awns exceeding a line in length.

New Mexico; G. R. Vasey, 1881.

Trisetum Hallii, *n. sp.*—Culms slender, 6–18 in. high, smooth; ✓ leaves flat, a line or less wide; minutely scabrous, involute near the tip; panicle contracted, 2–4 in. long, the erect and densely flowered branches an inch or less long; spikelet about 2.5 lines long, 2–3-flowered, the nearly smooth rhachis prolonged above the upper floret, and often bearing a slender hair-like awn; outer glumes about 1.5 line long, equal in length, obtuse, the lower narrowly oblong, 3-nerved, the upper much broader and 5-nerved, nerves prominent, aculeate-scabrous, the lateral ones terminating below the scarious margin, which is finely ciliate on the edge; the first flowering-glume 1.5–2 lines long, tuberculate-roughened on the back and scabrous near the tip, terminating in two acute teeth and bearing a scabrous, straight awn a line long, teeth of the second and third florets prolonged into slender setæ less than a line in length, awn longer, twisted below and bent near the middle; palea about two-thirds as long as its glume; grain smooth, about 1 line long.

Named for the late Elihu Hall, in whose Texan collection (1872) it was distributed under No. 799, mixed with *Trisetum elongatum*, Kth. (*T. interruptum*, Buckley; No. 3,546* of Curtiss's Distribution of 1883) to which it is closely allied and which it much resembles in habit, but from which it differs essentially in its broader and obtuse outer glumes, and in having the lowest awn straight and shorter than the others. Brazos County, Texas; G. C. Nealley, 1883.

A New Grass.

By GEO. VASEY.

AMMOPHILA CURTISSII.—Culms 3 to 6 feet high, from a strong, perennial rhizoma, growing singly or in small tufts; base of the culm clothed with the rigid, imbricated, 2-ranked sheaths, above the base 3 or 4 distant leaves, the sheaths shorter than the internodes, very smooth, firm, the ligule an obscure, ciliate ring, the blade becoming involute and setaceous, 4 to 12 inches long.

Panicle 8 to 10 inches long, narrow and strict, the rhachis roughish, the branches very numerous, single, or in pairs below; erect, loosely flowered, sub-divided nearly to the base, the lower ones two to three inches long. Spikelets short-pedicelled, 2 to 2.25 lines long; the outer glumes unequal, keeled, nerveless, the lower one ovate, obtuse, half to two-thirds as long as the upper, which is two lines long, barely acute; the flowering-glume and its palet of similar texture and equal length, slightly longer than the larger outer glume, obtuse or acutish, strongly ciliate on the keel of the flowering-glume and on the two keels of the palet, the basal hairs scant and about one-third as long as the flower.

This was distributed in 1879 by Mr. A. H. Curtiss as *Calamagrostis brevipilis* (now *Ammophila brevipilis*), from which it differs in its greater size, its longer involute leaves, and its much longer and narrower panicle, with the branches sub-divided and flowering nearly to the base; the flowers are very similar, but differ notably in the latter having a ring of very short hairs at the base of the outer glumes beside those at the base of the flowers.

Collected by Mr. A. H. Curtiss on the Indian River, Florida, and to him I take pleasure in dedicating the species.

The Pteridophyta of Litchfield Co., Ct.—During the past three summers I have spent a portion of my vacation in Litchfield County, Ct., and am able to report a considerable fern list, with a few new stations for some species. Most of my collecting has been confined to the towns of Cornwall and Goshen, extending once to Bantam Lake, where the extremely local *Marsilia quadrifolia* is found, and once to Salisbury and northward along the mountains of S. W. Massachusetts. In the list, C stands for Cornwall for species not found in Goshen, and S for Salisbury.

EQUISETACEÆ.—*Equisetum arvense*, L., *E. sylvaticum*, L., *E. hiemale*, L. (3).

OPHIOGLOSSACEÆ.—*Ophioglossum vulgatum*, L., *Botrychium simplex*, Hitch., *B. ternatum*, Swz., *B. lanceolatum*, Angs., *B. Virginianum*, Swz. (5).

I have never found *B. lanceolatum* elsewhere except with its congener *B. matricariæfolium*. Diligent search here failed to reveal it. *B. simplex* is probably new to the State.

FILICES.—*Polypodium vulgare*, L., *Adiantum pedatum*, L., *Pteris aquilina*, L., *Asplenium ebeneum*, Ait., *A. Trichomanes*, L. (S), *A.*

thelypteroides, Michx., *A. filixfœmina*, Bernh., *Camptosorus rhizophyllus*, Link., *Phegopteris polypodioides*, Fée (C), *P. hexagonoptera*, Fée, *P. Dryopteris*, Fée, *Aspidium acrostichoides*, Swz., *A. Noveboracense*, Swz., *A. Thelypteris*, Swz., *A. cristatum*, Swz., *A. marginale*, Swz., *A. spinulosum*, Swz., *Cystopteris bulbifera*, Bernh. (S), *C. fragilis*, Bernh., *Onoclea sensibilis*, L., *O. Struthiopteris*, Hoffm., *Woodsia Ilvensis*, R. Br.,* *W. obtusa*, Torr., *Dicksonia pilosiuscula*, Willd., *Osmunda regalis*, L., *O. Claytoniana*, L., *O. cinnamomea*, L. (27).

MARSILIACEÆ.—*Marsilia quadrifolia*, L. Bantam Lake and Tyler Pond, where it was transplanted by Dr. T. F. Allen and myself in 1881. (1).

LYCOPODIACEÆ.—*Lycopodium lucidulum*, Michx., *L. dendroideum*, Michx., *L. clavatum*, L., *L. complanatum*, L. (4).

SELAGINELLACEÆ. — *Selaginella rupestris*, Spring., *S. apus*, Spring. (2).

ISOETACEÆ.—*Isoetes echinospora*, Durieu, var. *Braunii*, Engelm. Tyler Pond, common. I believe this species has never before been reported from Connecticut. (1).—Total, 43.

During each of the three years I have found the so-called var. *obtusilobata* of *Onoclea sensibilis* growing in the same locality under conditions identical with those noted by me in this journal for September, 1881. I am more fully convinced that the explanation there given was sufficient to account for the variation in this locality.

I have also the pleasure of recording "Tamarack Swamp," near Syracuse, N. Y., as a new locality for *Botrychium simplex*, Hitch.

Syracuse University, Jan., 1884. LUCIEN M. UNDERWOOD.

The Involucre in Malvaceæ.—Referring to Prof. W. W. Bailey's statement in the BULLETIN for December, 1883, that a greenhouse specimen of *Abutilon* had been found with traces of an involucre, I am happy to be able to say that a 3-leaved involucre is normally present in the young flowers of the common velvet-leaf (*A. Avicennæ*) and also in the greenhouse species, *A. vexillarium* (one of the bractlets long, the others short.) These facts, taken along with the presence generally of a hypocalycine node in the 'non-involucrate' Malvaceæ, suggest that the distinction between them and their involucrate allies is unwarranted, the real distinction being that in some the involucre is fugacious. In some of the genera there are difficulties in the way of verifying this view, arising chiefly from the bristly character of the young flower-buds.

Princeton, N. J. G. MACLOSKIE.

Notes from Massachusetts.—At one of the field meetings of the Essex Institute, held at Groveland, Mass., several plants were reported as having appeared there, the seeds doubtless having been introduced from the West in wool or in grain and other seeds. Of those mentioned there were *Linum usitatissimum*, *Pentstemon Digitalis*, *Lythrum alatum* and *Verbascum Blattaria*. The same *Pentstemon*

* *W. Ilvensis* can hardly be ranked here, as I found it near Sage's Ravine not more than one-eighth of a mile over the Massachusetts line. It is doubtless found on the brows of the same range of hills extending southward into Litchfield Co.

and *Houstonia purpurea* have been found at Boxford, *Cynoglossum officinale* at Topsfield, and *Verbascum Blattaria*, *Echium vulgare* and *Trifolium stoloniferum* at Georgetown.

We found on the field day above mentioned *Campanula rotundifolia* with double flowers.

Georgetown, Mass. C. N. S. HORNER.

Helonias bullata in Cultivation.—It has been claimed that *Helonias bullata* would not thrive under cultivation, but I have succeeded in growing it to perfection here in Massachusetts. After trying it in different soils and situations and meeting with no success, it was at last planted in mud saturated with water the whole year, the water being allowed to stand around the plants. They have been planted three years, and last year I counted over sixty rank flower-stalks, some of them two and a half feet high.

Southwick, Mass. EDWARD GILLETT.

Stipules in Onagraceæ.—It is stated in all the books that the Order Onagraceæ is ex-stipulate. I have a *Fuchsia*, the young and vigorous shoots of which show small, but very decided stipules. If one were describing the plant, unbiased by previous conceptions, he would most certainly report it stipular. In connection with this, see *Nature*, Vol. xxii., page 521, where, quoting Baillon, it is stated that many Onagraceæ show small stipules.

Providence, R. I. W. W. BAILEY,

Contributions toward a List of the State and Local Floras of the United States

THE WESTERN STATES.

ILLINOIS (continued).*

The native naturalized and cultivated Grasses of the State of Illinois. By I. A. Lapham. (D.)
In Trans. Agric. Soc., Vol. ii., 1855–7.

Additions and Annotations to Mr. Lapham's Catalogue of Illinois Plants. By F. Brendel. (C.)
In Trans. Agric. Soc., Vol. iii., 1857–8.

List of Plants in Northern Counties of Illinois not in Lapham's Catalogue by M. S. Bebb.
In Trans. Agric. Soc., Vol. iii., 1857–8.

Mosses of Illinois. By George Vasey.
In Agric. Trans., Vol. iii.

List of Trees found in Fulton Co. By John Wolf.
In Vol. iii., Geol. of Ill.

W. R. G.
N. L. B.

*We are indebted to Prof. L. M. Underwood for this additional list. The full title of the catalogue by John Wolf and Elihu Hall (BULLETIN, Vol. x., p. 120) is:

"A List of Mosses, Liverworts and Lichens of Illinois." (Bull. No. 2, Ill. State Lab. Nat. Hist.) The continuation of Brendel's Trees and Shrubs of Illinois was concluded in Vol. iv., Agricult. Trans., 1859–60.

Botanical Notes.

Volvox globator.—Mr. J. Levick maintains* that while the idea that the pretty little microscopic alga, *Volvox globator*, is hollow has passed as so self-evident as scarcely to have been challenged, "it is easy for microscopical students to demonstrate for themselves the certainty that those charming little globes are not hollow, but solid." * * * "A little experiment, which it is easy for every one to try, shows that *Volvox* is without any cavity whatever, and that the perfectly transparent contents of the globe appear to possess little, if any, less firmness than the pellicle or membrane which forms its periphery. This may be shown by taking *Volvox* in good quantity and straining the water from them ; by this means a little mass may be obtained. Let the *Volvoces* thus collected be taken up rather roughly by means of a syringe and placed in water containing carmine or any fine solid matter. It will probably be found that some of the *Volvoces* have been broken, some perhaps even into fragments which still display rolling motion. Now, if a little care is used in examining the ruptured specimens, it will be seen that the carmine adheres to any surface thus exposed, at once displaying the fact of their solid consistency." * * * "*Solid* is too strong a word, perhaps, to apply to matter which cannot be more than gelatinous, and is here used only in antagonism to the word *hollow;* but, if the spheres be stripped of their outer green covering, this envelope collapses, while the contents retain their spherical form, as is readily seen by the displacement of the carmine."

Mr. Levick also cut sections from the frozen plant and found that the internal matter, whatever it was, had sufficient density to support particles of carmine, dirt, or any other solid matter which lodged upon it.

A wingless-fruited Ptelea.—In a recent winter trip into Lower California, as far as Todos-Santos Bay, Dr. Parry discovered a new species of *Ptelea*, which was quite similar in habit and general appearance to the common northern *P. angustifolia*, but remarkably distinct in possessing wingless fruit, thus making a slight modification of the characters of the genus necessary. Dr. Parry has named the plant *P. aptera.*

The Rhododendron and Poisonous Honey of Pontus.—Mr. A. Nesbitt doubts in the *Gardeners' Chronicle* the oft-repeated assertion that honey made from the flowers of *Rhododendron Ponticum* is poisonous, and even that the plant itself is so. He says that he has observed lambs eating a small quantity of the leaves either of *T. Ponticum* or hybrids of that plant and no bad results followed. He suggests that it is possible that as the flower of the oleander is more like a rose than the rhododendron, it is probable that the former was the plant from which the honey was obtained that poisoned Xenophon's soldiers, the oleander being well known to be poisonous.

The Rev. C. Wolley Dod contributes to the same journal an interesting note which throws some light upon this point. He remarks

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**Rep. and Trans.* Birm. Nat. Hist. and Micr. Soc., 1882, after *Journal* Roy. Micro. Soc., Dec., 1883.

that there were apparently two kinds of poisonous honey met with in Pontus, one found near Heracles and the other near Trebizond, the former being attributed by Pliny to a plant called "ægolethon" or goat's-bane, the other to a plant which both he and Dioscorides called "rhododendron;" but they also used the name "nerium" for it. Sibthorp has identified the latter as *Nerium Oleander*. Mr. Dod can find no direct evidence that *Rhododendron Ponticum* is poisonous; but *Azalea Pontica*, which occurs in profusion near Trebizond, about ten miles from the coast, he believes to possess poisonous properties similar to those attributed to *Kalmia latifolia*. It is a noteworthy fact, if correct, that no species of *Rhododendron* is known to be poisonous, while members of certain of the other Ericaceous genera, *Azalea*, *Kalmia*, *Andromeda* and *Ledum*, possess either poisonous or narcotic properties.

The Name Fishberries, which has long been applied to the fruit of Cocculus Indicus (*Menispermum Cocculus*, L.) because of its use in stupefying and capturing fish, is, according to Prof. James Hyatt, given to the drupes of *Prunus Caroliniana* in Tennessee, where they are locally used as a fish poison. It appears that the amount of hydrocyanic acid that this fruit contains is sufficient to poison the fish which swallow it, without rendering their flesh unsafe for food.

Botanical Literature.

Genera Pyrenomycetum schematice delineata. By P. A. Saccardo.

This latest work of the well known Italian mycologist consists of 14 lithographic plates, large 8vo, on which are delineated the 280 genera into which the Pyrenomycetes are divided in the system of classification adopted in the two volumes of the Sylloge by the same author. The figures, though not claiming artistic perfection, are good and answer well the end for which they were intended. They give, in fact, "a bird's eye view" of this vast family of fungi and may be considered as indispensable both to the amateur and the critical student of mycology. The low price of the work (6 francs) places it within the reach of all.—J. B. E.

Botanical Micro-Chemistry: an Introduction to the Study of Vegetable Histology, prepared for the use of students by V. A. Poulsen, translated with the assistance of the author and considerably enlarged by William Trelease, Professor in the University of Wisconsin. 12mo. Boston: S. E. Cassino & Co., 1884.

There has been considerable interest taken in this country for a few years past in the microscopic examination of plants, and the number of botanists who are turning their attention to the study of vegetable histology is gradually increasing. Although all the necessary apparatus for prosecuting this fascinating study has been easily procurable at moderate prices, there has hitherto been sadly needed some sort of a manual which should give the beginner directions how to proceed in the examination of the minute anatomy of tissues, while it should at the same time contain everything of importance that more advanced students might desire to be informed upon. This want has at length been supplied in the work before us, which, first published in Danish, then in French, German and Italian, has finally been translated into English by Prof. Trelease with the sanction of the author.

The work is divided into two parts: the first treats of micro-chemical agents and their application, with an appendix on cements and media for mounting purposes; and the second gives descriptions of the vegetable substances and the modes of recognizing them.

The work is rendered the more valuable by the additions that have been made by the translator, and by the numerous references to other works that give more detailed information than could be crowded into the compass of this. No student of vegetable histology can well afford to dispense with this work, and for this reason, and on account of its moderate price (one dollar), we predict for it a large sale.

Thirty-third Annual Report of the State Museum of Natural History. (Botany.) Albany: Weed, Parsons & Co., 1880.

Thirty-fourth Annual Report of the State Museum of Natural History. (Botany.) Albany: Weed, Parsons & Co., 1881.

From these interesting, but much belated reports of Mr. Peck the State Botanist, we learn that during the year 1879 specimens of, 183 species of plants were mounted and placed in the herbarium, none of which was before represented therein. Of plants new to the herbarium, collected by the botanist in person and contributed by correspondents, the number was 170. Sixty-eight of the latter (all fungi) were deemed new to science, and have therefore been named and described, and, in some cases, illustrated in the plates accompanying the pamphlet. During the year 1880 the number of plants new to the herbarium that were mounted and placed therein was 167. The number of plants new to the herbarium collected by Mr. Peck and contributed by correspondents was 98. Among these there were 38 species of fungi that were new to science. To his Thirty-third Report Mr. Peck appends an account of the New York species of *Amanita*, in which he has rewritten the descriptions and supplemented them with remarks upon the variations of the species, their peculiar characteristics and their distinguishing specific features. For the benefit of students of fungi, the synonyms have to some extent been given and the spore-characters of each species added.

It is to be regretted that the scientific names of the plants (especially the new species) enumerated in these Reports were not printed in italics in order to make them more easily distinguishable from the accompanying text.

Arctostaphylos: Notes on the United States Pacific Coast Species, from recent Observations of living Plants, including a new Species (*A. oppositifolia*) from Lower California.—*New Plants* from Southern and Lower California (*Phacelia suffrutescens*, *Ptelea aptera*, *Polygala Fishiæ* and *Gilia Orcutii*). By C. C. Parry. 8vo, pamph., pp. 10. (From the *Proceedings* of Davenport Acad. Nat. Sciences.)

Notes on the Cryptogamic Flora of the White Mountains. By W. G. Taylor. 8vo. pamph., pp. 20. (From *Appalachia* for December, 1883.)

Desmids of the United States.

BULLETIN

OF THE

TORREY BOTANICAL CLUB.

Vol. XI.] New York, February, 1884. **[No. 2.**

Fresh-Water Algæ. VIII.

By FRANCIS WOLLE.

(Plate XLIV.)

In the summer of 1883 I made my tenth annual visit to the haunts of fresh-water Algæ, choosing those in our neighboring State of New Jersey where the ponds are more numerous as well as more accessible than in Pennsylvania. In the vicinity of Ocean Beach, Monmouth Co., there is a number of what may be termed small lakes, the waters of which, though separated from the ocean by only a narrow strip of land, are very clear and fresh. Therein are to be found many interesting plants; among others I saw, for the first time, *Utricularia inflata*, a very distinct and beautiful species of bladderwort, swimming free by means of the inflated petioles, arranged in a whorl, bearing in the centre a perpendicular scape with large yellow flowers.

From among the aquatic plants I gathered many algæ, and, among these, the following desmids new to our flora:

Cosmarium depressum, Næg., and *C. obsoletum*, Reinsch; *Staurastrum pachyrynchium*, Nord. (Plate XLIV., Figs. 32–36); *S. monticolum*, Lund. (Figs. 24–26; and

S. IOTOMUM, *n. sp.* (Figs. 5–7)—Very minute; semicells quadrangular, angles drawn out into thin, diverging, granular rays, each about as long as the diameter of the body, apices obtuse; end view triradiate. Diameter, including the rays, 15–20μ.

A small species, quite plentiful at Ocean Beach and at Malaga, N. J.

Two other desmids, not new, but rare, were also found here, viz: *Cosmarium sportella* and *Euastrum attenuatum*.

From the ponds in the vicinity of Malaga, Gloucester County, I was fortunate enough to secure five new desmids, viz.:

Staurastrum leptacanthum, var. TETROCTOCERUM, *n. var.* (Figs. 29–30)—Semicells suborbicular furnished with eight, long, thin rays, deeply forked, or clawed at the ends; this whorl rather below the middle, and another above it with four similar rays; end view octangular, each angle produced into a long thin ray; between the margin and the centre are four more rays. Membrane smooth. Diameter of body 25μ.; including the rays 75–80μ.

The only essential distinction between this form and the typical Brazilian plant is that ours has *eight* and four rays in the two whorls, and the Brazilian plant has *six* and four rays.

Collected in pond near Malaga, N. J.

S. QUATERNIUM, *n. sp.*—Small, smooth, quadrangular in front view, deeply constricted; sinus acute angled, much ampliated; semicells oblong, sides rounded, end truncate, each angle furnished with four firm aculei; end view triangular, sides concave, angles broadly rounded and furnished with four aculei. Diameter 25μ; with aculei 40–50μ.

Ponds, Malaga, N. J , and Wilkesbarre, Penn.

S. ANKYROIDES, *n. sp.* (Fig. 4.)—About as long as wide, granularly rough; semicells cylindrical, with enlargement towards the convex ends; sides produced into narrow, elongate, slightly tapering, incurved arms; margins granulate crenate, apices bifurcate; end view quadrangular, with angles drawn out into long arms. Diameter 82μ. Length 75μ.

The only water which hitherto furnished this new species was a pond near Malaga, N. J. Var. HEXACERUM, *n. var.* Somewhat stouter than the typical form and furnished with *six*, instead of *four* arms.

This variety I find in northern counties of New Jersey. In the possession of six arms it bears a resemblance to *St. coronulatum*, but, being nearly twice the length, and without the crown, it appears more nearly related to *St. ankyroides.*

COSMARIUM SEJUNCTUM, *n. sp.*—Membrane smooth, slightly longer than broad; semicells semicircular, with angles rounded, separated by a wide, nearly linear sinus; isthmus narrow, less than one-fourth the diameter of the cells. Diameter 20–25μ.

Ocean Beach, etc., N. J.

MICRASTERIAS DICHOTOMA, *n. sp.*—Semicells three-lobed; lateral lobes twice bifid; the ultimate lobules (four resulting from one), deeply furcate or clawed at their apices; the polar, or end lobe, exserted, on a cylindrical neck, with two diverging arms, clawed at the ends. Diameter 175–200μ.

Ponds, Malaga, N. J., Harvey Lake, Penn.

A visit to Brown's Mills, Burlington County, demonstrated how the most unpromising fields will sometimes at last reward the perseverance of the patient explorer, for at this place I have hitherto met with very poor success. But last August I was rewarded by the discovery of twelve new plants, viz.:

Cosmarium pseudotoxichondrum, Nord.

Staurastrum elongatum, Barker, var. TETRAGONUM, *n. var.* (Fig. 31.)

S. forficulatum, Lund., forma TETRAGONA (Figs. 16 and 17), and forma TRIGONA (Figs. 18 and 19.)

S. ASPINOSUM, *n. sp.* (Figs. 22 and 23)—Semicells smooth, in front view oval with end protracted into a colorless arm, about three times as long as the breadth of the body, diverging; apices tricuspidate, margins rough with minute, firm perpendicular, irregularly placed, aculei. End view triradiate. Spread of arms 58–63μ.

Brown's Mills, New Jersey.

The vertical spines, like the thorns of a rose, give this plant a distinctive character.

S. inconspicuum, Nord.

Docidium dilatatum, Cleve.

D. TRIDENTULUM, *n. sp.*—Cells slender, elongated, linear or slightly tapering, smooth ; semicell with a prominently inflated base;

apex crowned with a few large teeth, usually three in view. Diameter 12–13μ.

Ponds, Pleasant Mills, and Browns Mills, N. J.

PHYMATODOCIS NORDSTETIANUM, *n. sp.*—(This genus is based on a plant found in Brazil, in character near the genus *Desmidium*). Cells closely united in sheathless filaments; deeply constricted in the middle; filaments quadrangular with sides longitudinally excavated.

The new species, hitherto found only in a pond at Brown's Mills, New Jersey, differs from the Brazilian plant in being one-fourth smaller, in having the lobes in end view straight, not curved to one side, and in having the sinuses of the cells not narrow linear, but somewhat enlarged inwardly and rounded at the base.

Desmidium (*Didymoprium*) *quadratum*, Nord.

D. ELONGATUM, *n. sp.*—Filaments thin; cells in front view nearly twice as long as wide; in side view nearly 2.5 times longer than broad; closely united, without a thickened border at their junction; end view broadly elliptic. Diameter at widest part, 28μ, thickness, 16–18μ.

This interesting new species from a pond at Brown's Mills, New Jersey, was found late in September last. No gelatinous sheath was observable.

Hyalotheca undulata, Nord., and *Penium Clevei*, Lund.

Further north, in Passaic County, the ponds known there as Wood, Longwood, Green and Buckaberry, furnished many algæ, including a number of desmids. A very interesting plant was *Pleurocarpus mirabilis*. Through nine consecutive seasons I had carefully sought for this *in fruit*, and only came across it, in this my tenth annual search, in Buckaberry Pond; and, oddly enough, it was found about the same time by my friend Miss Butler, of Minneapolis, then on a visit at Malden, Mass. These are, I believe, the only two places where it has been detected, although Mr. E. L. Cheeseman, of Knowlesville, N. Y., discovered it in his aquarium a year earlier.

The new desmids from these waters are:

Euastrum abruptum, Nord.

E. URNÆFORME, *n. sp.*—Semicells urn-shaped, three-lobed; terminal lobe dilated, centrally sinuate; lateral lobes horizontal with sides converging, sinuate; basal portion protruding, emarginate; upper part broadly rounded; a rounded sinus between it and the end lobe; protuberances, one at each angle of the terminal lobe, one at each of the basal angles, two intermediate and one between the end and the lateral lobes. Diameter 55–60μ.

Wood Lake, Passaic Co., N. J.

E. COMPACTUM, *n. sp.*—Very small, suborbicular, slightly longer than broad; semicells broad, transversely oval; apex a slight protuberance with a linear incision; two small prominences, one on each side below the apical protuberance. Diameter 20–22μ. Length 22μ.

E. OBTUSUM, *n. sp.*—Minute, twice as long as wide; semicells obovate; base flattened, sides roundly diverging; end broadly rounded, with a linear central incision. Diameter 14μ. Length 25μ.

Ponds, Pennsylvania.

MICRASTERIAS NORDSTETIANA, *n. sp.*—Of equal length and breadth; semicells three-lobed; the lateral lobes divided into two subcylindrical segments with a wide notch between, ends obtuse smooth, or provided with three or four small teeth, polar lobe exserted, neck long, with a short, conical prominence about the middle of each side; the ends broad, sinuate, with two horizontal arms on each side, one of which is long and the other short, both in the same direction, slightly diverging.

Longwood Pond, Passaic Co., New Jersey.

Cosmarium excavatum, Nord.; *C. Kjelmanni*, Wille; *C. Beckii*, Wille; *C. Nægeleanum*, Bréb.; and

C. PSEUDOBROOMII, *n. sp.* (Figs. 36 and 37).—This species is separated from *C. Broomei*, Thw., by the total absence of a central inflation.

Frequent in ponds, Sussex Co , N. J.

In a small vial of specimens gathered by Mr. E. Potts, of Philadelphia, while exploring Harvey Lake, Luzerne County, for fresh-water sponges, I found the same new *Micrasterias Nordstetiana* mentioned above and one new *Staurastrum*, which I have named

S. POTTSII, *n. sp.* (Figs. 8 and 9)—Small, smooth; semicells in front view broadly elliptic, furnished on each side with three divergent processes, apices rounded, bearing two aculei; end view triangular, sides concave, angles broadly truncate and produced into two processes with a wide rounded sinus between; a third process from a position somewhat back of the sinus rises at an angle of about 40,° thus constituting three diverging aculei-tipped processes at each of the three angles.

To the collections heretofore made by Miss Butler, at Minneapolis, I have to add three new names, as follows:

Micrasterias Rabenhorstii, Kirch.

Cosmarium protuberans, var. GRANULATUM, *n. var.* (Figs. 13–15)—Cells about one-fifth longer than broad; semicells with straight base, sides somewhat diverging from the basal line; superior angles nearly right, inferior angles obtuse; centraliy inflated; seen from the vertex, elliptic with a swelling on each side; membrane granular. Diameter $25–28\mu$.

Separated from the typical form mainly by the rather coarsely granular membrane; the centra linflation is also less prominent.

From pond a near Minneapolis, Minn.

EUASTRUM NORDSTETEANUM, *n. sp.*—Cells quadrangular, oblong, nearly twice as long as broad; semicells obscurely three-lobed; basal lobes broad, divided in the middle by a rounded notch into too lobules with tridentate or spinous ends; end lobe short, pouting, more or less emarginate; the two sides of apex usually inclining backward, with a subacute or rounded notch between; lateral margins furnished with two or three horizontal spines. End, transverse and side views rectangular, with broad, square, more or less sinuate ends, angles dentate.

Frequent near Minneapolis, Minn. Seen occasionally in New Jersey also.

Xanthidium antelopæum, var. MINNEAPOLIENSE, *n. var.*—A new form possessing the peculiarity of a fifth pair of aculei immediately over the central protuberance and bead-like series of granules.

My experience in the search of fresh-water algæ during the past ten years demonstrates that in New Jersey alone, hardly more than a third of the territory has been explored, and even that which has been gleaned over and over again usually presents something new and interesting wherewith to gratify the student every recurring season.

The plate which accompanies this is a copy of one of 53 (all colored) that I have prepared for a monograph on the Desmids of the United States which is now about to go through the press, and to be shortly issued to the public. It is the only work of the kind that has been published in this country, and will contain all that is known up to this period concerning our desmids, the number of which, from Wood's 160 described species, I have increased to nearly 500, and illustrated with more than 1,100 drawings sketched by myself, with very few exceptions, from living plants as they presented themselves to me in the field of the microscope. The price of the work (five dollars) will be about a third, only, of that of similar works published abroad; but, as I am desirous of exciting interest in this fascinating study, it is to be offered at a price that will reimburse me for the actual cost incurred, without reference to the time and labor that I have bestowed upon it.

EXPLANATION OF PLATE XLIV.—In addition to the species designated in the foregoing article, the following desmids are illustrated in the Plate. They are not new species but are mostly new to our flora: Figs. 1 and 2. *Staurastrum anatinum*. Cooke. Figs. 10 and 12. *St. megacanthum*, Lund. Figs. 20 and 21. *St. Dickiei*, Ralfs. Figs. 24 to 26. *St. monticulosum*, Bréb. Figs. 27 and 28. *St. striolatum*, Næg. Figs. 32 to 35. *St. pachyrhynchium*, Nord.

New Species of North American Fungi.

By J. B. ELLIS and B. M. EVERHART.

RHIZOCTONIA MONILIFORMIS.—Yellowish-white inside and out, cylindrical, .33–.5$^{cm.}$ in diameter and constricted at intervals, forming a loose net-work extending for several inches along the surface of the wood, the different parts either directly connate or attenuated at one or both ends into white, creeping fibres. Substance carnose and firm, but not as tough as in the next species.

Found under the bark of a rotten *Nyssa* log. November 1883.

RHIZOCTONIA AURANTIACA.—Suborbicular, flattened, 1$^{cm.}$ in diameter, or, by confluence, 2$^{cm.}$ or more, loosely attached by a few pale creeping fibres, dull liver-color outside, orange-red within, in which respect, as well as in its more regular shape, it differs from *Rh. tricolor*, Ell., which is black outside and red within.

Found under the bark of a rotten maple-limb at Newfield, N. J., at the same time as the preceding species.

ZYGODESMUS MURICATUS.—Purplish rose-color, becoming light buff, forming orbicular patches of a loose cottony texture, 2–4$^{cm.}$ across, or, by confluence, more; hyphæ 5–7μ in diameter, strongly muricate roughened, much branched, with a strong zygodesmoid joint just above each branch, the extremities of the branches divided into numerous oblong, cylindrical basidia with four strongly developed spicules at their obtuse apices, bearing the subglobose, strongly echinulate, 5–6μ conidia.

On rotten pine. Newfield, N. J., September 1883.

RHINOTRICHUM SULFUREUM.—Forming a thin, sulphur-colored (nearly white at first) stratum on the surface of the matrix. Prostrate hyphæ branched and septate, fertile hyphæ erect, simple, 4–6-septate, 200–250μ high by 7–8μ thick, gradually attenuated above and bearing the elliptical, 11–15x9–10μ conidia on little tubercular, lateral processes.

On rotten wood. Decorah, Iowa, October, 1882. E. W. Holway.

STILBOSPORA FENESTRATA.—Stroma subcuticular and imperfectly developed; spores elliptical, fenestrate, brown, 35–40x15–20μ on strong basidia, and, by their growth, elevating the cuticle in a pustuliform manner and finally rupturing it and oozing out so as to form little black patches on the surface.

On dead twigs of *Clethra alnifolia* Newfield, N. J., throughout the year.

NIDULARIA RUBELLA.—Peridia irregularly globose, 1–2$^{mm.}$ in diameter, often confluent, two or three together, dirty white, of a loose, thin texture and soon disappearing; sporangia of a dull, dark reddish color, orbicular or sub-elongated, about .33$^{mm.}$ in diameter, not umbilicate, under the lens the surface appearing slightly uneven, but smooth and shining as if varnished.

After the disappearance of the peridium the mass of sporangia becomes flattened out and remains attached to the surface of the wood.

Nearly allied to *N. denudata*, Fr., from which it differs in the color of its sporangia.

On decaying pine. Newfield, N. J.; autumn.

PEZIZA (MOLLISIA) GLENOSPORA.—Sessile, orbicular, .25–.5$^{mm.}$ in diameter, dull white, becoming darker; substance of the cup coarsely cellular, but fringed above with a row of erect, sub-cylindrical, continuous, hair-like cells, 8–10x2μ, rather narrower below, and their apices obtuse. (This structure is only visible with a considerable magnifying power, the margin with a pocket lens being scarcely visible.) Asci clavate-cylindrical, 75–80x9–10μ; paraphyses curved and swollen at their tips; sporidia elliptical, or rather more acute at one end, with a single large nucleus, 12–15x7–8μ.

The young sporidia are filled with numerous globose nuclei, but these soon unite into one and often cause the sporidia lying in the asci to appear globose, since the two ends, because of the thin epispore, are so transparent as to be almost invisible.

On rotten *Magnolia*. Newfield, N. J., November, 1883.

Untenable Names of Carices.—A number of old and doubtful names was resuscitated by Olney and made to replace familiar ones in his published fasciculi. These names have in some instances been adopted in local floras, and should be arrested before coming into more general use. The doing away with generally adopted names results at best in more or less confusion, and it should not be tolerated when any doubt exists as to the application of the revived names. The following names introduced by Mr. Olney are uncertain as to application, and deserve not to be regarded as synonyms even:

Carex Nuttallii, Schw., for *C. crus-corvi*, Shuttleworth. This name was first published in 1824, by Schweinitz, in his preliminary Analytical Table, a list containing no descriptions, and intended as a temporary affair to precede his monograph. The plant was credited to Arkansas. It had spikes "corymbosely ramose," with a habit "near *C. Indica*." The name may have referred to the plant now called *crus-corvi*, but it is entirely uncertain, and Schweinitz did not again use it.

C. albo-lutescens, Schw., for *C. adusta*, Boott. This name was also published in the Analytical Table, and was probably founded upon an immature specimen. So uncertain was the species that in the subsequent monograph of Schweinitz and Torrey the name was not mentioned. Dr. Boott, Ill., iii., 120, makes it a synonym for *C. straminea*, var. *festucacea*.

C. Muskingumensis, Schw., for *C. arida*, Schw. and Torr. Under rigid rules of priority this name will hold. It was made by Schweinitz in his Table, but, disliking it, he and Torrey substituted *arida* in their Monograph, under which name it was first described. Rules of nomenclature in those days of comparatively few names were less rigid than now, and no breach was made in suppressing a little-known and unwieldy name. It is no service to science to unearth a name buried by common consent in its infancy, when its unearthing but increases confusion.

C. microdonta, Torr., for *C. Crawei*, Dew.—This name was made by Torrey and Hooker and published in Torrey's Monograph of the Cyperaceæ in 1836. It was given to a Texas plant, No. 439 of Drummond's collection, It refers to a plant differing from *Carex Crawei* in its toothed perigynium and laxer habit. It may prove to be an older name for *C. alveata*, Boott. Texas specimens referred to *C. microdonta* in the Gray Herbarium approach *C. granularis* in appearance. When sufficient material accumulates, *C. Crawei* and *C. microdonta* may be found to be the extremes of the same species, but at present they must be kept distinct.

L. H. Bailey, Jr.

Concerning Abutilon.—On further consideration, I am convinced that Professor Macloskie and myself are wrong in our morphology —a little confused as to facts. In *Abutilon Avicennæ* there sometimes occurs a bract like that which I noticed in another species, and also one or two smaller ones; but they are below the joint in the peduncle or pedicel, and I think that the small bracts are axillary to the larger one. However that may be, it seems plain that this is an attempt toward the two-flowered peduncle, which is quite common in that species. Now the "involucel," as botanists are particular to call it, of mallow and hibiscus is always close to the calyx, above the articulation when there is any, and never has a sign of any second flower within it. It is so strictly connected with the flower that some botanists have called it *epicalyx*. *Hypocalyx* would be a better term if a special name were needed. I have not yet found any bracts on the peduncle of *A. vexillarium*, but I do find what appears to be a five-lobed involucel, close pressed to the base of the calyx and wholly above the joint. If so, this is the true homologue of the involucel of the mallow. But what troubles me is that this minute involucel, as it would appear to be, is completely continuous with the base of the calyx, and differs from it only in its green instead of red color. If this is what Dr. Macloskie has in view, I would like to ask if he finds it at all separable from the calyx, and, if not, whether it is an organ at all? And I now wish to insist that in any case, whether it is a discoloration or an involucel, it is not the representative of the bract or bracts low down on the peduncle of the velvet-leaf.

Providence, February 10th 1884. W. W. BAILEY.

Note on Juncus trifidus, L.—In looking over some plants collected in the Shawangunk Mountains* last August, I find specimens of *Juncus trifidus*, L., from the exposed conglomerate ledges at Sam's Point, Ulster County, N. Y., where it grew plentifully. Mr. C. H. Peck informs me that it is known from but three other localities in the State, viz., Mt. Marcy and Mt. Whiteface in the Adirondacks, and near Lake Mohunk, the latter station being about fifteen miles north of Sam's Point, on the same mountain range.

N. L. BRITTON.

Death of Dr. George Engelmann.—Lovers of the science of botany will be pained to learn that the long and active life of Dr. George Engelmann was closed on the 4th inst., at his residence in St. Louis.

Dr. Engelmann was born at Frankford-on-the Main, Germany, Feb. 2d, 1809, and was consequently, at his death, seventy-five years and two days of age. His university education was acquired at the universities of Berlin, Heidelberg and Wurzburg. In 1832 he came to the United States and three years after setting foot upon the eastern shore of the country he found himself in St. Louis, in the heart of the country. There he began the practice of medicine and continued the study of it and other sciences. In the year 1839 was founded the Western Academy of Science, Dr. Engelmann being one of the organizers. For a number of years the society flourished and then died. He was one of the originators of the St. Louis Medical society, and was for some time the president of that body. In 1856 the St. Louis Academy of Science was organized, and he was one of the founders and for many years held the honorable position of president.

As we may expect a full account of his life and labors from the hand of one whose name has several times been associated with his in botanical investigations, we refrain from giving such details of his biography as we find in the daily papers, and which may not be in every respect accurate.

Necrology.—The friends of science, and mycologists especially, will learn with regret of the death of Wm. T. Haines, which occurred at his residence in West Chester, Pa., on the 2nd of February, 1884. Mr. Haines, in addition to his great legal

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*See BULLETIN, October, 1883.

abilities, was well-known for his devotion to scientific pursuits, and, during the last few years, his labors with those of his colleagues, Messrs. Everhart, Jeffries and Gray, have added many interesting species to the mycologic flora of Chester County.

The friends who were accustomed to accompany him in "fungus forays" through the grand old woods around West Chester will long cherish the recollection of those excursions among the pleasant memories of the past.

J. B. ELLIS.

Botanical Notes.

Coloring Matter of Flowers.—H. Hansen has separated the two constituents of chlorophyll by Kühne's method. He has also examined the coloring matter of flowers. The yellow pigment is lipochrome and can be crystallized It shows two bands in the blue and no fluorescence; that described by Pringsheim resulted from a small admixture of chlorophyll. The red coloring matter is in a state of solution in the cells. The spectrum shows a broad band between D. & *b*. The shades of red are often caused by an admixture of lipochrome, as in *Papaver*, *Lilium bulbiferum*, etc. The blue and violet pigments are also in a state of solution and show bands in the red half of the spectrum. Acted upon by acids, they become red. None of these pigments shows spectra resembling that of chlorophyll, except when a small quantity of that substance is present. *(Jour. Royal Micros. Soc.)*

Proceedings of the Torrey Club.—The regular meeting of the Club was held at Columbia College, Tuesday evening, Dec. 11th, 1883, the President in the chair and twenty-four persons present.

Messrs. Schrenk, Day and Britton were appointed a permanent committee to act with Mr. E. Steiger in preparing a catalogue of the plants of Central Park.

A permanent Committee, consisting of Messrs. Britton and Hyatt, and Miss Knight, was appointed to organize a sub-section for the study of physiological botany.

Dr. Willis showed specimens, from a dry hill near Scarsdale, N. Y., of a *Melanthium*, which Dr. Britton identified as *M. latifolium*. Desrouss, a species which grows on dry ground, while *M. Virginicum* occurs in swamps. One person was elected an active member.

According to previous announcement, the President, Dr. Newberry, was to have delivered an address upon the Vegetation along the Line of the Northern Pacific Railroad, but, owing to the lateness of the hour, he was obliged to confine himself to a description of the forest trees. The following is an abstract:

ON THE FOREST TREES OF THE COUNTRY BORDERING THE LINE OF THE NORTHERN PACIFIC RAILROAD.

In going westward from Lake Superior the arborescent vegetation ceases near Brainerd, the last trees being white pine, Banks's pine, the larch, white birch, white maple and aspen. Thence to the Rocky Mountains a continuous sheet of herbaceous vegetation covers the surface, and no trees are seen except cottonwoods (*Populus monilifera*) along the Missouri. The first ranges of the Rocky Mountains on this route along the Yellowstone River and in the Park are covered sparsely or densely with trees, the higher summits and ridges with *Pinus flexilis*, James, *Abies grandis*, and *Tsuga Douglassii*, Carr., while the foot-hills, and, in some cases the levels, are thickly set with *Pinus contorta*, Dougl., var. *Murrayana*, Watson. This latter is regarded by some as a distinct species (*P. Murrayana*, Murr.), but is only an upland form, which is larger and more spreading. Both varieties, however, grow in proximity in many parts of Oregon and Northern California. In the lowlands of the Park are dense thickets of dwarf willow and here and there a tree of *Populus angustifolia*, James, and *Pinus ponderosa*, Dougl.

The divide west of Helena is covered with scattered trees of Douglass's spruce, which here reaches a height of one hundred feet. In the gorges which head in the mountains there are a few trees, often of good size, of *Pinus ponderosa*, Dougl., but they are here out of place and belong properly to the arid country between the Rocky Mountains and the Cascade Range.

In the valley of Clark's Fork and about Pend'Oreille Lake the forest growth is quite strong, the rocky cliffs and ridges are set with Douglass's and Menzie's spruces, while the lowlands sustain a crowded growth of slender trees belonging to three species which are characteristic of the Western flora, probably not crossing the divide. These are *Pinus monticola*, Dougl., *Larix occidentalis*, Nutt., and *Thuya gigantea*, Nutt. Of these, the first has altogether the habit of our white pine in trunk, foliage and branches, but is at once distinguished by its longer and more slender cones. In the Cascade Mountains this species occurs sparingly over a large area, but I have never seen it elsewhere in such abundance as on Clark's Fork. The same is true of the *Larix;* larger trees than any found here are scattered over the eastern slope of the mountains of Oregon, but they are comparatively rare. The *Thuya* extends from the sources to the mouth of the Columbia, constantly increasing in size; in the Rocky Mountains never attaining more than one-half the dimensions it reaches on the lower river. As we descend the valley of Clark's Fork the western hemlock (*Tsuga Mertensiana*, Carr.) begins to make its appearance; at first as shrubs or low trees simulating exactly the hemlock of the Eastern States, from which this has only a varietal difference. On the Lower Columbia it grows, like many other conifers, to be a majestic tree.

Between the last ranges of the Rocky Mountains, near Pend' Oreille Lake and the Cascades, the prevailing and almost the only tree is *Pinus ponderosa*, Dougl. It scarcely forms forests here, but is scattered over the country in considerable abundance and attains a large size.

Passing the gorge of the Columbia we come into the dense forests of the Pacific Coast proper, where the number and magnitude of the trees is greater than I have seen in any eastern or even tropical region. The trees of several kinds here reach an altitude of three hundred feet, and often stand so near together that all undergrowth is absent, and the horseman makes his way through them with difficulty. On the lowlands the Douglass spruce and the western arbor vitæ are the most abundant. Locally, the hemlock is common, and along the rivers the Northwestern cottonwood (*Populus trichocarpa*, T. & G.) stands thick and attains a large size. Along the smaller streams, and in swampy places, the Oregon ash (*Fraxinus Oregana*, Nutt.) and the arborescent alder (*Alnus rhombifolia*, Nutt.,) occur in considerable numbers and attain about equal size, *i. e.*, a diameter of one foot and a height of fifty or sixty feet. Scattered through this lowland forest are the two common maples of the West (*Acer macrophyllum*, Pursh, and *A. circinnatum*, Pursh.) Of these, the first grows sometimes to the height of eighty feet with a diameter of trunk of twelve to fifteen inches, and on young plants the leaves sometimes attain a breadth of a foot or more. The vine-maple is a peculiar feature in the forests of the Lower Columbia, Puget Sound and Vancouver's Island. It never becomes more than six inches in diameter and several trunks usually spring from the same root. These are very slender, droop, and, frequently reaching the ground, take root at the summit. Where these interlacing trunks are numerous they form a thicket which is almost impenetrable.

On the higher and more rocky portions of the country the Western balsam fir (*Abies grandis*, Lindl.) and its congeners *A. nobilis*, Lindl. and *A. amabilis*, Dougl., are locally numerous and attain great size, *i. e.*, reach a height of from one hundred and fifty to two hundred feet, and a trunk diameter of five to seven feet. With these, which form a distinct sub-genus, are the omnipresent Douglass spruce, and Menzies spruce, formerly known as *Abies Menziesii*, Dougl., but now generally called *A. Sitchensis*, Carr. Still higher, and reaching to the line of perpetual snow, are *Pinus flexilis*, James, var *albicaulis*, and *Tsuga Pattoniana*, Englm., the latter the most beautiful of all conifers. Less common than the preceding conifers, but locally abundant in the country bordering the Lower Columbia and Puget Sound, are two cypresses (*Chamæcyparis Lawsoniana*, Parlat., and *C. Nutkaensis*, Spach.) Of these, the first, sometimes called the ginger pine, from the fragrance of its wood, is much admired and cultivated for its beauty and esteemed for the excellence of the lumber it furnishes. Scarcely less interesting to the botanist is the western yew (*Taxus brevifolia*, Nutt.), a tree often forty to sixty feet in height growing sparingly in the lower portions of Oregon and Washington. Three species of juniper are scattered over the dryer and more rocky parts of the country bordering the Columbia, viz., *Juniperus occidentalis*, Hook., in the foothills of the cascades, often an erect tree 40–50 feet in height; *J. Utahensis*, Englm., low and spreading, in the interior; and *J. communis*, L., generally distributed and closely resembling in foliage, fruit and mode of growth, the eastern and European plant.

Among the great conifers of the Pacific coast, two of the most gigantic and valuable, the sugar pine (*Pinus Lambertiana*, Dougl.) and the redwood (*Sequoia sempervirens*, Endl.) approach, and the first reaches the line of the N. P. Railroad, though their habitat is more southern, and both are important elements in the resources of the country from which it will derive much of its business. Of these, the sugar pine—nearly related to the eastern white pine, by habit, foliage, cones and wood—is the monarch of the genus, frequently reaching a height of 300 feet, with a diameter of from 10 to 15 feet. This grows chiefly in the Sierra Nevada and Cascade Mountains throughout Oregon and California. The redwood is even larger. It is found only along the coast and about Port Orford forms forests, which surpass, in the average dimensions of the trees, any others I have seen. The lumber furnished by both these great trees is excellent; and, like the white pine of the East, they are suffering such wholesale destruction as promises soon to exhaust the supply they furnish. The next in intrinsic value as timber trees, and, from their abundance, having even greater economic importance, are the Douglass and Menzies spruces, the "white fir" (*Abies grandis*, Lindl.) and the western white cedar (*Thuya gigantea*, Nutt.) These form the basis of the lumber industry of the Puget Sound region and supply all the great saw-mills, some of which cut 250,000 feet per day. The timber furnished by these trees is good, but the lumber is inferior.

With the array of magnificent conifers which flourish in the moist and equable climate of the North Pacific coast, the poverty of the angiospermous flora is in striking contrast. Two maples, two poplars, —one on the high and other on low grounds—one ash and one alder have been enumerated. To these should be added two arborescent willows (*Salix lasiandra*, Benth., and *S. longifolia*, Muhl.) one oak of little value and two other hard-wood trees, and the list is complete. On the last mentioned trees I have made the following notes:

In the open grounds of the Willamette Valley, Puget Sound and Vancouver's Island, Garry's oak (*Quercus Garryana*, Dougl.) is not uncommon. It is usually of moderate size and of a peculiar straggling and misshapen growth; occasionally trees of three or four feet in diameter are met with, but the shape is so irregular and the wood so brittle that it has little value as a timber-tree. In the forests of both Oregon and Washington Territory two trees are sometimes seen that are sure to attract the attention of the eastern botanist. One of these which grows on the higher grounds, is the Oregon chinquapin (*Castanopsis chrysophylla*, A. DC.) generally a shrub, but sometimes reaching an altitude of fifty or sixty feet, and conspicuous from the golden pubescence of the under side of the leaf. The other tree to which I refer is the madroña (*Arbutus Menziesii*, Pursh.) This is a small tree, but one much admired; the foliage is persistent and rich, the leaves oblong or lanceolate with serrated edges, and the fruit, which grows in clusters, is red, and somewhat resembles that of the mountain ash, but is less abundant and grows in more open panicles.

Note on Plate XLIII.—Through an oversight on the part of the Editor the following sentence was omitted from the description of Plate XLIII., which appeared in our last number: "All the powers refer to the original drawings, which, in the plate, appear reduced to one-half their size."

BULLETIN

OF THE

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Two Lichens of the Pacific Coast.

By Edward Tuckerman.

The development of a stalk-like, descending thallus in the typical horizontal and crust-like one of the genus *Lecidea*, in *L. conglomerata*, Ach., is so rare that another example of it in the Italian *L. caulescens*, Anz., acquires an importance the value of which is not affected if we regard it as only such a condition (American also) of *L. squalida*, Ach., as is our *Lecanora cervina*, v. *thamnina* (Syn. N. Amer. Lich., p. 202) of this *Lecanora*. It is indeed possible that such outgrowth may prove less rare, or even, in the proper conditions, not very uncommon; and I observe it, also, in the admirably exhibited *L. Cenisia* of California, in specimens from the Yosemite granite (Bolander.) The Pacific coast, which furnished these lichens, has proved at once fertile and various in illustrations of the vertical thallus, and I venture to think that we may add one more to them; referable this neither to the typically ascendant and shrub-like, as *Stereopelte*, Th. Fr., and *Pyrenothamnia*, mihi (Lichenes fruticulosi) nor the typically horizontal just above noticed, in which the members of a properly squamous thallus, in certain conditions of the substrate, extend downwards into branching stems (Lichenes radicati, *si placet*) but where what should be a laciniate, crustaceous lichen, the appressed, effigurate circumference of which is without apparent variation from the ordinary type in such lichens except indeed the sufficiently important one that the cortical layer extends to the under side, runs, at least at the thickened centre, with more or less distinctness, into ascendant branches (Lichenes rameo-laciniati) of which our examples are the Californian *Lecanora thamnoplaca*, mihi (Gen. Lich. p. 113 *) and the widely diffused *L. melanaspis*, Ach. The nakedness and ready separableness, or even large separation of the under side from the substrate in this last lichen, due to the continuity of its cortical layer, as well as the looseness of extreme conditions of it, have been noted by authors, but not, so far as I am aware, that its divisions are something more than "inflated" laciniæ, and really pass at last into vertical stems. This is the case, however, in the thickest portions of *L. melanaspis*, as it grows in Colorado and New Mexico (Brandegee, in herb. Sprague) and, especially, in the cushion-like clumps exceeding now a quarter of an inch in thickness, in which the same acute observer has found the lichen to occur nearer the Pacific, in Washington Territory. Here the turgid, loosely intertangled divisions are seen below to pass into quite terete ones becoming vertical, and it is not always easy to refer the plant to the species as elsewhere represented (California, Bolander; and especially Kansas, Hall) irrespective of apothecial difficulties, now, and in Europe as well as here, not

* In the writer's later synopsis this marked feature escaped attention in the diagnosis, though plainly indicated in the specific name.

a little pronounced. And I find precisely the same modification of structure in a well-marked, purchased specimen collected in the Pyrenees; as in other European ones. In the fruit, while not in this really separable from the foreign plant, ours is variously emphasized; the New Mexican specimens offering flat and well-margined, glaucous-pruinose apothecia, and those from Washington Territory naked ones, in which the disk finally equals and surpasses the margin, and the fruit becomes curiously glyphidoid-difform, an anamorphosis to be observed now in extreme forms of *L. cinerea*, v. *gibbosa*, Nyl. (California; H. Mann) and noticeably enough prefigured, in both lichens, by the *Pertusaria*-like younger conditions. The described margin of the disk of *L. melanaspis* is indistinct or obsolete commonly here, as it appears to be, for the most part, elsewhere.

But I have also to notice a fruticulose member of a genus not before known to exhibit this kind of thallus:

STAUROTHELE BRANDEGEI, *sp. nov.* — Thallo fruticuloso (alt. 3–5$^{mm.}$) erecto, e tereti ramulis dactylinis obsesso mox compresso et superne dilatato lobatoque, in crustam verrucosam plus minus stipato, fusco, subtus dilutius; apotheciis globosis (lat. o$^{mm.}$,3–5). Sporæ solitariæ visæ, muriformi-multiloculares, nigro-fuscæ, longit. o$^{mm.}$,026–50, crassit o$^{mm.}$,020–24, paraphysibus diffluxis.

Mountains of Washington Territory; T. S. Brandegee, in herb. Sprague. The internal structure of the thallus offers no differences from that of the *umbrina*-stock. This group, which is not uncommon both west of the Rocky Mountains and in the Appalachian system, offers other marked evidences of its superior rank in the Tribe, exhibiting now an effigurate and even lobulate circumference, which, scarcely more than hypothalline in the European *Dermatocarpon Ambrosianum*, Mass. (*Lich. Ital.* n. 30) is here (in the eastern *S. Drummondii* and *S. Petersii*) very distinctly thalline, and occurs (in Oregon specimens very close to *S. umbrina*, in herb. Sprague) with much the aspect of a reduced form of *Lecanora molybdina* (Wahl.) Ach. Hymenial gonidia of *S. Brandegei* oblong, guttated, o$^{mm.}$,006–12 long, and o$^{mm.}$,0025–40 thick.

New Species of Fungi.

By CHAS. H. PECK.

POLYPORUS DELECTANS.—Pileus sessile, convex or subtriquetrous, frequently elongated, simple or subimbricated, fleshy-fibrous, becoming corky, azonate, glabrous or slightly floccose-tomentose, uneven, white becoming yellowish, the margin acute; pores plain or slightly concave, decurrent, large, unequal, subrotund or angular, whitish, the dissepiments at length acute, dentate or lacerate; spores subglobose or broadly elliptical, .00025 to .0003 in. long. Pileus 2 to 4 inches long, about 2 inches broad.

Prostrate trunks in woods. Ohio; A. P. Morgan. The species belongs to the Anodermei, section Carnosi, and is related to such species as *P. lacteus*, *P. destructor*, etc. From the former its large pores will distinguish it, from the latter its paler color and the entire absence of zones both without and within, and from *P. molliusculus* both the absence of zones and the much thicker substance will separate it. According to Professor Morgan's notes, the dissepiments are at first thick and obtuse. In the dried specimens they are thin, acute and uneven or dentate. They do not become distinctly flexuous or labyrinthiform, and their length is scarcely equal to the thickness of the flesh of the pileus.

MYRIADOPORUS, *Gen. nov.*

Hymenium cellular-porous; pores of the surface shallow, open, the others imbedded in the hymenium, variously directed, short, closed, inseparable from each other and from the hymenophore.

This is a singular genus of Polyporei, at present represented by two species, both of which are resupinate and bear a striking resemblance to certain resupinate species of *Polyporus*. I have not been able to find spores in either species, and can scarcely avoid the suspicion that both may be abnormal developments of species of *Polyporus*. Still, the structure is so peculiar that I have thought best to describe it. The pores do not, as in *Polyporus*, form vertical, parallel tubes, but rather cells or short tubes variously directed, so that a vertical section of the hymenium, as well as a horizontal one is porous. In the thickening of the hymenium, new pores are begun and old ones are closed from time to time and are thereby changed into cells or vesicular cavities. In both species the pores are minute, and sometimes contiguous ones run into each other.

MYRIADOPORUS ADUSTUS.—Hymenium about one line thick, distinct from the whitish or pale cream-colored subiculum, from which it is separated by a definite line, grayish-black, varying slightly in color within, wherefore appearing substratose in a vertical section; pores minute, those of the surface unequal, somewhat angular, occasionally confluent.

Decaying wood. Ohio; Morgan.

The hymenium closely resembles in color that of *Polyporus adustus*, and the subicular hymenophore is very similar in hue to the corresponding part of that *Polyporus*, so that our plant might at first sight be taken for a resupinate form of that fungus. It forms a statum two inches or more in length, and, when separated from the matrix, rolls up in drying. The stratified appearance of a vertical section of the hymenium is apparently due entirely to a variation in color and not to any interruption in the structure.

Polyporus induratus, Pk, 31st Museum Report, p. 37, has a similar structure, and, if the genus shall prove to be a valid one, this will stand as *Myriadoporus induratus*. In it the hymenium is concolorous with, and inseparable from, the subiculum. The general appearance and color of the fungus are suggestive of *Polyporus obducens*.

VALSA MINUTELLA.—Pustules minute; perithecia six to twenty in a pustule, nestling in the bark, crowded, black; ostiola erumpent in a minute subferruginous disk which is closely surrounded by the ruptured epidermis, black; asci short, clavate or subfusiform, scarcely pedicellate, .0009 to .0012 in. long, .0002 to .00025 in. broad, spores allantoid, crowded, .0002 to .00025 in. long.

Bark of beech (*Fagus ferruginea*), Canada; Professor J. Macoun.

Very small in all its parts and readily recognized by its minute pustules and subferruginous disk.

VALSA GRISEA.—Pustules small, perithecia four to fifteen in a pustule, nestling in the inner bark, their necks converging and piercing the small, orbicular, erumpent, grayish or brownish disk; ostiola punctiform, black; asci clavate, .002 to .0024 in. long; spores allantoid, colorless, .0004 to .0005 in. long.

Dead branches of ash (*Fraxinus Americana*) and of maple (*Acer rubrum*), Canada; Macoun.

The pustules are often arranged in rows. The grayish disk becomes darker with age.

VALSA FRAXININA.—Pustules small; perithecia minute, three to ten in a pustule, nestling in the inner bark; ostiola minute, punctiform, black; asci subclavate, .002 to .0024 in. long, .0003 in. broad; spores allantoid, crowded, colorless, .0005 to .0007 in. long, .00016 to .0002 in. broad.

Dead branches of ash (*Fraxinus Americana*), Canada; Macoun.

Closely related to the preceding species, from which its larger spores and the absence of a grayish, pulverulent disk will separate it.

VALSARIA PURPUREA.—Pustules prominent, erumpent, covered with a purplish tomentum; perithecia six to twenty in a pustule, crowded, subglobose, black; ostiola piercing the tomentum, rostrate, cylindrical or elongated-conical, rugged, sometimes curved or flexuous, black; asci cylindrical, paraphysate, .003 to .0045 in. long, .0004 in. broad; spores uniseriate, colored, oblong-elliptical, uniseptate, .0006 to .00065 in. long, .0003 to .00035 in broad.

Dead bark of ash. Canada; Macoun.

Remarkable for, and easily known by, the purplish tomentum of the pustules.

HYPOMYCES XYLOPHILUS.—Subiculum effused, whitish; perithecia numerous, crowded, small, subflavid, with a blunt ostiolum; asci cylindrical, .0035 to .0045 in. long, .00025 to .0003 in. broad; spores simple, uniseriate, subfusiform, .0006 to .0007 in. long, .0002 to .00025 in. broad.

Decaying wood. Ohio; Morgan.

The species is remarkable for its peculiar habitat. By reason of its simple spores it belongs to the subgenus Peckiella.

PYRENOPHORA DEPRESSA.—Perithecia .010 to .014 in. broad, depressed or collapsed, at first covered by the epidermis, then erumpent or naked, black, sometimes surrounded at the base by a few appressed, black, radiating filaments, furnished above with a few short, erect or divergent, straight, black, setæ; asci cylindrical or subclavate, .0045 to .006 in. long; spores crowded or obliquely monostichous, oblong or subovate, triseptate, with one or two longitudinal septa, colored, .0011 to .0014 in. long, .0006 to .0008 in. broad.

Dead stems of *Arabis*. California; M. E. Jones.

PYRENOPHORA FENESTRATA.—Perithecia .011 to .015 in. broad, depressed, at first covered by the epidermis, then erumpent or becoming naked, hispid with a few straight, divergent, black setæ; asci fugacious; spores oblong, fenestrate, deeply colored, black in the mass, .0016 to .002 in. long, .0007 to .0009 in. broad, with about seven transverse septa, generally constricted in the middle.

Dead stems of herbs. Utah; Jones.

A New Species of Cyperus.

By N. L. Britton.

Cyperus Rusbyi.—Culm slender, triangular, smooth, about a foot in height; leaves narrowly linear, smooth, shorter than the culm; involucre about five-leaved, equalling the rays; umbel three- to five-rayed, one or two of the rays elongated to a length of about three inches; heads composed of four to seven, lanceolate, acute spikelets, which are thirteen- to twenty-flowered, their axes not winged; scales about eleven-nerved, the mid-nerve slightly darker, keeled, distichously arranged, broadly ovate and obtuse when unfolded, all fertile; achenium black, smooth, sharply triangular obovate; stamens three; roots fibrous, with short, scaly rhizomes.

Collected near Silver City, New Mexico, in 1880, by Mr. H. H. Rusby, for whom it is named.

Notes on New England Algæ. III.—The different character of the marine flora of the New England Coast in its northern and southern parts has been noticed by all algologists. North of Cape Cod it is distinctly arctic, while south of Cape Cod it has, as pointed out by Professor Farlow, considerable resemblance to that of the Adriatic. The only important exception hitherto recorded is Goose Cove, Squam, on Cape Ann, a small pond, separated by a dam from the sea, and where the water becomes quite warm in summer. Three species found here by Professor Farlow, *Rhabdonia tenera*, Ag., *Gracilaria multipartita*, Ag., and *Chondriopsis tenuissima*, Ag., though common to Vineyard Sound, etc., were new to the northern coast. Since then the *Gracilaria* has been found in ditches in the Mystic River marshes, but the other species have not been recorded from any new locality.

Among the algæ collected by the late Silas Durkee, M.D., and now in the herbarium of the Boston Society of Natural History, is a small specimen of *Dasya elegans* marked "*Dasya pedicellata*, Ag., Boston." Last summer I made a number of excursions to various points within fifteen miles of Boston to see if this or any other of the southern species were to be found there. I was much more successful than I anticipated, and in Weymouth River and the adjoining cove running up into Quincy, I found a rich flora of characteristic southern forms. In July and August I found *Dasya elegans*, Ag., *Grinnellia Americana*, Harv., *Griffithsia Bornetiana*, Farlow, *Lomentaria uncinata*, Meneg., *Champia parvula*, Harv., *Mesogloia divaricata*, Kütz., *Polysiphonia atrorubescens*, Grev., and *P. variegata*, Ag., all floating in great abundance. The fronds of *Dasya* were frequently over two feet long, and the *Grinnellia* grew in tufts, sometimes of twenty fronds or more, each over a foot or more in length. The *Griffithsia* was more luxuriant than I had ever seen it, even in such a place as Buzzard's Bay, where it reaches very good dimensions; the *Lomentaria* appeared in all the forms described in the Nereis Boreali-Americana; the *Rhabdonia* was of good size, and often had on it plants of *Callithamnion byssoideum*, Arn., var. *unilaterale*, Harv. *Chondriopsis tenuissima*, Ag., and var. *Baileyana*, Farlow, were growing abundantly between tide-marks. In September, I found the same species of *Polysiphonia* as in July, but the plants were much denuded; *P. fibrillosa*, Grev., I found for the first time here, and in good condition; *Griffithsia* had disappeared; *Dasya* and *Grinnellia* were represented only by small forms growing on *Zostera; Champia* was very abundant and well developed, with abundance of both kinds of fruit, and I found a small frond of *Gracilaria multipartita*, Ag., var. *angustissima*, Harv.,

All the species named are characteristic southern forms, most of them hitherto unknown in this region; and the locality is fully open to the ocean, shipping passing in and out continually. The water is undoubtedly warmer than in Massachusetts Bay, but the difference cannot be very great, as the tide rises and falls from six to eight feet, and the rapid current in and out must mix the waters quite thoroughly. This is quite different from Goose Cove, where there is almost no communication with the sea, and the summer temperature is quite high; yet, as we have seen, the Weymouth flora is much the richer. I think it probable that similar "colonies" must occur at other points on the shore, especially along Plymouth and Barnstable Counties. One certainly exists at Truro, on the inside of Cape Cod. Among algæ collected by Mr. W. P. Rich, I found fine specimens of *Spyridia filamentosa*, Harv., the only reported instance north of Vineyard Sound, and also the *Griffithsia*, *Mesogloia*, *Champia*, and *Polysiphonia variegata* found at Weymouth. It would be interesting to know if there grew at any such places some species equally common in southern New England with the plants found at Weymouth, such as *Sargassum vulgare*, Ag., *Stilophora rhizodes*, Lyng., *Hypnea musciformis*, Lamour., etc.

I also found at Weymouth, in addition to the species named and the ordinary species of the vicinity, *Castagnea Zosteræ*, Thuret, *Dictyosiphon fœniculaceus*, Grev., subspecies *flaccidus*, Aresch., *Bryopsis plumosa*, Lamour, an *Ulva* and an *Ectocarpus*. Both the latter are, I think, new to America, but I defer further mention until I am more certain of the species. It is interesting to observe how the warm southern and the arctic floras meet here. *Dasya elegans* is a characteristic plant of the Mediterranean basin, and does not extend north of Spain; at Weymouth it grew in the greatest luxuriance, while the tide brought up from the lower harbor *Euthora cristata*, Ag., and *Ptilota serrata*, Kütz., both arctic species, the former reaching its southern European limit in the north of Great Britain, the latter in Norway.

F. S. Collins.

Cement for Mounting Plants.—Take of bisulphide of carbon any quantity desired, and dissolve therein a sufficient quantity of crude India rubber to make a cement of the proper consistency. This is the best compound that can be made for the purpose of mounting plants, as well as for use where a strong cement is desired. It is always ready for use.

J. H. Oyster.

Paola, Kansas.

The Development of Dodecatheon.—The development of our native plants has been so little studied that almost any of them is capable of presenting new facts. In *Dodecatheon Meadia*, L., I think I have found some new phases of development which are of sufficient interest to warrant my publishing them.

Taking the plant during the last days of March we find a tuberous, shortened root-stock, *f* (Fig. 1), bearing at its top two buds, one large and strong, *c*, the other small, *b*; between these is a scar, *a*, which indicates the position of last year's flower-stalk or scape. The smaller bud, *b*, contains only leaves, the large, prominent one, *c*, contains all the leaves and all the flowers of the coming spring. These were already evident in the fall, but they remained undeveloped during the winter in order to flower the coming spring. The root-stock, *f*, will perish after flowering this year, but the continuation of it, bearing the

Fig. 1.

Fig. 2.

Fig. 5

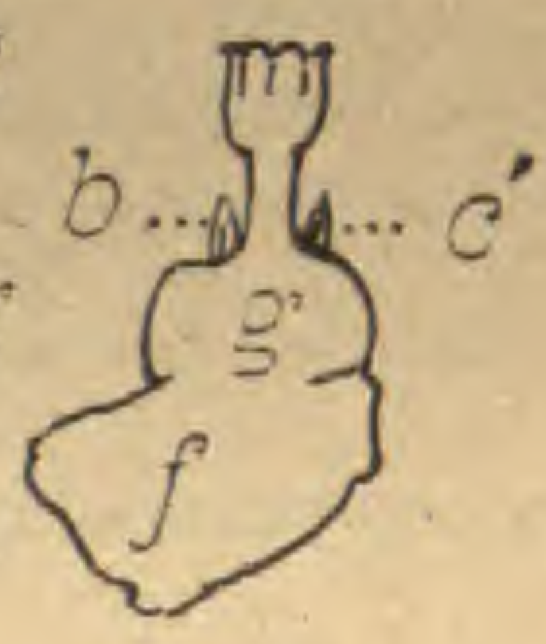

Fig. 6

Fig. 3.

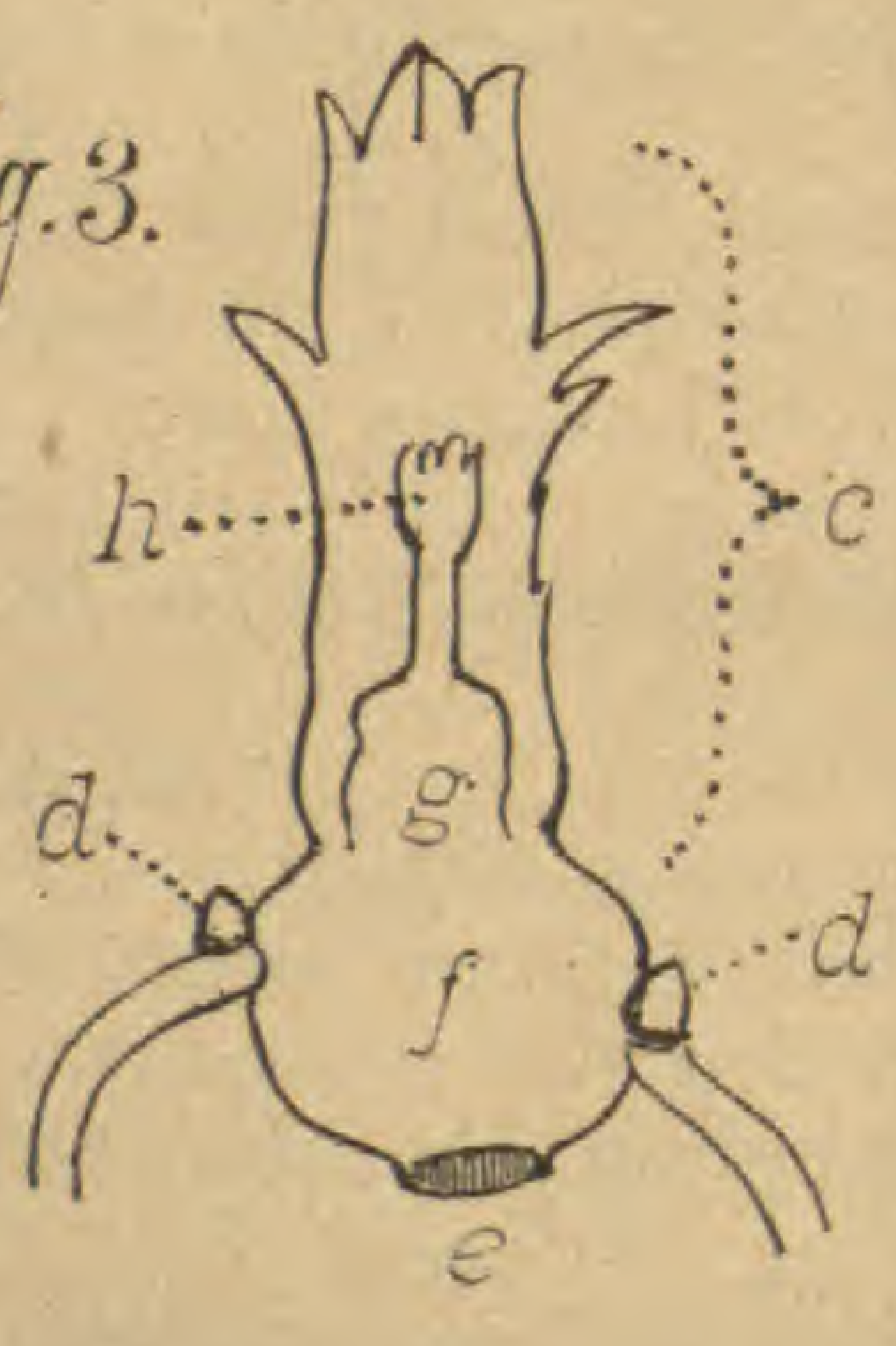

Fig. 4.

leaves and flower-scape, *g*, of the season, will produce roots, and, at is summit, a continuation of its axils bearing the leaves and scape of next year. Thus it becomes evident that each growth of the rootstock remains but two seasons, one while it bears leaves and flowers, and another while it serves as a reservoir in which to lay up a supply of food.

After the second year a constriction takes place between the effete biennial rootstock and the growth above it which at last results in their entire separation, leaving a scar at the point of attachment, *e*.

The peculiar feature of this plant, however, is this: The lower axils of the leaves in early spring contain leaf-buds, at the base of which in each case we find but one root, so that in this case the roots preserve the phyllotaxy of the leaves, since they agree with the position of the buds which are in the axils of the leaves. The roots of these leaf-buds, *d*, remain for one year attached to the parent plant and serve them as suppliers of sap. When, after the second year, this portion of the parent stem decays, the roots are separated from it, but carry with them the still quite undeveloped buds (Fig. 4), which are capable of forming a new plant. I know of no parallel case. The phyllotaxy is $\frac{5}{13}$, or occasionally $\frac{3}{8}$. I consider the scape as the end of the rootstock, the two buds being axillary, the upper one the larger. This would make it a case of sympodial growth.

EXPLANATION OF THE FIGURES.—Fig. 1. The plant in March. Fig. 2. Section showing the position of buds and last year's scape. Fig. 3. Longitudinal section. Fig. 4. The roots after separation. Fig. 5. Plant divested of scales and leaves. Fig. 6. Section of the last. *a*. Last year's scar. *b*. Small leaf-bud. *c*. Bud containing the scape. *b'* and *c'*. The same in the young shoot. *d*. Bud falling away with root. *e*. Scar left by the falling off of the portion of the root-stock more than two years old. *f*. Two years old. *g*. One year old portion. *h*. The scape.

Dayton, Ohio. A. F. FOERSTE.

Notes from Southern New Jersey.—The following plants, collected in 1883, are not given in the Preliminary Catalogue of the State, and may therefore be worth noticing:

Chionanthus Virginica, L.—This is an addition to the flora of the State; locality, near Buena Vista Station, N. J., and Atlantic City R. R. Rare, but probably occurs more frequently in a locality called "Thick Hole," Cumberland Co.

On July 4th I collected in Stephen's Creek, near Estellville, Atlantic Co., *Potamogeton Oakesianus*, Robbins. I am not aware that this plant has been reported from New Jersey before.

Perhaps the only definitely known locality in the State for *Scleria reticularis*, Michx., is near Main Road Station, N. J. S. R. R., seemingly not very abundant.

C. A. GROSS.

Note on Æcidium Bellidis.—The *Æcidium* upon the common daisy, which has hitherto been regarded as a spore-form of *Puccinia Compositarum*, is a true heterocismal uredine. A series of experimental cultures which I have made during the past four months has demonstrated the fact that *Æcidium Bellidis* is one stage of *Puccinia obscura*, Schröt., which occurs on *Luzula*. The *P. Luzulæ* Lib., is a totally distinct species having smooth, elliptical uredospores. Those of *P. obscura* are round and rough.

King's Lynn, England. CHARLES B. PLOWRIGHT.

An Abnormal Form of Carya porcina, Nutt.—The accompanying Fig. 1 represents a longitudnal section between the two valves,and shows the hull,shell and kernel-zones of a nut from an abnormal form of *Carya porcina.* The hull breaks off abruptly into a neck which is often half an inch long. There is a long point of the shell projecting into the neck of the husk. The husk of this form splits at maturity into only two valves, one of which is entire and covers from two-fifths to one-half of the nut. The other valve varies from three-lobed, to three-parted, but the lobes are always grown together at the base. There is a prominent ridge, which runs around the nut between the valves, and which in some specimens amounts almost to a wing. There are also lesser prominences. A cross-section of the nut would have the appearance of a semi-circle attached to a semi-hexagon. The nut has a wrinkled appearance. The hull is cinereous in color or pale green. The leaves are glabrous, and large for this species, and of a darker green than those of the common form.

Fig.1.

Fig.2.

The specimens were found on a tree in the campus of the Arkansas Industrial University, and near a tree with nuts of the forms represented in section in Fig. 2.

Fayetteville, Ark. F. L. HARVEY.

Botanical Notes.

The Formation of Gum in Trees.—Sir James Paget has drawn attention in the *Medical Times* to some remarkable investigations made by Dr. Beijerinck in connection with the formation of gum in trees, and lately published by the Royal Academy of Sciences at Amsterdam. Dr. Beijerinck found that in the peach, apricot, plum, cherry, or other trees bearing stone-fruits, the formation of gum may be caused by inserting a portion of the gum under the edge of a wound through the bark. The observation that heated or long-boiled pieces of gum would not produce this effect, and that wounds made in the bark of the tree did not produce gum unless a portion was first introduced into it, led him to suspect that the formation of gum was due to the presence of bacteria or other living organisms. On microscopical investigation he found that only those pieces of gum containing spores of a highly organized fungus, belonging to the *Ascomycetes,* had the power of conveying the gum disease or gummosis, and that these spores, inserted by themselves under the bark, produced the same pathological changes as did the pieces of gum. The fungus has been examined by Professor Oudemans, who has ascertained it to be a new species, and has named it *Coryneum Beijerinckii.* Its chief characters consist in the fact that it has a cushion-like stroma, composed of a bright brown parenchyma, on which stand numerous conidia having colorless, unicellular and very slender stems, about as long as themselves. The conidia are small, cask-shaped, about one-third of a millimetre in length, and usually divided by slightly constricting septa into four cells, of which the two terminal are longer than the two middle ones. From these cells germinal filaments may proceed, from which are developed brown, thick-walled and many-celled mycelia. The first symptom of the gum disease is the development of a beautiful red color around the wound, due to the formation of a red pigment in one or more of the layers of the cells of the bark. Dr. Beijerinck believes that the fungus produces a fluid of the nature of a ferment, which penetrates the adjacent structures, since the disease extends beyond the parts in which any trace of the fungus can be detected. This ferment he believes to act on the cell-walls, starch granules and other constituents of the cells, transforming them into gum and even changing into gum the *Coryneum* itself. The influence of this fluid is also exerted in the cambium, causing the formation of morbid parenchyma, the cells being cubical or polyhedral, thin-walled and rich in protoplasm which is in its turn transformed into gum. It is further stated that "a similar disease produces gum arabic, gum tragacanth, and probably many resins and gum-resins." Gum tragacanth is known to be produced by the pith as well as the bark of the stem, and to ooze out from the pith when the stem is cut; and if it be indeed due to a disease it would seem as if the disease infects the whole plant. Gum, moreover, may be found in the uninjured husk of the almond, and it seems at first sight more probable that the irritation caused by a fungoid parasite should cause a greater flow of the natural product, just as the irritation caused by an insect causes the development of galls.

Tuberous Species of Solanum.—A paper upon this subject was read by J. G. Baker at a meeting of the Linnean Society on January 17th.

There have been about nine hundred species described as belonging to the genus, which, however, Bentham and Hooker would reduce to about seven hundred. Only a very small proportion of these has tuberous underground stems, this section including, according to Dunal's monograph in De Candolle's 'Prodromus,' twenty species, all natives of the South American continent, and as far north as Mexico and Texas. These twenty species Mr. Baker thinks should be reduced to six, with well-marked specific characters. While, from a botanical point of view, the range of *Solanum tuberosum* has been unduly narrowed by separating from it forms which are not specifically distinct, from a popular point of view it has, on the other hand been erroneously extended, from the fact that the late Mr. Darwin, in his 'Voyage of the Beagle,' described the potato as growing as far south as 50° S. lat. But Mr. Baker has clearly determined that the species gathered there by Mr. Darwin was not *Solanum tuberosum*, but a quite distinct species, *S. Maglia*. The geographical range of the true *S. tuberosum* extends from Chili to Mexico, though it is doubtful to what extent it is native in equatorial regions, having been cultivated from time immemorial by the Indians. Besides *S. Maglia*, the most important of the tuberous species are *S. Commersoni*, widely dispersed through Uruguay and Paraguay, and *S. Jamesii*, a native of New Mexico. The tubers of the later species are, however, very small, not much larger than a hazel-nut. The remaining species are but little known, and probably are of no economic value.

Mummy Garlands.—In *Nature*, Dr. G. Schweinfurth gives an account of some new botanical discoveries made by him in connection with the mummies of the twenty-first Egyptian dynasty, found at Deri-el-Bahan. In the floral wreath on the mummy of the Princess Ugi-Khouni were found folded leaves of a willow, *Salix Safsaf*, perfect flowers of the corn-poppy (*Papaver Rhœas*, var. *genuina*), flower-heads of *Centaurea depressa* and of *Picris coronopifolia*. The flowers of *P. Rhœas* appear to have been gathered in an unopened condition to prevent the petals from falling, and are in so good condition that Dr. Schweinfurth remarks that so perfect and well-preserved specimens of this fragile flower are rarely to be met with in herbaria. It is worthy of note, too, that the character of this variety of the poppy, var. *genuina*, although gathered more than three thousand years ago, are identical with those of the same variety known at the present day. With respect to *Picris coronopifalia*, the author remarks that not a single peculiarity is apparent by which it might be distinguished from the recent small form with low spreading branches now so common on the outskirts of the desert. From the occurrence of this flower in the wreaths it is possible to conjecture that the burial of the princess took place in March or April, since there would have been considerable difficulty in obtaining the flowers after the latter month. It has also been determined by capsules of the linseed plant found in a Theban tomb of the twelfth dynasty, 2,200–2,400 B.C., that the flax used by the ancient Egyptians was derived from *Linum humile*, Mill., and that the mustard oil used by them was derived from one of the two varieties of *Sinapis arvensis*, viz., *S. Allionii*, Jacq., or *S. turgida*, Del., both of which are still common in Egypt.

Solid Pigments in Cell-sap.—The petals of flowers are far more often colored by a pigment soluble in the cell-sap than by one in a solid, granular form. Of 200 species examined by P. Fritsch, only 30 contained solid pigments in the cells either of the petals or of the fruits.

Far the most common of these solid pigments is yellow, much the greater number of yellow flowers, including nearly all the yellow Compositæ, being indebted for their color to substances of this nature. Exceptional instances of soluble yellow pigments occur in the petals of *Dahlia variabilis*, *Althæa Sieberi* and *Tagetes*, and in the hairs of many species. Solid yellow pigments are described in *Impatiens longicornu*, where they vary greatly in size and form, in *Tropæolum majus*, where the various shades of color in the flower are due to a substance of this description in a brown cell-sap, in *Œnothera biennis*, *Cerinthe aspera*, *Calendula officinalis*, *Tagetes glandulifera*, *Viola tricolor*, *Rudbeckia laciniata*, *Digitalis ambigua* and *Salpiglossis variabilis*. The particles of the pigment are often in a state of active molecular movement; they are always colored green by iodine and are soluble in concentrated sulphuric acid with a deep blue color. In some other chemical reactions they vary. The pigment appears to be always imbedded in a matrix of protoplasm. A solid red pigment was observed in the fruits of *Rosa canina*, *Pyrus aucuparia*, *Convallaria majalis*, *Bryonia dioica* and in the acid of *Euonymus latifolius* and *Europæus*, *Celastrus scandens* and *Taxus baccata*.

The red pigment in the cortical portion of the root of the carrot is of a very peculiar kind, resembling long, pointed crystals.

Insoluble violet pigments are rare, but occur in *Thunbergia alata* and *Delphinium bicolor;* while blue granules are found in the fruit of *Viburnum Tinus*. Brown insoluble pigments were found only in the seaweeds, *Fucus vesiculosus* and *Furcellaria fastigiata*. The development of the colored granules does not end with their acting as pigments; after this period they go through a variety of changes of development or degradation. (*Journ.* Roy. Micros. Soc., from Pringsheim's Jahrb.).

Proceedings of the Torrey Club.—At the regular meeting of the Club Tuesday evening, January 8th, the President occupied the chair and twenty persons were present. The following officers were elected for the current year: President, J. S. Newberry; Vice-President, Addison Brown; Corresponding Secretary, Miss Maria O. Steele; Recording Secretary, A. Hollick; Treasurer, W. H. Rudkin; Editor, W. R. Gerard; Associate Editor, Benj. Braman; Curator, Miss E. G. Knight; Librarian, N. L. Britton. The annual reports of the various officers were read and accepted.

Dr. Britton exhibited specimens and read

A List of Plants collected by Mr. J. Albert Rudkin during a trip from Juno, on the coast, to Mt. St. Elias, Alaska, in the summer of 1883, as follows:—

Coptis asplenifolia, Salisb.; *Aconitum Napellus*, L., var. *delphinifolium*, Seringe; *Claytonia Siberica*, L.; *Spiræa Aruncus*, L.; *Geum macrophyllum*, Willd.; *Rubus Nutkanus*, Moçino; *Rubus pedatus*, Smith; *Poterium Sitchense*, Watson; *Tiarella trifoliata*, L.; *Tellima grandiflora*, Dougl; *Epilobium coloratum*, Muhl.; *Epilobium latifolium*, L., var. GRANDIFLORUM *n. var.*—Stems strong, angled, their upper portions slightly canescent; leaves ovate-lanceolate, two and one-half inches long by one inch wide, bearing small, obtuse, remote teeth; veins very apparent on the lower surface; flowers two inches broad when expanded; petals obovate, obtuse, three-quarters of an inch broad; peduncles axillary, canescent, erect, one inch long; pods woolly erect, truncate, about as long as the peduncles. A well-marked variety, probably not specifically distinct. There is a specimen of the same in the Torrey Herbarium from Sitka.

Fatsia horrida, Benth. & Hook.; *Cornus Canadensis*, L.; *Valerianella sylvatica*, Richardson; *Nabalus alatus*, Hook.; *Pyrola secunda*, L.; *Gentiana Douglassiana*, Boug.; *Romanzoffia Unalaschensis*, Cham.; *Mimulus luteus*, L.; *Spiranthes Romanzoviana*, Cham.; *Habenaria dilatata*, Gray.; *Prosartes trachycarpa*, Watson; *Tofieldia glutinosa*, Willd.; *Eriophorum polystachyon*, L., var. *angustifolium*, Gray, a form with only two or three spikes; *Equisetum pratense*, L.; *Lomaria Spicant*, L.; *Phegopteris Dryopteris*, Fée; *Phegopteris polypodioides*, Fée.; *Aspidium spinulosum*, Swartz, var. *dilatatum*, Eaton, a small form; *Lycopodium Selago*, L.

CATHESTECHUM ERECTUM, V. & H.

BULLETIN

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A new Species of Grass.

By GEO. VASEY.

(Plate XLV.)

In 1830 Presl published in the first volume of Reliquiæ Haenkeniæ a description and figure of a Mexican grass which he called *Cathestechum prostratum*, which has not been since collected, and which is doubtfully admitted by Bentham and Hooker in the Genera Plantarum. In the herbarium of the Department of Agriculture are specimens of a grass collected by Dr. E. Palmer in Sonora, Mexico, in 1869, which has, until recently, remained undetermined. In 1882, however, I received from Dr. Havard specimens of the same grass collected at Presidio, Western Texas, and again in 1883 specimens collected in Presidio County. These specimens I finally concluded to be the long lost *Cathestechum* and sent specimens of them to Prof. E. Hackel of St. Poelten, Austria, who compared them with the original specimens of Presl in the Herbarium at Vienna, and decided that although they were of the same genus they were a different species, for which he proposed the name of *C. erectum*, Vasey and Hackel, and pointed out the differences between the two. Mr. Scribner ascertained that the same grass was collected on the Mexican Boundary Survey. As I am not yet prepared to separate the generic and specific characters, I give the full description as follows:

CATHESTECHUM ERECTUM, Vasey and Hackel.—Culms tufted, erect, 6 to 9 inches high, throwing out from the base long arched runners, of 2 or 3 joints, the joints villous and bearing a tuft of short leaves. The leaves are mostly at the base 2 to 3 inches long, narrow, plane or becoming somewhat involute, sparsely hairy on the margins, striate. Culm-leaves 2 or 3, distant, 1 to 2 inches long; ligule a ciliate ring.

Some of the culms are simple, and others develop at the upper sheath 2 to 4 lateral peduncles, each 2 to 4 inches long, forming a kind of cymose cluster. Each of these peduncles, as well as the main stem or rhachis, bears a raceme, about one inch long, of from 5 to 9 approximate, sessile fascicles of flowers. Each fascicle consists of three (rarely 4) spikelets. The lateral spikelets of each fascicle are 2-flowered, the middle spikelet usually 3-flowered, frequently with a fourth imperfect flower. Sometimes also the lateral spikelets have a sterile pedicel or an imperfect flower. The outer glumes are colored and very unequal; the lower one is minute (one-half line long), broadly cuneate, truncate or somewhat toothed at the apex; the upper one is lanceolate, compressed, somewhat keeled, 1-nerved, acute, or in the central spikelet 2-toothed and mucronate, 1 to 1.5 line long, villous externally. The flowering-glumes are oblong, about 1.5 line long, 4-lobed, with the nerves extended into awns between the lobes, the awns as long as, or in the central spikelet considerably longer than, the lobes. The lobes in the lateral spikelets hardly extend to the middle; in the central spikelet they extend half or two-thirds the length of the glume. The awns are either naked or ciliate, at least below. The palet is oblong-lanceolate, as long as its glume, 3-toothed or 3-lobed at the apex, and the two nerves in the central spikelet are extended into awns slightly longer than the teeth or lobes.

Presl's description says the flowers are all hermaphrodite; in our species my examinations lead me to think that only the lower flower of each spikelet is perfect. The genus is evidently related to *Ægopogon* and *Hilaria*, and by Bentham and Hooker is placed with them in the tribe Zoysieæ of the section Panicaceæ, to which they belong by virtue of the disarticulation of the flowers below the outer glumes. It has also affinity with the sub-tribe Pappophoreæ of the tribe Festucaceæ, where it was placed by Kunth, and where Mr. Hackel thinks it belongs.

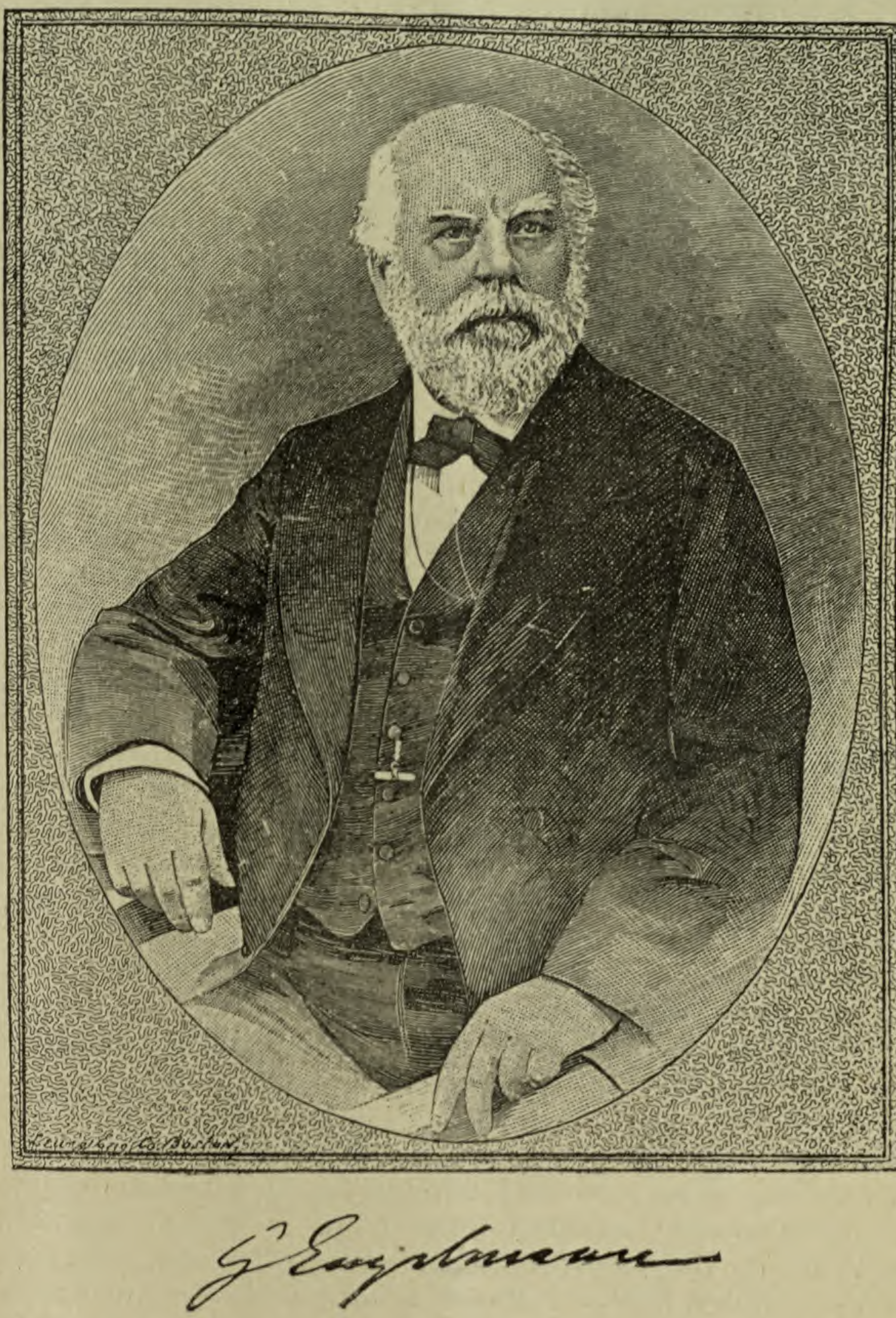
I am indebted for the drawings illustrating this article to Prof. W. J. Beal, for whom they were made by Mr. F. L. Scribner to illustrate a proposed work on grasses.

Explanation of Plate xlv.—Fig. 1. *Cathestechum erectum*, V. and H., natural size. Fig. 2. One of the terminal clusters of three spikelets, showing the prolongation of the main axis, much enlarged. Fig. 3. Lower empty glume. Fig. 4. Upper empty glume. Fig. 5. Flowering-glume of first floret. Fig. 6. Flowering-glume of second floret. Figs. 7 and 8. Palea of the first floret, dorsal and anterior views. Fig. 9. Palea of the second floret. Fig. 10. Terminal rudimentary floret of the spikelet. Fig. 11. Pistil, with the imperfect stamens of the lower floret. Fig 12. A perfect stamen of one of the upper florets. (Figs 3 to 10 inclusive are enlarged on the same scale.)

George Engelmann.

George Engelmann was born in Frankfort-on-the-Main on the 2d of February, 1809, and died in St. Louis just after the completion of his seventy-fifth year, on the 4th of February, 1884, after an illness which had kept him from his scientific work but a few days.

Dr. Engelmann received his medical education and early scientific training at Berlin, Heidelberg and Frankfort. Agassiz, Alexander Braun, and Charles Schimper were among his college-associates and lifelong friends. He left Germany almost at once after his graduation, reaching New York in 1832. His first visit was to Philadelphia, where he was fortunate enough to make the acquaintance of Nuttall and other scientific men. His inclinations turning westward, he soon left the seaboard to seek a home in the almost unexplored regions beyond the Mississippi. He first went to St. Louis, but did not at once establish himself there. Desiring to see something of the western country before selecting a home, he undertook a long and solitary journey on horse-back through South-western Missouri, Arkansas and Western Louisiana. This journey, probably made in 1833, occupied six months. It nearly cost Dr. Engelmann his life, for he took a dangerous fever among the Arkansas swamps, into which his botanical zeal, no doubt, often led him. Fortunately he fell into the hands of a negro family, which nursed him faithfully through a long illness that cut short further exploration and hurried him back to St. Louis. Here he finally established himself as a physician in 1835. He had previously, however, gone to Germany, and, on his return, brought back with him to his new home the faithful and devoted companion who shared his labors, his trials and triumphs, for more than forty years. From 1835 until his death Dr. Engelmann continued to live



in St. Louis and to devote to scientific investigations every moment which could be spared from a large and absorbing professional practice.

Engelmann's first botanical publication appeared in 1832, when he printed in Latin a *dissertatio inauguralis,* "De Antholysi prodromus," illustrated with drawings made by its author. No other botanical paper appeared from his pen until 1842, when he published in the *American Journal of Science* his monograph of North-American Cuscutineæ.

The appearance of this monograph, which was soon republished in the *Botanische Zeitung* and the *London Journal of Botany*, established Engelmann's reputation as a systematic botanist and procured for him the correspondence of Hooker and other foreign botanists. Several new species were described in this paper, and the genus *Lepidanche* was proposed for a *Cuscuta*-like plant of the western prairies. *Cuscuta* always interested Dr. Engelmann, and in 1859 he published in the *Transactions* of the St. Louis Academy an elaborate revision of the whole genus, for which he had long been collecting material.

In 1844 he published in the *American Journal of Science* a list of plants collected by Charles A. Geyer in Illinois and Missouri, in which several species were first described; and in 1845, in the *Journal* of the Boston Society of Natural History, in collaboration with Asa Gray, an enumeration of plants collected in Western Texas by his countryman, Ferdinand Lindheimer, a naturalist attached to the German colony of New Braunfels.

In 1848 was published his account of the plants collected on Dr. A. Wislizenus's expedition. The study of this collection exerted a powerful influence upon his subsequent botanical studies. It first drew his attention to Cactaceæ and *Pinus*, which continued to occupy his thoughts for the remainder of his life, and of which his knowledge was unequalled. As early as 1856, Dr. Engelmann published in the *Proceedings* of the American Academy a synopsis of the Cactaceæ of the territory of the United States. Two years later appeared his "Cactaceæ of the Boundary," in the second volume of the United States and Mexican Boundary Survey report. This paper, superbly illustrated with drawings made (under Dr. Engelmann's direction) by Roethe, is, perhaps, his best-known botanical work. Dr. Engelmann studied and described all the collections of Cactaceæ which, from time to time, were made in the Mexican boundary region, and, had he lived, would have elaborated the whole order in accordance with his latest views of the subject. He even proposed so late as last year to pass a considerable time in Northern Mexico for the purpose of studying these plants in their native country before finally giving to the world the final results of his long investigations.

Other difficult genera were studied by Dr. Engelmann. His predilections, indeed, were always for the most difficult and perplexing plants, and he willingly devoted himself to such genera only as less patient investigators hesitated to take up. Thus he mastered the North-American Euphorbiaceæ, elaborating all recent collections of the family, without, however, undertaking a complete revision of the order as represented in this country. He published an elaborate and exhaustive paper upon the North-American species of *Juncus*, and, later, one on the North-American *Isoëtes*. His published notes upon the North-American species of *Quercus*, and upon North-American *Abies*, *Juniperus* of the section Sabina, and upon the genus *Pinus*, contain the most valuable and trustworthy information that has appeared upon these plants. In 1873 he published, under the title of "Notes on the genus *Yucca*," his elaborate revision of the genus here first comprehensively treated. Two years later appeared his notes on *Agave*, in which are enumerated and described the species detected within the limits of the United States, as well as a few foreign species previously imperfectly known. For many years Dr. Engelmann studied the genus *Vitis*, and our knowledge of the North-American species of this is due in a large measure to his investigations. His last botanical publication, a sketch of the true grape-vines of the United States, although written some months earlier, and previous to his last European journey, was issued late in 1883.

Dr. Engelmann's botanical writings were not voluminous. All his work, however, is characterized by the most careful and conscientious preparation, great, good judgment, classical methods of treatment, and remarkable thoroughness. His investigations were slow and laborious, often lasting for years in the case of a single plant. No botanist was ever less anxious to publish prematurely the results of his observations, or was less satisfied with the results of his own knowledge. So admirable, and in these days unusual, caution has made Dr. Engelmann's botanical writings masterpieces in their way, worthy to stand with the best productions of their nature which have yet appeared. This very caution and desire to wait for completeness, however, which has made Dr. Englemann's published papers what they are, has cost the world a vast store of valuable information collected by him during long years of careful investigation, but never quite ready, in his critical judgment, for publication.

Dr. Engelmann, in addition to his professional and botanical labors, was a most zealous meteorological observer, and, at the time of his death, was probably one of the oldest meteorologists in the United States. His meteorological and other miscellaneous papers, as well as his important botanical ones since 1859, have been published in the *Transactions* of the St. Louis Academy of Science, which he was largely instrumental in establishing, and which he long served as president.

Dr. Engelmann was a member of the American Academy of Arts and Sciences, a corporate member of the National Academy of Sciences, a foreign member of the Linnean Society of London, and an active or corresponding member of many other learned bodies. He long enjoyed the friendship, the respect and the correspondence of many of the most distinguished botanists of the age, everywhere the recognized authority in those departments of his favorite science which had most interested him.

(For this account of Dr. Engelmann's life and labors, and for the engraving which illustrates it, we are indebted to our cotemporary, *Science*.)

New North American Fungi.

By J. B. Ellis and B. M. Everhart.

Peziza (Mollisia) fumigata.—Densely gregarious, minute (.13–.16mm.) sooty-black; disk nearly plane, scarcely margined, minutely papillose; asci oblong-cylindrical, 50 x 7μ; paraphyses thickened above; sporidia oblique or biseriate, oblong, 2–3-nucleate, hyaline, slightly curved, 9–12 x 3μ. Texture of the cups, fibrous, the fibres bearing at their free ends minute, oblong or subglobose brown conidia.

On rotten wood of *Magnolia*, Newfield, N. J., Oct., 1883.

SCHIZOXYLON MONILIFERUM.—Cæspitose, 4–6 individuals clustered together; disc about 1.5$^{mm.}$ across, covered by the cinereous, thin inner membrane, which is soon perforated in the centre, revealing the pallid hymenium; margin of the outer membrane briefly reflexed and imperfectly toothed; asci 250–300x6–8μ surrounded by numerous paraphyses; sporidia filiform nearly as long as the asci and very easily separating into many globose joints about 1.15μ in diameter.

On dead and dry wood of oak (*Quercus coccinea* and *Q. alba*), mostly on some old wound or where a limb has been broken off. At first buried in the wood, except the disk, but at length more or less exposed (by the decay of the wood?) and then black outside.

Newfield N. J.; autumn and winter.

LEPTOSPHÆRIA PHYSALIDIS.—Perithecia minute, depressed-globose, of coarse cellular structure, with a rather broad opening above; asci 35–40x7–8μ without paraphyses; sporidia biseriate, fusiform, slightly curved, yellowish, 3-septate, 15–19x3μ.

On dirty, white, round spots on leaves of *Physalis pubescens*, with *Entyloma Physalidis*, Winter. Near Lexington, Ky., Aug. 1883, Prof. W. A. Kellermann.

SPHÆRIA (TEICHOSPORA) MURICATA.—Perithecia gregarious or scattered, hemispherical, .33–.5$^{mm.}$ in diameter, muricate-roughened and often obscurely radiate-striate around the prominent, very slightly compressed ostiolum, slightly pruinose, olivaceous when fresh, black and collapsed when dry; asci cylindrical, with stout, granular paraphyses 2.5–3μ thick; sporidia elliptical, brown, 3-septate, with one or more imperfect, longitudinal septa, 18–25x10–11.5μ.

Differs from *T. pezizoides*, S. & S., in its larger, rougher perithecia and its larger asci and sporidia.

On bark. San Diego, Cal.; leg. C. R. Orcutt, com. C. J. Sprague.

ANTHOSTOMELLA OSTIOLATA.—Perithecia single or 2–4 together, .33–.5$^{mm.}$ in diameter, nearly buried in the unchanged inner bark, but with their upper part distinctly prominent though closely covered by the blackened epidermis, which is pierced by the short, stout ostiolum; asci cylindrical, 80–85x7–8μ, with linear paraphyses; sporidia obliquely uniseriate, oblong-elliptical, brown, 1–2-nucleate, 10–13x4–5μ.

Closely allied to *A. limitata*, Sacc., and *A. intermedia*, Nitschke. The stroma is formed of the unaltered substance of the bark and not limited by any circumscribing line.

SPHÆRIA AQUATICA. — Perithecia scattered, membranaceous, .25$^{mm.}$ in diameter, partly buried in the wood, subglobose or a little elongated; ostiolum papilliform; asci linear, 150x8–6μ with abundant paraphyses; sporidia uniseriate (end to end), oblong, uniseptate and slightly constricted at the septum, straight or slightly curved, pale at first, with a single large nucleus in each cell, at length clear dark brown, 15–20x6–7μ.

Inside a cedar water-pail in constant use; on the bottom and around the lower part of the sides where it must have been almost constantly under water. Newfield N. J., Dec., 1883.

Contributions towards a List of the State and Local Floras of the United States.

MINNESOTA.*

A Catalogue of Plants collected in the North-western Territory by Thomas Say in the year 1823. By Lewis De Schweinitz. (C.)
In Keating's Narrative of Long's Exped. to source of St. Peter's River, Vol. ii., London, 1825.

Botany of the North-eastern Geological District of Minnesota. By Thomas Clark.
In Rep. of State Geologist for 1865.

A Catalogue of the Plants of Minnesota. By I. A. Lapham.
In Rep. of State Hoticult. Soc. St. Paul, 1875.

List of the Ferns of Minnesota. By W. H. Lemard, M.D.
In Bull. Minn. Acad. Sci. Minneapolis, 1877.

The Mycological Flora of Minnesota. By A. E. Johnson, M.D. (C.)
In Bull. Minn Acad. Nat. Sci. Minneapolis, 1877 and 1878. (Additions in same, 1879.)

The plants of the North Shore of Lake Superior. By B. Juni. (C.)
In Ann. Rep. Geolog. Survey for 1878.

Plants of the north shore of Lake Superior. By S. C. Roberts. (B.)
In 8th Ann. Rep. Geol. Survey Minn. Minneapolis, 1879.

List of Trees, Shrubs and herbaceous Plants identified by O. E. Garrison in the region of the head-waters of the Crow-Wing River, the White Earth Reservation, Itasca Lake, and the Upper Mississippi.
In Ann. Rep. Geolog. Survey for 1880.

The wild Flowers of Lake Pepin Valley. By Miss Sara Manning.
In Ann. Rep. Minn. Horticult. Society for 1884.

Fillmore County.

The Trees and Shrubs of Fillmore County. By N. H. Winchell.
In Ann. Rep. Geolog. Survey Minn. for 1875.

Freeborn County.

List of Trees and Shrubs of Freeborn County. By N. H. Winchell. (A.)
In 3rd Ann. Rep. Geol. Survey. St. Paul, 1875.

Hennepin and Houston Counties.

List of Shrubs and Trees. By N. H. Winchell.
In Ann. Rep. Geolog. Survey for 1876.

Mower County.

List of Trees and Shrubs of Mower County. By N. H. Winchell. (A.)
In 3rd Ann. Rep. Geol. Survey. St. Paul, 1875.

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*See also WISCONSIN, p. 131, Vol. x. *A Flora of Minnesota*, to be published as a report of the Geological and Natural History Survey next autumn, will include not only the observations of the State Geologist and his assistants, but also those of earlier botanic collectors and explorers, enumerating all the species that are known to have been found in Minnesota by all observers up to the present time (about 1,550 species of phænogams and vascular cryptograms; of which 126 are introduced species; about 100 are western and northern plants not described in Gray's *Manual;* and, for all these, quoted specific descriptions will be appended, with citation of the author.) The geographical range of each species will be stated, so far as it pertains to Minnesota; and its abundance, frequency, or rarity, be noted. In the case of rare or local species, the localities and names of observers will be mentioned.—WARREN UPHAM.

Olmsted, Dodge and Steele Counties.
List of Shrubs and Trees. By M. W. Harrington.
In Ann. Rep. Geolog. Survey Minn. for 1875.
Ramsey County.
List of Shrubs and Trees. By N. H. Winchell.
In Ann. Rep. Geolog. Survey for 1877.
Rice County.
List of Shrubs and Trees. By L. B. Sperry.
In Ann. Rep. Geolog. Survey for 1877.

IOWA.

A Catalogue of the indigenous Forest Trees of Iowa. By C. A. White, M.D. (A.)
In Rep. Geol. Survey of the State, p. 138. Des Moines, 1870.
Contributions to the Flora of Iowa. By C. E. Bessey. (B.)
In 4th Bien. Rep. Iowa Agric. College, Des Moines, 1871.
Contributions to the Flora of Iowa; a Catalogue of the phænogamous Plants. By J. C. Arthur. (A.) 8vo, pamphlet, pp. 44, Charles City, 1876. Additions in Proc. Davenport Acad. Sci.
List of species of Fresh-water Algæ found in Iowa. By C. M. Hobby, M.D. (A.)
In Proc. Iowa Acad. Sci., Iowa City, 1875–1880.
Scott County.
List of phænogamous Plants collected in the vicinity of Davenport, Iowa, during 1870 to 1875. By J. J. Nagel and J. G. Haupt. (A.)
In Proc. Dav. Acad. Sci.

MISSOURI.

Catalogue of the trees and Shrubs of Missouri. By G. C. Swallow. (B.)
In 2nd Ann. Rep. Geol. Survey, p. 221, Jefferson City, 1855.
Systematic View of Plants gathered on a Tour on the Missouri. By Maximilian Prince of Wied. (C.)
4to, London, 1843.
Trees, Shrubs and Vines of Missouri. By G. C. Swallow.
In 1st Ann. Rep. Comm. Statistics to the General Assembly of the State of Missouri, p. 112, Jefferson City, 1867.
Jackson County.
Flora of Jackson Co. By Frank Bush. (B.)
8vo, pamphlet, pp. 16, Independence, 1882.

NEBRASKA.

List of Nebraska Carices. By Chester Dewey. (B.)
In Trans. Amer. Philos. Soc., Vol. xii., Philadelphia, 1863.
Catalogue of the Flora of Nebraska. By Samuel Aughey.
Publ. by University of Nebraska. 8vo, pp. 37, Lincoln, 1875.
List of Forest Trees and Shrubs of Nebraska, with notes on their distribution. By Samuel Aughey. (B.)
In Sketches of Phys. Geog. and Geol., Nebraska, Omaha, 1880.

KANSAS.

Catalogue of Kansas Plants. By J. W. Carruth. 8vo, pamphlet, pp. 29, 1872.
Centennial Catalogue of the Plants of Kansas. By James W. Carruth. (B.)
In Proc. Kans. Acad. Sci., Vol. v., Topeka, 1877.

W. R. G.
N. L. B.

Notes on Mertensia Virginica DC.—In the BULLETIN for May, 1880, I announced my discovery of *M. Virginica* as indigenous to New Jersey, it being plentiful on the bank of Crossick's Creek, near the mill at Walnford in Monmouth County. The plant has been long established, and is found in various places along the stream for a mile or two north and south of Walnford. I have to announce a new and richer station for this plant on the Raritan River in Somerset County, having received from Miss Sarah E. Veghte an elegant specimen of it. She writes: "This flower is found in great abundance in many places along the Raritan River. This specimen was taken from woods about one mile and a half west of the village of Raritan, opposite the summer residence of Secretary Frelinghuysen."

Abnormal form.—Three years ago I transferred some good roots from Walnford to my garden, but not until last spring did they bear any perfect flowers, and then not in their wild profusion, nor did they mature any seeds. One of the plants gave flowers nearly every one of which was prettily abnormal. Instead of the normal form, on the smooth tube of the flower several wart-like bosses or spurs were developed. Some of the flowers had five of these protuberances, according with the pentamerous mouth of the trumpet. The very effect was odd, but decidedly pretty. I hoped to get seeds in order if possible to perpetuate the form, but failed. I should add that the outer sides of the long throat or tube of the abnormal flowers were as many-sided as there were bosses.

SAMUEL LOCKWOOD.

Mertensia Virginica.—A propos of Dr. Lockwood's note, I would state that the Virginian cowslip is represented in the herbarium of the Philadelphia Academy by specimens from "meadows between Bordentown and Lamberton." Mr. A. C. Apgar reports it from Somerville and Raritan, and Miss Veghte, of South Branch, states that it grows plentifully along the Raritan in Somerset County. It therefore seems quite certain that it is indigenous to New Jersey.

N. L. BRITTON.

Note on Some New Species of Grasses.—In the January number of the BULLETIN (1884), under the article New North American Grasses, three species of *Bouteloua* are described, viz: *B. trifida*, Thurb., *B. Burkii*, Scribn., and *B. Havardi*, Vasey—which were characterized and published by Mr. Sereno Watson in his list of Palmer's plants in Vol. xviii. of the *Proceedings* of the American Academy of Arts and Sciences, issued August 15th, 1883.

In justice to myself I wish to state that my article in the BULLETIN was written in April, 1883. and was placed in the hands of the editor May 22d following.

Bouteloua pusilla, Vasey, ined., published by myself in the January BULLETIN, is certainly the same as No. 751 Bourgeau and No. 1,016 Schaffner, referred by Mr. Watson in his list of Palmer's plants to *B. prostrata*, Lag. (*B. humile*, HBK.)

F. LAMSON SCRIBNER.

New New York Stations.—It may be of sufficient interest to mention in the BULLETIN that in June, 1883, I found well established on a railroad embankment on Coney Island quite a number of specimens of *Asperugo procumbens*, L., and on the northerly side of 155th Street, opposite the Trinity Church cemetery, in New York city, *Barbarea præcox.*

Buffalo, N. Y. DAVID F. DAY.

Necrology.—Samuel Botsford Buckley, Ph.D., died February 18th, 1884, of pneumonia, at his home in Austin, Texas, aged nearly 75 years. He was born May 9th, 1809, in Yates County, N. Y., near Seneca Lake, six miles from Penn Yan and graduated at Wesleyan University, Conn., in the class of 1836. From this period onward he spent much time in the Southern States, then a comparatively new field for the naturalist, collecting plants, shells and insects. His various discoveries in natural science relate exclusively to southern species, in connection with which his name often occurs.

It was not until 1866, however, that he made his home in the South, at which time he was appointed State Geologist of Texas and became a resident of Austin.

In 1841 he discovered in Clarke County, Ala., the skeleton of a *Zeuglodon* seventy feet in length which is now in the Warren Museum at Boston. As a botanist he had no specialty, and his studies were in consequence promiscuous; yet his name will be forever linked with the flora of our country. He aided largely in the preparation of Mrs. Young's "Flora of Texas," and was several years engaged in writing a work on the trees and shrubs of America, which is unfinished. He contributed some papers on new species of ants. Among the new shells found by him in Florida is a beautiful *Unio*, which Dr. Isaac Lea has named *Unio Buckleyi.* Professor Buckley was a member of the Philadelphia Academy of Sciences, and of societies in New York, Buffalo and New Orleans.

Penn Yan, N. Y. S. HART WRIGHT.

Botanical Notes.

A Catalogue of North American Carices has been compiled and recently published by Mr. L. H. Bailey, Jr., of Cambridge, Mass. It includes the names of two hundred and ninety-three species and eighty-four varieties, and is intended as an exchange-list, a check list for herbaria and as a contribution to American caricography. Copies of the catalogue will be given for desiderata.

Parkinson's "*Paradisus.*"—A good many people, we suspect, have experienced difficulty in construing "Paradisi in Sole Paradisus terrestris." The editor of *Aunt Judy's Magazine* and the venerable Rev. H. T. Ellacombe are confessedly among the number, but they have been the means of eliciting from correspondents of *Notes and Queries* the explanation that the title is a wretched pun. "Paradisus" is a park; "Paradisi" is, of course, the genitive of this; "in sole" is in (the) sun (son). Hence the title would run, "The Terrestrial Paradise of Park-in-son." Such punning titles were not uncommon in Parkinson's time.—*Gardeners' Chronicle.*

The Gender of varietal Names.—In answer to the editor of the *Gardeners' Chronicle*, who asked Mr. DeCandolle's opinion as to whether the name of a variety should conform in gender to the generic name when the abbreviation "var." follows the specific, the distinguished codifier of botanical namenclature answers as follows:

"I have sometimes put to myself the same question as to the gender of the names of varieties, and it is most likely that in practice I have resolved it sometimes in one way and sometimes in another, but I have just been looking to the practice of authors of repute, and I observe that, in general, they have made the varietal name conform to the gender of the generic name, thus:

"Nasturtium amphibium, α indivisum, DC., *Syst.*, ii., p. 117.

"Thymus Serpyllum, β montanus, Benth., in *Prodr.*, xii.

"Phyllanthus simplex, β oblongifolius, Müller, in *Prodr.*, xv., &c.

If the word '*varietas*,' or the abbreviation 'var.' be employed, it seems most correct to make the abjective feminine. The use of Greek letters to indicate varieties, thus: α, β, γ, corresponds to the employment of figures, which have no gender. On the other hand, when the idea is expressed by a qualifying 'var.' or '*varietas*,' a sentence is made which must be constructed in the correct grammatical manner. The name of the variety becomes in this case an adjective qualifying '*varietas*,' and should therefore take a feminine termination. English writers generally use the abbreviation 'var.' Linnæus indicated the varieties by the Greek letters, α, β, γ, without, as a rule, adding any other epithet. Continental authors have mainly confirmed to Linnean usage, and do not write 'var.' This is in conformity with the omission of 'gen.' before the generic, or 'sp.' before the specific name."

Relation of Medullary Rays to the Strength of Timber.—At a January meeting of the Philadelphia Academy of Natural Sciences Dr. Rothrock called attention to some experiments made by Mr. Frank Day, in the laboratory of the University of Pennsylvania, on the relation of the medullary ray to the strength of timber. Mr. Day had found that it required just about twice as much force (say 1,130 pounds) to pull apart a square inch of live oak, if the force ran parallel with these rays, as it would if the force were applied at right-angles to them.

What was true of the live oak was also largely true of other timbers. The buttonwood (*Platanus occidentalis*) was remarkable for the development of its medullary rays, and also for the difficulty of splitting the wood at right-angles to them.

Mr. Day's experiments also proved that there existed great differences in the quality of the material of the woody fibre; for in timber where the relative proportion of wood and ducts could well be compared, and where the fibres were of equal size throughout, differences in strength were to be found.

Botanists of short stature will be interested in a statement made in the April *Naturalist* "that no obituary notices of scientific men of a length of a page or less have ever been declined by its editors."

The Syracuse Botanical Club.—During the past year the Syracuse Botanical Club has added over one hundred and fifty mounted specimens to its Onondaga herbarium, which now contains nine hundred and forty species and varieties of phænogams and acrogens, besides seventy-six mosses. The order best represented in this collection is Compositæ, of which there are a hundred and seven species.

The Club has held fortnightly meetings through the winter for botanical readings and hopes soon to resume its field work.

At its annual meeting, March 15th, the following officers were elected for the current year: President, Mrs. Clark W. Barnes; Vice-President, Mrs. Leonora Goodrich; Corresponding Secretary, Mrs. George Hosmer; Recording Secretary, Miss C. A. Bach; Treasurer, Miss Katie Poole. MARY OLIVIA RUST.

Proceedings of the Torrey Botanical Club.—At the regular meeting of the Club held at Columbia College, Tuesday evening, Feb. 12th, the President occupied the chair and twenty-five persons were present.

The following Committees were appointed for the current year:

Finance Committee.—Addison Brown and J. L. Wall.

Committee on Admissions.—W. R. Gerard and Benj. Braman.

Herbarium and Library Committee.—N. L. Britton, Miss E. G. Knight, A. Hollick and J. S. Brown.

Dr. Newberry continued his account of the vegetation along the line of the Northern Pacific Railroad, describing more particularly on this occasion the shrubs and herbaceous plants.

One person was elected an active member.

At the regular meeting of the Club held at Columbia College Tuesday evening, March 11th, the President occupied the chair and twenty-six persons were present. Messrs. Rudkin, Day and Hollick were appointed a committee on field meetings for the present year.

Dr. N. L. Britton remarked upon a collection of ferns made in recent years by Mr. S. B. Buckley in Texas and Mexico. It included the following species:

Polypodium incanum, Swartz, a small form from rocks in the mountains of Pecos Co., Texas.; *Gymnogramme hispida*, Mett., Lampezas Mountains, Mexico; *Notholæna sinuata*, Kaulf., Pecos Co., Texas.; *N. ferruginea*, Desv., Lampezas Mts., Mexico; *N. candida*, Hook., Pecos Co.; *N. Hookeri*, DC., Pecos Co.; *N. Fendleri*, Kunze, Pecos Co.; *N. dealbata*, Kunze, Austin, Texas.; *Cheilanthes Alabamensis*, Kunze, Austin; *C. microphylla*, Swartz, Austin; *C. leucopoda*, Presl, Lampezas Mts, Mexico; *C. Eatoni*, Baker, Pecos Co., Texas; *C. Lindheimeri*, Hook., Lampezas Mts.; *Pellæa atropurpurea*, Link, *P. ternifolia*, Link, Pecos Co.; *P. Wrightiana*, Hook., Pecos Co.; *Asplenium parvulum*, Mart. and Gal., Austin; *Aspidium patens*, Swartz, Austin; *Lygodium Mexicanum*, Presl, on the Mexican side of the Rio Grande, near Brownsville, Texas.

Dr. Newberry remarked upon the flora of the Cascade Mountains in Oregon, and read extracts from his journal of the expedition to that region in 1855.

ERRATUM.—Page 31 (March number) second line from bottom, read "axis" for "axils."

BULLETIN

OF THE

TORREY BOTANICAL CLUB.

Vol. XI.] New York, May, 1884. **[No. 5.**

New Species of Fungi.

By CHAS. H. PECK.

PUCCINIA COMANDRÆ.—Spots pale or yellowish, often confluent; sori abundant, amphigenous, crowded or scattered, orbicular, blackish-brown or black; spores variable, obovate-oblong or elliptical, obtusely pointed, obtuse, truncate or obliquely truncate, .0012 to .0024 inch long, .0008 to .0009 in. broad, with a long colorless pedicel.

Leaves, stem and fruit of living *Comandra pallida*. Washington Territory, T. S. Brandegee.

The sori occur on both sides of the leaf, but they are usually more plentiful on the lower than on the upper surface.

PUCCINIA CLARKIÆ.—*Stylospores*.—Sori minute, orbicular, amphigenous, reddish-brown; spores globose or subglobose, .0009 to .0011 in. in diameter.

Teleutospores.—Sori minute, orbicular, scattered, amphigenous, blackish-brown; spores oblong or obovate, obtuse or obtusely pointed, slightly constricted at the septum, .0016 to .002 in. long, .0009 to .001 in. broad, the pedicel about equal to or shorter than the length of the spore.

Living leaves of *Clarkia pulchella*. Washington Territory, Brandegee.

The sori of the teleutospores occur on the same plant and even on the same leaves as the stylospores, but they are at once distinguished from these by their darker color. Stylospores are sometimes intermingled in the same sorus with the teleutospores.

PUCCINIA BALSAMORRHIZÆ.—Sori amphigenous, scattered, suborbicular, large or small, black; spores oblong-elliptical, obtuse, scarcely constricted, .0016 to .0018 in. long, .0009 to .001 in broad, with a short pedicel.

Living or languishing leaves of *Balsamorrhiza sagittata*, etc. Washington Territory, Brandegee; Utah, M. E. Jones.

Trichobasis Balsamorrhizæ, *Bot. Gazette*, Vol. v., p. 276, is apparently the stylosporous condition of this species. In the specimens from Washington Territory the stylospores are intermingled with the teleutospores.

PUCCINIA SOLIDAGINIS.—Spots pale, becoming brownish, sometimes confluent; sori large, prominent, amphigenous, scattered or clustered, black; spores oblong, constricted at the septum, pointed or obtuse, .0016 to .002 in. long, .0009 to .0011 in. broad; pedicel colorless, longer than the spore.

Living leaves of *Solidago pumila*. Utah, Jones.

This is clearly distinct from *P. Virgaureæ*, which also inhabits the leaves of certain species of *Solidago*.

ÆCIDIUM PHACELIÆ.—Spots large, suborbicular, pallid or greenish-yellow, becoming brown; peridia hypophyllous, crowded, short, numerous, occupying the entire spot, crenulate on the margin; spores subglobose, orange-yellow, .0008 to .001 in. in diameter.

Living leaves of *Phacelia*. Utah, Jones.

CÆOMA COMANDRÆ.—Spores pale, indefinite; sori amphigenous, clustered, at first covered by the epidermis; spores subglobose, ovate or elliptical, orange-yellow, .00095 to .0014 in. long, .0008 to .00095 in. broad.

Living leaves of *Comandra pallida*. Utah, Jones.

PERICONIA GEOPHILA.—Stem two to three lines high, composed of compacted filaments, smooth, smoky-brown; head hemispherical, pulverulent, little broader than the diameter of the stem, whitish or yellowish-white; spores subglobose, colorless, .0002 in. in diameter.

Ground. Washington Territory, Brandegee.

This species is peculiar in its habitat. By some authors it would be referred to the genus *Sporocybe*, the application of these two generic names having been interchanged by different writers.

DENDRODOCHIUM PALLIDUM.—Tufts small, .014 to .028 in. broad, suborbicular, depressed when dry, whitish or pallid; flocci slender, much branched above, colorless; spores abundant, large, oblong or subcylindrical, straight or slightly curved, obtuse, colorless, .0008 to .0015 in. long, .0004 to .0005 in. broad.

Decaying wood. Canada, Prof. J. Macoun.

The filaments are closely and abundantly, but irregularly branched above, so that the spores, which are terminal on the ramuli, are crowded together as if produced in large masses.

PHYSARUM MULTIPLEX.—Stems growing from a thin, subpersistent hypothallus, sometimes confluent at the base; longitudinally furrowed, equal or tapering upward, orange-red; sporangia small, irregular, numerous, confluent into subglobose gyrose-convolute heads, greenish or yellowish-green, with single walls bearing numerous lime-granules; knot-like thickenings of the capillitium very small, sparse, white or yellowish; spores globose, blackish-brown, .0004 in. in diameter.

Decaying wood and bark. Ohio, Morgan.

The species is related to *Physarum polymorphum*, Mont., from which it is distinguished by its bright orange-colored stem and its very numerous small, confluent, greenish sporangia.

Bees and Colored Flowers.—I noticed recently, in a paper of some pretension to scientific accuracy, that Mr. Darwin has shown that insects are attracted to flowers by their color or fragrance, and, therefore, anemophilous flowers are not visited by insects; and Mr. Darwin's experiment with the *Lobelia* was cited in which no flower was visited subsequent to the cutting off of the petals. Now Mr. Darwin does not say this, and his views often suffer from the zeal of those who believe themselves his followers, but have not his talent for accuracy in giving every statement about a case. What Mr. Darwin does say is that color is a "chief" guide, and this can scarcely be questioned. That it is some guide is certain. That it is not the only guide, he himself, with the remarkable candor so characteristic of the man, shows in the same paragraph in which he reports his *Lobelia* experiment. Bees, he says, visited *Geranium phæum* after the petals had fallen, finding by experience that there was some nectar secreted by the apetalous flower. And he repeats that color is only an "approximate" guide. But, for all this, I think Mr. Darwin fails to give full credit to the bee's sagacity. To my mind much that has recently been written about the relation of insects to the color of flowers is but an illustration of the popular idea of "running a thing into the ground," and I think science is served when an exaggeration is—again in popular language—"sat down upon." I thought of this distorted view of Darwin's *Lobelia* experiment to-day while watching honey-bees at work on the flowers of the common snow-drop tree—*Halesia tetraptera*. We know now that there is scarcely a flower with the lower portion tubular, or which offers any obstacle, however slight, to the entrance of the humble-bee, that is not rifled of its sweets by being bored from the outside. Indeed, if bees were really intended to cross-fertilize flowers, the experience of Mr. Darwin with the European humble-bee would excite a smile in those with only an American experience, for indeed the American species are frauds of the first magnitude. They shirk their duty on the shallowest pretence. But though I have had suspicions, I have never been able to satisfy myself that the honey-bee does not perform its duties honestly. Whenever I have noticed it getting honey from the outside I have been unable to decide whether the hole was not there before and the honey-bee was not satisfying itself on the crumbs left from the stranger's table. On this occasion all the honey-gatherers were collecting from the outside, the pollen-gatherers only entered by the mouth. And I was satisfied, in all cases, that the holes had been made the day before by the humble-bee.

The corollas were now beginning to fall. The slightest jar of the tree sent numbers—literal snow-flakes—to the ground, and the bees were as busy as I ever saw them on the most favorite flowers collecting the nectar from the base of the now naked pistils. On branches where not a single corolla remained they were as active as if the perfect blossoms were still there. They had learned by experience that they could find what they wanted there. Though there was nothing but a slender pistil from a very inconspicuous base, the total absence of any bright color did not prevent them from alighting at the spot most convenient to them; and it was evident that if the *Halesia* had never had a corolla at all, the bees would have been there all the same. Of course, color is an "approximate" guide to a bee as it is to us. In a basket of green apples that we had never seen before we should most likely try the most rosy-cheeked specimen first, only experience would teach us that a greening was as good as a Baldwin. It is so with bees. Accustomed to associate nectar with a blue *Lobelia*, and none with the faded flower, Mr. Darwin, if he had possessed as much faith as I have in the value of experience to a bee, would not have expected the creature to visit it after it had been led to believe the petals had fallen. If there had been honey in the calyx after the fading of the flower, as in the case of the *Halesia*, the bee would not have been so easily deceived; and, as it was, I have that faith in a bee's sagacity that I fancy if Mr. Darwin had continued the work for a few days, and on a scale to make it worth while, the little creatures would have found out the trick.

THOMAS MEEHAN.

Carex Pennsylvanica and Carex varia.—Whether these sedges are simply varieties, one of the other, or whether each is a true species, continues to be a mooted question. Without entering into the literature of the subject, it may be said that Gray, in the last edition of his manual, guardedly states that they "seem to run together."

The latest that I have seen touching the question is a note by Dr. E. C. Howe, in the BULLETIN for July, 1881, wherein is advanced evidence to show that the two plants intergrade. Dr. Howe states that in a large series of specimens "separation becomes guesswork." But does not the Doctor mean that certain characters presumed to be diagnostic of one or the other plant do not always so prove. As to the interchange, between these sedges, of characters which have been regarded as distinctive of one or the other, I fully agree with Dr. Howe; but from this I deduce, not identity of the two plants, but simply that certain differential characters are less stable than our text-books may have led us to believe.

Perhaps there is no surer way of discovering the true relationship of allied or doubtful species, whether of plants or animals, than by comparative study of their earlier stages of development. According to a now familiar biological law we expect community of origin of differing types of life to be indicated by increased similarity as we compare at successively earlier stages of development. Indeed, in recently differentiated forms, we would look for practical identity up to a point in development close upon maturity.

An application of these principles to the two *Carices* now under notice goes to show, not only that they are distinct species, but that their ancestral relationship was in some respects more remote than is their present; for certain differences between the plants are more emphasized in the earlier stages of their growth that at any later period. I refer particularly to differences in the leaves, scales and bracts and the disposition of the spikes. This fact is a significant one, and one on which the specific validity of the plants may safely rest.

But I wish chiefly to call attention to important differences in the subterranean parts of the plants which our text-books fail to recognize: *Carex Pennsylvanica* differs conspicuously from *Carex varia* in having running, underground stems. These extend in all directions from the central plant, each fostering a succession of shoots, some of which themselves become centres of a secondary series of runners, which thus distribute a numerous progeny all about their parent. I have unearthed runners bearing at intervals of a few inches four or more generations of living shoots, together with the remains of several older generations. Hence the new shoots do not always become established as separate plants, but often remain joined by underground connection, through the two or three years that they appear to live. Where this sedge grows abundantly its runners are to be found crossing and recrossing beneath the surface, and careful excavation will show that many seemingly distinct plantlets belong to one system of underground stems. In some soils the plant grows more compactly than normally, and few runners are produced. In more favorable situations the runners are numerous, and many strike down diagonally into the earth, proceeding some inches before turning upward to the surface to bear a shoot.

The runners are at first clothed with closely imbricated scales or paleae arising from nodes all along the stem. These scales ultimately decay and become frayed into a coarse fringe, which remains appressed to the stem in whorls from every node.

In *Carex varia* we find a very different habit of growth. This species never produces running underground stems, and shows no disposition to spread, but grows in close tufts. Beneath the surface it develops a dense, knotty mass of small and closely aggregated rootstocks which bears a profusion of long fibrous roots. Year after year these rooty masses produce an abundance of new shoots, which rise from the surface amid the remains of the old. Each ultimate rootstock becomes the site for a cluster of compound shoots, and these secondary tufts, compacted together, make up the plant. A slight lateral prolongation of a shoot is sometimes necessitated by an obstruction in the most direct way to the surface, but this is the closest approach to subterranean spreading, and thus we find the plant forming neat, even-bordered tufts, there being no offshoots to mar the symmetry of outline.

In *C. Pennsylvanica* a slenderness of general habit is associated with a certain liberty of growth—a distribution of vital energy; in *C. varia* similar vegetative conditions are contracted, and somewhat modified in action, resulting in greater solidity of growth and increase in the size of parts. We may say that in the principle of growth of one we perceive decentralization, enterprise, advance in many directions; of the other, centralization, conservatism, unified strength. In none other of our species of *Carex* of the section Montanæ do we find the counterpart of the running underground stems of *C. Pennsylvanica*. The closest approach to them is shown by *Carex umbellata*. From its dense, matted tufts, this sedge occasionally puts off short underground stems. These, however, are more like suckers than running stems, and never stray from the main tuft, but merely aid in increasing its dimensions. *Carex pubescens* is of less tufted habit than any of the other species of this section, the shoots being irregularly produced by a progressive underground stem or rootstock. But this bears no resemblance to the running stems of *C. Pennsylvanica*, being rather stout, with short, irregularly-branched divisions. Our only other species, *Carex Emmonsii*, is of very similar underground growth to *C. varia*, the difference, in fact, corresponding to the general difference between the superterrene parts of the two plants.

Riverdale, N. Y. City. EUGENE P. BICKNELL.

Survival of the Fittest.—When we use this expression it may be well to remember that accident has quite as much to do with fitness as constitutional peculiarities. Where cattle are continually grazing, those tall growing plants which produce flowers only towards the ends of the branches extend amazingly if they happen to be distasteful to the animals. Plants of similar habit, if agreeable to cattle, cannot spread, because they are eaten off before they flower. Accidental introductions may thus be totally eradicated the first season, if annual—or confined to the original spot if a perennial plant. Thus, in Pennsylvania we have *Ranunculus bulbosus* and *Leucanthemum vulgare* common in our pastures because the cattle suffer them to go to seed. In vacant lots about our cities we have *Stramonium*, mayweed and many other plants progressing with amazing rapidity simply because not even the half-starved cattle of the "poor man" will pasture on them. But if an introduced plant can flower and fruit close to the earth, where some seed may mature though cattle eat the tops, it may survive and spread in spite of its being a good morsel for a hungry beast. Hence the *Lespedeza striata*, or Japan clover, has taken possession of immense territory in the South, because numerous seed-vessels mature close to the ground, between the crevices of rocks, or underneath loose stones, where cattle cannot get at them. If this were an erect instead of a prostrate plant, and did not flower till several inches high, it could not survive in a grazing country. There is no adaptation of the plant to the circumstances—the fitness is in the accident which came at the proper time to destroy or to save it.

In some gardens-weeds the accident is the early flowering. Chickweed, *Draba verna*, *Arabis Thaliana*, the shepherd's purse, and many other things are common in Pennsylvania gardens solely because they mature so very early in spring that seed is perfected before the gardener commences to use the hoe. When he begins this branch of cultivation the earth is full of seed for the next year's crop. If they flowered a month later than they do, they would soon be among rare plants, instead of being the common weeds they are. In a part of my grounds I have what I term my "botanical patch." There I sow every "weed" I can get from any part of the earth. Some escape, and I often enjoy noting how their peculiar characters fit them to spread without any modification of character to enable them to advance. Some four years ago, I had in this botanical border the pretty Siberian *Nonea rosea*. It matures its seeds sometimes in the early part of April with me. I am so situated that our serious attack on weeds seldom commences before the end of May. The *Nonea* has now spread and is not uncommon in many parts, and it is quite pleasant to note it struggling with, and successfully holding its own against, the *Thlaspi*, *Arabis* and other immigrants that have before ventured to regard the soil as their own. Having the broadest leaves and the rankest growth, it is of course more "fitted to survive" in its battle with the two named and similar others. But we may now bring in speculation and say "if" the *Arabis* should grow stronger—"if" the leaves should get broader—"if" the plant should flower earlier—"if" many other points which would be an advantage to the *Arabis* in the struggle should occur, these superior plants would produce a race which might in time crowd down the *Nonea*. Of course; but "if" the *Nonea* grew also the stronger for its struggle, the battle would still be about equal, until an "if" in the shape of some such an accident as I have above illustrated should come in to the advantage of the victor.

It seems to me that there is another side to the subject of the "survival of the fittest" that we seldom have presented to our view.

THOMAS MEEHAN.

Note on Dicentra.—I find that in my garden the flowers of *Dicentra cucullaria* are systematically punctured by humble-bees; I have watched them in the process. Has this been noticed when the plants are growing wild? It sadly interferes with the very neat mechanism for cross-fertilization.

Providence, May 1, 1884. W. WHITMAN BAILEY.

Abnormal Hepaticas.—The blossoming of *Anemone Hepatica* in Ross Park, near this city, this spring, is very varied and profuse. Among the myriads of plants, I have noticed the following abnormalities:

(1) Dozens of plants have very deep blue sepals with a white or light blue margin. All of these are absolutely stamenless, though pollen was found upon the stigmas, whither it must have been brought by insects.

(2) Numbers of flowers were pure white, and all of these had nine sepals and bore—as far as the flowers were concerned—an exact resemblance to *A. nemorosa.* One *monosepalous* flower was found with six lobes, one of which was cleft to its centre, thus forming, with a stameniferous extra sepal, nearly an 8-sepaled specimen.

Binghampton, N. Y. C. F. MILLSPAUGH.

Tribute of Respect to Dr. Engelmann.—The following preamble and resolutions, indicative of the appreciation of the high scientific and personal character of the late Dr. George Engelmann, were unanimously adopted by the Botanical Section of the Academy of Natural Sciences of Philadelphia, April 14th, 1884,

WHEREAS, the Botanical Section of the Academy of Natural Sciences of Philadelphia has heard with profound regret of the death of Dr. George Engelmann; therefore

Resolved: We regard this as a calamity to Botanical Science and to those who were in any way associated with him in its study; also

Resolved: That in his life he furnished an example of industry in his profession, of devotion to science, of thoroughness in investigation, and of success in labor which will always command our admiration and respect; and be it further

Resolved: That by his readiness to aid all who were seekers after the truths of nature, by the conscientious answers to the botanical questions referred to him, no less than by his goodness as a man, we believe he has attached many to the science in whose service he died.

Resolved: That as a mark of respect to the memory of the deceased, these resolutions be entered upon the minutes of the Section, a copy be transmitted to his family, and also a copy of them be furnished to the BULLETIN OF THE TORREY BOTANICAL CLUB and to the *Botanical Gazette*, with the request that they be published therein.

JOS. T. ROTHROCK.
THOMAS MEEHAN.
JOHN H. REDFIELD.

Botanical Notes.

Gender of Names of Varieties.—Among other subordinate questions in Natural-history nomenclature, it has been asked whether names of varieties, like those of species, should conform in gender to the genus, or whether they may not as well conform to the word *varietas* and so always be feminine.

Linnæus introduced the current practice of numbering varieties by the letters of the Greek alphabet, α, β, γ, etc. But to some varieties, evidently to the more important, he gave names. These names, when adjectives, were always (so far as we know) made to agree in gender with the generic name: ex. gr.—

Viburnum Opulus, β *roseum.*
Asparagus officinalis, α *maritimus*, β *altilis.*
Mesembryanthemum ringens, α *caninum*, β *felinum.*

In our days, named varieties play a more and more important part, and all botanists, as a rule, appear to have followed the Linnæan model, with now and then a divergence which is readily explained, and which may be said to be accidental, such as

Ripogonum album, var. *leptostachya*, Benth.

This is as one writes "forma *albiflora*" or "var. *albiflora*," a white-flowered form or variety. But that this is not the pattern or the true construction of varietal names appears at once on reference to ordinary cases. Thus, for example, in "*Nasturtium amphibium*, α *indivisum*, DC. Syst.," it is not an undivided variety of the species that is meant, but a name which stands in the same grammatical relation to *Nasturtium* that *amphibium* does, and to write *N. amphibium*, α *indivisa*, is obviously wrong. We should say that it makes no difference whether the word variety, or its abbreviation *var.* is expressed or understood. When the conditions of the case seem to call for it, we should write "*Nasturtium*, spec. *amphibium*," and just as L. C. Richard (a good model), in Michaux's Flora writes,

Viburnum dentatum, var. α *glabellum*, β *semitomentosum.*
Rhus Toxicodendron, var. α *vulgare*, β *quercifolium.*

The editor of the *Gardeners' Chronicle* (March 22, p. 373), having put this kind of question to Mr. Alphonse De Candolle (whom we should consider the highest living authority upon nomenclatural matters), understands him to reply that "the insertion of the abbreviation *var.* for *varietas*, which is feminine, demands a feminine termination; but if the word *var.* be omitted, then the rule would be for the variety to follow the specific name;" meaning probably the generic name, for in one of the examples given, "*Thymus Serpyllum*, β *montanus*," it does not follow the specific.

From this point of view, viz., that where the nature of the group (in this case, variety) is expressed the adjective name should be feminine, but, where only understood, it might be masculine or neuter—we must commend the editor's closing remark:

"Perhaps the simplest and most easily recollected rule, would be to make the varietal name feminine in all cases, whether the *var.* or *varietas*, were expressed or understood. This at least would be intelligible, and would conduce to uniformity of practice."

It would also be logical, and the logic also would require all specific names to be feminine; for the word understood, *species*, is feminine.

Now we do not suppose that Mr. De Candolle would tolerate a double set of genders for the names of varieties. His doctrine is that the "var." should be discarded and the Greek letters only employed, not only for numbering the varieties, but for designating the fact that the name they are prefixed to is a variety.

It is not difficult to perceive why it has come to pass that "English writers generally use the abbreviation *var.*," and that some continental botanical writers follow the practice. One reason is that it enables us to cite an author's variety by its name without having to concern ourselves with its Greek number, whether it is β or γ or δ, which otherwise we should have to attend to. Another is that our sense of good form revolts at beginning sentences and paragraphs without capitals. In our books, varieties usually stand in independent paragraphs. Even in Latin we do not like to begin a paragraph:

"α *indivisum* foliis omnibus integerrimis serratisve, non aut vix basi auriculatis."

In English we can still less abide it. So we prefix "var.," and either number our varieties with Greek letters or, preferentially, leave them out.

But, we did not suppose that by the employment of the word "var." we had interfered with the relation of the name of the variety to that of its genus. Var. *indivisum*, in this case we should construe the phrase: "Varietas cujus nomen est *indivisum*. 'Var. *indivisum*' stands on the same ground as 'species *amphibium*.'" The latter rank we rarely need to express, because we always prefix the generic name or its initial. The former may often come in a shape which renders the designating prefix *var.* necessary, or at least most convenient.

We may, indeed, quite correctly write, *var. albiflora*, a white-flowered variety, *var. longfolia*, a long-leaved variety; but that is not according to the Linnæan pattern nor to the regular practice, nor to the strict analogy of the varietal name with the specific.

Moreover, if the gender of the word which designates the grade of the name is to govern the gender of the name, at least when expressed, as by *var.*, then all *subspecies* must be made feminine. Now this term *subspecies* is coming largely into use, and it has to be expressed in every case, in this wise:

Ranunculus aquatilis, L.
Subsp. *heterophyllus*.
Subsp. *hederaceus*, etc.

If the proposition which we deprecate is adopted these names would have to be written *heterophylla* and *hederaceea* by an author who ranked them as subspecies, but *heterophyllus* and *hederaceus* by one who took them as varieties and simply numbered them by Greek letters. Obviously the propositions in the *Gardeners' Chronicle* had not been thoroughly worked out.—ASA GRAY, in *Amer. Journ. Science.*

Sex in Plants.—Some interesting experiments have been carried out by F. Heyer (*Journ. Microsc. Soc.*, p. 251) with a view to determine the cause of differentiation of sex in unisexual plants. The result obtained in the case of diœcious plants, by experiments with 21,000 specimens of *Mercurialis annua* and 6,000 of *Cannabis Indica*, was that external conditions have no influence upon the production of seedlings of one or the other sex. In the case of the former plant the proportion of males to females produced was as 105.85 to 100, and in the latter as 86 to 100. In a second series of experiments made with monœcious plants, to determine whether external conditions of temperature and soil caused any difference in the proportion of male and female flowers, *Urtica urens*, *Atriplex*, *Spinacia*, *Xanthium*, and various Cucurbitaceæ produced negative results. He also came to the conclusion that sex is determined at an earlier period than the ripening of the seed. A knowledge of the means whereby female plants could be produced at will would be of considerable commercial importance, as, for instance, in the cultivation of nutmegs, hops, etc.

A gigantic Plane-tree—Professor Virchow recently exhibited at a meeting of the Berlin Medical Society photographs of a gigantic plane-tree growing in the Island of Cos, under the shade of which Hippocrates is said, by tradition, to have held medical consultations. The tree now stands in the market-place of Cos on the east side of the island. The branches, which spread over nearly the whole of the market-place, are supported by marble pillars.

Botanical Literature.

A Catalogue of the Native aud Naturalized Plants of the city of Buffalo and its vicinity. By David F. Day. 8vo, pp. 215. Buffalo: Baker, Jones & Co. 1883.

Of purely local floras, this, presenting the names of all the plants which have been detected within a radius of fifty miles of Buffalo, may be regarded as one of the completest that has ever been published in this country. All the classes in the vegetable kingdom are included, and the number of plants enumerated, according to the tabular statement on page 190, is 2,739, which are distributed among 946 genera.

Mahonia Aquifolia as a Nurse of the Wheat Mildew (Puccinia Graminis). By C. B. Plowright. (From *Proceedings* of Royal Society, No. 228).

On the Life History of the Dock Æcidium (Æc. Rumicis). By C. B. Plowright. (From *Proceedings* of Royal Society, No. 228).

The Microscopical Bulletin and Opticians Circular.

Under this title, the well-known opticians, Messrs. James W. Queen & Co., of Philadelphia, have recently begun the publication of a bi-monthly which will prove of value and interest to all microscopists, and which will no doubt be well supported by them. Sample copies will be sent to those who request them.

The Microscopic Examination of Timber with regard to its Strength. By F. M. Day.
(From the *Proceedings* of the Amer. Philosoph. Society.)
On the Comparative Morphology of Sciadopitys. By M. T. Masters, M.D. (Reprint from the *Journal of Botany*).

Proceedings of the Torrey Club.—At the regular meeting of the Club held Tuesday evening, April 8th, the President occupied the chair and eighteen persons were present.

After some remarks by the President on the efforts that are being made to save the Adirondack forest, a committee, consisting of the President, Vice-President and Secretary, was appointed to draft resolutions to be presented at the public meeting to be held at Chickering Hall.

Mr. Hollick read a paper entitled "Notes on the Genus *Viola*," of which the following is an abstract:

The Genus Viola:—The changes which most species of the genus *Viola* undergo in the late summer and autumn months do not seem to have had the attention bestowed upon them that their importance deserves. The changes are in leaf, stem and flower, and are apparently invariable and constant, hence of considearble value in determining specific differences.

The following species were collected and studied during the past year: *V. cucullata*, Ait.; *V. sagittata*, Ait.; *V. palmata*, L.; *V. blanda*, Willd; *V. primulæfolia*, L; *V. lanceolata*, L; *V. odorata*, L.; *V. pedata*, L. and *V. canina*, L., var. *sylvestris*, Regel.—*V. cucullata* and *V. sagittata* are connected by every conceivable intermediate form, and *V palmata* also connects with the former by insensible gradations. There is one characteristic, however, which can always be depended upon to distinguish *V. cucullata* and its varieties from the other species, and that is the decumbent habit of the cleistogamous flowers. Indeed, the entire growth of this species partakes of the decumbent habit, the rootstock, leaves and flowers being seldom if ever strictly erect. In *V. sagittata* the growth of the plant is erect from the roots and continues so throughout, and the cleistogamous flowers are conspicuously so.

It is sometimes difficult to know, from superficial appearances, where to place *V. palmata*, whether as a variety of *cucullata* or *sagittata*, but the decumbent habit of the intermediate forms point to the former as the the type. In the young plants of *palmata*, the palmate and cucullate leaves may often be seen on the same plant, this being in accordance with the well recognized principle that the typical form is always more manifest in the young individuals of the variety or derived species.

The three species of white violets are known to be very closely allied. *V. primulæfolia* and *V. lanceolata* produce such a variety of intermediate forms that it is an utter impossibility to say definitely where some of them belong. *V. blanda*, however, is unmistakably distinct, in several particulars. In the autumn, all three of these species produce runners, but no detailed description of the latter seems to have been made. In the entire Torrey herbarium there is but one specimen representing the autumn transformation! In *V. blanda* these runners are almost roots, being more or less under the surface of the ground, slender, producing no leaves and bearing no cleistogamous flowers. They grow from the main rootstock, are not numerous, and are somewhat decumbent. *V. primulæfolia* has runners that sometimes reach a length of 12 inches. They are comparatively stout, run along the surface of the ground, and are mostly leaf- and flower-bearing throughout. These runners have nodes or joints from each of which the leaves and erect cleistogamous flowers start—usually one of each. They root at these nodes, and, during the month of October, break away from the parent plant, the nodes forming the nuclei of new plants for the next year. In nearly every specimen the cleistogamous flowers far outnumber the others. The typical form of *V. lanceolata* has somewhat shorter and more robust runners, which are also more leafy—sometimes appearing almost like incipient branches. While the latter two species are invariably found in company, the former is more often solitary, which is another point in its claim for specific distinction.

In all three species the runners begin to form about the middle of August, reach their full growth about the beginning of October, and then most of them decay except at the points where they have taken root.

Viola odorata produces both runners and cleistogamous flowers. The flowers are quite numerous, starting from and clustering around the main rootstock. They are very much appressed, sometimes appearing as if subterranean. The runners, although having leaves, do not seem to bear cleistogamous flowers.

Viola canina, var. *sylvestris*, shows a very beautiful transformation. The branches of the season become elongated, sometimes to full seven inches, and bear clusters of cleistogamous flowers, each upon a short, slender peduncle in the axils. In some specimens little branchlets start from the axils, bearing both leaves and flowers. The autumnal peduncles are not more than two inches long, while those of the early spring are generally three or four inches in length. Again, in the spring, there is but one flower from each axil, while in the autumn there are two or more.

Viola pedata apparently does not produce cleistogamous flowers, but it very commonly blossoms a second time in the autumn. Specimens have been collected as late as the middle of November.

Mr. Schrenk supplemented the paper with some notes on the structure of cleistogamous flowers.

Mr. Britton referred to a peculiar form of *Viola blanda* (*V. amœna*, Leconte) with petioles and peduncles flecked with red.

Veronica Buxbaumii, Tenore, is reported by Mr. Britton as becoming a weed in many places. It is very common in gardens at New Dorp, S. I., and specimens have just been received from New Brunswick, N. J.

BULLETIN

OF THE

TORREY BOTANICAL CLUB.

Vol. XI.] New York, June, 1884. **[No. 6.**

New Species of Grasses.

By Geo. Vasey.

Panicum Chapmani.—Culms tufted, 1 to 3 feet high, erect, slender, smooth, mostly simple; leaves chiefly radical, often 1 foot or more in length, 1 to 2 lines wide, firm, often involute when dry, the sheaths narrow, shorter than the internodes of the culm, smooth, finely striate, sparingly ciliate on the margins; ligule a short ciliate ring; blade 6 to 12 inches long, attenuate-pointed, scabrous above, slightly ciliate below. Panicle 6 to 12 inches long, narrow, racemose, composed of 8 to 10 sessile spikes, which are approximate toward the apex, gradually becoming 1 to 2 inches distant, appressed, the upper ones about one-half inch long, the lower ones 1 inch or more, containing from 3 to 12 spikelets; the rhachis flexuous, triquetrous, scabrous, and terminated by a short bristle; there are frequently 1 to 3 secondary racemes from lateral peduncles, which are sometimes nearly as long as the terminal one. Spikelets 1 line long, first glume broad, obtuse, one-quarter or one-third as long as the spikelet, second glume 7-nerved, as long as the flower, third glume 5-nerved, slightly exceeding the flower; flowering-glume ovate, acutish, finely striate; palet of equal length with its glume.

This is the *Panicum tenuiculmum* of Chapman's Flora, but is not the *P. tenuiculmum* of Meyer, and I am unable to find it described. It is dedicated to the esteemed author of the Flora of the Southern States.

Panicum Hallii.—Culms cæspitose, 1 to 2 feet high, erect, smooth, simple or sparingly branched, each with about 4 light green, striate leaves, which are 3 to 6 inches long, and 2 to 3 lines wide; ligule a ciliate ring; sheaths smooth or somewhat pubescent. Panicle 4 to 6 inches long, the branches erect spreading, mostly single, alternate and few flowered, the lower one 3 or 4 inches long and subdivided, naked below; the rhachis smoothish, pedicels about as long as the spikelets. Spikelets about one and one-half lines long, acute or acutish, very smooth, first glume broadly ovate, acutish, half as long as the spikelet, second glume ovate lanceolate, acute, 9-nerved, one-quarter to one-third longer than the fertile flower, third glume (that of the sterile flower) 7- to 9-nerved, acute, equal to the second, and enclosing a palet half as long; flowering-glume a line long, oblong, obtuse, smooth and shining.

This is number 816 of E. Hall's Texas collection, distributed as *P. giganteum*, Scheele. It has since frequently been collected in Texas and New Mexico. The spikelets resemble those of *P. virgatum*.

The panicle resembles that of *P. proliferum*, but is a distinct and good species, to which I give the name of its earliest collector, the late Mr. E. Hall.

The May Apple (*Podophyllum*) presents several peculiarities in its development which are so interesting as to merit an explanation. The non-flowering-stem of this plant bears but one leaf, while the flowering-stem bears two leaves, the flower being between them. A section of the base of the flowering-stem reveals nothing peculiar, it is merely a continuation of the rootstock (Fig. 1). The section of the base of the non-flowering-stem, however, reveals a bud, which represents the continuation of the root-stock (Fig. 2). A careful examination shows a small slit at one side of the bud by means of which it has access to the air (Fig. 4) and a cross-section shows that

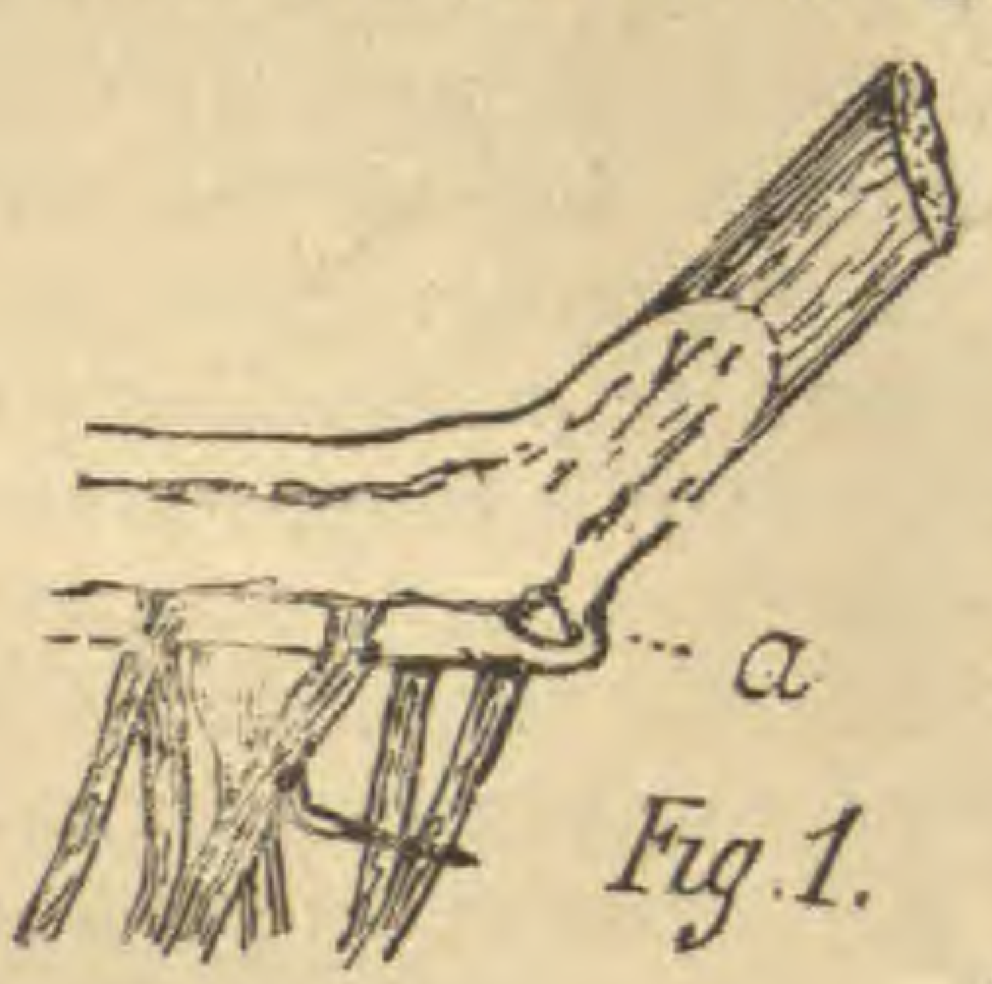


Fig. 1.

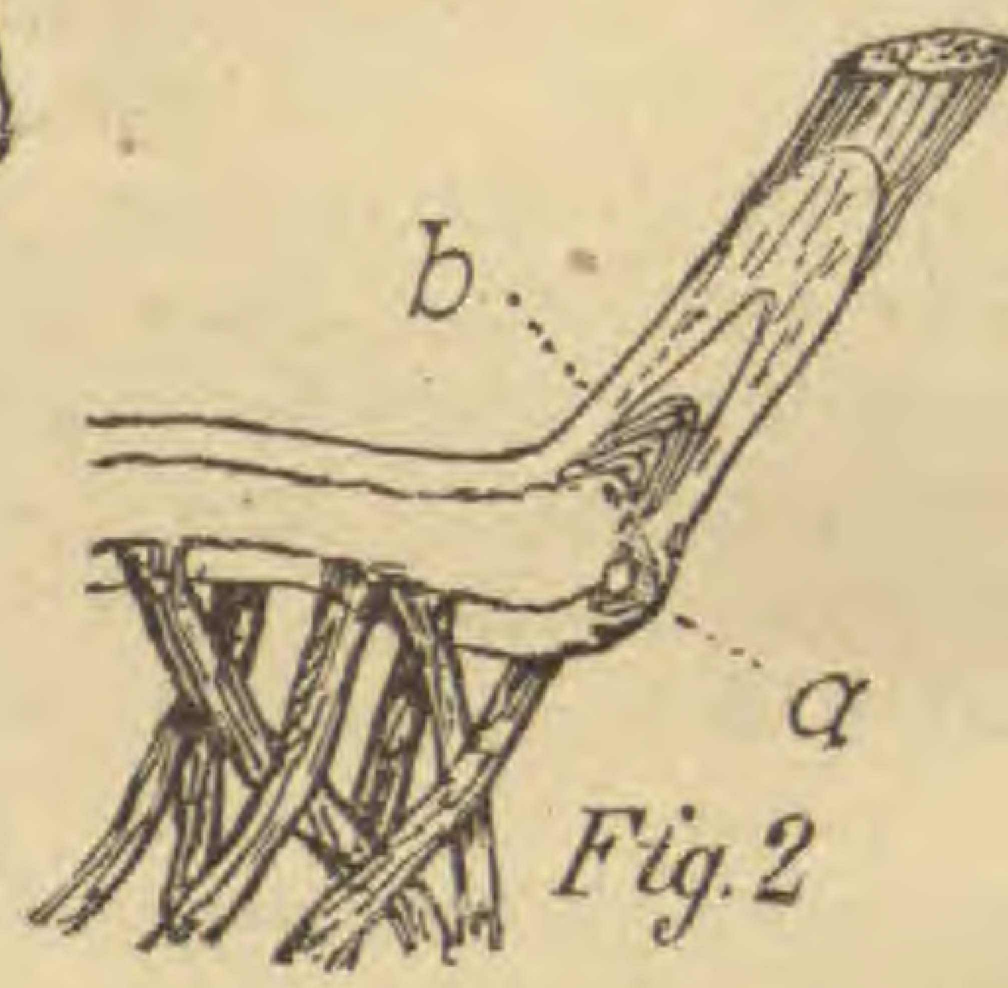


Fig. 2

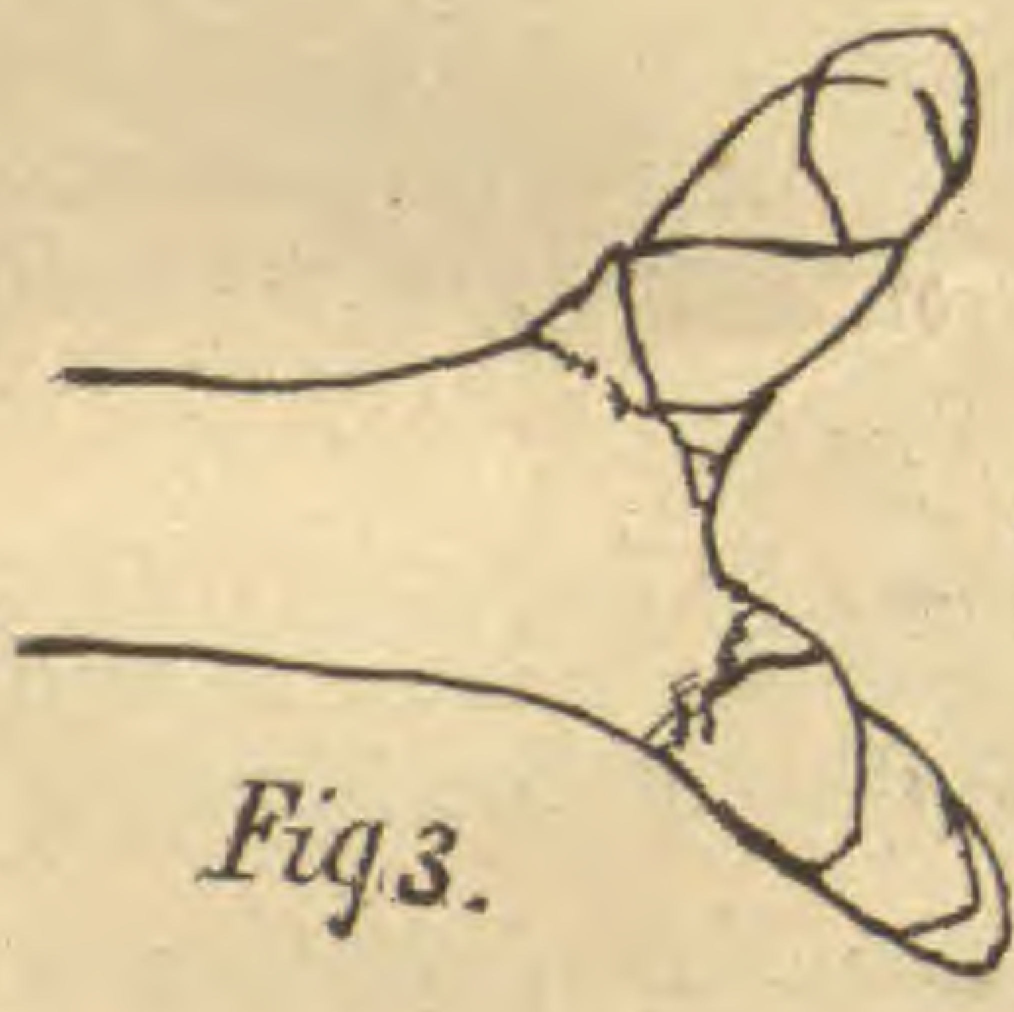


Fig. 3.

Fig. 4

it is formed by the overlapping of the two edges of the stem about the bud (Fig. 5). In a logitudinal section I find the bud-cavity to be placed quite near to the margin of the stem (Fig. 6). Upon examining the older nodes of the rootstock I find undeveloped buds (Fig. 7.) which are placed quite near to the margin of a scar which is pitted like a leaf-scar. In fact, the non-flowering-stem of the May-apple is only a leaf, the base of whose petiole encloses a bud. When two such leaves arise, as is not unfrequent, the bud is enclosed by the base of the inner, second leaf. As a rule, the life of *Podophyllum peltatum* is prolonged by the development of axillary buds into branches (Figs. 1, 2, 7, 8, *a*), because the terminal flowering-stem perishes and the terminal buds of non-flowering stems rarely develop (Fig. 7, *b*). In one abnormal specimen found, a lateral bud divided at its tips, neither branch being axillary to the other (Fig. 3). And here I would state what appears to me a remarkable fact: while the axillary branches always produce long internodes, the terminal bud of a non-flowering stem, whenever it develops, produces only extremely short ones, so as to be practically almost none (Fig. 8). This is a case never found by me in any other plant.

The flowers of the May-apple are terminal. The flower-stems

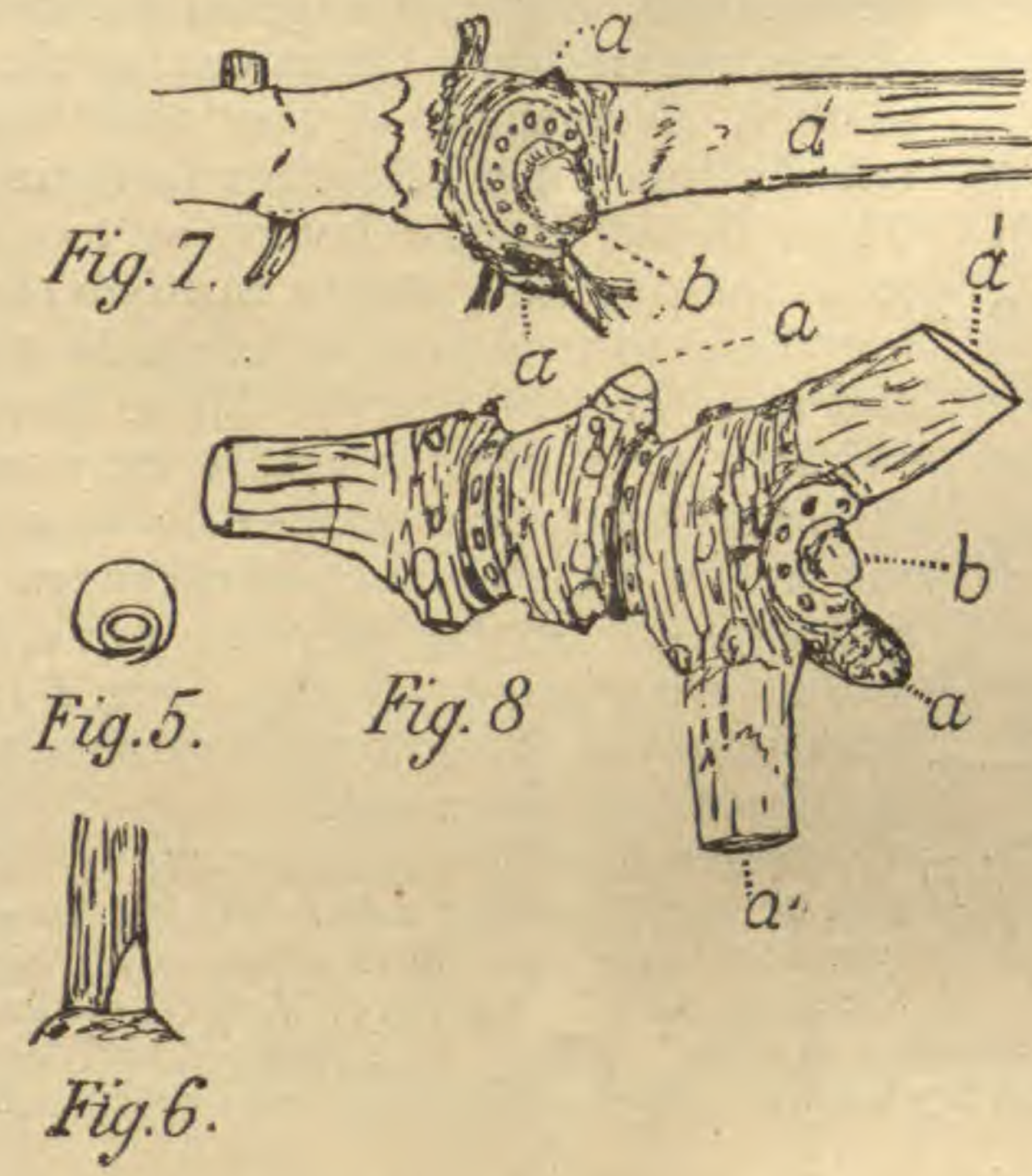


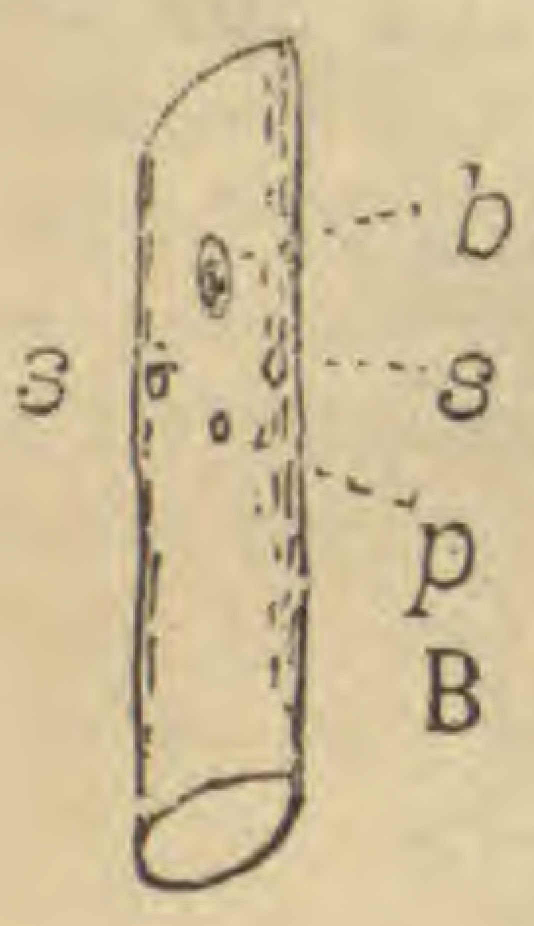
Fig. 7. Fig. 5. Fig. 8 Fig. 6.

may be entirely destitute of leaves, as was a specimen found by me last spring, and which I sent to Prof. A. Gray at the time of discovery (Fig. 9). During one hour this spring I collected within the same woods six specimens of *b*, innumerable quantities of *c*, the usual form, sixteen of *d*, six of *e*, three of *f*, and one of *g*, a form in which

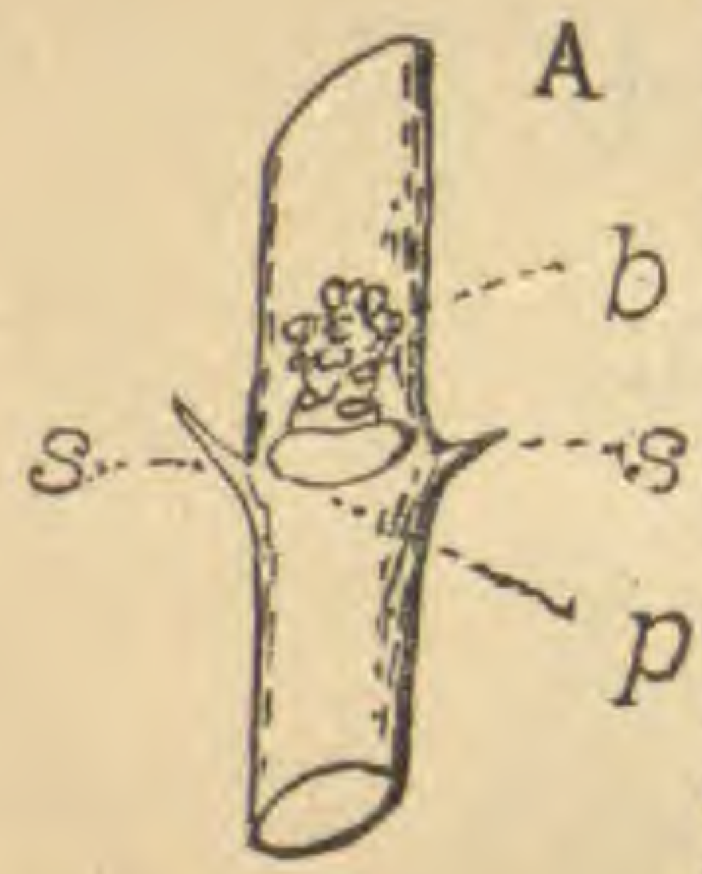
Fig. 9.

three leaves and the peduncle originated from the same point of the stem. In each case the peduncle of the flower bent away from the petiole of the last leaf; a fact which is explained by considering the leaves of the ordinary bifoliate type as not being truly opposite, but merely apparently so, from the close proximity of the one to the other. The leaves are alternate, and the peduncle bends from the petiole which properly belongs to it. The latter is always the smallest petiole of any developed on the plant.

The prickles of the Robinia have been explained as stipules, but never, so far as I remember, have those of *Xanthoxylum Americanum*.



B



A

There are two prickles, one on either side of the petiole-scar, and, as a general thing, somewhat above the latter. Occasionally the thorns are scarcely developed, so that they can be traced only by the fibres belonging to them in the bark. These fibres, whether belonging to a developed or to a latent prickle, always run *into the wood*, showing them to be not a mere product of the bark; and their situation would define them as stipules. Prickles or thorns therefore may represent four different parts of a plant—the stem or a branch, the leaf or its ribs, mere emergences of the bark, and stipules. In Fig. A, *p* is a node, *b* is a branch, and *s s* are stipular prickles. Fig. B represents the bark removed to show the entrance to the vascular fibres into the wood.

DESCRIPTION OF FIGURES.—Fig. 1. Flowering stem. Fig. 2. Non-flowering stem. Fig. 3. Abnormally divided root-stock Fig. 4. Leaf sheathing at *c*. Fig. 5. Section of sheathing base, "*c*." Fig. 6. Vertical section. Fig. 7. The bud (*b*.) formerly sheathed by a leaf. Fig. 8. The sheathed bud developing for several years. *a*. Axillary bud. *a'*. Developed axillary bud or branch. *b*. Terminal bud.

Dayton, Ohio. AUG. F. FOERSTE.

Æcidium Bellidis.—In a note upon this fungus in the BULLETIN for March, 1884, p. 32., I stated that I had produced it from the teleutospores of *Puccinia obscura*. This *Puccinia*, however, occurs in the United States, specimens of it having been sent to me by Professor Farlow, who also informs me that the host-plant of the *Æcidium* is neither indigenous nor cultivated in gardens, except very rarely. It has been assumed by many persons, notably by some of those who write books upon botany, that the æcidial stage is absolutely necessary to the perpetuation of those species of uredines which possess it. This, however, is by no means true. Witness not only the presence, but profusion of the wheat-mildew (*Puccinia graminis*) in districts where the barberry is very scarce, as in the fen country of Norfolk and Lincolnshire in England. The same is even more strikingly shown by the ravages of this fungus upon the wheat crops in Australia, where none of the barberries is indigenous. Impressed by these facts, I have given this matter some special attention, for, living as I do upon the borders of the fen district it has been constantly brought under my notice. It has been thought that a single barberry bush could produce æcidiospores enough to infect half a county, all that was necessary being a few stiff breezes to waft the spores from the bush to the corn, miles away, in the same manner in which we have been taught to believe the spores of *Peronospora infestans* were blown from one end of Europe to the other in the year 1845. Any one, however, who has practically studied the life history of the uredines must be aware that all æcidiospores (like the conidia of the *Peronosporæ*) are endowed with but a very limited term of vitality. If we wish to infect a plant with the æcidiospores of a uredine they must be perfectly fresh, as well as perfectly ripe, and to imagine that the spores of *Æcidium Berberidis* can be blown mile after mile by the wind and still retain their germinative power is simply absurd. If we observe what actually occurs in nature we shall have ample evidence that this far spreading of the parasite does not take place in the aforesaid manner. It is not in the district from which I write an easy thing to find a barberry bush in the hedge of a corn-field, for the practical nature of the observations made by our agricultural forefathers have pretty well exterminated the barberry. I was, however, able to do this two years ago. Three barberries grew in the hedge of a wheat-field, and around each of these bushes the wheat at harvest was as black as if soot had been scattered upon it, in a semicircle about 50 yards across. Nearest the bush it was quite black, but the mildew gradually became less and less the farther we proceeded from the bush. The rest of the field was perfectly healthy.

When the parasitic fungus starts from the æcidiospore, the teleutospores are produced very early, and in great profusion, but when it starts from the teleutospore the uredo is in great profusion and the teleutospore comparatively sparse. I obtained some specimens of wheat mildew from Australia in which the enormous development of "rust," compared to the "mildew," was very striking and unlike anything I had ever previously seen in England. It was this which first drew my attention to the above-mentioned fact, to which I alluded in a paper on the subject of Heterœcism, in "Sunlight." It is also observable in *Puccinia rubigo-vera*, which is here very abundant early in the year upon wheat. The uredo is extremely abundant, but the teleutospores are but slightly developed. The æcidium of this *Puccinia* I have never yet seen in the fresh state, although the other spore-forms are to be found in every wheat-field. The same is true of the specimen of *Puccinia obscura* which Professor Farlow sent to me, as compared with the fungus as it occurs when developed directly from the daisy æcidium. I am much pleased to find that Mr. Rostrup the eminent Danish mycologist, in his recent paper, Heterœciske Uredineer, holds the same view. He mentions the fact that *Coleosporium Senecionis*, when growing in districts in which fir-trees do not occur, consists almost entirely of uredospores. Further, he has found *Chrysomyxa Ledi* upon a plant of *Ledum palustre* from Greenland, a country in which the æcidium-bearing host-plant (*Picea excelsa*) does not grow.

King's Lynn, Eng. CHARLES B. PLOWRIGHT.

Mutilation of Flowers by Bees.—Referring to Prof. Bailey's note in the May BULLETIN, I may say that it has been a matter of frequent observation with myself that the flowers of *Dicentra Cucullaria* are systematically punctured by bees; when growing wild *Corydalis glauca* suffers in the same manner, and, I doubt not, other members of the family also. As Mr. Meehan remarks in the same number of the BULLETIN, this lawless trait of the humble-bee may be easily observed. It is an acquired habit, and one that has not yet reached its fullest development, for, while some species of flowers are invariably punctured, others, which are even more difficult of access, are approached in the legitimate manner and are never mutilated. In some localities, hardly an individual of *Gerardia integrifolia* will escape being punctured, and always, so far as I have observed, in the same relative portion of the corolla. In both cases, too, the corolla is bored before its lobes have been unfolded; yet not all the bees seem to understand this, for while by far the greatest numbers fly at once to the puncture made by some previous visitor, others will visit every flower in the regular manner, showing that some understand the operation while others do not. Again, although the *Gerardia* is commonly punctured, it has a comparatively open and accessible corolla, and, on the other hand, the corolla of *Linaria vulgaris*, which is thoroughly closed, is, I believe, never punctured, though the bees visit it in numbers and are forced to no slight exertion to reach its interior.

To me the interpretation of these facts is that while there is the appearance of a purpose in the act, yet it is in the main a blind operation on the part of the bees, and, in any event, they fail to derive the greatest possible benefit from their work, when they persist in boring an open corolla and approach a closed one in the laborious manner which its peculiar mechanism demands.

Mountainville, N. Y. WINTHROP E. STONE.

Dicentra Punctured by Humble-Bees.—In the last number of the BULLETIN, (p. 55) Prof. W. Whitman Bailey, of Rhode Island, says: "I find that in my garden the flowers of *Dicentra Cucullaria* are systematically punctured by humble-bees; I have watched them in the process. Has this been noticed when the plants are growing wild? It sadly interferes with the very neat mechanism for cross-fertilization."

Several years ago Dr. A. K. Fisher called my attention to the fact that humble-bees were in the habit of obtaining honey from this species by biting through the base of the corolla; and I have since observed that, along the borders of the Adirondack region, in Northeastern New York, it is the exception to find a mature flower of either *Dicentra Cucullaria* or *D. Canadensis* that has not been thus punctured. Whatever be its theoretical bearings upon the fertilization of these plants, the fact remains that both species still thrive here, growing abundantly and in luxuriance.

Locust Grove, New York. C. HART MERRIAM.

Dicentra Punctured by Humble-Bees.—In reading Prof. Bailey's note in the May BULLETIN on the perforation of the flowers of *Dicentra Cucullaria* by humble-bees, I am reminded that the late Mr. Leggett once noted a similar cirçumstance in plants sent to him from Lewis Co., N. Y. For the benefit of those who are not fortunate enough to possess a complete set of the BULLETIN, I make the following extract from Mr. Leggett's note:* "C. went to the woods

* Extract from a letter sent to Mr. L. from Lewis Co., BULLETIN, iii., 33.

and spent several hours watching the bees. The woods were full of Dicentras this spring. He could not find a spike of any species on which there were not one or more punctured flowers. He saw several humble-bees performing this labor, and many honey-bees sucking the honey, but in no instance did he see the honey-bee make the incision." N. L. BRITTON.

Teratology.—A head of the ox-eye daisy (*Chrysanthemum leucanthemum*, L.) has just been brought to me by a lady (Mrs. Cowles) living in Hamden which has the rays replaced by white tubular corollas one-quarter of an inch long, gradually ampliated outwards, and irregularly 5-lobed. Most of these corollas are somewhat bilabiate, with three parts in the lower lip, and two, a little smaller, in the upper. The veins of the lobes are submarginal and unite below the sinuses, as in the normal disc-flowers of the order. These ray-flowers have both stamens and a short, included style, like that of the disc-flowers. The ray-flowers are in general structure comparable to those of *Chænactis*, but there are no gradations from them to the disc-flowers in this specimen. Is this condition to be explained by a simple reversion of the usual rays to a form more like that of the disc-flowers, or by supposing the ray-flowers to be deficient, and the exterior disc-flowers to be enlarged so as to replace the rays? One of these exterior flowers, which I dissected, had the ovule well developed, and it is probable that all would have been fertile.

Mrs. Cowles tells me that the plant bore six heads like the one sent to me.

New Haven, June, 1884. DANIEL C. EATON.

Another Florida Fern has been lately discovered by Miss Mary C. Reynolds, viz., *Phegopteris tetragona*, Mett. This is one of the species which has sometimes the faintest rudiment of an indusium, and so has been referred to *Aspidium* in Mettenius's later writings. It has a creeping rhizoma, and rather thin herbaceous and finely pubescent fronds one or two feet high. These are pinnate with a gradually decreasing apex and several pairs of long and not very deeply pinnatifid pinnæ. The veins are simple, and the 2–3 basal ones are connivent as in *Aspidium molle*. It is common in the West Indies, and on the continent from Panama to Brazil. Miss Reynolds "found it a year ago in a live-oak hummock in Marion County, well established there, and a very pretty fern it is, too." "When growing, there is a metallic lustre about it that to me is very pleasing."

New Haven, June, 1884. DANIEL C. EATON.

Albinism.—During the winter and spring I have found, usually single plants only, sometimes several clusters, of the following species with pure white blossoms. The whole plant was of a lighter green than usual, no other color being present: *Delphinium decorum*, F.&M. (one specimen); *Sidalcea humilis*, Gray (two specimens); *Erythræa venusta*, Gray (several clusters); *Gilia dianthoides*, Endl. (common in places); *Linaria Canadensis*, Dum. (one case); *Orthocarpus purpurascens*, Benth. (often nearly white); *Mirabilis Californica*, Gray (not rare); *Brodiæa capitata*, Benth. (three specimens). *Phacelia Parryi* and *P. grandiflora* are found nearly white occasionally, very rarely pure white.

A bud on a branch of *Mimulus glutinosus*, v. *puniceus*, upon developing in a vase, was identical in color with the typical form of *M. glutinosus*, Wendl.

San Diego, Cal. CHARLES R. ORCUTT.

Absorption in partially severed Branches.—In the recent experiments reported by Francis Darwin (*Nature*, Vol. xxx., p. 9) upon the absorption of water by plants, he alludes with surprise to the fact that "cuts to the depth of half or more than half the diameter of the branch produce practically no diminution in the rate of absorption."

Remarkable instances of a similar, if not identical, phenomenon often come to the notice of the arboriculturist, and the following illustration of the ability of a greatly reduced cellular area to supply moisture, etc., occurred in our garden last year. A large apple-tree, with a spread of branches almost circular, twenty feet in diameter, with four main limbs, twenty-five secondary limbs, and a numerous growth of twigs and final ramifications on the outskirts and summit of the tree, had suffered from being too deeply covered with earth around the trunk, and the epidermal layers sickened and died, contracting the available area by which sap passed to and fro in the general circulation of the tree to a strip of bark less than two inches in width. The trunk at this point was three feet in circumference, and above the zone of dead tissue, which was removed, the bark retained its healthy and normal condition.

The tree put out leaves in great abundance, and blossomed luxuriantly. The disproportion between the area supplied with nutriment from the roots, and the size of the bark connective, seems very remarkable, and may be considered analogous to the conditions in Dr. Darwin's experiment, where the rate of transmission of moisture was unchanged in a half-severed twig. As the season advanced and became drier and hotter, the tree became sickly. It was deprived of the use of a large portion of its roots and could not, with the limited resources furnished it, feed itself with sufficient moisture; but the capacity of a very restricted line of cells to sustain, at least temporarily and under favorable conditions, a perfect union between the body of the tree and its roots was demonstrated.

L. P. GRATACAP.

Botanical Notes.

Palms.—Some interesting details respecting these princes of the vegetable kingdom, as Linnæus called them, are to be found in Sir Joseph Hooker's last report on the progress and condition of the Royal gardens at Kew. The extent to which they have recently been brought into cultivation is noteworthy.

Miller in his Gardener's Dictionary, edition of 1731, knew of seven species; but only two were generally known in conservatories, the dwarf fan-palm of the south of Europe, and the date. Aiton's

Hortus Kewensis, in the second edition (1813), enumerates only 24 species. The Loddiges, great cultivators of palms, who possessed in their day much the largest collection known, enumerate 210 species in their nursery catalogue of the year 1825. In the Herrenhausen conservatories, Hannover, Wendland had assembled 287 species in 1835, and 445 in 1882. This is the largest collection in the world; but the noblest must be that of the Botanical Gardens of Buitenzorg, Java, which, in 1860, boasted of 273 species, "all standing naked in the open air."

It is only when the literature of the order is brought together systematically, that we appreciate the extent and variety of palms. In the new Genera Plantarum, Sir Joseph Hooker characterizes 132 genera of true palms, and indicates about 1,100 species.

Our readers may like to know what palms are indigeneous to the United States, and what names they now bear. Without counting one or two tropical species which grow in Southern Florida, and which are outlying Cuban and Bahaman species, we have two true palmettos, *Sabal palmetto*, and *S. Adansoni*; the blue palmetto, *Rhapidophyllum hystrix* of Wendland; the saw palmetto, *Serenoa serrulata* of Hooker. This is the old *Sabal serrulata*, upon which Hooker has recently founded a new genus, dedicating it to our associate, Sereno Watson (*Palmam qui meruit ferat*) there being already a *Watsonia* in honor of an earlier botanist of this name. Finally we have, just beyond our national borders, namely on the Islands of Lower California, a palm of a peculiar genus, instituted by Mr. Sereno Watson, the *Erythea edulis;* and in Southern California the elegant *Washingtonia filifera*, with which Wendland has complimented our country by naming this palm in honor of its first president. The only other president so distinguished is Jefferson. *Jeffersonia diphylla* is one of our choicest spring flowers.—*Science.*

Morphology of the Husk of Carya.—At a recent meeting of the Philadelphia Academy of Natural Sciences Mr. Meehan exibited some nuts of *Carya glabra*, Torr., which had been brought in by one of his seed-collectors from a tree in the woods in the vicinity of Philadelphia. They had two, or sometimes three, nuts in a single exocarp, as in the manner of *Castanea vesca*, the common chestnut. The collector was under the impression that all the nuts borne by the tree were of a similar character.

Dr. Asa Gray, who was present, remarked that this occurrence of two or three nuts of *Carya* within the same husk, either separate or partly coherent, was of much morphological significance. Specimens like these, said to have been collected in Montgomery County, Penn., had been sent to him several years ago, with the remark that the tree bore a good many such abnormal fruits; Dr Gray believed that the conclusion to which they inevitably pointed had not yet been published. It was, however, communicated to Dr. Engelmann, along with a portion of his specimens, at least five years ago. The conclusion drawn was the following: The husk, or so called exocarp, of *Carya*, is an *involucre*, usually containing a single female flower, and connate with its ovary; its true morphology is revealed when, as in this case, it contains two or three flowers. The stone or shell of the nut is the whole pericarp in *Carya* as much as in *Corylus*. In the former genus it becomes free from the four-valved involucre at maturity; in *Juglans* the congenital union is more permanent, forming a drupaceous accessory fruit, of which the fleshy part is involucre, the bony part is pericarp. This view directly homologizes the Juglandaceæ with the Cupuliferæ.

Tamarinds.—There are few people to whom the flavor of preserved tamarinds is not agreeable, but do those who frequently use tamarinds know how they are prepared? They come into commerce both from the East and West Indies; the latter, it would seem, are simply the fruits, or, rather, pods from which the shell or epicarp has been removed, and the pulp together with the strong fibrous framework upon which it is built, and the seeds are placed in alternate layers with powdered sugar in a cask or jar, over which boiling sirup is afterward poured. In the East Indies it seems they are prepared by first removing the epicarp and seeds by hand, after which the pulpy portion is usually mixed with about 10 per cent. of salt, and trodden into a mass with the naked feet. Of these tamarinds several qualities are known in the market, the best being free from fibre and husk, and the worst containing both, together with the hard stone-like seeds, which are commonly eaten in the East Indies after being roasted and soaked to remove the outer skin, and then boiled or fried, when they are said to be tolerably palatable. West Indian tamarinds are alone officinal in the British *Pharmacopœia;* while on the Continent those from the East are alone employed. Besides the tamarinds sent to Europe they are also shipped in large quantities from Bombay to Persia and other northern countries.—*Gardeners' Chronicle.*

Attraction of Insects by Phallus and Coprinus.—E. Ráthay and B. Haas have examined the structure of the fructification of *Phallus impudicus*, with a view to determine the peculiarities in its construction which attracts flies and other insects to it. This is effected partly by the odor and partly by the taste. They find the fluid which results from the deliquescence of the gleba to contain an abundance of sugar; and they observed visiting this as many as fourteen species of insects, most of which also visit the nectar of flowers or feed upon honey-dew. The same phenomenon is exhibited by a number of other species of Phalloideæ; and the explanation suggested is that the insects are useful to the fungi in disseminating the spores which are set free by the deliquescence of the gleba [Cf. BULLETIN, Vol. vii., p. 30, where this same view is put forth by the Editor.]

The pileus of species of *Coprinus* and of some other species of Agaricini also exude sugar.

With regard to the exact chemical nature of the substance formed, the authors state that it consists in all these cases, in addition to dextrose, of another sugar which belongs to the same class and is probably trehalose. In *Phallus impudicus* there are no less than three substances which reduce alkaline solution of copper, viz., dextrose, torulose, and a substance intermediate between dextrose and gum. In *Coprinus deliquescens* the only one of these substances present is dextrose.

The Parasites of Money.—The *Frankfurter Zeitung* states that Dr. Reinsch has found, as the result of a long series of minute investigations, that the surfaces of 50-pfennig pieces which have been long in circulation are the home and feeding-ground of a minute kind of bacteria and vegetable fungus. An extended series of observations showed that this is the case with the small coins of all nations, the thin incrustation of organic matter deposited upon their surfaces in the course of long circulation rendering them very suitable for this parasitical settlement. Dr. Reinsch scraped off some of these incrustations, and with a small scapel divided them into fragments, which were subsequently dissolved in distilled water. The employment of lenses of very high power showed the bacteria and fungi distinctly.

The Banyan tree.—Respecting this tree, Forbes, in his "Oriental Memoirs," says that a Banyan tree, named Cubbeer Burr, was nearly 2,000 feet in circumference, measured round its principal stems, but that the ground covered by its overhanging branches was considerably more extensive. The large trunks numbered 350, and the smaller ones exceeded 3,000. This tree at one time was considerably larger, a fearful storm, accompanied by a flood on the Nerbudda, having carried away a greater part of it, reducing the number of the larger trunks from 1,350 to the 350 now remaining. The original size of this colossal tree may be better conceived by remembering that 2,000 feet, its circumference when Forbes saw it, is more than one-third of a mile. It is truly one of the wonders of Nature. The careful provision by which everything is made to adapt itself to the circumstances in which it is placed is strongly exemplified in the growth of this tree; for if these branches did not throw out roots, and so form a trunk with which to support their own weight, they would tear themselves off from the parent stem.—*The Garden.*

Absorption of water by plants.—Mr. F. Darwin, in an article on this subject recently published in *Nature*, shows that the rate of absorption is influenced by the dampness or dryness of the air, being more rapid in dry air, owing to the more rapid evaporation from the leaves, and more rapid in sunlight than in shade. He also confirms Baranetzky's statement that a small disturbance, such as a slight shake, by increasing the transpiration from the leaves, increases the rate of absorption, while cutting off a twig rapidly diminishes it. A. Sorauer, however, found in some experiments on gourds that the removal of leaves from plants on two occasions did not alter the amount of evaporation in the least; and even when half the leaves were removed from another plant, although a reduction in the amount of evaporation ensued at first, after eleven days the evaporation was equal to that of an untouched plant.

The American Association for the Advancement of Science.—The committee of the American Botanical Club of the A. A. A. S. has so far arranged the programme for the next meeting in Philadelphia, opening September 4th, that they are enabled to assure the botanists of the country a most enjoyable and profitable time. All botanical members of the Association should call at the Academy of Natural Sciences as early as possible after arrival and register. They will find a committee in charge to welcome them to the privileges of the

Club and of the Academy, and to assist them in becoming acquainted with other botanists.

Excursions in addition to those of the general Association have been arranged to the pine barrens and to the Bartram gardens, and others will be added. Upon Monday evening, September 8th, the Botanical Section of the Academy of Natural Sciences will give a reception to the Club at the rooms of the Academy. The hours for meeting of the Club will be annouced daily during the session.—J. C. ARTHUR, Chairman of Committee.

Botanical Literature.

A Manual of the Mosses of North America. By Leo Lesquereux and Thomas P. James. With Six Plates illustrating the Genera. 8vo, pp. 447. Boston: S. E. Cassino & Co. 1884.

In this volume we have a manual which will be greeted by all botanists as a valuable addition to the literature of the subject, supplying a need that has long been felt. To the arduous and protracted labors of the authors, with the assistance of other eminent bryologists, both in this country and abroad, the students of this delightful branch are indebted for a most satisfactory guide. It contains 447 pages, with descriptions of nearly 900 species, includes a good glossary and is illustrated with six plates. The type is clear, and the descriptions are full and amended from the most recent investigations —corrections and additions having been made just before going to press. We notice with pleasure copious descriptions of the orders and tribes, with bibliographical references and systematic tables. The classification is that used in "Sullivant's Mosses" (Gray's Manual, 1863), with additions; the class being sub-divided into three orders, Sphagnaceæ, Andreæaceæ and Bryaceæ; the first two including one genus each, the last, 23 tribes and 126 genera. One oversight has been noticed on page 5 which contradicts the text on page 95. *Eustichia* is given under the sub-division of "Teeth of the peristome 16," and, below, "fruit unknown."

The Sphagnaceæ are briefly described, and references are made to monographs for details. It is to be regretted that a whole plate was not devoted to them, and some of Braithwaite's excellent illustrations of the leaf- and stem-structure given, especially as the other plates, with one exception, are those used by Sullivant.

The Hypneæ are given in one genus with 28 sub-genera and 195 species.

As the name implies, Alaska, British America, Greenland and the United States are included in the range of the mosses, but Mexican species are omitted, which is a disappointment, as they are to be found in Rau and Hevey's Catalogue of N. A. Mosses. However, as a description of them would have entailed a further delay, since the Mexican collections are chiefly to be found in German Herbaria, we can excuse this omission and hope to see a demand for a Bryologia Americana on the scale of the Bryologia Europæa at no distant day.—ELIZABETH G. KNIGHT.

BULLETIN

OF THE

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New North American Fungi.

By J. B. ELLIS and BENJ. M. EVERHART.

ÆCIDIUM LIGUSTICI.—Cups small, margin narrow, subentire, collected in clusters 2–3 mm. in diameter on the under side of the leaves. Spores irregularly globose, 18–20μ (orange?) The upper side of the leaf is obscurely marked with pale, yellowish spots, indicating the position of the *Æcidium* opposite.

On *Ligusticum Scoticum* from the Island of Anticosti (Gulf of St. Lawrence), August, 1883. Prof. J. Macoun (No. 311.)

SEPTORIA ACICULOSA.—Perithecia innate-superficial, mostly in clusters of two or three together, black, minute, on the lower face of the leaf. Spores acicular, continuous, 12–20x1μ. Accompanied with *Sphærella Fragariæ*, Tul.

On strawberry leaves. Anna, Ill., May, 1883. F. S. Earle.

SEPTORIA PENTSTEMONIS.—Perithecia punctiform, black, epiphyllous, on small, white, round, thin spots, with a dark, purple-shaded border; spores cylindrical, slightly curved or undulate, 14–20x1μ, faintly nucleate.

On leaves of *P. digitalis*. Anna, Ill., June, 1883. F. S. Earle.

The perithecia are visible on both surfaces of the leaf, but open above.

EXCIPULA SUBCALVA.—Excipulum thin, substriate, 150–200μ in diameter, margin incurved when dry, jagged and uneven from the unequally developed tips of the brown, elongated constituent cells; basidia slender, branching 50–75μ long, bearing at their tips the minute (3–4 x .5–.75μ) oblong-cylindrical spores.

On fallen leaves of *Quercus obtusiloba*. Newfield, N. J., May, 1882.

HENDERSONIA PLATYPUS.—Seated on oblong or roundish white spots 2–4 x 1–2mm., perithecia punctiform, black, subelongated; spores mostly oblong elliptical, but rather variable in size and shape, mostly 12–15 x 3.5–4μ, but some of them shorter and broader, and some longer (19μ) and narrower, all 3-septate, yellowish-brown, on pedicels about 7μ long, with a broad base. The cuticle of the cane is soon eaten away in the white spots, leaving the surface of the inner bark exposed in the shallow depressions thus formed. Accompanied with a *Phoma* (*P. lethalis*, E. & M.) having small subglobose (2 x 1.5μ) brownish spores.

Differs from *H. sarmentorum*, West., in its smaller perithecia on white spots, and its rather smaller spores on pedicels swollen at the base. On living canes of *Rubus villosus* and *R. Canadensis*. Cobden, Ill., Feb., 1884. F. S. Earle.

PEZIZA EARLIANA.—Erumpent, scattered, liver-color; darker when dry, closely surrounded by the epidermis, hemispheric and nearly closed at first, at length expanding so as to show the pallid disk; margin suberoded, minute (.12–.17$^{mm.}$); asci sessile, oblong, 50–55x12μ; paraphyses stout, and, when mature, distinctly and abruptly swollen at the tips ; sporidia crowded, oblong-cylindrical, obtuse at each end, 3–4–nucleate, hyaline, 15–18x 2.5–3μ.

Differs from *P. Dehnii*, Rab., in its smaller size, scattered mode of growth, broader asci, larger sporidia and club-shaped paraphyses.

On the under side of dead leaves of *Fragaria*. Anna, Ill., May, 1883. F. S. Earle.

NECTRIA CANADENSIS.—Perithecia cæspitose, ovate, .33$^{mm.}$ broad by about .5$^{mm.}$ high, densely tuberculose-granulose, dull red ; ostiola broad, obtuse, not prominent, but distinctly stellate cleft and slightly collapsing when dry ; asci and paraphyses evanescent, the former about 75–80x10–12μ (spore-bearing part) ; sporidia irregularly crowded, hyaline, oblong, 3-septate, slightly curved, ends obtuse, 18–21x7–9μ.

The conidial stage is a *Tubercularia*, .5–2$^{mm.}$ high, with an orange-colored head bearing oblong, 5–7x1.5μ conidia and brick-red stem bursting out through cracks in the bark in continuous series two or three inches or more in extent. From the basal portion of this *Tubercularia* the perithecia arise, and finally entirely surround and overtop the orange heads of conidia, which are either entirely hidden or remain partly visible in the midst of the dense clusters of perithecia.

Allied to *Sphæria pseudotrichia*, Schw. On bark of elm limbs. Ottawa, Canada, August, 1883. Macoun (No. 311.)

BOSELLINIA MACOUNIANA.—Gregarious, superficial, ovate, .33$^{mm.}$ in diameter, covered, with the exception of the prominent ostiolum, with a coat of short, light purplish tomentum; asci long and narrow (100μ and over); sporidia uniseriate, overlapping, 19–22 by about 6μ, 2–nucleate, brown, oblong or subnavicular.

On rotten wood. Ottawa, Canada, Oct., 1883. Macoun (No. 253.) From other localities I have received specimens of what appears to be the same, only with the perithecia denuded and black (old) and much resembling old specimens of *Sphæria subiculata*, Schw., which, in the absence of the yellow evanescent subiculum, may be distinguished from this by its smaller (10–13μ long) sporidia.

NUMMULARIA PEZIZOIDES. — Stroma carbonaceous, erumpent, superficial, depressed-obconic, black outside and rufous brown within, about 1$^{cm.}$ broad and .5$^{cm.}$ thick, with a narrow sublobate margin ; disk thickly studded with the strongly prominent, papillate ostiola; perithecia flask-shaped, or subangular by compression, about 1$^{mm.}$ high; sporidia narrow-elliptical, a little bulging on one side, brown, 1–2-nucleate, 11–13 x 4–5μ.

On bark. Ottawa, Canada, Oct., 1883. Macoun (No. 228). Since found at Topeka, Kansas, by F. W. Cragin.

The specimens being rather old, the asci had disappeared. This has the general appearace of a thick, narrow-margined *Peziza*, and, judging from the description of that species, must be much like

Nummularia Moselei, Berk., but is apparently distinct. The Kansas specimens were on decorticated wood and were rather smaller.

PLEOSPORA CLARKEIANA.—Perithecia minute (.1$^{mm.}$), membranaceous, scattered, sunk in the substance of the leaf, the upper part slightly projecting and closely covered by the blackened epidermis, and finally collapsing; ostiola scarcely prominent; asci subcylindrical, 125 x 25μ; sporidia biseriate, pyriform or oblong, mostly slightly constricted across the middle, about 7-septate, becoming muriform and brown.

On dead leaves of *Plantago maritima?* Island of Grand Menan, (Maine), June, 1884. Miss C. H. Clarke. Allied to *P. Heleocharidis*, Karst, but asci and sporidia smaller.

SPHÆRELLA GALLÆ.—Perithecia minute, scattered, or in groups of 2–3 together, rupturing and loosening the epidermis; asci 40–45 x 10μ, sessile; sporidia crowded in 2–3 series, slender, clavate, 1–septate, 12–15 x 3μ (at the broad end).

On galls of *Vaccinium corymbosum*. Newfield, N. J., July, 1883.

Notes on the Botrychia.—I give some facts that struck me in recently gathering specimens of *Botrychium rutaceum*, Sw., and *B. lanceolatum*, Angst. The peculiarity of their growth is this: they are found at the head of a ravine, in shade, but generally in shaly soil that is almost barren of small undergrowth, and has but a slight covering of vegetable mould—sometimes none at all. They were so mature on June 28th that a tiny cloud of spores flew from the fertile fronds the first time they were touched. They grow in little colonies here and there where the soil seems to be suited to them. The two species grow together, *B. rutaceum* having sterile fronds that are almost uniform in width throughout, and pinnules that are broad, blunt and toothed. *B. lanceolatum*, on the contrary, is deltoid in shape, and has comparatively long and narrow pinnules. There is also a form of *B. rutaceum* in which the sterile frond is almost as finely incised as in *B. ternatum* var. *dissectum*. This is exceedingly pretty and delicate.

I had been quite inclined to believe that these two species were in reality only different forms of the same thing. They grow in the same locality, and often close to each other. But proximity by no means signifies consanguinity, and small forms of *B. Virginicum* grew there even more plentifully than either of the others, although it preferred the vegetable mould. So I made an examination of the bud forms and found them to agree substantially with Mr. Davenport's descriptions. There was a slight difference in the *rutaceum*, or *matricariæfolium* as he designates it, if I understand his description aright. He says: "the apex of the *fertile* frond is *bent downward* in the bud toward the sterile frond, which clasps it with its side divisions and bends its apex downward over the whole." In my specimens the fertile frond is shorter than the sterile in the bud, and stands up perfectly straight; but it is clasped by the sterile frond exactly as he describes. Both the figure and description of *B. lanceolatum* that he gives are capital, and cannot be bettered.

There is in my herbarium a monstrosity of *B. rutaceum* in which the sterile frond is four inches long, with a terminal pinna, and four pinnæ on each side, opposite to each other. The pair next to the lowest measures an inch and a half from tip to tip ; but the lowest pinnæ are each 1.75 inch long, making the pair measure 3.5 inches. All but these are at right angles to the rachis, but the lowest pair projects forward so as to form a V which encloses two-thirds of the upper part of the frond. They are fully an inch from the junction of the rachis with the stipe. The fertile frond is divided into three main branches, each of which is decompound and about three inches long. The entire plant is twelve inches high. It came from the same locality that I have described above.

I have also to report the presence, at a roadside in the town of Deerfield, Oneida Co., N. Y., of a considerable amount of *Trifolium stoloniferum*, Muhl., which is scattered along for half a mile or more. How it came there I have not been able to learn, and I can find no record of its occurrence elsewhere in this State. The street is two or three miles from the N. Y. Central Railroad, and, although it is an old one, as is indicated by an occasional Lombardy poplar, it is not much travelled save by the residents. Under such circumstances the plant would hardly be apt to come in of itself as a straggling immigrant. Possibly it may have come with cattle brought from the west.

Utica, July 9, 1884. BENJ. D. GILBERT.

Lonicera grata.—A year ago I sent a line to the BULLETIN asking for information about *Lonicera grata* in its indigenous habitats. Not having obtained much satisfaction, I renew the inquiry. Does any botanist now know of this plant in the "Cedar Swamps of New Durham," or in Darlington's habitats on "Ridley Creek," and on "the Brandywine above the Forks." As to Dr. Torrey's plant, he says he had not seen it in flower, and the specimen in his herbarium I suppose to be *L. parviflora*, Lam., *i. e.*, *L. glauca*, Hill.

A. GRAY.

The Range of Phoradendron.—Mr. J. Schneck's interesting notes on *Phoradendron*, its habit and range, in the *Botanical Gazette* for June and July, lead me to record the probability that its northward extension along the Atlantic coast was formerly greater than at present. Its most northern stations in the immediate vicinity of the coast at present known, is at Lakewood, N. J. (W. Bower, A. C. Apgar). The station noted by Mr. Canby, between Trenton and New Brunswick, is probably a few miles further north. In 1879, while preparing the Flora of Richmond Co., N. Y., with Mr. Arthur Hollick, we were credibly informed that, only a few years before, the mistletoe was growing on sour gums near Clifton, and a note was made to that effect ; since then I have been shown a locality in that neighborhood by Mr. R. S. Newbury, of New York, where he had seen the plant in former years. The *Nyssa* was there—several very old, decaying trees—but no *Phoradendron*.

N. L. BRITTON.

The Mistletoe (*Viscum album*, L.).—Forgotten or not, the mistleto is perhaps the most distinguished plant in the flora of England. Its name has been spelt in more ways than any other well-known word in our language. Mistleto itself has been a problem to etymologists, and there is the usual divergence of opinion on the subject. Prior thinks it means the "mixed" shrub, from its appearance, so different from its parent stock. Forby thinks mislinbush means the "golden bush," from a Saxon name of a kind of brass. Virgil speaks of it as the *ramus aureus;* a German poet has called it *die goldfärbte mistel*, and the Welsh have named it *pren puraur* or "tree of pure gold." But the Saxon name mentioned by Forby means nothing but "mixed metal," so at best this etymology is only a step in the explanation. In reality it means the "dung twig" or "shrub." The final syllable "-to" or "-den" corresponds to the Anglo-Saxon *tan*, "a twig." Mistel is derived originally from a Sanskrit word meaning "excrement." The name may possibly refer to the slimy mucilage surrounding the seeds, but more probably to the way in which the plant is propagated. The missel thrush or missel bird is really the mistleto thrush, and it is so named because of its great fondness for the berries. Like the nutmeg-pigeon of the Spice Islands, which eats the nutmeg fruits, digests the pulp, and expels the seeds which we call nutmegs, sometimes carrying them many miles from the parent, the missel thrush, by, eating the berries, is the chief agent in preserving the species.

Viscus or *viscum* is the Latin name for this plant; botanically it is distinguished as *Viscum album*. It is sometimes difficult to separate the meaning of *viscus*, the mistleto, from *viscus*, glue or birdlime, for making which the mistleto was formerly esteemed inferior only to the holly. And the word *viscera*, which is connected with them both, points to the original meaning of all three. *Vish* is the Sanskrit root, meaning to "separate" or "disjoin." One of its numerous derivatives is *vishta*, "excrement," and thence comes *viscum*. With *viscum* is connected a long series of words. The *iks*, *iksos* and *iksia* of the Greeks, called *biskos* in the Beotian, and *fiskos* in the Arcadian dialect, the Italian *vischio* and the Portuguese *visgo* are all related to it. The French is *gui;* in the Berry dialect this is *guè* in Norman *vi* or *vi de pommier;* in Aube *avi* or *havi*, and in Manche *wi*. The Celts or Gauls are said to have called the plant *visca* and *viscus*. *Gwysglys* is the Welsh representative of the same word. *Gwysgenlyd* and *gwysgonlys*, also Welsh, are probably connected with it. *Guis*, an old Erse name, means "mistleto" when a noun, and "viscous" when an adjective. In parts of Prussia the plant is called *wispe*, which may be connected with *viscum*, though it is more probably related to the *vespelt* of West Gothland, which, according to Grimm, means "holy wheat." This name is rather obscure. The dedication of the plant to Freya, or its worship by the Druids, may account for the epithet holy, but the connection of the plant with wheat is not easy to trace. Bock, a German botanist of the 16th century, states that in times of scarcity poor folk have gathered, dried, and powdered the plant, and, mixing it with rye-flour, have made a not unwholesome bread.

Trollope tells us that the plant is called in Breton *lou-zou-ar-*

groas, "herb of the cross," and that the Breton peasants put a bunch of it in their pockets when they start on a carousal. In Normandy at the present day a branch of this "sacred plant" serves as a sign for the drinking-houses (*cabarets*), and "with an apple placed amongst its golden branches it announces 'new cider.'" In the department of the Aube it is called *enseigne de cabaretier*.

Vert de pommier (the "greenness of the apple-tree") is Norman, perhaps connected with *verquet*, another name in provincial French. Connected with it in idea is the Breton *dour-dero* or *deur-derv*, "water (or juice) of the oak," and the Erse *sugh-darach*, "sap (or juice) of the oak." In German the common name for the parasite is *affolter*. This is also applied to the guelder rose. It is spelt, when applied to the mistleto, *apfolter afholder*, and in old High German the corresponding words are *affoltera* and *apholtera*. The word is exactly equivalent to the English "apple-tree."

Brou, a name in use in the Department de l'Aube, really means the cuttings of hedges, which are given to goats, and has been applied by extension to the mistleto, of which those animals are very fond.

Marentacken (German) and *maarenzacken* (Dutch) are names sometimes applied to the mistleto. They mean, literally, "spectre's twig." The first half of the name corresponds to the latter half of the word "nightmare." It need hardly be said that neither has any connection with horses, the word "nightmare" meaning simply "night spectre," or "ghost." A twig of mistleto held in the hand was formerly supposed to give the power of seeing ghosts and compelling them to speak. In the Netherlands it is believed that a branch of it hung at the bed's head will prevent the nightmare. In some parts of England the mistleto is still believed in as a protection against witchcraft. These facts are sufficient to show that the name *marentacken* is not meaningless, but they do not explain how the name or the ideas arose.

Kinster, *kenster*, *künster*, *genster*, *künst*, and *kinst* are the various forms of a German name which, like most of the names of the mistleto in that language, has been confused with the title of a totally different plant. The name *genster* is also given to the *genista*, or broom, and there seems to be some organic connection between the German and the Latin. The German *kenster* and its other forms are probably related to the Walloon *canista* (Champenais dialect), *hènistai*, *hènistrai*, *hinistai*, *hinistrai*, and *hennesa* (Ambleve dialect). It is probable, but not certain, that these words have the same origin. They seem to be connected with the Latin and Low Latin *canistellus* and *canistrellus*, "a little basket." "The metaphor is easily understood, for the mistleto looks like a basket of flowers suspended from a branch. The German *kinster* may even be the Latin canister. Two German names, *kluster* and *kleister*, seem related in idea to *kinster*.

Kreuzholz, "wood of the cross," and *heilige kreuzholz*, "wood of the holy cross," are German names corresponding to the *lignum sancti crucis*, said by Minsheu to be an Italian name for the plant, and with the Breton *louzou-ar-groas* "herb of the cross." "In the

West of England there is a superstition that the cross was made of mistleto, which until this time had been a fine forest tree, but was condemned henceforth to lead a parasitical existence." There is no doubt that this legend was invented by Christian missionaries. Reverence for plants and animals is the most difficult form of superstition to eradicate, and the expedient of giving the superstition a fresh direction has been frequently adopted. *Heiligheu* or "holy hay," is another German name.

Vogel-leim in German means both birdlime and mistleto. *Liga* (Spanish) signifies the mistleto, birdlime, a garter, and a league. Its derivation is self-evident. *Pania* and *paniaje* are Italian names for the plant. *Pania* means also "birdlime," and is evidently connected with *paniccia*, "paste," and *pane*, "bread." *Adabac*, *dabac*, *debach*, and *debkh* (Arabic) are connected with the Hebrew *debkh*, "that which adheres." *Glu* is both provincial and dictionary French, connected with our word glue, and meaning both mistleto and birdlime, and *glutier* is a Norman name for the plant. In Walloon we find the word *verjalle*, which generally means birdlime, but in some dialects is applied to the mistleto. Literally it is *petite verge* or "little rod." Limed twigs probably form the connecting idea. Birdlime was formerly made from the berries of this plant by crushing them when ripe, carefully separating the pulp from the skins and seeds, and boiling it for some time. It was then laid in a cool place, and, after fermenting a long time, it was washed with water to separate the branny particles, and was then ready for use. At a very early date it was used for catching small birds, and at the present day large numbers of nightingales are taken by its means.

In the Limbourg dialect of Walloon the names *hamustai* and *hamustaine* are used. In the Ardennais dialect the latter is contracted to *haustaine*. These words seem to be identical with the Anglo-Saxon *acmistel*, or oak mistleto.

In Walloon we find also the names *anse-di-pot*, or "pot-handle," which Grandgagnage says "explains itself," and *insitia*, from *insitellum*, a derivative of *insitum*, meaning "a grafted branch."

In the dialect of the Aube (France) we have *blondeau*, *bouchin*, *breton*, and *louvotte*. *Breton* may refer to its worship by the Bretons; *louvotte* closely resembles *louvette*, a name in another district for the *Allium vineale*, which is doubtless connected with *loup*, "a wolf." This species of *Allium* is known as crow garlic, and in the Aube it is called *Porre-au-loup*. *Muerdago* is a Spanish name for the plant. The names in the Slavonic languages are very much like each other, but we do not know their meaning. Thus the Bohemian is *melj*, *milii*, *melij*, *gmelj*, or *omeli;* Russian, *omela;* Polish, *jemiola* or *jemiel;* Lithuanian and Lettish, *amalai*, *æmalus*, and *ahmals*. These are strangely like the modern Oreek names, *melios*, or *melias*. The glistening berries are sometimes called by the French *pomme hemorrhoidale*, and the Portuguese call them *pommo hemorrhoidal*. They do not seem to have been ever used as a cure for piles; their resemblance to the disease probably gave them the name. Some of the Celtic names still remain to be mentioned. The commonest and most important is *gwid*, *gwidhel*, or *gwydhel*, litterally "*the* shrub."

The root is a fruitful one in Welsh. From meaning simply shrub, it came to be applied to bushy places, to wild places, to wild animals and the rude inhabitants of wild places, and to rudeness and savagery. In another direction it became applied to the worshippers of trees and shrubs, to the Druids, to the marks which distinguished the Druids from the common people, and thus it came to mean knowledge and science. *Heonllys* (Welsh) is from *llys*, "a plant," and *heon* a name under which the chief deity was worshipped by the Welsh bards. *Uchelawg* means "a lofty thing," *uchelfa* "a high place," *uchellawr* "the most exalted," *uchellawg* "having a lofty site," *uchelwydd*, *ycheluydh* "the lofty shrub," or "the branch of excellent virtues." All these are Welsh names for the plant. We find also *uchelfar*, *uchelfal*, *uchelfel*, *uchelvar*, *ychelvar*, Welsh; and *huel-varr*, *uchel-varr*, *ihuel-varr*, *inhuel-varr*, Breton; meaning (according to the Welsh etymologists) "lofty summit." Corresponding with these in idea is the Walloon name *hautèdame*, from *hautè*, "high," and *dame*, of unknown meaning. *Prenawyr* and *awyrbren*, Welsh names, mean the "ethereal tree." *Holliach*, or *ol-hiach*, Welsh; *uile-iceadh*, or *uile-iceach*, Erse; *uile-ic*, *uileice*, *uile-ice*, and *uil-ioc*, Gaelic; and *ollyiach*, Breton, are names for this plant. The the last means also a nostrum or panacea. The first means, when an adjective, "perfectly well in health." All are compounded of two words, *uile*, "all," "the whole," and *ioc*, "medicine," "healing," "rent," or "payment." Pliny records the fact that the Druids called the mistleto by a name meaning in their language "all-healing." Some etymologists say that mistleto itself is derived from *meist heil tan*, the "most healing twig." *Heil aller schäden*, "heal all wounds," is a German title of the plant; and a MS. list by Robert Brown (preserved in the botanical department of the British Museum) records the name "all heal" as a Scotch name.

Besides these we have the Welsh *glyd* and *ysglouring*, of doubtful authenticity.

One of the Danish names is *vintergrönt*. There is a similar name for the parasite in Swedish, and their meaning is "wintergreen," from the evergreen character of the plant.—*Abstract of a paper by W. G. Piper.*

Cones Wanted.—Baron F. Thümen, of Görz, Austria, wishes specimens of cones of North American conifers. It makes no difference whether the cones are with or without seeds, but it is very necessary that they shall be accurately determined. The Baron offers in exchange copies of his Mycotheca Universalis or of his publications on forestry-mycology, or payment in money.

Botanical Notes.

Sisyrinchium.—W. B. Hemsley points out the differences between the Bermudian *Sisyrinchium* and the Eastern North American plant, which latter he now refers to *S. angustifolium*, Miller, *S. Bermudiana*, L., not being native with us. Mr. Hemsley remarks as follows: "*S. Bermudiana* differs from *S. angustifolium* in being much larger in all its parts, and strikingly so in its broad leaves, which are equitant at the base."—*Journ. Bot.* xxii., 108. An Watson: Contrib. VII. 27.

Carnivorous Plants.—Although physiologists have universally accepted the facts originally proposed by Darwin as correct, yet there has been a disposition in some quarters, if not to question the fact, at least to doubt its utility. Mr. Francis Darwin undertook some experiments to satisfy the latter point, and now we have to record the results of some experiments made by M. Busgen. This gentleman commenced his experiments with seedling Droseras, and ascertained that the digestion of nitrogenous matter begins with the appearance of the first leaf. The experiments were continued for two years, with the result that those plants "fed" with nitrogenous diet in the shape of aphides and small insects were the more vigorous. Fourteen plants so treated produced seventeen flower-stalks and ninety seed-pods, while sixteen plants not so treated produced only nine flower-stalks and twenty seed-pods. More conclusive still were the results of analysis, which (we cite from the *Annales Agronomiques* 1884, p. 238) showed for the first set a total weight of dry matter (remaining after the expulsion of water by heat) of 0.352, while the unfed plants yielded only 0.119 parts of a gramme (= 15 grains).—*Gardeners' Chronicle.*

Timber in Texas.—As an illustration of the extent of the timber trade in North America the following extract from a recent report from Texas will be of interest: Notwithstanding the fact that the greater proportion of the State consists of immense prairie, Texas possesses the largest area of woodlands of any State in the Union. The timbered country is situated in Eastern Texas; and, according to the Forestry Report, in 1880 there were 63,000,000,000 feet of standing pine, worth, on the average at the mills if sawed up into planks, 12 dollars per 1,000 feet. Besides pine there are large quantities of cypress timber, both red and white, from which roofing shingles are made. At Beaumont these mills turn out 250,000 daily, and at Orange six shingle mills made during the year 1881 66,000,000 cypress shingles. Bois d'arc (*Maclura aurantiaca*) is very abundant in some counties, and for posts is unsurpassed, as it will last for years in the ground without rotting. It is also used for carriage and waggon spokes, and it is also coming into use for paving streets.

Favorable Influence of Climate on Vegetation in Alaska.—In some remarks before the Philadelphia Academy of Natural Sciences, upon glaciers in Alaska, Mr. Thomas Meehan observed that on the tops of what are known as "totem-poles" in some of the Indian villages, trees of very large size would often be seen growing. These poles are thick logs of hemlock or spruce, set up before the door of Indian lodges, carved all over with queer characters representing living creatures of every description, and which are supposed to be genealogies, or to tell of some famous event in the family history. They are not erected by Indians now, and it is difficult to get any connected accounts of what they really tell. At the old village of Kaigan there are numbers of poles erected, with no carving at all on them, among which many are wholly covered, and these all had one or more trees of *Abies Sitkensis* growing upon them. One tree must have been about twenty years old, and was half as tall as the pole on which it was growing. The pole may have been twenty feet high.

The roots had descended the whole length of the poles, and had gone into the ground, from which the larger trees now derived nourishment. In one case, the root had grown so large as to split the thick pole on one side from the bottom to the top, and this root projected, along the whole length to the ground, about two inches beyond the outer circumference of the pole. Only in an atmosphere surcharged with moisture could a seed sprout on the top of a pole, twenty feet from the ground, and continue for years to grow almost or quite as well as if it were in the ground.

At this village he also saw a bush of *Lonicera involucrata*, which was of immense size as compared with what he had seen in Colorado and other places. The plant was growing on a bank and rose some ten or twelve feet, when it bent over and rested on the roof of the lodge, its numerous branches making a dense arbor under which the road passed. The stems near the ground were, some of them, as thick as his arm, and the whole plant was covered with very large black berries. Subsequently another specimen was noted in the woods on a plant of the native hemlock, *Abies Mertensiana.* In the woods the plant is somewhat sarmentaceous. It could not climb a hemlock without assistance. This old hemlock was bereft of branches to a height of about twenty feet, but the *Lonicera* was above the lower branches, and had journeyed along them to the extremities, beyond which it was beautifully in fruit. It could have been there only by growing up with the hemlock when that tree was young, and was probably of about the same age.

Butterflies as Botanists.—The caterpillars of *Mechanitis*, *Dircenna*, *Ceratinia* and *Ithonia* feed on different species of Solanaceæ (*Solanum*, *Cyphomandra*, *Bassoria*, *Cestrum*), those of the allied genus *Thyridia* on *Brunfelsia.* Now this latter genus of plants had been placed unanimously among the Scrophularineæ, till quite recently it was transferred by Bentham and Hooker to the Solanaceæ. Thus it appears that butterflies had recognized the true affinity of *Brunfelsia* long before botanists did so. There is yet another and more curious instance of our butterflies confirming the arrangement of plants in Bentham and Hooker's Genera Plantarum. *Ageronia* and *Didonis* were formerly widely separated by lepidopterists, being even considered as constituting distinct families, but now they are to be found beside one another among the Nymphalinæ, and the structure of their caterpillars leaves no doubt about their close affinity. The caterpillars of *Ageronia* feed on *Dalechampia*, those of *Didonis* on *Tragia.* Now these two Euphorbiaceous genera were widely separated by Endlicher, who placed the former among the Euphorbiaceæ, and the latter among the Acalypheæ; Bentham and Hooker, on the contrary, place them close together in the same subtribe of Plukenetieæ, and thus their close affinity, which had been duly appeciated by butterflies, has finally been recognized by botanists also.—Fritz Müller, in *Nature.*

Fish killed by Utricularia.—Prof. Baird has recently received from Prof. H. N. Moseley, of England, a specimen of *Utricularia vulgaris*, L., holding in its embrace a number of young fish which it had caught. This plant has long been known to entrap the lower forms of animal life in its bladders, and to derive nourishment therefrom through absorption, but its fish-catching proclivities have only recently been noticed. Mr. G. E. Simms, of Oxford, England, was the first to call attention to the fact upon finding that a specimen of the plant which he had placed in an aquarium was actually entrapping large numbers of perches and roaches which had recently hatched from a mass of eggs lying at the bottom. These little fishes were usually caught by the head, but some were caught by the tail, and others were doubly trapped, the head being held fast in one trap and the tail in another. In order to learn something of its destructive powers, Mr. Simms placed 150 perch fry in a vessel containing specimens of *Utricularia*, and, at the end of two days, found that all but one or two had been entrapped.

Proceedings of the Torrey Club.—The regular meeting of the Club was held at Columbia College, Tuesday evening, May 13th. In the absence of the presiding officers, Mr. Braman occupied the chair.

Mr. Bicknell exhibited double-spurred specimens of *Viola canina*, var., *sylvestris*, and a white-flowered form of *Aquilegia Canadensis*, from Riverdale. Miss Knight showed specimen of *Aralia trifolia* with aborted flowers in the axils of extra leaves, from Hunt's Point.

Miss Steele exhibited *Sisymbrium alliaria* from Flatbush, L. I.

Mr. Hollick referred to the separation of sexes in *Antennaria plantaginifolia*, the male flowers always congregating in one group and the female in another, the two being seldom if ever united.

Mr. Bicknell read a communication upon the differences between *Carex Pennsylvanica* and *C. varia*, and some notes upon the time of flowering of other species.

On motion it was ordered that the local herbarium of the late Mr. Leggett be purchased.

Two corresponding members were elected, and four names were prepared for active membership.

The regular meeting of the Torrey Club was held Tuesday evening, June 10th, at Columbia College. In the absence of the officers Mr. Schrenk was called to the chair and Dr. Britton acted as Secretary; fifteen members were present. Four persons were elected active members, and one person a corresponding member.

The Chairman of the Herbarium Committee stated that the local plants of the Leggett herbarium had been secured for the Club's herbarium.

Mr. Bower exhibited many luxuriant fresh specimens of native plants from his Newark garden.

The following field excursions were reported:

May 17th, Todt Hill, Staten Island.—Prunus Americana; Cerastium oblongifolium; Viola pedata; Clematis ochroleuca—some of the plants having incised leaves; *Orchis spectabilis* and *Aphyllon uniflorum* were collected. The Chairman requested members to notice the parasitism of the last-named plant, saying that his recent observations had confirmed his former ones of its constant attachment to some species of golden-rod.

May 24th, Closter, N. J.; nothing of special interest noted.

May 30th to June 2d, Northern Morris and Sussex Cos., N. J. At Newfoundland, *Arenaria lateriflora* in quantity, and *Ranunculus aquatilis*, var. *trichophyllus* were noticed. At Sparta and Morris Pond, a charming region was found. A sand-hill near the depot was covered with *Lupinus perennis.* It was noticed that the standard petals of lower flowers were dark purple, while those of the upper, later ones were of a much lighter color. The same plant was seen from the cars at several places west of Newfoundland, forming dense, broad patches. *Arabis lævigata ; Zizia integerrima* and *Asplenium Ruta-muraria* were collected in this vicinity, and *Viola blanda* was found in great abundance in the ravine leading to Morris Pond. Dr. Britton called attention to the supposition of some botanists that there are two species included under this name, *i. e.*, the larger variety, in which the peduncles and sometimes also the petioles are flecked with red (*V. amœna*, Le Conte.), and the small obtuse-leaved, unspotted form, by some considered the type. Both were noticed, but also all stages of gradation between them. On the meadows bordering the Wallkill River, above Ogdensburg, *Geum rivale*, *Castilleia coccinea* and the leaves of *Parnassia* were seen in abundance ; *Rosa blanda* and *Arabis lyrata* were found on Stirling Hill, and *Viburnum Opulus* in the town. At Hamburg, were observed *Larix Americana* and *Arabis perfoliata*—the latter new to New Jersey.

June 6th, Carlstadt, N. J.—Among many plants collected were *Magnolia glauca*, *Lysimachia thyrsiflora* and, in the ditches, *Anacharis* in flower.

Miss Knight remarked upon the forms of *Rhododendron viscosum* noticed, and showed specimens of varieties *nitidum* and *glaucum.*

Mr. P. H. Dudley then exhibited and remarked upon a series of photo-micrographs of transverse, radial and tangential sections of some American timber-trees taken by him with ordinary lamp-light. They were enlarged 100 diameters. Among them were *Sequoia sempervirens*, in which attention was called to the very large cells—none less than one-tenth of an inch in length—and to the fact that in this and other conifers examined the pit markings of the cell-walls are seen in abundance in only radial sections ; *Catalpa speciosa*, now used for railroad ties in the west ; and *Ailanthus glandulosus*, in which Mr. Dudley had noticed the greatest number of and largest ducts in any wood yet examined by him. In *Liriodendron* the ducts are very numerous but small; in the osage orange the parenchymatous tissue within the ducts is plainly noticeable; in the white oak, chestnut and black walnut Mr. Dudley had observed that these parenchyma cells in drying, shrink away from the walls of the ducts and from each other, and then appear as separate vesicles. He also showed a photograph of a section of a decayed white oak railroad tie with the mycelia of fungi.

BULLETIN

OF THE

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A List of Cyperaceæ

Collected by the late Mr. S. B. Buckley from 1878 to 1883 in the Valley of the Lower Rio Grande, in Texas and Northern Mexico.

By N. L. Britton.

Cyperus flavicomus, Torr.—A large form with rays five inches long, 30–45-flowered spikelets, and scales of a rich chestnut-red color, the nuts persistent.

Cyperus microdontus, Torr., var. *Texensis*, Torr.—I do not agree with Nr. C. B. Clarke* in reducing this plant to a variety of the tropical *C. polystachyus*, Röttb.

Cyperus erythrorhizos, Muhl.—A form only three or four inches high, cæspitose; resembling the var. *pumilus*, Engelmann, in Torrey Herbarium, from St. Louis, to which I refer also the *C. occidentalis*, Torr., from the Northwest coast by Dr. Hooker, and from the mouth of the Willamette River by the Howell brothers.

Cyperus erythrorhizos, Muhl.—A large, erect form, with rays and involucral leaves also erect; otherwise hardly differing from the type. I refer to this Nos. 876, 2,306, and 3,223 of the Herbarium Berlandierianum, Texano-Mexicanum, and, with some hesitation, a specimen collected by Dugès at Guanajuato,† the "tule grande" of the Mexicans. These forms may later be best considered as a variety to be known as var. ERECTUS.

Cyperus aristatus, Röttb. (*C. inflexus*, Muhl.)

Cyperus cyrtolepis, Torr. & Hook.

Cyperus rufescens, Torr. & Hook., var. DENTICARINATUS, *n. var.* Scales with a prominent keel, which is armed with small hyaline teeth near its apex. Stamen solitary. Umbel appearing somewhat lateral.

Cyperus Drummondii, Torr. & Hook.

Cyperus aureus, HBK., i., 205, (?).—Agreeing quite well with the description, and the same as a fragment so named in Herb. Torrey, collected at Havana by D. B. Greene. The present specimens have the following characters: Culm one to two feet high, smooth. Leaves about the length of the culm, three lines wide, smooth. Involucre of about six, much elongated leaves, and several short ones. Umbel of about ten rays, two or three inches long, and several nearly sessile ones, the stronger rays compound, involucellate. Heads composed of 6–14, linear, obtuse spikelets, which are 3 or 4 lines long. Scales ovate, mucronate, loosely spreading, and curving upwards, of

*Journ. Linn. Soc. xxi., 55.

†See Mr. Watson's List in *Proc.* Amer. Acad., xviii., 170.

a bright yellowish-brown color. Achenium shorter than the scale, oblong, acute, sharply triangular in section. Style somewhat lengthened, 3-cleft. Stamens 3.

Cyperus filiculmis, Vahl.

Cyperus Schweinitzii, Torr.

Cyperus Fendlerianus, Bœckel., in *Linnæa*, xxxv., 520.—The species is distinguished from *C. Schweinitzii*, Torr., by the very short-rayed heads forming a dense, compact inflorescence, and the strongly mucronate scales, whose tips are horizontal or downwardly curved. It is No. 875, Fendler, Plantæ Novæ-Mexicanæ, and was collected also at Silver City, N. M., by Dr. H. H. Rusby in 1880.

Cyperus Buckleyi, *n. sp.*—Culm quite stout, triangular, smooth, one to two feet high. Leaves long, linear, about 3 lines wide, smooth. Involucre of about four, mostly elongated, linear, smooth leaves. Rays of the umbel about five to seven, the longest about four inches in length. Spikelets broadly linear, .5 to .75 inch long, 15 lines wide, 12–20-flowered, clustered in loose heads of 12–30 at the ends of the rays, spreading or in part reflexed, their axes zig-zag, not winged. Glumes oblong, or oblong-ovate, obtusish or truncate, with a dark keel and lighter brown, somewhat scarious margins, prominently 9–11-nerved. Achenium obovate, very sharply triangular, obtuse, with a short point. Stamens 3.

Cyperus articulatus, L., var. conglomeratus, *n. var.*—Spikelets 1–15 inches long, in dense clusters on the ends of short rays, showing a compact, glomerate inflorescence two to three inches in diameter.

Cyperus dissitiflorus, Torr.

Cyperus esculentus, L. (*C. phymatodes*, Muhl.).—Several forms; among them, one with the short rays and spikelets erect.

Cyperus strigosus, L.—A slender form with the spikelets disposed in loose clusters, and diverging at right angles from the axes.

Cyperus setigerus, Torr. & Hook.

Cyperus lutescens, Torr. & Hook.—The spikelets in these specimens are fewer-flowered than the original description calls for, but otherwise they agree very well with it, and with the specimens in Herb. Torrey and in Dr. Gray's Herbarium.

Cyperus Michauxianus, Schultes.—Numerous specimens; among them, one with more spreading scales, and answering to the description of *C. ferruginescens*, Bœckel.*; also a specimen with pale brown spikelets.

Cyperus oxycarioides, *n. sp.*—Culm about two feet high, smooth, bearing on its lower portion about three elongated, linear leaves (8–10 inches long, 3 lines wide), which are slightly rough-margined. Involucre of about six elongated leaves, resembling those of the culm. Inflorescence of a single, terminal, dense, globular head, about an inch in diameter, composed of a very great number of sharply acute, teretish, about five-flowered spikelets, one-eighth to one-quarter inch in length. Scales oblong-ovate, acutish. Achenium triangular, oblong, acute, about one-half the length of the scale, (one-half line long.) Stamens 3. Resembling the genus *Oxycaryum*, Rees, in outward appearance.

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* *Linnæa*, xxxvi., 396.

Cyperus ferax, Rich.—Agreeing with the description except in the darker brown spikelets. I have seen no authentic specimens, and refer Mr. Buckley's to this species with some doubt.

Cyperus Baldwinii, Torr.

Cyperus ovularis, Torr.

Cyperus cylindricus, Britton, in BULL. TORR. BOT. CLUB., vii., 48.

Cyperus flavus, Vahl. (*C. flavomariscus*, Griseb.)

Cyperus uniflorus, Torr. Also a form with 3-5-flowered spikelets.

Cyperus uniflorus, Torr., var. PUMILUS, *n. var.*—Culm about three inches high, equalling the leaves. Inflorescence of a single, occasionally slightly compound head of from 8 to 20 spikelets, mostly composed of three glumes; the lower persistent, empty; the middle one fertile; the upper sterile, subulate. I refer here also No. 350, Palmer, Indian Territory.

Fuirena squarrosa, Michx. Also var. MACROSTACHYA, *n. var.*—Spikes 8 to 12 lines long, lanceolate, stout. Perianth-scales tipped with a downwardly-barbed awn of their own length, or longer. Plant one to two feet high, stout; leaves broadly linear, nearly smooth, some of them slightly ciliate towards the base.

Hemicarpha subsquarrosa, Rees.

Heliocharis equisetoides, Torr.

Heliocharis obtusa, Schultes.—A form with fewer scales.

Heliocharis palustris, R. Br.—Several forms, including the var. *calva*, Gray, with bristles absent, and one with very large tubercles on the achenia.

Heliocharis capitata, R. Br. (The β, Torr. Cyp. p. 305.)

HELIOCHARIS TEXANA, *n. sp.*—Culm very slender, less than half a line wide, three-angled, apparently erect. Spikes linear, slightly compressed or terete, one line wide, .5 to .75 inch long, acutish. Scales very numerous, the lowest ovate and obtusish, the others ovate-lanceolate and acute, all with broad hyaline margins. Achenium obovoid, contracted at the neck, tipped with a conical, acute tubercle. Style deeply three-cleft, roughened. Stamens three, longer than the achenium. Bristles none.

Heliocharis acicularis, R. Br.—A large form.

Scirpus pungens, Vahl.—Specimens with 3-cleft styles, and bristles as long as the achenia.

Scirpus validus, Vahl.

Scirpus maritimus, L.

Scirpus lineatus, Michx.

Fimbristylis spadicea, Vahl., var. *castanea*, Gray.

Fimbristylis laxa, Vahl.

Fimbristylis autumnalis, R. & S.

Fimbristylis capillaris, Gray.

Fimbristylis congesta, Torr.

Dichromena leucocephala, Michx.

Phoradendron.—Dr. Britton's note in the July BULLETIN reminds me that twenty years ago I was cognizant of the presence of a large bunch of *Phoradendron* on an old *Liquidambar*, at the roadside, about three and a half miles north of Keyport, N. J. It was on the Willett farm, not many rods from the shore line of Raritan Bay. In the winter, as a green tuft about as large as a bushel measure, on the naked tree, it had a curious look. The best of my recollection would place it about half a mile north of the lighthouse. Some four years ago I looked for it, but though I found the old gum-tree, the parasite was gone.

Euphorbia Cyparissias.—In July, 1884, I saw a magnificent patch of this elegant spurge on a high bank at the edge of an oak wood, about two miles from Colt's Neck, N. J., on the road to Holmdel. From the size and compactness of the mass, and the length of the horizontal roots, as shown by the crumbling bank, it was plain that it had been long established. It was far away from any house, and the original plant must have come from seed dropped by a bird. The patch presented one of the most beautiful sights I have ever seen. I was pleased to find near by the spurge, that pretty milkweed, *Asclepias verticillata.*

S. LOCKWOOD.

Michaux's New Jersey Garden.

By H. H. RUSBY.

The exact location of Michaux's garden, at New Durham, N. J., has repeatedly been sought by local botanists, partly for its historical interest, and partly in the hope that some relics of its founder's planting might remain. Through the courtesy of some friends, descendants of his associate, Pierre Paul Saunier, an opportunity was recently afforded me of visiting the place, and fixing accurately the boundaries of the garden, the location of the building, and even the exact arrangement of the planting of many of the shrubs and trees.

It will be remembered that Michaux came to this country in the year 1785, being then thirty-nine years old, accompanied by Mr. Saunier, seventeen years of age. He was the representative of the French government, his duty being to collect and send home roots and seeds of such plants as were considered worthy of cultivation. The better to accomplish this purpose, the garden at New Durham was established. When he embarked for Europe in 1796 the garden and commission were transferred to Mr. Saunier, and afterwards to the latter's oldest son Michel, who continued to make shipments nearly to the time of his death. Mr. Saunier's two sons and two daughters, married and brought up families, and all are now represented by descendants in this country. My information was obtained from Mrs. Sarah A. Williams, of New Durham, and Mrs. Eliza Hanna, of Franklin, daughters of Michel Saunier. The former lady, and Miss Euphemia, a daughter of the latter, accompanied me to the site of the garden and pointed out the old land-marks.

The garden included most of the land now occupied by the Hoboken Cemetery, or at least most of that portion now* laid out. The southern boundary coincided with the present southern boundary of the cemetery, while the northern boundary included a little more

* June 21, 1884.

than that of the cemetery. Eastwardly it extended nearly to the top of the hill, although there was no regularity in the planting of this upper portion, which was very rocky, and was soon converted into an orchard. The garden was not confined to this space, but extended upon the western side of the road to, and even into, the swamp. The entrance was a few yards south of the present cemetery-entrance, and from this point a carriage-drive swept round to the door of the house, which stood a short distance northeast of the present porter's-lodge, the carriage-house standing on the site of the latter building. Later, this building was abandoned, and another was built upon the other side of the road, close to where the old pear-tree now stands; but this too has now disappeared. A school-house stood just south of the garden, and was subsequently converted into a blacksmith-shop.

This space, of about eight or ten acres, served the double purpose of a fruit and vegetable garden (supplying such articles of necessity and luxury as in those days could be had only from one's own garden) and a botanical garden, in which were transplanted in large quantity such natural species as appeared likely to prove useful or ornamental. As might be expected, but little was done in the introduction and distribution of exotics, although to Michaux and his successor is accredited the intoduction of the original stocks of most of the Lombardy poplars and flowering almonds in this country.

Most of the interesting shrubs growing within a radius of twenty-five miles were planted in sufficient numbers to yield a large quantity of seeds, while others there were, collected on excursions to distant localities, represented by only one or two specimens. The former were planted in long rows, and many of them are remembered by Mrs. Williams growing in their original position. Along the southern boundary was planted arbor-vitæ, which, under the name of horse-saffron, was in demand by the settlers far and wide as a veterinary remedy. Later, this hedge served as an excellent cover from which marauding parties of boys from the school hard by made raids upon the old gentleman's fruits and flowers, the pretty but deceitful crabs, and a variety of pear, with tiny fruits growing always three in a cluster, tempting the urchins to predatory feats of the utmost daring. Next this hedge was a row of *Chionanthus*. The northern side of the garden was selected for the taller species, including the persimmon, catalpa and several species of oaks not to be found in the woods close by. The drive was bordered for one-half its length by flowering almonds, while between it and the school-house, near the road, was a large space filled with the sweet shrub (*Calycanthus*), which is remembered as having attained a prodigious size for this species. Other rows are remembered as containing mountain laurels and weeping poplars. In front of the house stood "a small tree called 'leather-wood,'" which is probably the "very large *Dirca palustris*," which Mr. Le Roy writes to me that he well remembers. Just where the bell-house now stands was a cluster of immense rocks, now covered to form to form a mound, where these grandchildren remember having played among the prickly ash and barberries, in the shade of a group of sassafras-trees. The west side of the road was deemed most suitable for chinquapin and swamp magnolias, and there was planted another large group of *Kalmias*, than which these early collectors, like ourselves, seem to have found no shrub more admirable.

In addition to the seeds collected from the gardens and the forests about it, many were collected to order by the settlers living at a distance, and brought on their occasional visit to the sea-board. In this way Michaux obtained his stock of "scrub-oak" (*Q. ilicifolia*) from Paramus, just north of Hohokus. The seeds were kept dry and cool until just before the departure of a vessel, when they were packed "in iron-hooped boxes, between layers of rotten wood," in which condition many of them were sprouted on their arrival in France. It is believed that no shipment was ever lost by wreck. Mrs. Williams graphically describes the appearance of the wagons, with their great stacks of boxes, looking at a distance like loads of hay. She also remembers the steady decrease in the orders, until finally the shipments ceased, nearly fifty years ago, with one of three small boxes.

Reference is made to the extensive forests of *Cupressus thyoides* that bordered the swamp, and extended into it in the form of peninsulas and islands. It is definitely stated that while part of this died, as it is now doing, by the depression of the land, the most of it was cut away to be used in fencing; for the value of this timber, on account of its lightness and durability was early recognized.

Of everything planted by Michaux and Saunier it is probable that not a vestige remains except two old pear-trees, one in the cemetery, the other just across the road, and of the history of these nothing positive is known. A double row of Lombardy poplars planted by Mr. Saunier for "old Mr. Stevens," remained until quite recently, when they were destroyed in grading. Even the orchards are gone. The only positive living relics are two plants of *Berberis vulgaris* taken from the garden by Mrs. Williams and now growing in her dooryard at New Durham.

It seems eminently fitting that the Torrey Botanical Club should erect a monument to this excellent man and botanist, upon the spot which, the scene of his loving and conscientious labors, has so strangely become set apart as a depository for memorials of the dead.

A Botanical Trip into Northern New Jersey.—The evening of the 16th of last July found me under the hospitable roof of Rev. Mr. Clarke, of Stillwater, Sussex County. Early next morning his two sons, students in Lafayette College, drove me three miles, to the southwestern extremity of Swartswood Lake. On the edge of the stream near the outlet, the following plants were noted: *Cicuta bulbifera*, L., *Myosotis laxa*, Lehm., *Peltandra undulata*, Raf., *Sparganium eurycarpum*, Engelm., (in fruit), *Pontederia cordata* L., and *Equisetum limosum*, L. Taking a boat, the young men rowed me up the western shore, three miles, to the head of the lake. This shore has a few low limestone bluffs and sheltered coves between. The water is shallow, and our course lay through acres of *Nymphæa odorata*, Ait., and *Brasenia peltata*, Ph. Underneath, at a depth of three feet or more, the bottom is covered everywhere with the dark, regularly disposed, plume-like, waving stems of *Potamogeton Robbinsii*, Oakes, amongst which are to be seen, here and there, patches of *P. amplifolius*, Tuckerm., distinguished by its lighter yellowish hue, and broad leaves curiously twisted and curled. In one of the coves we came upon *Nasturtium lacustre*, Gray, (in flower and fruit). I had collected it during a former visit (Sept. 2, 1879) at a single station, but now it was observed at various places from the head of the lake to the outlet. The leaves, both those above the water and those beneath, are very easily detached, so that it is difficult to make complete specimens. At this spot we fished up half a dozen stalks of *Ranunculus aquatilis*, L., var. *divaricatus*, Chaix. (in flower), and *Potamogeton lucens* (in flower and fruit). The opposite border of the cove is lined with a dense growth of *Saururus cernuus*, L., conspicuous by its nodding spikes of fragrant flowers. This plant is common all along the Paulinskill Creek from the lake to the Delaware, fifteen miles, but, strange to say, it has been observed, as yet, on that river, only at Trenton, about seventy miles further down. As we passed around the main bluff, or promontory, some bushes of *Myrica cerifera* were seen on its slopes, and at its base, a solitary *Salix lucida*, Muhl. From this point we proceeded over a considerable bay to the northeastern end of the lake and glided into an area, several acres in extent, occupied by *Nelumbium luteum*, Willd. The vernation of the leaves is involute. Some project themselves above the water, whilst the others stop at the surface. These latter in unfolding assume the form of a bowl, or basin, or inverted skull-cap, and are very pretty objects as they float. When fully expanded, they are of a deep green color above and lie flat on the water, which, cast upon them by the dip of an oar, rolls and divides itself like quicksilver, emitting a brilliant silvery light. The cause of this phenomenon is worthy of investigation. The leaves of *Orontium aquaticum*, L., behave in the same way. To our great disappointment not a single flower could be discovered in the entire colony. It may have been too early for their appearance, or else the summer lodgers of the neighboring hotels and farm-houses had gathered them all. A little further to the east, I looked for *Heleocharis quadrangulata*, R. Br., where I had discovered it September 2, 1879. It was now in flower, and still plentiful. In coasting back along the eastern shore we found *Taxus baccata*, L., var. *Canadensis*, Gray, as abundant on the rocks as in September, 1879. On one of the undisturbed and untilled islets in the middle of the lake, it was a surprise to see *Solanum Dulcamara*, L., flourishing luxuriantly amongst the aboriginal vegetation.

After dinner, at 2 P.M., Mr. P. P. Clarke drove me over from Stillwater to Blairstown, six miles, in order to take the evening train at that place. For three miles along the road the eye was attracted by the frequent occurrence of *Zanthoxylum Americanum*, Mill., *Rosa rubiginosa*, L., and *Cnicus pumilus*, Torr. Midway on the route, we turned into a lane, to the left, and soon reached a lakelet of oblong shape and about three-fourths of a mile in length called White Pond. A white line of shell-marl all around its margin indicates the origin of the name, it lies in Warren County close to its Sussex boundary. The boat we had counted on for the work of circumnavigation could be seen some distance out on the water, occupied by two men, who were fishing for black bass. Our exploration had, therefore, to be done on foot, and so we tramped for nearly one-half a mile through a wide swamp on the border of the pond. The plants noted and collected here were: *Sarracenia purpurea*, L., and *Prunus Virginiana*, L., (in fruit), *Potentilla fruticosa*, L., (in flower and abundant), *Parnassia Caroliniana*, Mx., and *Menyanthes trifoliata*, L., (leaves), *Rhynchospora capillacea*, Torr., *Carex flava*, L., (over ripe), *C. Œderi*, Ehrh., (in good condition) and *Bromus Kalmii*, Gray. Of these, two (*Rhynchospora capillacea*, Torr., and *Carex Œderi*, Ehrh.) are new to the flora of New Jersey. *Carex flava*, L., was collected years ago by the late Dr. A. P. Garber in Sussex County, where he also obtained *Lobelia Kalmii*, L., but the latter was sought for in vain. The results of my visit to the charming lakelet gave me so much pleasure that I mean to see more of it at an early day.

Easton, Penn. THOS. C. PORTER,

Sweet Cicely as a Bur.—Yesterday, while rambling among the shady ravines and hillsides of the Virginia shore of the Potomac, and immediately above this city, I observed that my clothing was bristling with slender, spindle-shaped burs, some of which made their presence felt by penetrating to my skin. Spanish needles! I said; but no, I had not seen the plant that day. A glance showed that they were the linear fruits of *Osmorrhiza longistylis*, very abundant there, its foliage wholly gone and leaving the dry branching stalks loaded with fruit which only needed to be touched to be shaken off, and through dense patches of which I had been walking. I had never been thus troubled before and my curiosity was excited, as I was not aware of this bur-like nature of the sweet cicely. It was useless to remove the burs till I had wholly left the place, when I made a business of it.

On carefully examining the seeds after I reached home I easily discovered the secret. The narrowed base of each fruit terminates in a sharp spinous point, and this is backwardly bearded with stiff, white bristles, closely simulating in form and function the grains of some Aristidas and other grasses. Wondering why I had not always known this, I at once turned to the books to see how the authors had described this peculiarity. To my great surprise I was unable to find any distinct mention in any work at my hand of this, certainly the most striking character of the genus. Bentham and Hooker's "Fructus * * * basi longius attenuatus; carpella * * * sursum ciliata" certainly does not describe it. Gray says: "Fruit * * * tapering downwards into a stalk like base * * * the carpels with *upwardly* bristly ribs;" while Chapman contents himself by merely mentioning the "carpels with bristly ribs." It seems clear that the function of these bristles and the narrowed base, as a means of distribution like other burs, cannot have been present to the minds of any of these authors, and I write this partly to ask where the discovery of this function in *Osmorrhiza* has been formally announced, if anywhere.

The barb being at the base of the seed, or at the point of attachment to the plant, it is necessary that it shall first drop off and depend upon finding the distributing agent in the course of its fall of two or three feet. It is clear that the device is a somewhat clumsy and ineffective one, but the habit of the plant to grow in dense patches renders the chances of success fully adequate to its needs, as any one may easily realize by walking through half an acre of it as I did.

Washington, D. C., August 16, 1884. LESTER F. WARD.

Germination of Pardanthus Chinensis.—Two years ago I described and figured what seemed to me a peculiar mode of germination of *Iris versicolor* (BULLETIN, Vol. ix., No. 6). The seeds of *Pardanthus Chinensis* seem to germinate in exactly the same manner, as shown by the annexed figure. The seed (*sd*) stays under the surface (*sf*) and sends out a long connective (*ct*), bearing the cotyledon (*cn*) from which are developed the root and the leaves (*ls*).

I must assume that in this case we have to deal with a normal mode of germination, for I found numerous seedlings in the open ground, around an old plant that had been freely fruiting the previous fall, and all of them showed the same peculiarity.

(*Pardanthus Chinensis* has been known for many years to grow abundantly near Richmond Hill, Long Island.)

Hoboken, July, 1884. JOS. SCHRENK.

Celtis occidentalis, L.—A specimen of this tree is growing on Main St., in West Springfield, which is notable for its great size as also for its perfect shape. The following careful measurements show that it is not the "small or middle-sized tree" as described in Gray's Manual: circumference four feet from the ground, twelve feet and three inches; height, seventy-five feet and six inches; spread of branches, eighty feet. This locality seems to be a favorable one for the development of this tree. Though only a few specimens have ever been known here, they have all reached a great size. One is standing in Springfield nearly as large as the one whose measurements are given above. Two formerly stood on Main Street, which were a little larger than either of these now standing. They received special mention in Emerson's book. They were still vigorous and sound when cut down a few years ago. The two large ones now standing are apparently in all the vigor of middle life, making considerable growth each year. It is to be hoped that they will be spared to reach their greatest possible development.

Springfield, Mass. GEO. W. PERRY.

Æcidium Jacobeæ, Grev.—This *Æcidium* is a true heterœcismal uredine as I have recently demonstrated, and is not, as has hitherto been supposed, connected either with *Puccinia glomerata* or *P. compositarum.* On the contrary, it has its teleutospores upon *Carex arenaria.* This *Puccinia* is quite different from *P. caricis*, from which it can be readily distinguished by the naked eye. It is more nearly allied to *P. dioica*, Magnus, but whether these two species are identical I can at the present moment hardly say.

King's Lynn, Eng. CHARLES B. PLOWRIGHT.

Berteroa incana, placed by Bentham and Hooker under *Alyssum*, but known among other things by its bifid petals with expanded saccate bases, has appeared spontaneously in several places in our city. It was first seen by Mr. J. L. Bennett.

In a field with the above I have found a fine plant of *Sonchus arvensis*.

Providence, R. I. W. WHITMAN BAILEY.

Rudbeckia Missouriensis.—This is between *R. hirta* and *R. fulgida*, but more closely allied to the latter. *R. Hirta*, as compared with *fulgida*, commences to flower three weeks earlier. When cut through longitudinally the receptacle is narrowly conical, almost lanceolate. The leaves are wide in proportion to length, and remotely edged with minute serratures. The stems and leaves are very rough. The habit is widely branching.

R. fulgida begins to flower three weeks later, has a broadly ovate, somewhat triangular receptacle, narrow leaves, with remote toothed, deeply cut edges, and the stems and leaves clothed with short, soft hair. The habit is somewhat erect.

R. Missouriensis opens with *fulgida*, has still narrower leaves than *fulgida*, and the receptacle is broadly ovate as in *fulgida*, though more acute at the apex. But the narrow leaves are quite entire, and the whole plant more rough than even the rough *R. hirta*. There is a greater tendency in the ray-florets of *R. Missouriensis* to become "quilled," as the florists term it, than in those of the others.

T. MEEHAM.

Botanical Notes.

Histo-Chemistry of Plants.—In an interesting contribution to the "histo-chemistry" of plants (*Monatshefte*, v., 94) Herr Rosoll illustrates the light that can be thrown upon vegetable principles by studying them microchemically *in situ* in the plant. The first plant mentioned is *Helichrysum bracteatum*, the yellow flower-heads of which are well known as a variety of "everlasting flowers." This yellow color is very persistent, but when the dried flower-heads are dipped into borax solution to which hydrochloric acid has been added, the involucral leaflets become of a beautiful ruby-red color. Further investigation showed this yellow pigment to be a hitherto undescribed quinone-like substance, which Herr Rossoll has named "helichrysin." In the younger leaflets it exists in combination with protoplasm, whilst in the older ones it has its seat in the residual cell contents. Helichrysin is soluble in water, alcohol, ether and organic acids; insoluble in benzol, chloroform and carbon bisulphide; is colored purple-red by mineral acids and alkalies; and is precipitated by metallic oxides and their salts as a red colored extract. The same body appears to be present in *H. orientale*, *H. fœtidum* and *Statice Bonduelli.* Passing to the fungi, the organs of fructification of *Peziza aurantia*, with their yellow disk and lighter outer side, were examined. It was found that the orange color is due to a new yellow pigment, that has been named "pezizin," which is present in the form of extremely minute drops combined with an oil-like substance that occurs dissolved in the plasma of the paraphyses. The pigment, which occurs also in *P. convexula*, may be dissolved out by alcohol or ether. Saponin was ascertained to occur in the living roots of *Saponaria officinalis* and *Gypsophila Struthium*, dissolved in the cell juice, from which it can be separated in small amorphous white particles by treatment of thin slices of the root with absolute alcohol or ether. In the dried roots and in quillaia-bark it occurs as an amorphous white or gray substance. By treatment with concentrated sulphuric acid and exposure to air, which gives rise to a yellow, then a bright red and afterwards a beautiful blue-violet color, saponin can be detected in the contents of all the cells of the middle bark of *Quillaia saponaria.*

Botanical Literature.

*On the Indian Species of Cyperus, with Remarks on some others that specially illustrate sub-divisions of the Genus.** By Charles Baron Clarke, F.L.S., F.R.S. With four plates.

This valuable contribution to Cyperology treats of many of our American species, based on specimens mainly by the older collectors in the Herbaria of Kew and Calcutta. Numbers of them are referred to older names than those found in our manuals, etc., and others regarded as species are reduced to varieties. The changes in nomenclature proposed by Mr. Clarke are as follows:

C. microdontus, Torr., and var. *Texensis*, Torr., including *C. Gatesii*, Torr., are refered to *C. polystachyus*, L., a widely distributed species in the warmer regions of the eastern continent, under the varietal name *holosericea*; *C. fugax*, Liebm., of Mexico, becomes var. *paniculata* of the same species, and *C. Nuttalii*, (Eddy) Torr., becomes var. *filicina*, although, as Mr. Clarke remarks, it may best be regarded as a species; the form of the last-named plant described as *C. Cleaveri* by Dr. Torrey is also made a variety of *C. polystachyus*, var. *Cleaveri*; the original specimens from Monmouth Co., N. J., as well as recent ones collected by Mr. C. F. Parker at Cape May, N. J., with various intermediate forms between them and *C. Nuttallii*, indicate, as Dr. Torrey later suggested, that it is merely a depauperate form of this plant, not worthy of varietal rank. In these reductions Mr. Clarke follows the ideas of Bœckeler. *C. divergens*, Chapm., is made *C. leucolepis*, Carey, MS. *C. ambiguus*, Liebm , of Mexico, becomes *C. Olfersianus*, Kunth. *C. diandrus*, Torr., var. *castaneus*, Torr., is restored to specific rank under the name *C. rivularis*, Kunth, a change in which we are not ready to concur. The *C. flavicomus*, Torr., Mex. Bound. Survey, is referred to *C. Hochstetteri*, Nees. *C. inflexus*,

*Journ. Linn. Soc., xxi., 1–202.

Muhl., is *C. aristatus*, Röttb., a change already noted by Mr. Watson in the Botany of California. *C. rotundus*, L., a species of tropical distribution, includes var. *Hydra*, Gray, Manual. *C. esculentus*, L., is the older name for *C. phymatodes*, Muhl., and *C. Hermanni*, Buckley, (var. *Hermanni*, Watson) is included by Mr. Clarke. *C. Grayii*, Torr., is referred to *C. setifolius*, Torr., we suppose an older manuscript name, having found no such published description of the plant, though it was made a var. *setifolius* of *C. filiculmis*.—N. L. BRITTON.

Desmids of the United States and List of Pediastrums; with 1,100 *Illustrations on* 53 *colored Plates.* By Rev. Francis Wolle, 8vo. pp. 168. Bethlehem, Pa. 1884.

Although we have never specially studied the subject of fresh-water algæ, we have more than once had occasion to consult the pages of Rabenhorst to ascertain the name of some beautiful desmid which we have observed floating in the field of the microscope, and we know from so slight an experience as this how difficult it is to identify these minute plants without the aid of accurate figures. Those many readers of the BULLETIN who have, during the last few years, turned their attention to the study of these low forms of vegetable life, will heartily thank Mr. Wolle for placing at their disposal a work in which all obstacles of this nature are removed through the eleven hundred colored figures which he has given them, and which illustrate all the species and varieties that are described in the text.

The desmids, the group of fresh water algæ to which this work is specially devoted, embrace a large number of species, some of them of most exquisite forms, and the publication of a work like the one under consideration must certainly have the effect of giving a further impetus to the study of them among those who have a microscope at their command, and who desire to know more about the inhabitants of the unseen world.

As regards paper and letter-press the book is handsomely got up, the illustrations are beautifully drawn and colored, and we scarcely see how the author is able to offer the work to students at so low a price as five dollars.

Vacation Cruising in the Chesapeake and Delaware Bays. By J. T. Rothrock, M.D., Professor of Botany in the University of Pennsylvania. Philadelphia: J. B. Lippincott & Co., 1884.

It is rather late in the season to allude to this charming little book by a botanist whose name is familiar to all our readers, but it is none too late to recommend the perusal of it to those who, before many months elapse, will be laying plans for next year's vacation, and who, like our author, may have the means at their command to spend it upon the water, and in their own craft. But in making these remarks we do not mean that the reading of the book should be restricted to the class that we have just mentioned, for it is very pleasantly written, full of instruction, and will prove equally interesting to all those whose destiny compels them to while away their vacation hours upon dry land.

Correction.—On page 64, line 17, read Fig. A is a node, *p* is a petiole scar.

BULLETIN

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Corema Conradii and its Localities.

By John H. Redfield.

Referring to Dr. Gray's exhaustive paper in Chloris Boreali-Americana* for a full description and careful figures of this species, and for an account of its morphological relations, the object of this article is simply to place on record such facts connected with its known localities and environment as may tend to elucidate the past history of a plant now so sparsely represented in the existing flora. While its near relative, *Empetrum nigrum*, abundantly clothes the mountain heights and colder regions of the northern hemisphere, our *Corema* is restricted to very limited spaces in widely separated localities, in the district extending from New Foundland to New Jersey. Having been favored with opportunities to examine the principal known localities within our own limits, my notes will follow, as nearly as may be, the order of their discovery.

1. *New Jersey Pine Barrens.*—It is said to have been first discovered by Prof. Solomon W. Conrad as early as 1831 near Pemberton Mills, about ten miles from Burlington, N. J., and a fragment so ticketed (with a ?) is in the herbarium of the Philadelphia Academy. Soon after, Rafinesque collected it at Cedar Bridge, Monmouth Co., about twenty-two miles south-east of Pemberton. This locality was visited about 1833 by Dr. Torrey, who published the first description of the plant under the name of *Empetrum Conradii*, in *Annals* of N. Y. Lyceum of Nat. Hist. iv., 83. In April, 1869, in company with the late Charles F. Parker, I made some examination of the vicinity of Pemberton and also visited Cedar Bridge in search of the plant. The encroachment of cultivation near the former place discouraged search, but at Cedar Bridge the localities which Dr. Torrey in his paper has so carefully indicated were readily identified. But no trace of the plant was seen either at these points or elsewhere during a search of some hours. Dr. Torrey described it as growing in a few patches "in the pure white sand of that region." These places, as I now remember them, were quite bare of vegetation at that early spring season, but the prevailing tree growth of all that region is a very stunted form of *Pinus rigida*. At the time of Rafinesque's and Torrey's visits, Cedar Bridge was an inn for the accommodation of the limited summer travel of that period by stage-coach between Philadelphia and Barnegat Bay. Now alas, an occasional clam-wagon is the only visitant, and as I remember the

* *Memoirs* of Amer. Acad. Arts and Sciences. 2d series iii. pp. 3-14, tab. i. (1846.)

house in 1869 it was as rough a hostelry as it has been my lot to encounter. I have some doubt whether Conrad's and Rafinesque's localities were not the same.

Dr. Knieskern is said to have found the plant at other points in Monmouth Co., but this has not been confirmed, nor is the *Corema* enumerated in his Catalogue of the plants of Monmouth and Ocean Counties published in 1856. There is, however, a large tract of absolute wilderness lying between the New Jersey Southern R. R. and Barnegat Bay which may reward exploration.

2. *Long Island.*—Dr. Torrey, in the Flora of New York ii., 519, says that Dr. Emmons had given him specimens of *Corema* collected, as nearly as he could remember, "on the road from Oyster Bay to Hempstead, but possibly near Islip." It does not seem to have since been found, and Mr. Coles, of Glen Cove, "has sought it very generally in Queens and Suffolk Counties in the most likely places without even finding a single specimen." (BULLETIN OF TORREY CLUB iii., 5) and Mr. E. S. Miller in his careful Catalogue of the Plants of Suffolk Co., does not enumerate it.

3. *Plymouth, Mass.*—This is the best known and most abundant locality, and has furnished most of the specimens hitherto found in our herbaria, and was mode known in 1838 and 1839 by Tuckerman, Oakes and others. Mr. Tuckerman recognized the Plymouth plant as identical with that from Cedar Bridge described by Dr. Torrey, and communicated specimens with ripe fruit to Dr. Klotzsch of Berlin, who in 1841 proposed to separate it from *Empetrum* under the name of *Tuckermannia.** This name had, however, been already applied by Nuttall to a California Composite, and so Tuckerman, in London *Journal of Botany* i., 445, in the year 1842, proposed for it the name of *Oakesia* in compliment to William Oakes. Dr. Gray, however, in the paper referred to at the head of this article, showed that there was nothing in the generic character to separate it from the existing genus *Corema* established by Dr. Don in 1826 upon *Empetrum album*, L.

In visiting this locality, August 7th, 1885, I had the company of Dr. Gray and the guidance of Benj. M. Watson, Jr., Professor of Horticulture in the Bussey Institute. I found it presenting an aspect very different from those yet to be mentioned. Here I saw the plant, as Emerson† well describes it, "clothing one open, sunny hill of some acres, strongly reminding one of the description of the heaths of Europe." This hill, like most of those in the vicinity, is a deep deposit of gravel largely composed of quartz. Where the rains have washed out the loamy vegetable matter the residuum is a coarse sand much like that of the Jersey barrens. I am sure that there is more of the plant here than in all the localities I have yet to mention, and Mr. Watson informed us that the tenure of the land is such that the *Corema* is not likely to be disturbed for many years to come, and will never be ruthlessly destroyed. Portions of it had apparently died out, probably from the extreme drought of 1883,

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* Erichson Archiv., 1841, p. 248.

† Trees and Shrubs of Massachusetts. 1st edition, 1846, p. 328.

but new seedlings are springing up, and we may hope that it will long remain as one of the many attractions of the beautiful town which bears so many rich historical associations. The tree growth around is sparse, composed mostly of *Pinus rigida* with some *Quercus coccinea* and *Betula alba*. The *Corema* covers the position so thoroughly that there is room for little other undergrowth, but occasional plants of *Gaylussacia resinosa*, *Vaccinium vacillans*, *Comptonia asplenifolia* and *Baptisia tinctoria* are seen.

Mr. Watson informed us that he had also seen the *Corema* near Truro, Cape Cod, and near one of the coves of Buzzard Bay.

4. *Bath*, *Maine*.—In 1840, Mr. W. Gambell, a pupil of Nuttall, furnished to Dr. Gray specimens of *Corema* gathered in the spring of 1839 "on the rocky banks of the Kennebec in the neighborhood of Bath." Since then little seems to have been known of this locality. On the 5th of August, of this year, I visited Bath for the purpose of making some search in that vicinity. Bad weather shortened my visit and prevented me from examining the banks of the Kennebec; but a few hours spent upon the high grounds west of the city led me to a second range of hills covered with a dense young growth of trees, much of it white pine. On the higher part of the ridge, where the granitic rocks crop out into bare ledges some acres in extent, I found a considerable quantity of the *Corema*, perhaps in all twenty patches, all within the limit of a few rods. The rock contains a large proportion of quartz, and the scanty soil showed much silex. Here the tree growth was *Pinus rigida* in scattered, stunted examples, with some few small trees of *Betula alba*. As this locality was not near the banks of the Kennebec, but two miles west of them, I was at first inclined to believe it new, but I have since been informed that Prof. Goodell had collected the plant, probably at the same point, and also on the eastern bank of the river.

5. *Isle au Haut*, *Maine*.—This is the outermost island in Penobscot Bay, about six miles in length, two and a half miles in width, the central ridge rising to a height of 400 to 450 feet, being the highest island upon the coast except the mountainous one of Mount Desert. It is mostly wooded, but has on its northwesterly side a scattered village of about 200 inhabitants, who live upon the produce of the sea, and it is said that the first horse seen upon the island was landed only two months ago. The island has hitherto been rather inaccessible, but will doubtless soon become a summer resort and be made more easy of approach. The existence of *Corema* here was first discovered by A. Young, Jr., a student of Bangor, who communicated the plant to Dr. Gray in October, 1847. Mr. Young found it upon the high barren summit of the island, in considerable abundance, associated with *Potentilla tridentata*. I visited the island July 21st and 22d, 1884, and in the first house I entered it was my good fortune to meet an accomplished botanist, Mrs. Flora E. Haines of Bangor, who had spent several summers here and whose familiarity with the topography, botany and local history of the island relieved me from the loss of time and the possible failure which might have attended the hurried visit of a perfect stranger. Under her guidance the summit of the island was

reached, doubtless the point visited by Mr. Young. There we found the *Corema*, but only sparingly. The hill-top had been overrun by fire a few years ago, and it was evident that the plant had narrowly escaped extinction. This fact is a suggestive one as connected with the very local distribution of our *Corema*, and it is very probable that a similar cause has been for ages narrowing its field of existence. Yet some new sprouts gave promise of good increase if botanists give it fair treatment. The scanty soil in which it grows is composed of a finely comminuted granite of which quartz is the chief ingredient. Associated with the *Corema* were *Potentilla tridentata*, *Vaccinium Pennsylvanicum*, *Cornus Canadensis*, with here and there a stunted spruce.

I was then conducted to a bare, round, rocky knob, perhaps 150 feet in height, about 1¾ miles W. S. W. of the locality just mentioned, and overlooking Moore's Harbor. This hill has the local name of "Black Dinah," and on its summit the *Corema* grows in sufficient abundance, in numerous large patches after the manner of *Empetrum*. The rock is composed almost entirely of quartz, and the scanty soil is made up of its particles, and an occasional rock crevice gives foothold for the firmly rooted *Corema*. The associated plants were mainly the same as in the locality last mentioned, except that a few dwarf examples of *Pinus rigida* were scattered about. I was informed that a third locality exists on the rocky shore between Black Dinah and the little village opposite Kimball's Island, and another on the eastern side of the island. *Empetrum nigrum* is also found on Isle au Haut, and on the neighboring Kimball's Island, and is very abundant on many of the rocky headlands of Mt. Desert twenty-five or thirty miles distant, and I have recently been informed that *Corema* has been seen upon Green Mt., the highest part of Mt. Desert, but I need some more positive evidence that the plant there seen was not *Empetrum*, and further search in other of the many large islands of Penobscot Bay some of them many square miles in area, and upon the numerous promontories of the main land will probably yet reveal other localities

Nova Scotia and Newfoundland.—Mr. Tuckerman saw in the Lambert Herbarium in London specimens collected in Newfoundland by Cormack. In Nova Scotia it has been seen in Halifax Co. by Lindsay and Sommers, and at Wilmot, Annapolis Co., by Howe. I know nothing further as to these localities, but hope that our botanical brethren from the British Provinces will give us further facts.

7. *Shawangunk Mts., N. Y.*—All the localities hitherto mentioned are maritime, or so near the sea-coast that when in 1881 it was announced that the *Corema* existed in Ulster Co., N. Y., on a mountain top, eighty miles from the coast, some surprise was created, and botanists were led to call to mind how, in like manner, *Hudsonia* and *Leiophyllum* are perfectly at home on mountain summits in North Carolina. Mr. Smiley, proprietor of the Minnewaska House, a well-known summer resort in the Shawangunk Mountains, in 1881 called the attention of Aubrey H. Smith to the plant, who identified it as *Corema*, and reported the fact to the Botanical Section of the Phil. Acad. (See *Proc.* Phil. Acad., 1882, p. 35). Mr.

Charles E. Smith visited the locality May 2d, 1882, obtained good flowering specimens, and published his notes in the TORREY BULLETIN, Vol. ix., 1882. My own visit to the locality was June 26th, 1884, at which time the fruit was just perfecting. The Shawangunk Mountains consist of long, narrow ridges, extending from the Rondout Valley, southwesterly into New Jersey, crossing the Delaware River at the Water Gap, extending thence through Pennsylvania into Virginia. By the New York geologists the formation was named the Shawangunk Grit, and it is by Dana, in the latest edition of his Manual of Geology, referred to the Oneida Group. It is almost entirely composed of sand-stones and conglomerates, and is remarkable for the number of lakes or ponds which are found at frequent intervals throughout its extent, and of which L. Mohonk and L. Minnewaska are examples. The ridge at L. Minnewaska, and that running southwest from it, forming the easterly wall of Palmaghett Glen are of nearly pure quartz rock, bearing a scanty growth of scrub pine and white birch. The latter ridge extends about two miles, is then broken by a deep depression, rising again into a promontory called Gertrude's Nose. The height is from 1,500 to 1,800 feet above the sea. Following this ridge for nearly two miles beyond the lake, we find the *Corema* in frequent patches along the open sunny spaces on the western side of the path along the brow of the ridge, over a space of several hundred yards in length. Occasional starved examples of *Pinus rigida* are the only tree growth, and the associated plants are *Kalmia angustifolia*, *Gaylussacia resinosa* with some *Kalmia latifolia* and *Gaultheria procumbens*. The scanty soil in the rock crevices and on the rocks is of course derived from the pure quartz rock. On the ridge, beyond the depression above mentioned, the *Corema* is said to grow in still greater abundance, but I was not able to reach that point. I think we need be under no apprehension of the exhaustion of the plant by collectors, but the danger of destruction by fire is much greater.

I have thus given the facts connected with the distribution of this interesting species. I believe that a consideration of them will lead to discoveries of new localities, and to an extension of its known field. It is curious that the first discovery of the plant was made at the extreme southern end of its known area, at points where it seems not to have been abundant, and from which it has disappeared.

The Microvegetation of Bank-Notes, by Dr. Jules Schaarschmidt, Privatdocent of Cryptogamic Botany and Anatomy of Plants, Assistant of the Botanic Institutes and Gardens. Royal Hungarian University, Kolosvár.—The recent researches of Paul Reinsch in Erlangen have revealed the occurrence, on the surfaces of the coins of many nations, of different bacteria and two minute algæ (*Chroöcoccus monetarum* and *Pleurococcus monetarum*, P. Reinsch), living in a thin incrustation of organic detritus composed especially of starch-grains fibres, etc., deposited upon their surfaces during the course of long circulation. This thin incrustation renders the coins very suitable for this microvegetation, but the same phenomenon is exhibited by paper money, and, indeed, by notes of clean, and, to the naked eye, unaltered surface.

I have scraped off some of these minute incrustations with hollowed-out scalpels and needles and divided them into fragments in distilled water that had been boiled shortly before, and, upon examining them with lenses of high power (R. T. Beck's 1-10th inch), have seen the various Schizomycetes distinctly.

I can now proceed to give a brief account of the results I have obtained from the investigation of the paper money. I have investigated the Hungarian bank and State-notes, recent and old (from the years 1848–49), also Russian rubel notes, and have found bacteria upon all of them, even upon the cleanest.

On the surface of all the paper money is always to be found the special bacterium of putrefaction, viz., *Bacterium Termo*, Dujardin.

In the thin incrustations on the paper money I ascertained the occurrence of starch-grains (especially those of wheat), linen and cot ton fibres and animal hairs, and, in this deposit upon the forint State-notes, the Blastomycete *Saccharomyces cerevisiæ* in full vegetation.

Various *Micrococci*, *Leptotriches* (many with club-shaped, swollen ends) and *Bacilli* are also the most frequent plants in the deposit of the paper money.

The two new species of algæ described by Paul Reinsch are very rare on paper money. The green *Pleurococcus* cells have been observed in some cases on 1- and 5-forint State-notes, and the bluish-green, minute *Chroöcoccus* on the border of the 5-forint State-notes.

The vegetation of the paper money is, according to my researches, composed of the following minute-plants:

(1.) *Micrococcus* (various forms); (2.) *Bacterium Termo;* (3.) *Bacillus* (various forms); (4.) *Leptothrix* (species?); (5.) *Saccharomyces cerevisæ;* (6.) *Chroöcoccus monetarum;* (7.) *Pleurococcus monetarum.* From a hygienic point of view, an investigation of the commonest household objects, and especially of books, etc., used by students, may not be superfluous.

Klausenburg, Hungary. A. K.

Recent Changes in Plant Nomenclature. — Dr. Gray, in his Manual, enumerates less than 400 monopetalous species from Caprifoliaceæ to Compositæ, inclusive. The just published Flora, Vol. i., Pt. ii., makes one hundred changes in the nomenclature of these plants. For the benefit of the numerous students and teachers using his Manual (considering that about one fourth the species are to receive different names), the names of the species thus affected are given below, together with the corresponding name in the Flora. *Aster* has been thoroughly revised, and the limits of the species, as well as their nomenclature, have been changed so much that reference to the Flora alone can adequately show in what the changes really consist. *Solidago* is revised as indicated in Studies of Aster and Solidago in the Older Herbaria. *Fedia* becomes *Valerianella; Diplopappus*, *Aster;* *Cirsium*, *Cnicus; Nabalus*, *Prenanthes; Mulgedium*, *Lactuca*. The numerous other changes can be seen in the following list:

Lonicera parviflora=*L. glauca*, Hill.; *Lonicera parviflora*, var.

Douglasii=*L. hirsuta*, Eaton; *Sambucus pubens*=*S. racemosa*, L.; *Viburnum nudum*, var. *cassinoides*=*V. cassinoides*, L.; *Diodia Virginica*=*Diodia Virginiana*, L.; *Fedia olitoria*=*Valerianella olitoria*, Poll.; *Fedia Fagopyrum*=*V. chenopodifolia*, DC.; *Fedia radiata*=*V. radiata*, Dufr.; *Fedia umbilicata*=*V. Woodsiana*, var. *umbilicata*, Gray; *Fedia patellaria*=*V. Woodsiana*, var. *patellaria*, Gray; *Liatris pilosa*=*L. spicata*, var. *montana*, Gray; *Liatris graminifolia*, Pursh, not Willd.; *Liatris odoratissima*=*Trilisia odoratissima*, Cass.; *Liatris paniculata*=*T. paniculata*, Cass.; *Eupatorium parviflorum*=*E. semiserratum*. DC.; *Eupatorium pubescens*=*E. rotundifolium*, var. *ovatum*, Torr.; *Conoclinium cœlestinum*, DC.=*Eupatorium cœlestinum*, L.; *Nardosmia palmata*=*Petasites palmata*, Gray; *Aster lævis*, var. *lævigatus*=*A. versicolor*, Willd.; *Aster Drummondii*, Lindl.=independent species; *Aster Tradescanti*, chiefly, and var. *fragilis*=*vimineus*, Lam.; *Aster miser*=*A. vimineus*, var. *foliolosus*, Gray; [*Aster miser*, Ait.=*A. Tradescanti*, L. partly]; *Aster simplex*=*A. paniculatus*, Lam.; *Aster carneus*=*A. salicifolius*, Ait., and *paniculatus*, Lam.; *Aster æstivus*, mainly=*A. junceus*, Ait.; *Aster longifolius*=*A. Novi-Belgii*, L.; *Aster puniceus*, var. *vimineus*=var. *lucidulus*, Gray; *Aster graminifolius*=*Erigeron hyssopifolius*, Michx.; *Aster flexuosus*=*A. tenuifolius*, L.; *Aster linifolius*=*A. subulatus*, Michx.; *Erigeron vernum*=*E. nudicaulis*, Michx.; *Diplopappus linariifolius*=*Aster linariifolius*, L.; *Diplopappus umbellatus*=*Aster umbellatus*, Mill.; *Diplopappus amygdalinus*=*Aster umbellatus*, var. *latifolius*, Gray; *Diplopappus cornifolius* =*Aster infirmus*, Michx.; *Boltonia glastifolia*=*B. asteroides*, L'Her.; *Solidago virgata*=*S. stricta*, Ait.; *Solidago stricta*=*S. uliginosa*, Nutt.; *Solidago Virga-aurea*, var. *humilis*=*S. humilis*, Pursh.; *Solidago thyrsoidea*=*S. macrophylla*, Pursh.; *Solidago elliptica*=*S. Elliotii*, Torr. & Gray; *Solidago arguta*=*S. juncea*, Ait.; *Solidago Muhlenbergii*=*S. arguta*, Ait.; *Solidago linoides*=*S. neglecta*, var. *linoides*, Gray; *Solidago altissima*=*S. rugosa*, Mill.; *Solidago serotina*=*S. serotina*, var. *gigantea*, Gray; *Solidago gigantea*=*S. serotina*, Ait.; *Pluchea fœtida* =*P. camphorata*, D C.; *Xanthium strumarium*, var.=*X. Canadense*, Mill.; *X. strumarium*, var. *echinatum*=*X. Canadense*, var. *echinatum*, Gray; *Eclipta procumbens*=*E. alba*, Hasskarl.; *Helianthus cinereus*, var. *Sullivantii*=*H. doronicoides*, Lam.; *Helianthus microcephalus*=*H. parviflorus*, Bernh.; *Helianthus doronicoides*=*H. tuberosus*, L.; *Actinomeris helianthoides*=*Verbesina helianthoides*, Michx.; *Coreopsis involucrata*, Nutt.=independent species; *Verbesina Siegesbeckia*=*V. occidentalis*, Walt.; *Actinella scaposa*, var. *glabra*=*A. acaulis*, var. *glabra*, Gray; *Leptopoda brachypoda*=*Helenium nudiflorum*, Nutt.; *Maruta Cotula*=*Anthemis Cotula*, L.; *Leucanthemum vulgare*=*Chrysanthemum Leucanthemum*, L.; *Leucanthemum Parthenium*=*C. Parthenium*, Pers.; *Antennaria margaritacea*=*Anaphalis margaritacea*, Benth. & Hook; *Senecio Elliottii*=*S. aureus*, var. *obovatus*, Torr. & Gray; *Arnica mollis*=*A. Chamissonis*, Lees.; *Cnicus benedictus*=*Centaurea benedicta*, L.; *Cirsium lanceolatum*=*Cnicus lanceolatus* Hoffm ; *Cirsium Pitcheri*=*Cnicus Pitcheri*, Torr.; *Cirsium undulatum*=*Cnicus undulatus*, Gray; *Cirsium discolor*=*Cnicus altissimus*, var. *discolor*, Gray; *Cirsium altissimum*=*Cnicus altissimus*, Willd.; *Cirsium Virginianum*=*Cnicus Virginianus*, Pursh.; *Cirsium muticum*=*Cnicus* *muticus*, Pursh.; *Cirsium pumilum=Cnicus pumilus*, Torr.; *Cirsium horridulum=Cnicus horridulus*, Pursh.; *Cirsium arvense=Cnicus arvensis*, Hoffm.; *Lappa officinalis=Arctium Lappa*, L.; *Cynthia Virginica=Krigia amplexicaulis*, Nutt.; *Cynthia Dandelion=Krigia Dandelion*, Nutt.; *Hieracium scabrum*, in part=*H. Marianum*, Willd.; *Nabalus albus=Prenanthes alba*, L.; *Nabalus albus*, var. *Serpentaria Prenanthes Serpentaria*, Pursh.; *Nabalus altissimus=Prenanthes altissima*, L.; *Nabalus Fraseri=Prenanthes Serpentaria*, Pursh.; *Nabalus Fraseri*, var. *integrifolius=P. Serpentaria*, var. *barbata*, Gray; *Nabalus nanus=Prenanthes Serpentaria*, var. *nana*, Gray; *Nabalus Bootii =Prenanthes Bootii*, Gray; *Nabalus virgatus=Prenanthes virgata*, Michx.; *Nabalus racemosus=Prenanthes racemosa*, Michx.; *Nabalus crepidineus=Prenanthes crepidinea*, Michx.; *Taraxacum Dens-leonis =T. officinale*, Weber; *Lactuca Canadensis*, var. *integrifolia=L. integrifolia*, Bigel.; *Lactuca Canadensis*, var. *sanguinea=L. hirsuta*, Muhl.; *Mulgedium pulchellum=Lactuca pulchella*, D C.; *Mulgedium acuminatum=Lactuca acuminata*, Gray; *Mulgedium Floridanum=L. Floridana*, Gaertn.; *Mulgedium leucophæum=L. leucophæa*.

A. F. FOERSTE.

Botanical Notes from Kansas.—As it is rarely that we see any communications from this State concerning our flora, in any of our botanical publications, I have thought a few lines in regard to it might be of interest. I made a trip during the first week of September out as far as Harper County, a little over three hundred miles southwest of Kansas City, Mo., traveling over the Southern Kansas R. R., which runs through the best counties in the State. Fine crops were noticed in every county through which I passed. The emigration to Southern Kansas this year is very large.

The following is a list of some of the plants collected on this trip: *Mentzelia ornata*, T. & G., Harper Co.; *Eryngium Leavenworthii*, T. & G., Allen Co., common; *Grindelia lanceolata*, Nutt., Southern Kansas; *Helianthus Maximiliani*, Schrader, common everywhere I traveled; *H. petiolaris*, Nutt., in Cowley Co. and west, common in Harper Co.; *Coreopsis cardaminifolia*, DC., Cowley and Harper Counties; *Thelesperma gracile*, Gray, Harper Co.; *Liatris punctata*, Hook., found here, and common southwest; *Hosackia Purshiana*, Benth., grows here and is common in Harper Co.; *Dalea laxiflora*, Pursh., Harper Co.; *Aster patens*, L., near Independence; *Dicliptera brachiata*, Spr., Cowley Co.; *Solanum elæagnifolium*, Cav., Cowley and Harper Counties; *Eriogonum tomentosum*, Mx., common in Harper Co.; *Atriplex hastata*, L., Sumner Co ; *Frelichia Floridana*, Moq., Harper Co., common. Southwestern and Western Kansas are fine fields for botanists.

Paola, Kansas. J. H. OYSTER.

Death of John Williamson.—We have to mourn the premature death of this gifted man, who passed away on the 17th of June. Mr. Williamson was born in Scotland in 1857, came to this country in 1866, and established himself in Louisville, Ky., at first in the business of wood-carving, and afterwards in a foundry for ornamental brass-work. An innate taste for decorative art here found opportunity for development, and an ardent love for nature gave truthful direction to his taste. In 1878 appeared in an unexpected quarter a little treatise upon the "Ferns of Kentucky," which surprised all fern lovers by the beauty and novel form of its illustrations. These were etchings by Mr. Williamson's own hand, transferred to the lithographic stone. This was soon after followed by the publication of a work illustrating the ferns of the region covered by Gray's Manual. In this work the plates were printed directly from the etchings, and the book appeared under the modest title of "Fern Etchings." This work not only supplied a real want in the world of science, but surprised and delighted all lovers of the art he was so successfully cultivating, and the best art-critics were loud in encomium. Encouraged by this, he was giving himself to the fuller cultivation of his powers in that direction, when his health failed, and he was taken away at the outset of a career which gave such promise of brilliancy, leaving behind him a widowed mother, to whom he had manifested a tender filial devotion. His friend Mr. Davenport has done justice to the sterling excellencies of his character in a touching sketch in a recent number of the *Botanical Gazette.*

J. H. R.

Botanical Notes.

The May-flower.—It has been suggested that the delicate and modest little flower which we call the May-flower should be adopted as the emblem of the loyalists, because it is in full bloom at the season of the year when they landed on these rocky shores. In connection with this it may not be out of place to inquire as to the use of the word May-flower or "May-blossom" in the past; and especially to ask what was the *May-flower of the loyalists?* Was their May-flower identical with our spring favorite, or was it some other plant, to us unknown, or if known, called by some other name.

Our May-flower has been named by botanists *Epigæa repens* or the plant that *creeps on the ground*—a name very appropriate to its habit of grow, thas it forms patches of foliage. . . . It belongs to the great family of the heaths, and its nearest allies in this country are the bear-berry, spicy wintergreen and tea-berry. They, like the May-flower have evergreen leaves, and differ in this respect from most of the American heaths.

But the purpose of these remarks is not so much to describe the May-flower and its habits as to inquire whether this flower of ours was the May-flower of the loyalists. The writer was very much surprised many years ago, on being told by an old lady who came here with the loyalists, that our plant (*Epigæa repens*) was *not* the May-flower. Among the wild flowers that were afterwards shown to her she at once recognized one as the true May-flower. This was the plant which is now called the spring beauty (*Claytonia Caroliniana*), a delicate little plant with two opposite leaves, which are not unlike an Indian's canoe-paddle in shape, and having a cluster of nodding pink flowers between the leaves. The short stem which the spring beauty annually sends up comes from a little brown tuber buried deep in the rich mould of the hardwood forest. The plant differs from *our* May-flower in preferring a rich and moist soil, and its stem is soft and succulent like that of its ally the purslane (*Portulaca*), while the stem of *our* May-flower is strong and woody, and its leaves are thick and hard.

The family to which the lady belonged, who spoke of the spring beauty as the true May-flower, came from Connecticut; and it is easy to see why our May-flower was not theirs. In the region where they had lived before removing to St. John, the *Epigæa* would blossom in April, and the term "May-flower" would be inappropriate to it; hence some other blossom with them would have borne the name of "May-flower." The name and the associations connected with it were dear to those New England colonists; with what object more attractive could they have associated the ideas and the name than the delicate spring beauty—a plant which abounds in the rich woods covering the mountains and hills of Western New England and New York. To the loyalists of Connecticut, therefore, the word "May-flower" carried a different meaning from that which it bears with us.

And to the loyalists of New York and New Jersey, where the *Epigæa* was known as the trailing arbutus, the idea of "May-flower," as applied to this plant, was equally foreign. Their name for our May-flower, however, was not happily chosen, as the arbutus was one of those European heath plants which casts its leaves in the autumn, and in this resembles such American heath-plants as the leather-leaf (*Cassandra*) and the Lambkill (*Rhodora*). These cover the "barrens" with foliage and flower in June and July, but are bare and brown in the winter. As the term "trailing arbutus" was used in the Middle States for the *Epigæa* within a short time after the loyalists left there, it was probably current in their time as well. Whether the spring beauty was their May-flower or not, it is sufficiently clear that the *Epigæa* was not.

But to go one step further back in the history of the "May-flower." Washington Irving, in his "Knickerbocker's History of New York," describes in a very amusing way the helplessness of the Dutch Governors of New York in their attempt to oppose the colonizing tendencies of the New Englander. He describes the encroachment of the Yankees upon the territory of their Dutch neighbors on the northern shore of Long Island Sound, and they even swarmed over into Long Island, displacing the Dutch or occupying the country in advance of them. These Puritan farmers carried with them the tradition that their ancestors came over from England in the "May-flower." Many of them settled in Connecticut, and their descendants formed the bulk of the emigrants from that State whom we know under the name of loyalists. It is quite clear, however, that the May-flower for which the ship of the Pilgrim Fathers was named was not the "May-flower" of the loyalists, any more than the plant so designated by the latter is the May-flower of the maritime Canadians, for neither the *Epigæa repens* nor the spring beauty were known to Europeans before the discovery of America. They are both natives of this continent and are unknown in the old. The May-flower of the Pilgrims must, therefore, have been some other plant—perhaps the hawthorn (*Cratægus Oxycantha*), which appears to be alluded to by Mickle in the following lines:—

> "By this stream and the *May blossomed* thorn
> That first heard his love tale and his vows."

And by Spencer in the following:

> "To gather *May busket* and smelling brere
> And home they haste the postes to dight."

And in Chaucer there is the following line:

> "And fresher than the *May* with flowers newe."

The hawthorn still bears in England the name of "The May," and there can be little doubt that its fragrant blossoms suggested the name borne by the pioneer ship of the Plymouth colony.

As the location of the Sacred Mount—the point of dispersion of a primitive people—was transferred to the migrating Indo-European nations from one country to another, in the Old World, so the Saxon emigrants transferred the name of "May-flower" to a new species of plant, as they lost their familiarity with the old. To us, living in a region where *Epigæa* abounds, and blossoms in May, it very appropriately bears the name of May-flower, not only on account of its beauty and its fragrant flowers, but because it blooms in the spring. It is rightly chosen by the descendants of the loyalists as a fitting emblem of those who, on this day 100 years ago, first set foot on the shores of New Brunswick. Its home is in that region of the North American continent which extends from the Atlantic coast of Nova Scotia, through New Brunswick and Maine, to Eastern Ontario, Lake Superior and the rocky wilds of the northwest. In Ontario and the Maritime Provinces of Canada is the home of the loyalists, and when the first detachment of these people landed on the rocky shores of St. John's harbor in the spring of 1783, there can be no doubt that they found the May-flower (*Epigæa*) blooming around them. In its leaves, fresh and green from beneath the winter snow, they would have seen an emblem of their own preservation through adversity in the past, and in its modest and fragrant blossom an omen of content and prosperity in the future.

In conclusion, it may be added that our reflections upon the May-flower lead to the following result:—

The May-flower of the Pilgrims was not the May-flower of all the loyalists.

The May-flower of the loyalists was not the May-flower of the maritime Canadians.

The May-flower of certain of the loyalists was the spring beauty.

The May-flower of the maritime Canadians may very fittingly be dedicated to the loyalists.

Or, to consider the matter from a chronological standpoint, it may be said that 260 years ago the hawthorn was the May-flower. One hundred years ago the spring beauty was to some loyalists the May-flower. *Now* the *Epigæa* is to the descendants of the loyalists the May-flower.—*G. E. Mather, in Canadian Sci. Monthly.*

The Continuity of Protoplasm in plants is still attracting considerable attention in botanical circles. An interesting article in *Nature* (June 16, p. 182) gives a *resumé* of the history of the subject from the year 1837. Herr Russow, who maintains that in all plants during their entire life the whole of the protoplasm is continuous, says the protoplasmic threads are seen well in *Rhamnus*, *Fraxi-*

nus, *Humulus*, *Gentiana cruciata* and in the bark of *Prunus*, *Quercus*, etc. Threads, however, which contain no granules, but are transparent and homogeneous, are with difficulty rendered visible. His method of examination is to lay the sections to be examined in a solution of 0.2 per cent. of iodine and 1.64 per cent. of potassium iodide in concentrated sulphuric acid. After removal, the sections are repeatedly washed and then stained with aniline blue; in some cases they are previously stained with picric acid. Mr. Gardiner, however, considers that the sulphuric acid method is unsatisfactory and that the method of swelling with chloro-iodide of zinc and of staining with picric-Hoffman blue is in every way more advantageous, since little alteration of structure takes place and the staining with blue is limited to the protoplasm.

Chemical Constituents of Plants —Herr M. Ballo contributes an important paper on this subject to the Proceedings of the German Chemical Society. He thinks that oxalic acid has a much more important function in vegetable physiology than is generally supposed, carbohydrates being formed from the reduction of this and other vegetable acids rather than by direct synthesis from carbonic acid and water. Tartaric acid, on the other hand, is a product either of the oxidation of carbohydrates or of the reduction of oxalic acid, as is also the glycolic acid which occurs in unripe grapes and in the the leaves of the wild vine. As regards all other products of oxidation, the less the amount of oxidation the more complicated is the product and the more closely related to the original substance; while, when oxidation is carried on further, we get the original substances by which the plant is nourished. The vegetable acids are the most common products of oxidation in the plant. A portion of the oxalic acid is used in the decomposition of calcium sulphate, the rest as the raw material for the production of glycolic, tartaric, malic and succinic acids.

If formic acid is heated with nitric acid it is oxidized into carbonic acid and water, the nitric acid being reduced to nitrous oxide; but at the commencement of the process oxalic acid is formed, and the author believes that this process also takes place in nature, and that this is one of the reasons why nitrates are so valuable to the growing plant. In the living plant a portion of the nitrates is used in the production of ammonia and other substances nearly related to it, and another in the conversion of amide compounds into alcohol compounds. The greater part is reduced to the state of nitrous oxide, and from this nitric acid is again formed through the agency of oxygen and water. Hence a small quantity of nitrates can bring about the formation of a large quantity of oxalates.

Electric currents exist without doubt in the living plant, and it is possible that in some cases these may be converted into chemical work consisting in the decomposition not merely of water but also of salts. The products of decomposition of these salts may cause the formation of metal derivatives at the negative pole, of derivatives with negative radicals at the positive pole. Elsewhere, these substances may again combine with one another and the same process be then again repeated. Hence the comparatively small quantity of inorganic salts found in plants.


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Notes on the Haustoria of some N. A. Parasitic Phanerogams.*

By JOSEPH SCHRENK.

(Plate XLVI.)

GERARDIA QUERCIFOLIA, Pursh.—The parasitism of *Gerardia* seems to have been first pointed out by J. Stauffer, who, in a curious little pamphlet of two pages, printed by the author in 1850, mentions the parasitic attachments of *Gerardia flava*, *quercifolia*, *pedicularia* and *tenuifolia*.† On two accompanying plates portions of specimens of these four species are figured. The character of these illustrations may be judged of by a reproduction of one of them in Gray's Structural Botany, p. 38. Neither text nor figures contain any information about the interior structure of the haustoria, nor was I able to discover any literature referring to this subject anywhere else.

The figures on Plate xlvi. (with one exception) were drawn from the haustoria of *Gerardia quercifolia* attached to the roots of *Corylus rostrata*, Ait., gathered in New Hampshire, in the month of August, and on them the following description is mainly based. Besides, I examined the haustoria of *Gerardia flava*, L., *pedicularia*, L., *tenuifolia*, Vahl., *purpurea*, L., and *maritima*, Raf. The two latter species, to my knowledge, have not yet been reported as parasitic.

The haustoria of *Gerardia* appear as lateral rounded excrescences which are scattered irregularly along the branches of the root, whereever there is a chance for them to obtain suitable nourishment: they very frequently attach themselves to the root of the *Gerardia* itself. The largest I found are about $6^{mm.}$ in length, while the smallest consist simply of a few layers of cells raised above the surface of the root. We either find several, often many, haustoria, more or less distant from one another, growing from the same branch of the *Gerardia* root, which keeps on growing, eventually producing more haustoria (Fig. 7; at *cm* we see the continuation of the root); or the rootlet, after having produced a haustorium, shrinks into an insignificant appendage (Fig. 1), or disappears altogether, so that the haustorium appears terminal (Figs. 2, 3, 4).

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*Cf. BULLETIN, Vol. x., No. 4.

†When I sent the note referring to the parasitism of *Gerardia tenuifolia* to the BULLETIN, in December 1883, I had not yet seen this pamphlet; a copy of it was found in the library of the Torrey Herbarium by Dr. N. L. Britton, who drew my attention to it, and thereby enables me to give the credit of having discovered the parasitism of *G. tenuifolia* to Mr. Stauffer. In this pamphlet *Comandra umbellata* also is briefly described, and two accompanying plates, lithographed and printed by the author, give a good representation of the entire plant above ground, and a fair one of its roots.

At the earliest stages of their development which I examined, the haustoria form slight excrescences from the cortical portion of the *Gerardia* root, in such a way that the epidermis forms an unbroken covering of both root and haustorium. On young haustoria I noticed some papillose superficial cells which looked exactly like short root-hairs, but their principal function evidently is to take hold of some contiguous foster-root. The youngest haustoria do not contain any vascular tissue, but soon there appear in the axial portion single threads of reticulated vessels connecting the apex of the haustorium with the fibro-vascular tissue of its mother-root. At the same time the haustorium increases in all its parts and finally appears as figured on the plate.

As I called the haustorium an outgrowth of the root, and as the tissues of the latter are continuous with those of the former, I will, in the first place, give a brief description of the root of our *Gerardia.*

In the centre of the root there is a fibro-vascular cylinder; its diameter is usually equal to about one-half the diameter of the entire root. This cylinder contains very wide reticulated vessels and thick-walled wood-cells; it is surrounded by a narrow zone of cambium beyond which we find large parenchymatous cells with many inter-cellular spaces. Irregularly scattered in the parenchyma we see numerous sclerenchyma cells, singly or in groups from 2 to 6, mostly of prismatic shape; their walls are exceedingly thick and pierced by branching canals. The zone of parenchyma around the central wood cylinder is divided about midways by a layer of closely arranged cells. This layer seems to be a true endodermis; its cells are very narrow compared to the surrounding parenchyma cells; the partitions separating them are strictly radial and frequently undulating, and the cell-walls resist the action of sulphuric and even of chromic acid. Inside of this ring the starch granules in the parenchyma cells are much smaller than in those outside of it, where they are quite large.

At the circumference of the root there is a single layer of epidermoidal* cells the outside walls of which are thickened and even more resistant against the action of the reagents mentioned above than are the walls of the endodermis. The surface view of the root shows that these cells are arranged in oval, frequently elongated hexagonal plates or patches. The middle portion of such a group is formed of rows of two or three cells each; the cells are separated by radial (and vertical) partitions which are still more wavy than those found in the endodermis.

At first I was inclined to consider this epidermoidal layer as the true epidermis, and to explain the absence of root-hairs by the parasitic nature of the plant; but, on closer examination, I soon found that the supposed epidermis was covered with a continuous layer of very long, exceedingly thin-walled, empty cells, which, on the cross-section, show quite an irregular outline (Figs. 5 and 7, *e*). Owing to the tenderness of their membranes it is not easy to obtain transverse sections that will show these cells completely encircling the root, and

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* This term is used by v. Höhnel, Olivier and others to designate a layer of cells close to the epidermis, that resembles in most respects the endodermis.

it is still more difficult to prepare perfect longitudinal sections. However, I never failed to see this epidermis, as I must call it, on thin, *i. e.* young portions of the *Gerardia* root, while on older ones I could, at best, make out a few shreds only. I must therefore suppose that the epidermis is soon cast off. I am not prepared to assert that these epidermal cells perform the functions pertaining to root-hairs, but, considering the thinness of their membranes, which do not seem to be cuticularized, and their peculiar inflated form, I do not see what should prevent them from absorbing the water from the soil in case the plant needed it.

Referring to this description of the root, the structure of the haustorium itself will be more easily understood. With *Gerardia*, the body of the root from which the haustorium grows, contributes a much greater share to the bulk of the haustorium than with *Comandra.* We can see from Figs. 5 and 7 that a considerable portion of the upper half of the haustorium really belongs to the root proper. In Fig. 5, representing a longitudinal section of a hazel-root that bears a haustorium in the manner illustrated by Fig. 3, the vascular cells of the *Gerardia* root, *pl*, appear cut across, for it had grown at right angles with the foster-root. In Fig. 7 the vessels of the *Gerardia* root, *pl*, are viewed longitudinally, *Gerardia* and hazel-roots lying in the same plane.

The epidermoidal layer of the haustorium is continuous with that of its root (Figs 5 and 7, *ep*), and the epidermis, *e*, is also met with on the haustorium. It is found especially well preserved in the angles at which the haustorium and the foster-root meet (Figs. 5 and 7, *e*). In and near these places the epidermis-cells have so multiplied as to form several irregular layers; no doubt, they help the *Gerardia* to get a better hold of its host.

The portion of the haustorium-bark underneath the epidermis, *bk*, is likewise a continuation of the root-bark. The parenchyma cells near the epidermis are larger than those nearer the centre; the former contain much larger starch-grains. The endodermis of the root is also continued in the upper part of the haustorium ; in Fig. 6, it is indicated by a dotted line, *en*. The sclerenchyma-cells are of the same structure and similarly arranged in both root and haustorium ; they are, as a rule, more numerous in old haustoria. The cortical portion does not penetrate into the foster-root, but ends at its surface.

From the central wood-cylinder of the root very numerous vessels, surrounded by a zone of cambium, spread downward like an umbrella, but in a solid mass, Figs. 5 and 7, *vs*. Before they reach the middle of the haustorium most of them end abruptly, anastomosing, however, by means of short connecting vessels. Many of these vessels continue their course, singly, through the lower part of the haustorium to its apex, until they reach the wood tissue of the foster-root (Figs. 5, 6, 7 and 8). They consist of comparatively short links, the ends of which are laterally connected, and are transformed into continuous passages in the usual manner, by the absorption of their septa.

These vascular fibres are accompanied, in their lower course, with elongated, active cells, *ac*, which constitute the meristematic tissue within which the growth of the apex takes place. In the central part of every haustorium, just below the solid mass of descending vessels, there is a layer of considerable thickness which, except at its centre, is formed of regular rows of oblong cells that are flattened contrary to the vertical axis ot the haustorium. The centre of this layer consists of rounded, irregularly arranged cells (Figs. 5 and 7). All the cells of this central portion contain a turbid, granular protoplasma, so that after staining with carmine they become quite conspicuous.

The contact of the tissues of the parasite with those of the foster-root is similar to that which we observed in *Comandra.* I satisfied myself that there is a perfectly open communication between them. The meristematic, active cells enter the vessels of the foster-root bodily after the walls of the latter have been partly absorbed, Figs. 10 and 11. Some vessels are formed in the haustorium, at the side of a vessel of the foster-root, and then the side-wall of the latter and the end walls of the former are absorbed, Fig. 13; or they meet end to end, and then they simply form one passage after the absorption of the end-walls, Fig. 9.

But more interesting and more important than all these facts I consider the following observation that I wish to record on this occasion.

In ever so many haustoria of *G. quercifolia* and, in a still more exquisite manner, of *G. flava*, I found almost all their vascular cells connected with those of the foster-root in such a way, that communication was open between the parasite and the *stem* of the foster-plant, while communication between parasite and peripheral ends of the foster-*root* was entirely cut off. In Fig. 5 the right-hand side of the foster-root, at *w*, if not cut off, would lead to the main root, and that to the stem. We observe that the tissues at the left, toward the root end were absorbed and replaced by the apex of the haustorium and that none of the entering vascular fibres turns that way. In Fig. 7 the *left* hand side points towards the stem. The process begun in these two cases has been completed in the one illustrated by Fig. 8. The apex of the haustorium gradually worked its way deeper and deeper into the hazel-root, while its tissues kept turning steadily in one direction: toward the stem, away from the root-end, until finally the latter was cut off completely and the haustorium took its place. The progress of this process may be seen in its various stages by examining some typical forms of the *Gerardia* haustorium, as illustrated by Figs. 1, 3, 2 and 4.

I have some slides with sections taken from *G. flava* which show the tendency of the apex to turn away from the root-ends in a remarkably clear manner. That portion of the apex which would correspond to the portion lying to the right of the point *x*, in Fig. 7, or to the left of *x* in Fig. 5 (*i. e.* toward the root-end), is *separated* from the tissues of the foster-plant, for the outermost cells of this part of the haustorium have their *outer* walls lignified, as shown by the indol and other reactions. At the same time, the adjacent cells of the foster-root are found to be in a state of partial decomposition, while on the opposite side the connection between parasite and host is perfect, as shown by Figs. 10 and 11 which were drawn from one of these slides.

I said above that haustoria are very frequently found attached to the roots of *Gerardia* itself. Such haustoria have either the shape of those already described (Figs. 1–4), or they are mere cylindrical branches growing at right angles *from* some *Gerardia* rootlet *into* another contiguous one. But, instead of single threads of vascular cells as described above, all these haustoria have solid, massive cylinders of vessels connecting the root *from* which, with the root *on* which they grow. In these haustoria I could not detect the remarkable tendency of the apical tissues to meet the descending sap-current of the foster-plant, the vessels are generally inserted at right angles with the wood cylinder of the *Gerardia* root.

In some *Gerardia* rootlets infested with haustoria I found the vessels in the immediate vicinity of the haustorium apex filled with those hernioid protrusions which were observed by some histologists* growing in vessels surrounded by very active cells. The walls of these active cells will bulge out through the pits of a vessel into its cavity; then they will grow considerably, forming globular cells, and will eventually close up the vessel entirely. In the sections that I have examined the walls of these hernioid cells seem to be lignified; at least, they appear of the same color as the vessels enclosing them after staining the sections with alum carmine and aniline green.

If I had found these "puzzling"† hernioid protrusions near all, or at least near very many of the haustoria examined, I should not hesitate to consider them as a contrivance to defend the *Gerardia* against the senseless depredations of its own haustoria.

I abstain, for the present, from drawing the conclusions in reference to the nature of parasitism in general, which are most forcibly suggested by the above premises.‡ Besides, if these observations should prove correct, they might contribute, to a certain extent, to the solution of another much discussed, and still undecided,§ physiological question—the question about the functions which the tracheary tissues perform in the transmission of the various fluids necessary to the life of plants.

We have seen that in the parasites examined thus far the *channels* or cavities of the vessels are in close, open connection with the cell-cavities of the foster-root. Shall we still assume that it is only *air* which passes within these united channels? And must we still suppose that the water in plants travels within the *substance* of the walls of these vessels, and not within their cavities?

Hoboken, August, 1884.

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*De Bary, *Vergleichende Anatomie*, p. 594 ("Thyllen"); J. C. Arthur in Ch. E. Bessey, Botany, p. 30.

†Bessey, l. c.

‡*E. g.* it is very doubtful whether the following assertion, found in Sachs (Lehrbuch, 4th ed., p. 690, foot-note) will hold good: "Parasites containing much chlorophyl, like the Loranthaceæ, are able themselves to assimilate, consequently they need to take only water and mineral substances from their foster-plants."

§ Haberlandt, Physiologische Pflanzenanatomie (1884), p. 209: "The physiological nature of the vessels and tracheids has been discussed very frequently; still this question has not yet been definitively solved."

EXPLANATION OF PLATE XLVI.—Figs. 1, 2, 3, 4. Haustoria on hazel-root about x 8, (see text). Fig. 5. Longitudinal section of haustorium and hazel-root of the same form and arrangement as those of Fig. 3. *e*, epidermis; *ep*, epidermoidal layer; *bk*, bark (parenchyma and sclerenchyma cells); *cm*, cambium; *pl*, central wood cylinder of *Gerardia*-root cut across; *ac*, meristematic tissue; *b*, epidermis and bark of hazel-root; *c*, cambium; *w*, wood tissue; *G*, portion of the haustorial apex that has worked its way around the wood-cylinder of the foster-root to its lower side (*cf.* Fig. 3); *D*, large pitted duct of Corylus with entering vessels of *Gerardia*; x 45.—Fig. 6. Cross-section of both *Corylus* and *Gerardia*-roots. As the tissues of the haustorium appear in the same way as in Fig. 5, the outlines only are given. *en*, endodermis; *c*, *b*, *w*, same as in Fig. 5, x 25.—Fig. 7. Longitudinal section of both *Corylus* and *Gerardia*-roots. Letters as in Fig. 5, x 45.—Fig. 8. Section of a haustorium occupying the end of a rootlet, as illustrated in Fig. 2, x45.—Fig. 9. The duct D, Fig. 5, magnified x460. 1, large vessel of *Gerardia* cut across, showing perforated septum; 2, 3, 4, 5, smaller vessels communicating with 1 and opening into the large *Corylus*-duct; the vessel 4 shows remnants of its absorbed end wall and (below the rim) of a septum, also the scalariform thickening of its farther wall.—Figs. 10 and 11. Wood-cells of an unknown root attacked and entered by some haustorium cells of *Gerardia flava*, x 500.—Fig. 12. Tangential section of hazel-root with medullary ray cut across, and with large duct *d*; *v*, cells of haustorium, x 135.—Fig. 13. Duct *d*, of Fig. 12, magnified x 460, to show the vessels of *Gerardia*, *v*, opening into the duct, and the cells 1 and 2 disintegrating its end wall.

All the powers given above refer to the original drawings, which, in the plate, appear reduced to one-half their size.

Kansas Fungi.*

By J. B. ELLIS and W. A. KELLERMAN.

ÆCIDIUM ÆSCULI.—Hypophyllous, on pale yellowish, slightly thickened spots, 4–6^{mm} in diameter. Æcidia orange-yellow, 30–75 on each spot, generally with a vacant space in the centre, hemispheric and closed at first, about 200μ in diameter, at length opening above and becoming short cylindric, with an irregularly lacerated margin; spores orange-colored, irregularly globose (19–25μ) with coarse granular contents; the component cells of the æcidia subhexagonal or oblong, and faintly striate, the striæ extending more or less perfectly entirely across.

On leaves of *Æsculus glabra*. May. No. 526.

ÆCIDIUM VERBENICOLA.—Æcidia hypophyllous, clustered, 3–35 together, 200–250μ in diameter, orange-red within, covered outside with a granular, semitransparent coat like grains of sugar; margin of æcidia white, recurved and sublacerate-dentate; component cells subhexagonal (19–25μ), or elongated (30–35x20–25μ), surface marked with flexuous ridges and tubercles; spores globose, elongated or subangular by compression, 19–25μ, orange. The corresponding spots on the upper surface of the leaves are at first pale yellow but become purplish black.

On leaves of *Verbena urticifolia* (No. 532) and *V. stricta* (No. 549.) June. Possibly not distinct from *Æc. Verbenæ*, Speg., but differs with constantly clustered æcidia with *recurved* margin, and in not being hemispheric at first.

ÆCIDIUM CEANOTHI.—Æcidia hemispheric, closed at first, but

*The species here described were collected by Dr. W. A. Kellerman in the vicinity of Manhattan, Kansas, from May to September, 1884.

finally open, with an erect, subentire margin, .33–.5$^{mm.}$ in diameter, whitening out; component cells with a more or less distinct striate margin; spores subglobose, about 20μ in diameter, orange. The portion of the leaf occupied by the fungus, generally a small marginal area .75–.5$^{cm.}$ in diameter, is slightly thickened.

PHYLLOSTICTA CORNUTI.—Perithecia minute (70μ), black, thickly scattered on indistinct brownish spots (2–3$^{mm.}$) nearly round or limited by the veinlets of the leaf, subangular and of irregular outline and more or less confluent; spores oblong-cylindric, about 3x1μ.

On withered or dead leaves of *Asclepias Cornuti*. Aug. No. 620.

PHYLLOSTICTA VERBASCICOLA.—On large, brown, rather indefinitely limited spots, 1.5–1$^{cm.}$ across, or, by confluence, 2–4$^{cm.}$, occupying large irregular areas of the leaf. Perithecia buried in the substance of the leaf, 100–150μ in diameter and filled with abundant subhyaline or brownish tinted, oblong-elliptical spores, mostly 3.5–4x1.5–2μ, with a few darker and larger.

On leaves of *Verbascum Thapsus*. July. No. 587.

P. Verbasci, Sacc., is on small bleached spots and has spores 6x3μ, slightly constricted in the middle.

SEPTORIA LEPTOSTACHYA.—Perithecia amphigenous, punctiform minute, black, scattered on pale brown spots 2–4$^{mm.}$ in diameter, limited in part by the veinlets of the leaf, and without any very distinct raised border; spores filiform, slightly undulate-curved (nucleate ?) 20–22μ by about 1μ, or rather less.

On leaves of *Phryma Leptostachya*. Ohio. June, 1883. No. 344.

SEPTORIA CEPHALANTHI.—On round, red-brown spots (1.5–3$^{mm.}$) with a narrow, slightly raised border. Perithecia minute (130–120μ) mostly collected in a cluster in the centre of the spots; spores abundant, fusiform, brownish, continuous, nearly straight, 12–20x1μ. This can hardly be *S. verrucæformis*, B. & C., which is on branches of *Cephalanthus*.

On leaves of *C. occidentalis*. Aug. No. 602.

SEPTORIA STENOSIPHONIS.—Spots red-brown 1-2$^{mm.}$, or, by confluence, 2–4$^{mm.}$ across, either remaining brown or whitening out in the centre, the whitened part being surrounded by an indistinct narrow border, which is included in the limits of the brown spot; perithecia visible on both sides of the leaf, mostly collected in the centre of the spots, brownish black, subglobose (90μ); spores filiform, yellowish or nearly hyaline, but slightly curved, 18–30x1μ.

On *Stenosiphon virgatus*. July. No. 578.

Closely allied to *S. Œnotheræ*, West., but spots smaller, spores shorter and narrower and perithecia less numerous.

ISARIA XYLARIOIDES.—Stems fasciculate, about 1$^{cm.}$ high and 1$^{mm.}$ thick, brown, dusted with yellow powder below and bearing above a white, oblong head, composed of loosely branching hyphæ bearing abundant globose or ovate hyaline conidia, 2–2.5$^{mm.}$ in diameter. The whole somewhat resembles an imperfectly developed *Xylaria*, which perhaps it is.

On dead wood. June. No. 554. Sent also from Bethlehem, Pa., August, 1884, by Mr. E. A. Rau.

CERCOSPORA ISANTHI.—On round (1$^{mm.}$) white spots, with a narrow raised border, hyphæ tufted ($25-30x4\mu$), crooked and subdentate above, continuous, brown; conidia clavate-cylindric, multiseptate, $75-100x3-4\mu$. The spots are at first purplish, with a purple shaded border but soon whiten out.

On leaves of *Isanthus*. Manhattan, Ks. Aug. No. 610.

CERCOSPORA TUBEROSA.—Hypophyllous, on spots ($.75-.5^{cm.}$) at first gray and imperfectly defined, but at length dirty brown and of irregular outline, angular, elongated and partly limited by the veinlets of the leaf, hyphæ arising from a small tubercular base, nearly straight and more or less toothed above, septate, brown, $35-45x4\mu$; conidia subcylindric, slightly tapering downwards, subfuscous, 5-10-septate, $80-110x3.5-4\mu$.

The spots are darker and more distinctly defined on the upper side of the leaf. This differs from the preceding chiefly in the character of the spots.

On leaves of *Apios tuberosa*. No. 613.

CERCOSPORA OCULATA.—Mostly epiphyllous, on dirty brown spots ($.25-75^{cm.}$), with a definite, slightly raised, narrow, darker border; hyphæ cæspitose, short ($25-30x4\mu$) obtuse, simple, brown, continuous, entire or slightly denticulate and obtuse above; conidia at first oblong and 1-septate, $20-30\mu$ long, at length attenuated below and becoming $30-60x3-4\mu$ and faintly 3-septate.

The spots are often concentrically wrinkled and sometimes confluent, forming patches $2-3^{cm.}$ across. This differs from *C. Vernoniæ*, E. & K., in the different character of the spots, as well as in its shorter and less distinctly septate conidia.

On leaves of *Vernonia Baldwinia*. July. No. 574.

CEROCOSPORA TEUCRII.—Epiphyllous, on brown (mostly $1-2^{mm.}$) spots which soon become dirty white, with dark or purple shaded border; hyphæ tufted, brown, crooked and sub-denticulate above, $75-120x3-4\mu$, faintly septate.

On leaves of *Teucrium Canadense*. Aug. No. 457.

Notes on Corema Conradii.

In July, 1879 I found *Corema Conradii* growing quite abundantly at Grand Lake, Nova Scotia. It was limited, however, to a bare promontory on the eastern shore of the lake, and was associated with *Myrica Gale*.

ELIZABETH G. KNIGHT.

——— To Mr. Redfield's interesting and comprehensive list of localities of *Corema Conradii*, in the last number of the BULLETIN, I have one addition to make. On the summit of Blue Mountain, just back of Camden, Maine, perhaps eight hundred feet in height, and within a half hour's climb from the village, I have found several large patches of this interesting species. The dates of flowering are noted in my herbarium as May 18th, 1859, and May 2nd, 1860.

Washington, D. C. J. W. CHICKERING.

——— Prof. Fowler, of Kingston, Ontario, has found *Corema Conradii* abundant in a sphagnous bog near St. John, New Brunswick. I have seen it also at Aylesford, Nova Scotia, growing on a sandy plain among scattered pines. This station was visited by Prof. Macoun and Dr. Burgess in 1883, and described in a late number of the *Botanical Gazette*. It is not far from Dr. Howe's station at Wilmot, in the adjoining county. Other localities will probably be found in the western part of Nova Scotia.

Presque Isle, Me. J. VROOM.

——— With regard to Mr. Redfield's most interesting paper on *Corema*, I would note that there seems to be no doubt that Mr. S. W. Conrad did collect the plant at "Pemberton's Mills, about twelve miles from Burlington, N. J.," for a specimen so ticketed is in the Torrey Herbarium.

N. L. BRITTON.

——— Besides the localities of *Corema Conradii*, Torrey, recorded by Mr. Redfield in the September number of the BULLETIN, I can state that the plant grows in great abundance on the island of Nantucket, Mass., where I have known it for some twenty years. There are acres of it, as in Plymouth, occupying the ground to the exclusion of almost everything else. The plants are large, with their tops rounded, so that the surface of the bushes looks like an assemblage of green mounds of a conspicuous and pleasing regularity. The tops are two and three feet in diameter, all green and flourishing, but, underneath, the branches, large and small, are leafless and look very old.

The plants bloom profusely the last of April or early in May, and the fruit when ripe falls off and covers the ground. From the activity of the ants amongst the little grains I have suspected that they made some use of them.

The locality most easily reached is on the *old* 'Sconset road, from one to two miles from the edge of the town.

Springfield, Mass. MARIA L. OWEN.

Aromatic Leaves in Quercus rubra.—One warm morning early in August last, while exploring a grove surrounded on all sides by saltmarshes, in Sea View (Marshfield), my attention was attracted by a strong, almost hot, perfume. My two companions, coming to the spot a moment afterwards, noticed it also.

A search by all three failed to reveal anything beneath the leaves on the ground or above them more fragrant than golden-rod, and the few stalks of sweet golden-rod grew beyond the limits of this peculiar fragrance.

The impression produced on our minds was so strong that about a fortnight afterwards two of us paid another visit to the marsh expressly to investigate the odor. I fancied that it might prove to be a hidden plant of *Apios tuberosa*, as I had, in the meantime, seen some in bloom, though not within a couple of miles of this place. Finding, after a thorough search, that there was no *Apios tuberosa* or anything else to account for the perfume, and that I lost it when more than six or eight feet distant from a certain oak-tree, it occurred to me to smell of the oak-leaves. I found that the fragrance proceeded from them. I afterwards found another sweet-scented oak on high land, not near the water, and a mile from the first. On a third visit to the marsh, late on a cool afternoon, I found still another specimen, though not very near the first.

All the trees seem to be the common red oak (*Quercus rubra*); those in the marsh are not more than ten or twelve feet high, and are bushes in shape, with branches to the ground. The upland specimen is a tree twenty-five to thirty feet high. None of the oak-trees about them has any odor whatever, and, while the latter seem to be comparatively free from the attacks of insects, the former are so eaten that it is difficult to find perfect leaves. The only exceptions to this are the young red leaves at the ends of the branches; they are all perfect and have no odor until dried for twenty-four hours, when they develop it as strongly as the mature green leaves. All lose their odor when pressed, but retain it for a week or more when simply dried. The leaves of the upland tree were sweet when last seen, September 22nd. The others were probably so too, but I did not see them. I have examined all the oak-trees I have met with since finding the above, but have discovered no more sweet ones. If one is not attracted by the strong arbutus perfume when passing near the tree, it seems to be useless to examine it further.

These trees appear to reverse the rule with sweet-leaved plants, which generally have to be crushed or dried to develop their full fragrance. For instance, one can walk through a plantation of bayberry and hardly perceive any odor, though when crushed or dried the leaves are very sweet and finally acquire the exact smell of tea. These oak-leaves, on the contrary, attract the attention of the passer-by, are not improved by crushing, and, with the exception of the young leaves mentioned, do not gain more fragrance in drying.

Boston, Oct. 22nd, 1884. BELL F. HAPGOOD.

Subularia aquatica.—In September, 1882, I found one specimen of this rare little plant on the gravelly margin of Echo Lake, Franconia, and quite out of water. I made a note of it in the BULLETIN for March '83. I afterwards received several letters from botanists in regard to the plant, and was told that no record had been printed of its being found at Echo Lake since Tuckerman's discovery in 1844. In September '83 I again visited the station, and was so fortunate as to find several specimens in the same locality, all out of water and quite small. My information concerning the plant was derived from Gray's Manual, which gives its habitat "margin of lakes." I did not therefore search for it under water, and other botanists who visited the place made the same mistake. But this year I, with others, have made further investigations, with satisfactory results. It is found in great quantities on the gravelly bottom of the lake, in from one to four feet of water, and probably at a greater depth. In this situation it is much more luxuriant, sometimes fully 9 inches in height, and grows in thick, close mats, twenty to thirty feet in extent. On consulting Tuckerman's original article (*Silliman's Journal*, 2d series, vi., 1848) I find that he there speaks of the *Subularia* as submersed, "growing abundantly in about a foot of water." In Gray's Genera, 1848, it is described as "growing on the gravelly margins of lakes and pools where it is ordinarily covered with water. Gray's Manual gives June and July as its flowering season, but I have never seen it even in bud before August, and I do not think it is in pod (and therefore in the best state for examination and identification) before September.

ANNIE TRUMBULL SLOSSON.

Immediate Influence of Crossing or Hybridizing on Fruits and Seeds.—Much writing, though few experiments, has been offered lately on this subject. Anxious to go, myself, over experiments recorded in the early part of the century in relation to sterility in hybrid Verbascums, I crossed *Verbascum Blattaria* with *V. Thapsus* the past summer. I need not go over the precautions taken to prevent the use of self pollen—every one of experience knows how to make these precautions absolutely certain in their results. Again, I may note that the seeds of these two species are very distinct as seen under a lens. *Thapsus* has gray seeds, which taper as if they were the ends of corn-cobs—those of *Blattaria* are dark brown, and in form as if they came from the middle portion of an ear of corn. The hybrid seed-vessel and the hybrid seeds were exactly those of its female parent, *V. Blattaria.* I have plants growing, and shall have to wait another year to know if they are sterile, but that is another question. But as we know that there is an immediate effect on the seed in crossing in Indian corn, the *Verbascum* experiment simply shows one more case where there is none.

THOMAS MEEHAN.

Teratological.—I have seen, this year, a common cooking-bean with three cotyledons; also, within a few days, a horsechestnut bur containing three perfect seeds.

W. W. BAILEY.

Rudbeckia.—I see by Dr. Gray's Synopsis, just received, that what I figured as *Rudbeckia fulgida* in my Flowers and Ferns he regards as *R. speciosa.* What I have said about *R. fulgida* in my note on page 94 of the BULLETIN refers to his *speciosa.*

THOMAS MEEHAN.

Synspermy in the Horsechestnut.—After sending a note lately upon a three-seeded horsechestnut, I found those with two seeds so common as to be unworthy of mention. So perhaps is the case I cited. Now, however, I can record a greater rarity, viz., a complete union of two seeds into one, the attachment being at the hilum. As I wish to preserve the specimen, I have not dissevered the parts to ascertain whether the union is by more than the integuments, but it looks as if it were. Under *Synspermy,* Dr. M. T. Masters, in a footnote, gives the case of *Æsculus Hippocastanum,* but considers the phenomenon unusual.

Providence, R. I. W. W. BAILEY.

Note on the May-Apple.—Prof. T. C. Porter kindly sends me a copy of the *Botanical Gazette,* 1877, No. 9, describing essentially the same variations of growth shown in Fig. 9 of my notes (BULLETIN, p. 63). The figure of his aphyllous form would indicate an abortion of the leaves, there being a distinction made between stem and peduncle in the figure. In my specimen this was not so. The various forms were not accounted for by abortion of leaves—the occurrence of three-leaved forms would preclude that—but by the flower not being preceded by the same number of leaves, these varying from 3 to 0. Perhaps Prof. Porter's aphyllous form indicates that the leaves were *potentially* present.

AUG. F. FOERSTE.

Prolification in Phleum.—While driving in New Hampshire early in October I found a curious proliferous specimen of *Phleum pratense.* The spike was fully an inch thick, with tufts of spreading green leaves. A week later, in Massachusetts, I found a second specimen, with the same development, and a few days afterwards, in Connecticut, still another.

ANNIE TRUMBULL SLOSSON.

Note on Sphærella polystigma, E. & E. (BULL. TORR. BOT. CLUB Vol. x., p. 127.)—This species has also been found at Newfield, N. J., on fallen leaves of *Quercus coccinea,* and a recent examination of these specimens, which were collected in the summer of 1883, shows that the endochrome of the sporidia becomes at length divided close to the narrow end of the spore, forming a pseudo-septum. This character was not noticed in the fresh specimens, but possibly may have been overlooked, though it is not by any means unusual for spores which are at first continuous to finally become septate, and especially so in those which are at first nucleate; so that two nuclei indicate the probable appearance of a septum; three nuclei of two septa; four, of three, and so on; a single septum appearing between the adjacent nuclei; and this fact is not to be lost sight of in estimating the value of genera founded on the septation of the spores.

The measurement of the sporidia ($10-13 \times 3.5-4\mu$) was accidentally omitted.

J. B. ELLIS.

Wanted.—Any one having a perfect copy of Michaux's Sylva may hear of a purchaser upon stating terms to the editor of the BULLETIN.

Errata.—In Dr. Britton's article, in the August number of the BULLETIN, the following errata occur, and should be corrected as follows:

Under *Cyperus Buckleyi*, for "spikelets 15 lines wide" read "1.5 line wide." Under *Cyperus articulatus*, "spikelets 1–15 inches long" read "1–1.5 inch long," and for "showing" read "forming." On page 86, bottom line, and on page 87, line 20, read Nees for Rees.

On page 98, line 21, for "mode" read "made," and in line 34 for 1885 read 1884; on page 100, lines 30 and 31, the phrase beginning with "but" and ending with "*Empetrum*" should be enclosed in parenthesis. On page 105, line 4 from bottom, for 1857 read 1837.

BULLETIN

OF THE

TORREY BOTANICAL CLUB.

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Kansas Fungi.*

By J. B. ELLIS AND W. A. KELLERMAN.

CERCOSPORA APOCYNI.—Amphigenous, on small ($1-3^{mm.}$) brown spots with a narrow raised border; often occupying only a small ($1^{mm.}$) circular area on the brown spots, or sometimes several small white patches of conidia on the same spot; hyphæ very short, 16–20 x 2.5μ, tufted, hyaline, simple, entire; conidia narrow-cylindric, 45–60 x 2.5μ, granular and becoming faintly 3–4-septate.

The spots are at first purplish brown, with a purplish border, but become rusty brown except where whitened by the conidia. On leaves of *Apocynum*. Aug. No. 601.

CERCOSPORA DESMODII.—On reddish brown, roundish or irregularly shaped and rather indefinitely limited spots $2-3^{mm.}$ in diameter; hyphæ mostly hypophyllous, 70–80 x $3-4\mu$, brown, 1–3-septate, undulate or often abruptly bent above, rising in loose spreading tufts of 6–8 from a minute tubercular base; conidia oblong-cylindric and nucleate, becoming clavate-cylindric and mostly 3-septate, 30–50 x $3.5-4\mu$.

The spots become more or less confluent and the leaf assumes a reddish brown hue. On *D. acuminatum*. July. No. 585.

CERCOSPORA CEPHALANTHI.—On orbicular ($1-4^{mm.}$) red-brown spots with a narrow, dark, raised border; hyphæ mostly epiphyllous, tufted, brown, continuous or faintly septate 24–30 x $3-4\mu$, at length elongated ($40-56\mu$) and crooked or undulate above; conida (mature?) subfuscous, oblong-cylindric, 20–30 x $3-4\mu$, 1–3-septate.

The tufts of hyphæ are very minute and meagre and are seen with difficulty. The conidia, are not abundant. On leaves of *C. occidentalis*. July. No. 582.

CERCOSPORA GYMNOCLADI.—Mostly epiphyllous on suborbicular, grayish brown spots ($3-4^{mm.}$) with a discolored border; hyphæ in minute punctiform tufts, simple, continuous, brown, 18–25 x 4μ; conidia clavate-cylindric, brown, 3–6-septate, 45–60 x $5-6\mu$, but often wanting the narrow base, and much shorter ($25-35\mu$), 2–3-septate and occasionally constricted at the septa.

On leaves of *Gymnocladus Canadensis*. July. No. 571.

CERCOSPORA PENTSTEMONIS. — Amphigenous, on orbicular ($.25-.5^{cm.}$) purplish brown spots (whitening out), with a narrow raised border surrounded by a purplish discoloration; hyphæ brown, continuous, nearly straight, subattenuated and more or less denticulate above, 25–35 x 3μ, forming dark tufts $70-80\mu$ across and thickly

* Continued from page 116.

scattered over the spots; conidia brownish, swollen or enlarged above, 2–2.5μ thick, and, with the slender filiform base, 40–75μ long, nucleate, becoming faintly 1–3-septate.

Many of the conidia lacking the slender base are much shorter (20–25μ). On leaves of *Pentstemon Cobæa* (No. 546) and *P. grandiflora* (cult.) No. 566. June.

CERCOSPORA CHIONEA.—Amphigenous but mostly epiphyllous, on large (.5–1$^{cm.}$, or, by confluence, 3–4$^{cm.}$) dark reddish brown spots with a brown, yellow-shaded, but not raised, border; hyphæ densely tufted, subhyaline, mostly 18–30 x 4–5μ, but often elongated to 35 or 40μ and then somewhat undulate or crooked above; conidia vermiform or clavate-cylindric, 54–90 x 4–5μ and 3–8-septate.

The conidia are very abundant and appear to the naked eye like a sprinkling of white powder on the brown spots. Different throughout from *C. cercidicola*, Ell. On leaves of *Cercis Canadensis*. July. No. 580.

CERCOSPORA MURINA.—Hypophyllous, on large (.5–1$^{cm.}$), roundish, indefinitely limited, dirty brown spots (dirty white above); hyphæ effused, mouse-colored, branched, septate, clear fuscous brown, 75–100 x 3–4μ; conidia oblong or oblong-cylindric, 3-septate, brownish, sometimes slightly constricted at the septa, 25–35 x 4–5μ.

Looks like a fine mouse-colored down overrunning spots previously occupied (?) by another *Cercospora* (*C. granuliformis*, E. & H.)

CERCOSPORA VELUTINA.—Amphigenous; hyphæ pale olivaceous, simple, continuous, more or less bent and toothed above, forming a dense velvety growth over the surface of little dark-colored tubercular swellings 1$^{mm.}$ or less in diameter, which are collected in groups or irregularly scattered over the surface of the leaf; conidia pale olive-brown, subequal or attenuated above, curved, sparingly septate 75–100 x 3μ.

On leaves of *Baptisia*. Aug. No. 622.

RAMULARIA GRINDELIÆ.—Amphigenous, erumpent, punctiform; hyphæ densely tufted, simple, hyaline, straight, 18–25 x 3–4μ; conidia cylindric, straight or slightly curved, hyaline, 1–2-septate, 20–40 x 3–4μ.

The tufts of hyphæ (150–200μ in diameter) are collected in little groups forming rusty yellow specks thickly scattered over both sides of the leaf and finally whitening out.

This might be referred to *Cercospora* from its habit and mode of growth, but the conidia and hyaline hyphæ are those of *Ramularia*. On leaves of *Grindelia squarrosa*. Aug. No. 616.

SPHÆRELLA DECIDUA.—Perithecia visible on both sides of the leaf, of coarse cellular structure, depressed-globose, 100μ in diam., asci oblong, sessile, 50 x 15μ; sporidia crowded or biseriate, oblong or oblong-pyriform, uniseptate and constricted, mostly a little curved, 12–11 x 4–5μ; perithecia in small (1–1.5$^{mm.}$) round, dull white, translucent spots with a narrow raised border; spots on dead, discolored parts of the leaf which finally fall out and leave irregular-shaped holes as if the leaf had been eaten out by insects.

On living leaves of *Vernonia*. June. No. 556. Also on *Scrophularia nodosa* (No. 563); spots white and more confluent and mostly not on dead, but living green parts of the leaf.

SPHÆRELLA CERCIDICOLA.—Perithecia erumpent (100μ) scattered, mostly on the upper side of the leaves, at length broadly perforated above; asci oblong-cylindric, 35 x 5μ; sporidia closely packed, overlapping and subbiseriate, oblong-pyriform, 1-septate, 11–13 x 2.5–3μ, slightly curved and constricted.

On fallen leaves of *Cercis Canadensis.* June. No. 550.

SPHÆRELLA LACTUCÆ.—Epiphyllous, on dark brown (2–4μ), concentrically wrinkled spots with a distinct raised border; perithecia erumpent subglobose (120–150μ), of coarse cellular structure; asci 40–75 x 12–14μ, sessile, oblong; sporidia biseriate, ovate-oblong, 1-septate and constricted at the septum, 14–16 x 5–μ, ends obtuse.

On living leaves of *Lactuca Canadensis.* Aug. No. 619.

The Nectar-Glands of Apios tuberosa.

By AUG. F. FOERSTE.

The flowers of *Apios tuberosa* are arranged in dense panicles, which have the appearance of racemes. At the base of the first main axis are two small bracts, one of them frequently subtending another panicle. The main axis of the second panicle has also two bracts at its base, one of which sometimes subtends a third flower-cluster in an insignificant rudimentary state. The third flower-cluster rarely, if ever, develops. The second panicle arises so close to the base of the first panicle that both seem to spring from the axil of the leaf.

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Although but one of the basal bracts usually subtends a panicle, the other not rarely subtends a minute rudimentary flower-cluster, which rarely develops its flowers. The main axis of each panicle bears at short distances the secondary axes or racemes, each of which is subtended by a bract. Each raceme (Fig. 1) bears three flowers, all of them subtended by bracts. Two of the flowers are placed at either side of each raceme, the third being placed just above the bract subtending the raceme. The bract (Fig. 2 *b*) of the third flower is smaller than the one subtending the raceme (Fig. 2 *c*). The three flowers are placed at the very base of the short stubby axis of the raceme, and are inserted at about the same height. The top of this axis (Fig. 2 *a*) suddenly becomes truncated, and on the flattened surface thus produced may be seen the remaining aborted flowers of the raceme. Under a low power of the miscroscope they appear as so many clusters of lanceolate, thin scales. These clusters usually wither and fall off a short time before the flowering of the three lower members of the raceme. Their locality, however, is marked by small rings (Fig. 3) slightly raised above the flat surface formed by the end of the axis. While the lower flowers of the raceme are in blossom the rings representing the points of attachment of the upper flowers are exuding a kind of honey. It is necessary to mention, however, that only one or two of these rings seem to yield honey at the same time. This flows quite freely, and when removed by my hand was usually replaced in less than two or three minutes. The honey-glands, being extra floral, seem to take no part in any adaptation for cross fertilization, but they are abundantly visited by ants. Several plants growing in my garden are almost covered with them. There are ants going up and down the vines. Every panicle on the entire plant has one or more insect visitors upon it. Some panicles have seven or eight ants upon them, one to every gland in full operation. Ants are usually supposed to be beneficial to plants of this kind by warding off the insect enemies to which they may be subject. It may be noted in connection with this that my plants are free from insects before the period of honey secretion, as well as afterwards; still, any insects trying to get at the flowers during their period of blossoming would find themselves in rather an uncomfortable

Fig. 5

Fig. 7

Fig. 6

position and would be effectually *crawled over* by the ants. The flowers, after anthesis, wither and fall off at a joint between the flower and pedicel. The pedicel falls of later at a joint next the axis of the raceme. A very remarkable discovery to me, however, was the fact that the ends of the panicle, together with the raceme that belongs to them, never mature. The entire panicle appears perfectly healthy until a short time before anthesis, then *the ends of the panicles* (Fig. 4) *suddenly wither and fall off at a clean-cut joint*, hence *all panicles in the flowering state are really truncated.* The end of the panicle shown in Fig. 4 had thirteen racemes upon it, each with its three flowers and truncated axis; the very summit of the panicle I forgot to examine. It was a curious sight to see panicle after panicle lose its end without any special reason for such an operation that I could discover. The pedicels of the flowers, in dropping off, leave a circular scar (Fig. 2 *d*) similar to those left by the aborted flowers. The latter are arranged "spirally" on the truncated end of the axis. In the specimen figured (Fig. 3) the spiral turned toward the right, and the sixth pit or ring stood next to the first. The first two or three of these rings are the honey producers. The three developed flowers do not maintain a spiral arrangement similar to the aborted flowers, but an examination of the plant would readily show that displacement is unavoidable. Of the flowers, one of those at the side blossoms first, then the one on the opposite side, and lastly the one in the

Fig 10

Fig 8

Fig. 9

middle. The arrangement of the various flowers has not been sufficiently studied to *settle* the phyllotactic arrangement of those on the axis of the raceme. How necessary bees are to insure fertilization may be seen from the fact that those clusters which escape the attention of bees by being too much hidden by the surrounding foliage, never spring the keel, so that the flowers wither and die without the keel being loosened. (Gray, Struct. Bot. p. 218). Flowers thus unsprung seem to last longer.*

In connection with this it may be interesting to note that in *Tilia Americana* (Fig. 5) *Catalpa speciosa* (Fig. 6) and *Ailanthus glandulosus* (Fig. 7) the terminal part of the leaf branches falls off, leaving a clean scar (*sc*). The branches are continued by buds in the axils of lower leaves. In *Hamamelis Virginica* (Figs. 8, 9 and 10) the leaves fall off in autumn and leave a scar. In the following spring a plane has been formed just beneath the scar of the former year. At this plane the leaf-scar of the former year falls off leaving another scar for the spring time. This singular phenomenon might be called that of a "deciduous leaf-scar." The accompaning drawings will make unnecessary all further description.

DESCRIPTION OF FIGURES.—*Apios tuberosa.* Fig. 1. Entire raceme seen from above. Fig. 2. The same x 5; flowers fallen off, pedicel of middle flower remaining: *a*, truncated axis of the raceme; *b*, bract subtending the middle flower; *c*, bract subtending the raceme; *d*, circular depression left by the pedicel of the flowers. Fig. 3. Truncated axis of raceme x 5, showing attachment of flower-pedicels. Fig. 4. Deciduous end of the panicle. Fig. 5. *Tilia Americana:* scar, *s c*, of leaf-branch. Fig. 6. *Catalpa speciosa:* scar, *s c*, of leaf-branch. Fig. 7. *Ailanthus glandulosus:* scar, *s c*, of leaf-branch. Figs. 8 and 9. *Hamamelis Virginica;* front and side views of leaf-scar before falling off. Fig. 10. Deciduous leaf scar.

New Grasses.

By GEORGE VASEY.

STIPA SCRIBNERI.—Culms 2–3 ft. high, stout, erect; lower leaves half as long as the culm, smooth, flat below, becoming involute at

* Note. The following from Prof. Trelease is of interest: "The sort of glands you find in *Apios* are also found in other Leguminosæ, e.g., species of *Dolichos Phaseolus*, and *Canavalia*. I have noticed them in all but the last named genus; probably they occur in many others.

References: Trelease, in Comstock's Report on Cotton Insects, 1879, 325; *American Bee Joural*, 1880, xvi., 271–2., Figs. 9–10. Delpino, in Atti della R. Universita, Genova, 1880, iv., part i. p. 27."

the long acuminate point; upper sheath enclosing the base of the panicle, which is narrow, erect, and 6–8 inches long, the branches in twos or threes and appressed; outer glumes unequal, lower one 6–7 lines, upper about 5 lines long, both 3-nerved, acuminate; flowering-glume 3–5 lines long, hairy, hairs longer above, and at the apex forming a white crown a line or more long; awn rather slender, 8–9 lines long, not hairy; stipe short, very acute, pubescent; palet less than a line long, obtuse and adherent to the grain.

Differs from *S. viridula* particularly in the unequal glumes, the hairy crowned flowering-glumes, the more slender awn, and the very short palet.

Collected on dry hill-sides at Sante Fe, New Mexico.

√ FESTUCA CONFINIS.—Culms about 3 ft. high, rather rigid, smooth, radical leaves half as long as the culm, those of the culm 2 or 3, the sheath loose and shorter than the internodes, blade flat, 6 inches long, 3 lines wide, ligule short, scarious, obtuse; panicle 4–5 inches long, strict; branches in twos or threes, unequal, erect, the longest twice as long as the internodes, subdivided below the middle, rhachis and branches nearly smooth; spikelet oblong, 3- to 5-flowered, the outer glumes ovate-lanceolate, thin, smooth, 1-nerved, the upper one about 3 lines long, the lower a little shorter; flowering-glumes about 3 lines long, prominently 3-nerved, scabrous, rather rigid, rounded on the back, acutish to very acute, but not awned; palet about equaling its glume, scabrous-ciliate on the keels, adherent to the grain.

This differs from *Poa* chiefly in the rigidity of the culms and the thicker, harsher, more rounded flowering-glumes.

Collected at Peu Gulch, Colorado, altitude 8,000 ft.

√ ELYMUS SAUNDERSII.—Culms tufted, 2–3 ft. high, slender but firm, smooth; radical leaves involute-setaceous, about half as long as the culm, culm-leaves about 3, the sheaths smooth, the upper one long, the blade rigid, 5–6 inches long, finely scabrous, becoming involute, ligule obsolete; panicle 5–7 inches long, rather cylindrical and flexible, rhachis with 20 or more joints, which are 3 to 4 lines apart; spikelets 2- to 4-flowered, generally in pairs, at least below, frequently singly above and sometimes throughout; upper glumes linear-lanceolate, 3- to 5-nerved below, with 2 short teeth at the apex, scabrous on the midnerve and running into a slender scabrous awn an inch or more in length; flowering-glumes lanceolate, 5-nerved, finely scabrous, 2-toothed at apex, 5 lines long to the awn, which is slender and 1 to 1.5 inch long; palet wide and flat, nearly as long as its glume, bifid, scabrous on the 2 sharply flexed keels. The whole spike generally of a purple color.

One of the handsomest species of the genus. Collected at Veta Pass, Colorado, 9,000 ft. altitude.

On the Existence of a Peculiar Flora on the Kittatinny Mountains of North-western New Jersey.

By N. L. BRITTON.

The occurrence of a group of plants which, from preconceived notions, seem to be out of place in any region, is always of interest to botanists, and especially so to those who enjoy the study of the geographical distribution of species and its various causes. I can contribute a brief chapter to the literature of this subject with some facts obtained during two recent expeditions to the Kittatinny (Shawangunk) Mountains of New Jersey and New York, made for the purpose of more thoroughly elaborating the flora of the former State.

This mountain chain forms a wall of almost constant altitude, averaging over 1,200 feet in height, along the eastern side of the valley of the Delaware River, from Port Jervis to the Water Gap, and excludes many plants of more northern and western range from the interior portions of New Jersey. Its summits and western slopes are composed of a coarse or fine, very hard silicious conglomerate or sandstone, with little soil but that derived from the limited disintegration of these rocks. While the mountain sides and summits are extensively glaciated, there is very little glacial drift on the ridge, as Dr. A. A. Julien has pointed out* for the vicinity of Sam's Point, New York, and my observation is that it holds this character throughout its extent in New Jersey. The soil of the summit and slopes is cansequently highly silicious.

My first trip was made on August 31st, 1883, to the vicinity of High Point, Sussex Co., and the following unlooked for plants were noticed:

Juncus Greenii, Oakes & Tuckerm., a species previously known only from sandy soil along or near the coast, was found on the very top of High Point at an elevation of 1,800 ft. The plants were somewhat smaller than those growing abundantly at several points along the Raritan River, the Staten Island, Long Island and New England coasts, but Dr. Engelmann pronounced them this species, shortly before his death. *Solidago puberula*, Nutt., was very abundant on the mountains, both here and at Sam's Point, and constantly associated with *S. bicolor*. Before this I had been accustomed to find it only along and near the coasts and in the sandy plains of the southern part of the State. *Orontium aquaticum*, L., grew along the shore of Lake Nascia, a pond just below the summit.

These plants and the shortly previous discovery by Mr. A. H. Smith, near Lake Mohunk,† of *Corema Conradii*, Torr., a plant whose limited distribution renders its presence there doubly interesting, induced me to make special search for other sand-loving species during my visit to the same region on June 15th of the present year. As the result of this, *Prunus pumila*, L., the sand cherry, which grows on sand bars and islands in the Delaware River, and in similar situations northward, was found on the summit of the mountains southwest of High Point, among dry rocks; *Tephrosia Virginiana*, Pers., and *Lespedeza hirta*, Ell., so abundant in sandy soil southward, in several places on the western slope; *Lupinus perennis*, L., and *Calystegia spithamæa* Pursh, near the summit, and the latter known at present from but two other localities in New Jersey, but generally a sand plant. The immense quantities of *Quercus ilicifolia*, Wang. (in the

* *Trans.* N. Y. Acad. Sci. Vol. iii., ined.

† See BULL. TORR. CLUB, ix.

Shawangunks, as in the pine barrens, the most abundant shrub), and the substitution of *Pinus rigida*, Mill., the pine barren pine, on the mountains, for the *P. Strobus*, L., of the surrounding country, contribute to the list of plants whose natural habitat is low sandy ground rather than elevated mountain districts, though the last named may hardly be regarded as typical of sandy regions.

The reason for these somewhat remarkable occurrences is easily found in the similarity of the soil on the mountains, in chemical composition, to that of the plains bordering the coast, this being with some of these plants evidently more potent than climate, for the average annual temperature of these mountain districts is seven or more degrees lower than that of the sea-coast.* This has its effect, however, in modifying the flora, as seen in the *Potentilla tridentata* and *Pyrus Americana*, DC., of High Point, *Stellaria borealis*, Bigel., and *Habenaria viridis*, L., var *bracteata*, Reich., of its slope; *Arenaria Grœnlandica*, L., and *Juncus trifidus*, L., of Sam's Point, with other plants of northern range.

Notes on South-western Plants.—The appearance of Dr. Gray's long-expected work on Compositæ calls for changes in the names under which several of my plants were distributed.

*663=*Malacothrix sonchoides*, T. & G., but the crown is plainly about 30-toothed.

*665 }
*666 } =*Senecio multilobatus*, T. & G.

*203=*Trixis angustifolia*, DC., var. *latiuscula*, Gray.

*670=*Senecio Douglasii*, DC.

*651=*Bigelovia Drummondii*, Gray. A form of *Bigelovia graveolens*, Gray, collected at Casuino, A. T., differs from the description in having the leaves distinctly rigid.

*780 is not *Verbena polystachya*, but probably an extreme form of *V. stricta*, Vent. It requires further comparison.

The following notes should be published as extending the ranges of species beyond those credited to them.

Lonicera involucrata, Banks, Mt. Humphreys, A. T.

Galium Rothrockii, Gray, Mogollon Mts., N. M.

Stevia Plummeræ, Gray, Mogollon Mts., N. M.

Kuhnia eupatorioides, L., at various places in N. M., and A. T.

Brickellia floribunda, Gray, Burro Mts., N. M.

Aphantostephus Arizonicus, Gray, Central N. M.

Erigeron glabellus, Nutt., Mogollon Mts., N. M.

Erigeron flagellaris, Gray, Central Arizona.

Erigeron Rusbyi, Gray, Mogollon Mts. of South-western N. M., not of A. T.

Helianthus Maximiliani, Schrader, Central Arizona.

Coreopsis Drummondii, T. & G., Central Arizona.

Schkuhria Hopkirkia, Gray, Western N. M.

Hymenopappus Mexicanus, Gray, Northern Arizona.

Polypteris Hookeriana, Gray, Central N. M.

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* See Mr. J. C. Smock in Ann. Rep. State Geologist for 1881.

Actinella Bigelovii, Gray, Northern Ariz.
Actinella biennis, Gray, Central Ariz.
Actinella Rusbyi, Gray, Northern Ariz.
Dysodia Cooperi, Gray, Western Ariz.
Hymenatherum polychætum, Gray, Central N. M.
Artemisia franserioides, Greene, Mogollon Mts., N M.
Artemisia Bigelovii, Gray, Northern Ariz.
Tetradymia glabrata, Gray, Northern Ariz.
Senecio Neo-Mexicanus, Gray, Central N. M.
Senecio tomentosus, Mx., Clifton, South-eastern, A. T.
Senecio Rusbyi, Greene, Central N. M.
Perezia Wrightii, Gray, N. M. and Central Ariz.
Lygodesmia spinosa, Nutt. Northern Ariz.
Lactuca pulchella, HBK, Northern Ariz.
Taraxacum officinale, Weber, Prescott, Ariz.

It may be well to make these notes the text of a few remarks on the topographical relations of Northern Arizona, as bearing on the constitution of its flora. The north-eastern portion of the Territory forms a continuation of the high land of Utah, the plateau terminating suddenly in a line extending from the western termination of the Colorado Cañon, south-eastward to the south-western portion of New Mexico. This line is very irregular, and exceedingly abrupt, presenting a series of broken precipices, often from 1,000 to 2,000 feet in height. To the eastward this plateau is pretty intimately connected with that of New Mexico, the shallow and gradual valley of the Little Colorado forming an avenue for, rather than a barrier to, an interchange of species. With the mountains of South-western New Mexico a direct connection is found in the forest-belt which skirts the edge of the plateau, and is known, at least in the north, as the San Francisco Forest. We should look, then, in Northern Arizona, for the representatives of four quite distinct floras, and these we actually find, all of them being represented in the short list given above. The Mohave Desert is connected by a rather gradual slope with the north-western section, but this slope at length ends abruptly at the base of the north-eastern plateau as above described. On this lowland we find many species characteristic of the South-Californian deserts. In the list, *Dysodia Cooperi*, not before reported from East Colorado River, represents this immigration. The plants of the comparatively low land of Central Arizona, such as *Coreopsis Drummondii*, *Helianthus Maximiliani* and *Perezia Wrightii*, also encroach, here in the west, on the northern section, but are elsewhere very effectually checked by the line of cliffs, so that on the plateau above, all the affinities are with the north, east and south-east. I point in the list to *Lonicera involucrata*, *Artemisia Bigelovii*, *Tetradymia glabrata*, *Lygodesmia spinosa* and *Erigeron glabellus* as well marked illustrations of this southern encroachment, all being now for the first time reported from south of the Arizona line. The last named has doubtless made its way into New Mexico by way of the elevated forest-belt referred to. From the plains of New Mexico, *Kuhnia eupatorioides* and *Bigelovia Drummondii* have moved westward, the latter obviously traveling down the Colorado Chiquito, while that Territory has in return received *Aphantostephus Arizonicus* and *Schkuhria Hopkirkia*. But most marked of all is the interchange of species along the line of the forest-belt. The resemblance between the flora of the Mogollones of South-western New Mexico, where the summer of 1881 was chiefly passed, and that of the San Francisco and Mogollones of Arizona, where I staid in 1883, was very striking. Among the most conspicuous species in the vicinity of Clairmont, N. M., were *Pentstemon linarioides*, *Actinella Rusbyi*, *Hymenopappus Mexicanus* and *Aster canescens*, with *Helenium Hoopesii* at a higher altitude. About Flagstaff, A. T., the same species abounded, imparting a striking similarity to the landscape. *Senecio Rusbyi* was also here rediscovered and is probably to be found all the way down the highland to the New Mexican Mogollones. *Cupressus Arizonica* also follows the western side of this highland to Southern Arizona, but has not yet appeared from New Mexico. It may be added that those very interesting Mogollon Mountains of New Mexico are also very intimately connected south-westward with the mountains of Southern Arizona, from which source they have received *Galium Rothrockii*, *Stevia Plummeræ*, *Primula Rusbyi*, *Brickellia floribunda* and *B. oliganthes*.

H. H. RUSBY.

Notes on New England Marine Algæ, IV.—The following species have not before been reported from New England, and all with the exception of *Ulva marginata*, found by Prof. Farlow in algæ from Salt Lake, Utah, are, as far as I know, new to the United States.

Microchæte grisea, Thuret, Notes Algologiques, Plate xxx. On an old pecten shell at West Falmouth, Mass., in company with *Calothrix crustacea*, Thuret. Resembling a small *Calothrix*, from which it differs in having no terminal hair, the trichome ending in a rounded cell instead of a point; known heretofore only on the coast of France. I am indebted to Dr. E. Bornet for the identification of this plant.

Nodularia litorea (Kütz.), Thuret. A few filaments among *Lyngbyæ*, *Ulvæ*, *Calothrix*, etc., in marshes at Hampton, N. H., in company with *N. Harveyana*, Thuret; the filaments are about twice the diameter of those of the latter species. Figured in Notes Algologiques, Plate xxix.

Rhizoclonium (*Linum*), Thuret. I have found at Kennebunkport, Maine, Hampton, N. H., and Nahant, Mass., a plant which agrees with authentic specimens of this species from Cherbourg, France. The filaments are from .10 to .12 $^{mm.}$ in diameter, and often much curled and twisted. It seems quite distinct from the *Chætomorpha Linum* of Farlow's Manual, which is about twice this diameter, and resembles rather *Rhizoclonium tortuosum*, which, however, is only half its size.

Chætophora maritima, Kjellman, Spetsbergens Thallophyter, Plate v., Figs. 15 and 16. At Kennebunkport, Maine, I found in an upper tide-pool, growing in a dense mass of *Calothrix scopulorum*, Ag., *Oscillariæ*, etc., a few filaments agreeing with Kjellman's description and plate. They did not, however, form a definite thallus, and if they belong to this species are probably a reduced form, growing at its extreme southern limit; probably farther north and east it would be found more fully developed.

Ulva percursa, Ag., (*Enteromorpha percursa*, J. Ag.) Growing in upper tide-pools at Kennebunkport, Maine, Hampton, N. H., and Cohasset, Mass., and probably common in tide-pools and marshy places along the coast. It is undistinguishable by the naked eye from the various *Ulvæ* and *Rhizoclonia* found in similar localities, but is easily recognized on microscopic examination by the frond composed of two longitudinal series of symmetrical cells. It is figured in Areschoug, Phycæ Scandinavicæ Marinæ, Part 2, Plate ii. A.

Ulva marginata, LeJolis. (*Enteromorpha marginata*, J. Ag.) Weymouth and Quincy, Mass., growing on woodwork; distinguished by its dark green, narrow, slightly branched, flattened frond, composed of a few longitudinal series of small, elongated cells, the marginal series differing somewhat in depth of color from the central. This is the *Ulva* referred to in my note in the BULLETIN of March, 1884.

Ulva aureola, Ag. (*Enteromorpha aureola*, Kütz.) Growing in small quantities among *Ulvæ*, *Lyngbiæ*, *Rhizoclonia*, etc., in the marshes at Hampton, N. H. The cells, which are arranged in longitudinal series, look like a *Glœocapsa.* Figured in Hauck, Die Meeresalgen Deutschlands, Fig. 190.

Myrionema orbiculare, J. Ag. On *Zostera marina*, Kennebunkport and Hampton. Differs from the common *M. vulgare*, Thuret, by the presence of peculiar, saccate, hair-like growths, in addition to the usual hairs and paraphyses. Figured in Hauck, Meeresalgen, Fig. 132. I am indebted to Prof. J. G. Agardh for the identification of this species, and for valuable assistance in determining various forms of the Ulvaceæ.

Porphyra coccinea, J. Ag. On *Desmarestia aculeata*, Lamour., at Hampton, N. H. A very delicate alga, with a thinner frond and much smaller cells than any other American *Porphyra.* I found it only once, a floating plant of *Desmerestia* being pretty well covered with the delicate fronds, which, when lifted out of the water, collapsed like one of the finer Callithamnions. Figured in Agardh, Till Algernes Systematik, vi., Plate ii., Figs. 41-43.

Porphyra miniata, Ag. The Nahant plant which I mentioned in the BULLETIN for May, 1882, under the name of *P. leucostica*, Thuret, seems to belong rather to this species. I have since found it at Kennebunkport and at Hampton, at both of which places it seems to be not uncommon in the summer, growing on other algæ, or washed up from below low-water mark. The antheridia do not form patches of any considerable size, but are scattered in groups of a few cells throughout the frond. This is a characteristic arctic species, and adds another to the list of extreme northern species that have been found extending quite a distance south on the American coast. Its occurrence in the same locality with *Dasya elegans*, Ag., is a curious instance of the meeting of northern and southern forms in Massachusetts Bay. *P. miniata* is figured in Agardh, Till Algernes Systematik, vi., Plate ii., Figs. 44-48.

I have received what appears to be the true *P. leucosticta* from

Rev. J. D. King, collected at Cottage City, Mass., and from Mr. S. R. Morse, collected at Atlantic City, N. J.

Kallymenia reniformis, Ag. A single specimen, with cystocarpic fruit, washed ashore at Revere Beach, Mass., April 27th, 1884. In appearance it much resembles some forms of *Rhodymenia palmata*, Grev., but the color is a somewhat different shade of red; the microscopic structure is quite distinct. It is figured in Harvey, Phycologia Britannica, Plate xiii., and has not been previously recorded as found outside of northern Europe.

FRANK S. COLLINS.

Corema Conradii.—Much may be done towards elucidating the probable origin and past history of our native plants, by carefully tracing their local and geographical distribution in the way Mr. John H. Redfield has done in his interesting paper on *Corema Conradii* in the TORREY BULLETIN for September, p. 97. As the details given under the head of "Nova Scotia and Newfoundland" are meagre, and Mr. Redfield appeals to botanical brethren in the British Provinces for further facts, I cannot well resist contributing my mite, notwithstanding the supplementary records in the October number, some of which relate to this Province.

In the spring of 1864, soon after my arrival in Nova Scotia, I found the *Corema* blooming abundantly on a bare ridge of quartzite rock, eleven miles to the north of Halifax city. Wherever there was a crevice or crack in the rock there were tufts of *Corema*, with stiff wiry stems. It was about the only flowering-plant on these barren rocks. I soon found that the *Corema* was not rare in the district, and could discern it in heath-like tufts on the bare rocky hills from the railway cars, in many places. The auriferous quartzite rocks to which I refer stretch along the Atlantic coast district of Nova Scotia throughout nearly its whole extent. Wherever they are bare enough to resist more leafy plants, *Corema* is apt to be found. It is usually associated with *Vaccinia*, *Cornus Canadensis Gaultheria procumbens*, *Polypodium vulgare*, and, less frequently, *Arctostaphylos Uva-ursi*. On level ground, where the soil is very poor, consisting of gravel or sand, the *Corema* also occurs, not only in our Atlantic Coast district, but in other parts of the Province; in such situations it does not grow in distinct tufts, but becomes more gregarious, exclusively occupying large areas, and is usually much dwarfed in growth, the stems being often only a very few inches high. I shall endeavor next summer, by aid of my students and correspondents, to trace the distribution of *Corema* throughout this Province with more exactness.

In Nova Scotia the *Corema* has been so often mistaken for Scotch heather (*Calluna*) that I have frequently wished it were less abundant. Compared with *Corema*, *Empetrum nigrum* is, with us, comparatively rare.

Dalhousie College and University, Halifax. GEORGE LAWSON.

Big grape-vines.—In the BULLETIN for February, 1882, I gave a statement of a grape-vine I had visited and measured at Baisden's Bluff near Darien, Ga. There were two errors in the accouut, which may as well be corrected here, so as to have it accurate. The types made me say "just in leaf," instead of "not in leaf," and also that the measurement was made at "eight feet from ground" instead of "one foot." I stated that it being not in leaf (I visited it early in March) I had no means of ascertaining the species, but judged from the appearance of the trunk it was *æstivalis*. I obtained leaves during the past summer from a friend, and verified the fact of its being that species.

But my object in this communication is to place on record the measurement of another and larger vine, probably the largest wild grape-vine known.

During the past summer, by appointment of our State Commissioner of Agriculture, I had charge of the collections in the botanical department of our State exhibits for the New Orleans Exposition, including specimens of our native woods, grasses, etc. Having heard of a famous grape-vine in the lower part of the State, near the old Sheldon Church in Beaufort Co., I endeavored to procure a section of the trunk for the Exposition. The owner of the grounds, Mr. H. M. Fuller, was unwilling to cut it down, but gave the measurement as follows (I quote from his letter): "At ground 59.5 inches circumference; at two and a half feet from ground, where it divides into two branches, 57.5 inches in circumference."

If Mr. Fuller is correct in his measurement (and I have no reason to believe otherwise) this gives a diameter of nearly 20 inches, and the vine is probably the largest on record.

I have requested a leaf to be sent to me, to ascertain the species, but have not received it, and I fear it is now too late in the season.

Aiken, S. C. H. W. RAVENEL.

Bouteloua gracilis.—Two American botanists whose writings are frequently quoted have employed this name, *Bouteloua gracilis*, in their published works and in both instances there has been a double error committed. In order that these errors may not be repeated in future works, I desire to call attenion to them and point out the correction. I may say that in both cases the grasses described under this name are referred to it with a query. "*Bouteloua gracilis*, Hook.?", Vasey, in the Botany of Wheeler's Report, page 287, is *Bouteloua aristidoides*, Thurb. (*Dinebra aristidoides*, HB K., *Eutriana aristidoides*, Kth.) A South American species was published by J. D. Hooker (Acta Lin. Soc., xx., 173,) under the name of *Eutriana gracilis*, but no such species appeared by that author under *Bouteloua*.

"*Bouteloua gracilis*, HBK ?," Chapman, in Southern Flora, Suppl. p. 663, is *Bouteloua hirsuta*, Lag. The species intended by Dr. Chapman was, I doubt not, *Chondrosium gracile* of Humbold, Bonpland and Kunth, to which the Florida specimens have some resemblance. These authors published no species under *Bouteloua*.

F. LAMSON SCRIBNER.

Droseraceæ and Orchidaceæ of Spruce Pond, N. Y.—Returning home on the 7th of July, 1884, from a botanical trip to New York, Staten and Long Islands, I heard on my arrival at Middletown, N. Y., that *Drosera rotundifolia*, L., grew in abundance at Spruce Pond, near Southfields, a station on the Erie R. R. 25 miles east of that city. Although the time I had allotted myself for a vacation was spent, the opportunity was not to be missed, and leaving the cars I took the next returning train for Southfields. Arriving there in company with the son of my informant, the self-educated and genial botanist Isaac P. Madden, we learned that the pond lay up on the mountain about two miles south-east of the station. After a pleasant walk down the valley of the Ramapo, and a "directly heavenward" climb of nearly three-quarters of a mile, we reached the pond, a beautiful sheet of water about ten acres in extent, situated, I judge, 900 feet above the valley at this point. The entire margin of the pond is a dense growth of *Sphagnum* of the quakiest kind, a step upon the surface of which can be detected in the responsive waving of tree-tops over a hundred feet distant; this sphagnum carpet was at all points interspersed with the largest and most beautiful *Sarracenia* pitchers I ever had the pleasure of examining, while the surface of the pond itself was nearly covered with a luxuriant growth of *Nymphæa odorata*. In order to catch the returning train, I had but a short hour to spend at this arcane spot, nevertheless in the time I remained I found that *Drosera rotundifolia*, L., and *D. longifolia*, L., were really very abundant, though their flowering season in this locality was so nearly spent that only a flower or two were to be seen. Of Orchidaceæ I saw *Habenaria psycodes*, Gray, *H. hyperborea*, R. Br., *H. dilatata*, Gray, *H. blephariglottis*, Hook., and *H. lacera*, R. Br., *Calopogon pulchellus*, R. Br., *Microstylis monophyllos*, Lindl., and, in the woods near by, *Aplectrum hyemale*, Nutt. This latter plant I have found numerous specimens of at Ross Park near this city. I am informed that *Cypripedium arietinum*, R. Br., *C. candidum*, and *C. spectabile*, Swartz, have been gathered at, or near, this pond.

I know of no peat-bog near new York City that would better return an excursion of the Torrey Club in May or June, and shall visit it again (D. v.) about the middle of June next season. I hope to find it a station for many of New York's boreal species.

On the route from Middletown home, I noted from the car windows that *Baptisia tinctoria*, R. Br., though plentiful all along the road from New York, ceased entirely at about one mile east of Hancock on the Delaware; I have not seen it in Broome Co., the flora of which I hope to complete in about three years.

Binghamton, N. Y. CHAS. F. MILLSPAUGH.

Salisburia adiantifolia, Smith.—Although it has been known for several years that the ginkgo fruits abundantly each year in Central Park, yet, as a recent copy of Henderson's "Handbook of Plants" states that "there has been no fruit borne in this country," and as Josiah Hoopes in "The Book of Evergreens" does not note the fruiting of any of the trees he knows, I venture to say to all who are interested in seeing the fruit and desire to obtain specimens that they will be supplied upon application to me at the Normal College, N. Y. City.

ELIZABETH G. KNIGHT.

Cereus nycticalus, Link, or night-beauty, one of the night-flowering and but slightly fragrant species bloomed with me August 6th, and again on the 16th of the same month, when I observed that fructification had taken place in the former case. The ovary at this stage of development, when I had the whole plant photographed, was of a deep green, or, to be more exact, of a greenish-purple tint, with the scales of each spiniferous pulvillus tipped with bright pink, surrounded by white woolly hairs, and the whole capped by a persistent calyx.

The fruiting of this species, which inhabits Mexico, has not yet been reported to have taken place while in cultivation, either in this country or Europe. Five years ago I visited nearly all the public and private collections of Cactaceæ between the Atlantic coast and Mississippi River in quest of information regarding our night-flowering species, and every cultivator, amateur or botanist, met told me that this species had not been observed to perfect its berry. The same kind of information reached me from different parts of Europe, and even the late Dr. Geo. Engelmann disclaimed any knowledge of the subject referred to. All the works on Cactaceous plants, and I have consulted many, are silent on the same point, and therefore I watched with the greatest interest the progress the berry made.

My plant, a little more than thirty years old, has been in my possession for over eleven years, and flowers freely every season, late in July or August. The flower averages 10 inches in diameter and 12 in length, opens its petals about 7 o'clock, P.M., and, like its sister queen of flowers, *Cereus grandiflorus*, closes them again between the hours of two or three in the morning. There is something very fascinating about these vegetable cats and owls of Prof. Balfour; and I never before knew that some of the fruits were as short-lived as the flowers of the same. It is well known that some of the fruits of *Opuntia* and *Cereus*, when not disturbed, remain on the plants for one year.

My plant, which was out of doors when it blossomed and set its fruit, was taken back into the house on the 15th of October, and up to the 17th the berry remained of a dark green color.

Then it gradually and rapidly changed, so that by the 18th it had assumed the shade of a damson plum, light purplish-pink where exposed to the sun, and darker on the scales of the spiny cushions. October 19th the berry appeared to be of a yellowish-pink throughout its extent, and the skin in the sun-light presented a beautiful vitreous appearance, the same as in a ripe currant. October 20th the berry was pretty evenly colored with a light, delicate pink, or, in the language of the artist, Mrs. Annie N. Thomas, who made a beautiful sketch of it for me, it was of a delicate madder-pink.

The circumference of the berry around its thickest part was five and seven-eighths inches; the length, two and one-quarter inches, and diameter of the fleshy part without the spines only one inch and three-quarters; in thickness the berry measured two inches and one-quarter one way, and one and five-eighths the other. The berry had a slightly flattened shape, like that of an English walnut, the flat side, so to speak, being at a right angle with the long diameter of the stem.

By October the 25th the epidermis of the berry had wrinkled considerably, indicating over-ripeness, and had lost the beautiful pink shade, which now gave way to a yellowish tint. On the 29th it was so badly shrivelled and faded that I removed the specimen, with a portion of the stem, from the plant and placed it in glycerine, so that I might be enabled to exhibit it to the Torrey Club.

A word in regard to the fruit of the *Cereus grandiflorus*, which is as short-lived as the one under consideration. At my request, a friend sent me a berry of the *grandiflorus* from Cuba, five or six years ago. It was removed from the plant with a portion of the stem attached, before fully ripe, and was not quite six days in reaching its destination. A special messenger brought it to me on the arrival of the steamer in port. It was carefully packed in cotton and had not been handled or bruised in any way, but when I opened the package the fruit showed such evidence of decomposition that I could not have it painted. It was of a dark yellowish or chamois-color, of an ovoid shape and covered with spines, and woolly hair of a dirty yellowish shade. This fruit is edible and is sought after by man, birds and beasts.

The pulp has an aromatic flavor, and by some people the fruit is considered a delicacy when it can be obtained before the birds have feasted upon it.

The fruit of *Cereus serpentinus*, Lagasca, which is another of the night-flowering plants of the genus *Cereus*, will remain for a year on the plant if not molested. Mr. Peter B. Mead of Mamaroneck, who ripened its berry, informs me that it remained in color (which was of a deep pink) for about four months. The one which he forwarded to Dr. Engelmann was seven months old, and the doctor informed the sender that its seeds were not quite ripe within. The serpentine *Cereus* has now been fruited by Mr. Mead for three years in succession.

R. E. Kunzé.

Calendula officinalis.—I was interested last September in seeing in a dense grass-sward by the road-side near a house, the golden heads of the potherb, or golden marigold, peeping out and seeming quite at home. Of course it was an estray; but the plant was not growing in any garden near by. I dare not say it was established, though it seemed to be.

Freehold, N. J. S. Lockwood.

Shortia.—Friends of botany will be sorry to learn of the dying out of *Shortia*. In a note just received from Mr. M. E. Hyams of Statesville, N. C., he informs me that it is dying out from its only locality, not six specimens being left.

E. S. Miller.

Ilex Dahoon, Walt., var. **myrtifolia,** Chapman.—We have received a variety of this plant with yellow berries from Dr. T. F. Wood, of Wilmington, N. C., who remarks: "This is the first time I have ever seen this variety, although I had heard of its existence for a year or two. It was found within the radius of Curtis's earliest botanical field, about four miles from this place."

Ferns Wanted.—Mr. Hugo Andriessen, of Beaver, Pa., would like to exchange specimens of ferns with other collectors of these plants. A list of his desiderata will be sent upon application.

Botanical Literature.

Descriptive Catalogue of the North American Hepaticæ North of Mexico. By Lucien M. Underwood, Ph. D. Bull. Ill. State Lab. Nat. Hist., Vol. ii.

The appearance of a work on the Hepaticæ so soon after the publication of the Manual of N. A. Mosses will give students of the Bryophytes great assistance, and, with the author, we hope "that it may serve as a stimulus to more work in this direction, and lay in store material for a more critical examination of this group in the future." "No attempt has been made to publish new species, the writer believing that too many have already been described from insufficient data, and considering it far more necessary to set in order those already published." The catalogue therefore incorporates all of the work of C. F. Austin so far as accessible, Watson's MS. of Californian Hepaticæ and valuable information gained from Dr. Bolander, Prof. Forbes and others. There is a brief introduction on the characters, classification and bibliography, and three appendices on the geographical distribution, Lindberg's classification, and Dumortier's. The descriptions are very good, as is also the plan of giving references to descriptions and plates in other works, though a complete synonymy for each species would have been of great value. We note the omission throughout of the last *n* in *Jungermannia*. The author concludes as follows: "It is hoped that persons receiving this work will aid in further critical study of this group by communicating specimens of all forms found in their own localities."—E. G. Knight.

Check-List of North American Gamopetalæ, 8vo, pamph., pp. 43.

Under this title, Mr. H. N. Patterson, of Oquawka, Ill., has published, in convenient form for reference, a list of all the systematic names given in Dr. Gray's recently issued Synoptical Flora. It will prove of value not only as a check-list, but also as a record of the changes that have been introduced into botanical nomenclature, for consultation by those who do not possess Dr. Gray's work.

Select Extra-Tropical Plants readily eligible for industrial Culture or Naturalization, with Indications of their Native Countries and some of their Uses. By Baron Ferd. Von Mueller, K.C.M.G. 8vo., pp. 450. Detroit: George S. Davis. 1884.

This is a work which has already appeared in Victoria, New South Wales, India, and several European countries, and which is now revised and still further augmented, for the especial use of North American readers. Its object is to bring together in condensed form, and in popular languages, data concerning the characteristics and economic uses of all the principal plants, herbaceous and arboreal, that have been found to prosper in extra-tropical countries, and to point out the particular sections to which they are adapted.

At the close of the volume are grouped together all the genera enumerated in the body of the work, according to the products that they yield, thus affording facility for tracing out any series of plants regarding which special information may be sought, or which at any time may prominently engage the attention of the cultivator, the manufacturer, or the artisan. There is also an appendix in which are brought together, in index form, the various industrial plants according to their geographic distribution, so as to render it easy to order or obtain the plants of such countries as any settlers, colonists or others may be in relation with through commercial or other intercourse.

As a work of reference, this book will prove invaluable to all who are interested in economic botany.

The Fungi of Norfolk (*Eng.*) By Chas. B. Plowright, M.R.C.S. 8vo., pamph., pp. 21.

Catalogue of the Flora of Minnesota, including its Phænogamous and Vascular Cryptogamous Plants, indigenous, naturalized and adventive. By Warren Upham. 8vo., pp. 193. Minneapolis. 1884.

The Agricultural Grasses of the United States. By Dr. Geo. Vasey. 8vo., pp. 144. With 120 plates. Washington. 1884.

Annual Report of the Public Gardens and Plantations [of Jamaica], for the year ending 30th September, 1883. By D. Morris, M.A., Director. 4to., pamph., pp. 20. Jamaica. 1884.

First Annual Report of the Agricultural Experiment Station of the University of Wisconsin, for the year 1883. 8vo., pp. 102. Madison, Wisconsin, 1884.

Philadelphia Academy of Natural Sciences.—At the November meeting of the *Botanical Section* of the Academy of Sciences of Philadelphia, Mr. F. L. Scribner read a paper entitled " Observations on the genus *Cinna*, with description of a new species. A communication from Dr. Gray, " On the movements of the andrœcium in the sunflower," was also read and presented for publication. In remarks relating to the subjects discussed in Dr. Gray's paper, Mr. Meehan said that at about the time of his own investigations on the sunflower and discovery of the movements of the stamens, an account of which was read at the Philadelphia meeting of the American Association for the Advancement of Science, Mr. Grant Allen was making similar although entirely independent observations on the same plant in Europe, with like conclusions. Mr. Allen's observations were published in " Knowledge," September 5th, 1884.

Mr. Martindale remarked upon his recent trip to Roan Mt., North Carolina, in company with Dr. A. Gray, Prof. John Ball and others, and spoke of the interesting botanical features of the mountain. There is little probability that the species peculiar to the locality will soon be exterminated. Botanists who contemplate visiting this mountain will be glad to learn that a railroad leading to the summit is in process of construction. This will make comparatively pleasant a journey that is now extremely tedious.

Mr. Scribner stated that the " Check-list of the North American Grasses," compiled by Dr. George Vasey and himself, and announced nearly two years ago, was now ready for the printer. The list embraces 122 genera and 817 species and varieties, including "ballast" and other introduced species. *Hemarthria*, a species of which has recently been discovered by Dr. Havard in South-western Texas, is a new genus added to our North American flora.

Mr. Scribner exhibited specimens of *Elymus triticoides*, Nutt., and showed why he regarded this a good species distinct from *E. condensatus*, Presl., to which some recent American authors had reduced it as a variety. It is particularly well characterized by its habit of sending out stout, running rootstocks, similar to those of *Agropyrum repens*, and, like *Agropyrum*, is a great pest in moist cultivated soil. He also exhibited specimens of a *Muhlenbergia* (*M. Wrightii*, Vasey), in which many of the spikelets were two-flowered.

Proceedings of the Torrey Club.—At the regular meeting of the Club held at Columbia College Sept. 9th, Dr. O. R. Willis, in the absence of the presiding officers, was elected chairman.

Dr. Willis noted the following plants from Westchester Co.: *Potentilla fruticosa*, *Heracleum lanatum*, *Sambucus pubens*, *Taxus baccata*.

Mr. Schrenk showed specimens of *Limnanthemum lacunosum*, both dried specimens and living plants cultivated from the floating rootlets, also seeds of *Pardanthus Chinensis* exhibiting peculiar mode of germination (illustrated in August number, page 93).

At the regular meeting held Oct. 14th, the President occupied the chair and 28 persons were present. Preliminary arrangements were made for a field-day excursion on Nov. 4th to Princes Bay, S. I., in conjunction with the Natural Science Assoc. of Staten Island. Specimens of *Opuntia* were shown by Dr. Willis, both the orbicular and elongated forms (*O. vulgaris* and *O. Rafinesquii?*) Dr. Britton stated that his observations in New Jersey showed the two forms to be merely unstable varieties.

Miss Knight showed specimen of chestnut with a ripe bur and fresh catkins on the same branch, collected Sept 28th, at Alpine, N. Y.

Mr. Schrenk showed specimens of *Marsilia quadrifolia* from Bantam Lake, Conn.

Dr. Britton showed dried specimens of *Corema Conradii* from all the known localities, including the type specimen in the Torrey Herb.

Dr. Newberry gave a brief account of the botanical features of Colorado and Montana noted while on a recent trip to that region.

At the meeting of the Club held Tuesday evening, November 11th, the President occupied the chair, and 22 persons were present.

Dr. Britton called attention to a communication from Dr. Gray in regard to *Lonicera grata*. A specimen found in the herbarium of the late Mr. Leggett, collected near Flatbush jail by Mr. Ruger, was sent for identification to Dr. Gray, who decided it to be what passes for *L. grata*.

Mr. Schrenk showed specimens of *Carduus nutans* from hills back of Hoboken, where it has become well established.

Dr. Kunzé read some notes on the genus *Cereus*, with particular reference to a specimen of *L. nycticalus*, preserved in glycerine.

Dr. Britton read a paper upon the existence of a peculiar flora in the Kittatinny Mts.

At the regular meeting held at Columbia College, Tuesday evening, Dec. 9th, the President occupied the chair and 27 persons were present. Mr. Hollick showed specimens of *Mitchella repens* with leafy berries from Tottenville, S. I., where they are abundant. Reference was made to an article on the same subject in BULLETIN, Vol. x., No. 1, by W. R. Dudley, where a full description is given.

Miss Knight showed specimens of the same plant from Stowe, Vt., having the calyx-teeth developed into long bearded, petal-like parts.

Dr. Britton showed a specimen of *Botrychium matricariæfolium* from Sussex Co., N. J., a fern new to the State.

Mr. Schrenk stated that he had discovered submerged leaves in *Brasenia peltata*, a fact which is not mentioned by either Gray or Wood. They were small and thin and were not covered with gluten as are the stems and under surfaces of the floating ones.

Mr. P. H. Dudley read an account of the structure of an old railroad tie which had been in use thirty-one years on the N. Y. C. & H. R. R. R., showing photo-micrograph of the same.

Miss Knight showed fruit of *Salisburia adiantifolia* from Central Park, where it has fruited abundantly this year.

Dr. Britton read the following note on *The Northward Range of Pentstemon Digitalis*, Nutt.—This plant extends much further north than has generally been supposed. Dr. Gray in his Synoptical Flora reduces Nuttall's species to *P. lævigatus*, Solander, var. *Digitalis*, Gray, and gives its range "Virginia to Illinois and Arkansas." I have received a specimen from Mr. C. E. Smith ticketed "Tinicum, Del. Co., Penn.; this increases its range 150 miles northeastward." On June 18th of the present year Dr. H. H. Rusby and I found it growing in great profusion in a low meadow below the mouth of Van Campen's Creek, a tributary of the Delaware River, in Warren Co., N. J., and also at another place a few miles further down the Delaware Valley above the Water Gap. In these localities the plant is certainly indigenous. Dr. G. N. Best has communicated specimens from the vicinity of Rosemont, Hunterdon Co., N. J., still further down the valley, with a note reporting the species indigenous at that point. Finally, on June 21st I discovered a patch of it in a field back of Newburgh, N. Y. There were here but a few plants and they may have been introduced, though I then formed the opinion that it was native.

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GENERAL INDEX.

(Illustrated articles are designated by an asterisk* before the page number.)

NEW DESMIDS OF THE UNITED STATES.

BULLETIN

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TORREY BOTANICAL CLUB.

Vol. XII.] New York, January, 1885. [**No. I.**

Fresh-Water Algæ. IX.

By FRANCIS WOLLE.

(Plate XLVII.)

The opinion expressed in the preface to my Desmids of the United States, that the field for the study of our fresh-water algæ has not by any means been exhausted, receives confirmation in the additions made during the summer of 1884 to our already respectable collection of new species and varieties. The following list comprises the names and descriptions of nearly fifty species and varieties new to the flora of the United States. They were gathered, some from the apparently inexhaustible ponds of New Jersey, some by the Rev. H. D. Kitchell in Florida, others in the neighborhood of Minneapolis by Miss E. Butler, and a few from ponds of Pennsylvania. The plate which accompanies this article illustrates the species and varieties herewith described, and this, with four others, all of them colored, will form part of an appendix, or of a second volume of my work on the Desmids of the U. S., according to the quantity of material available at the time of publication.

DESMIDIACEÆ.

Hyalotheca dissiliens, var. HIANS, *n. var.*—Cells one-half to as long as wide; closely conjoined, sides more or less arched, with a distinct central notch. Diameter 25–50μ.

The large forms from Budd's Lake, N. J., the small from Maitland and other localities, Florida.

It is very nearly allied to a New Zealand species described by Nordstedt (*H. hians*). Some specimens from Florida present the appearance of undeveloped *Desmidium quadratum* and may be related thereto; the larger New Jersey forms, however, give no evidence of a thickening border or of a twist. End view circular.

Sphærozosma pulchellum, Archer, var. *bambusinoides*, Wittr.

Florida, Minn. and New Jersey ponds.

Penium (*Cylindrocystis*) *tumidum*, F. Gay.—Frequent in Toevi marshes, Florida.

Closterium juncidum, Ralfs, forma *gracillima lævissima*, Bréb.—Frequent in pond near Maitland, Florida.

C. lanceolatum, Kg.—I received last summer hundreds of specimens of this species in a gathering made by Prof. F. W. Cragin, Kansas. Diameter 40–50μ. Length 225–300μ

C. didymotocum, Corda.—A large form and distinct variety corresponding to description by Delponte. Cytioderm not longitudinally striate, but smooth and apices obtusely rounded. Diameter 50–60μ.

Minnesota and New Jersey.

C. ensis, Delp.—Occasionally in Minnesota, Pennsylvania and New Jersey ponds.

C. prelongum (Bréb.) Delp.—Luzerne Co., Penn., and Minnesota.

C. Brebissonii, Delp.—Similar in form to *C. prelongum*, but not striate or recurved at the ends.

Minnesota.

C. subcostatum, Nord.—Florida Ponds.

C. Delpontii, Krebs.—Delponte called this *C. crassum*, a name already applied to a species described by Rabenhorst; it was therefore changed as here given.

Frequent in Luzerne Co., Penn.

C. pronum, Bréb.—Differs from allied forms in its small size and proportionate length of body with the beak.

Florida ponds.

Docidium Archeri, Delp.—Luzerne Co., Penna.

D. rectum, Delp.—According to Delponte this species is separated from *D. Baculum* by being always straight, never bent, without a basal inflation, stouter and longer. I have frequently met with it, but am not yet satisfied that it is different from *D. Baculum*.

D. Woodii (Delp.) Wolle.—Cell cylindrical, six to ten times longer than broad; apices rounded, basal inflation of semi-cell large, wide and high; cytioderm smooth. Diameter at ends, 50μ; inflated base 65μ; length about 600μ.

Ocean Co., New Jersey.

Cosmarium Nordstedtii, Delp. (Plate XLVII. Figs. 23 and 25.) I adopt this name for a form widely distributed, but variable. Sometimes it resembles *C. triplicatum* in size and shape, but differs in the number and arrangement of the granules, which are not in series of threes but in continuous concentric rows. Sometimes they cover the upper half of the semi-cell, then again only one or two rows occur within, but near, the margin; the centre and basal half are usually nude. The semi-cells are not so straight-sided as figured by Delponte, but the front and end views are always more or less rectangular-oblong.

Reinsch has called a very different form by this name; it is nearly if not entirely identical with *C. cyclicum*, Lund.

C. sphalerostichum, Nord. (Figs. 26 and 27).—New Jersey and Pennsylvania. Resembles *C. orthostichum*, Lund., but is somewhat smaller; ends truncate and granules not so regularly arranged.

C. LOBATULUM, *n. sp.* (Figs. 33 and 34).—Small, one-third longer than wide, end of semi-cell broadly truncate; sides convex, with slight contraction near the end; side view circular with end truncate. Membrane finely and closely granular. Diameter 25μ; length 33μ.

Stillwater, Minnesota.

C. circulare, Reinsch. (Fig. 37)—Toevi marshes, Florida.

C. perforatum, Lund. (Fig. 32).—Near Minneapolis, Minn.

C. INFLATUM, *n. sp.* (Figs. 18–20).—Cell one-half longer than broad; semi-cell gradually enlarged from a narrow base to the broadly dilated end; end view broadly elliptic; lateral view circular, with slightly flattened sides; membrane finely punctate or smooth. Diameter 25–28μ; length about 40μ.

Ponds in Minnesota. *G. pseudoprotuberans*, Kir., has something in common with this form, but the semi-cells are separated by the narrow linear sinuses between them; *C. inflatum* has an obtuse-angled sinus.

C. (*Euastrum*) *Sendtneranium*, Reinsch. (Figs. 30–31).—I have received a number of good specimens from Minnesota identical with Reinsch's figures and description. In outline it approaches *C. nasutum* (*v.* D. of the U. S., p. 89), but that is a strongly granulated species.

C. Braunii, forma *major*, Reinsch. (Figs. 28–29).—Stillwater, Minnesota.

C. læve, Rab. (Figs. 35 and 36).—I have described this species in Des. U. S., p. 62. Membrane finely granular, which is sometimes the character; *v.* Nord. et. Wittr. Ital. et Tyr. Coll., p. 29. The figures represent a smooth form, in accord with the name and description by Rab. *glabrum et lævissimum.* I received large numbers the past summer from the basin of a fountain in Pottsville, Penn.

Xanthidium fasciculatum (Ehrb.) Ralfs., var. SUBALPINUM, *n. var.* Prof. Delponte, in his Sp. Desmidiacearum Subalpinarum, p. 168, plate 13, describes this species differently from that described in Des. U. S., the variation being mainly in the wider separation of the lateral spines. To distinguish the two I make the above variety.

Not rare in ponds of Minnesota or New Jersey.

X. COLUMBIANUM, *n. sp.*—Cells about one-third longer than wide, divided by a deep constriction, which forms much ampliated acute-angled sinuses; semi-cells oblong-hexagonal, superior and lateral angles each produced into a firm aculeus; within the margin, four, often indistinct aculei; end view more or less regular hexagonal, each angle somewhat produced and surmounted by a firm aculeus; within the margin are four aculei, the ends of which often extend over the margin; cytioderm smooth. Diameter 60μ; length 80μ without aculei.

Ocean Co., New Jersey.

X. TORREYI, *n. sp.*—Small, of nearly equal length and breadth, semi-cell somewhat hexagonal, half as long as wide; superior and lateral angles slightly protruding and surmounted each by a firm, straight, or slightly bent aculeus; end elliptic with one aculeus on, and another within, the margin of each end; on each side, a rounded prominence peculiar to the genus. Lateral view elliptic, with a constriction in the middle; two aculei at each end and two short tips evident near the middle. The inflations or rounded prominences are seen near the juncture of the semi-cells. Diameter 33μ without aculei, and, with them, 65μ; length about 75μ.

Ocean Co., N. J., particularly Horicon Lake. On the green, sloping banks of this beautiful sheet of water is the home of the venerable brother of the late John Torrey of botanical fame, and in happy remembrance of whom this new plant is named.

Euastrum crassum (Bréb) Kg., var. *scrobiculatum*, Lund.—Diameter 70–75μ; length 125–150μ.

Malaga and other places, New Jersey.

E. MAGNIFICUM, *n. sp.*—The largest of our *Euastra*; about twice as long as broad; semi-cell five-lobed, the terminal lobe exserted; neck short, dilated, with end somewhat convex; the basal and intermediate lobes entire, with a deep obtuse notch between; upper margin of the basal lobes nearly horizontal and parallel; no prominent scrobiculæ, but one large central undulate inflation shown in lateral view. End view shows the terminal and intermediate lobes notched at each side. Diameter 100μ; length about 190μ.

Near Malaga and Manchester, N. J.

E. PURUM, *n. sp.*—Small, short; semi-cell three-lobed, broader than long; basal lobe much inflated, terminal lobe short, dilated and notched; in lateral view the base and end are more or less inflated. Diameter 35–45μ; length 55–70μ.

The smaller forms from Florida; the larger from Brown's Mills, New Jersey.

This new species is separated from *E. ansatum*, Ehrb., by the decidedly dilated terminal lobe and more strongly inflated basal lobes.

E. cuneatum, Jenner.—Harvey Lake, Lycoming Co., Penn., and occasionally in New Jersey ponds.

E. pectinatum, Bréb.—Semi-cell 3-lobed, terminal lobe dilated, usually entire; lateral lobes broad, making the basal portion of the semi-cell somewhat quadrilateral, horizontal, and, at each side, emarginate; lateral view cuneate, with two swellings near the base and one at the apex; transverse view oval, with three lobules on each side and one (or imperfectly two) at each end. Diameter 40–50μ; length about 75μ.

Minnesota. Although common in England, I obtained this year the first specimen found in the United States. A number of varieties of this species has been described by specialists in different countries. The present is not Ralf's typical form, but a variety.

Micrasterias apiculata, Menegh.—Harvey Lake, Luzerne Co., Penn., and Stillwater, Minn.

M. SPECIOSA, *n. sp.*—Small, somewhat longer than broad, five-lobed; lateral lobes unequal, the basal lobes usually with only half as many divisions as the intermediate ones; basal lobe bifid, and intermediate lobes twice bifid; the angles of each section drawn out into two spine-like points; terminal lobe rather narrow, linear; end exserted and much dilated, usually with three prominent mucros at each angle, centre retuse and raised, standing free, with a gap between it and the intermediate lobes; a series of small spines often to be observed on the margins of the lobes. Diameter of Florida form 95μ; length 110μ; of New Jersey form, diameter 125–150μ; length 155–165μ.

This species is nearly related to *M. radiosa*, var. *ornata*, Nord., but is smaller; the lobes are not so often and so deeply intersected, and the polar lobe is more exserted and has the end more dilated.

STAURASTRUM CORNUTUM, *n. sp.* (Figs. 3 and 4).—Medium size, about one-fourth longer than wide, smooth; semi-cell oval or broadly elliptic, with a prominent, somewhat inwardly curved aculeus on each side; end view triangular, angles rounded, each with a firm spine, sides straight or slightly concave. Diameter 55–60μ; length about 70μ. Spines not included in these measurements.

The front view resembles that of *Arthrodesmus convergens*, Ralfs, but the triangular end view proves it to be quite distinct.

St. Anthony Park and other localities, Minn.

St. vesiculatum, *n. sp.*—Small, smooth, about one-half longer than wide; constriction deep, sinuses acute angled, much ampliated; semi-cell short, ovate or sub-pyramidal, not so long as broad; base wide, lower angles rounded, sides convex and inclining to the rounded apex; end view triangular, angles rather broadly rounded, sides slightly convex or straight. Diameter 31μ; length 45μ.

Differs from *St. cordatum*, F. Gay, in front view; sinuses are not narrow linear, but much ampliated, thereby giving the cell a more elevated appearance.

Green's Lake, New Jersey.

St. bacillare, Bréb. (Figs. 5 and 6).—Near Minneapolis, Minn. Brébisson describes a form of a French species as *St. globosum* which is somewhat stouter and partially granular, but nearly similar in form; the two have therefore been very properly considered as one by recent botanists.

St. Maamense, Archer (*St. pseudocrenatum*, Lund.) (Figs 9 and 10).—St. Anthony's Park, near Minneapolis, Minn.

As Archer's name antedates Lundell's, it is entitled to stand.

St. erasum, Bréb., forma *espinulosa*, Lund. (Figs. 16 and 17). Green's Lake, New Jersey.

St. xiphidiophorum, *n. sp.* (Figs. 21 and 21).—Small, one-half longer than broad; deeply constricted, sinus narrow, rounded at base and widened irregularly; semi-cell transversely oblong, with lateral margins notched; the end margin drawn out into a sort of one-sided, hastate, poignard-like spines, or slender points, about nine in number; membrane smooth, with several scrobiculæ; end view triangular, angles broadly truncate and usually three-lobed, each lobe with a vertical spine; sides concave. Diameter 25–30μ; length 40μ.

Near Stillwater and Minneapolis, Minn.

When sending me this beautiful and remarkable little *Staurastrum*, Miss Butler called my attention to "*the little gothic structure*," a very appropriate comparison.

St. Minneapoliense, *n. sp.* (Figs. 11–13).—Small, verrucose; semi-cells in front view sub-cuneate, with each of the two opposite superior angles drawn out into a short arm, with sides serrate and apex finely toothed, diverging from the arm of the connected semi-cell; end view, arms straight, body much elevated on each side; side-view, arms straight, body much raised in the centre and crenate on the apex. Diameter, f. v., 50–58μ; thickness of body 20–$25\ \mu$.

The front view not unlike other species, but the side and end views quite distinct in the unusual inflation of the body.

St. calyxoides, *n. sp.* (Figs. 14 and 15).—Nearly equal in length and breadth; smooth or finely punctate; deeply constricted; semi-cells saucer- or calyx-shaped, bearing on the undulate margin five equally distant divergent spines; end view pentagonal, each angle produced and bearing a strong aculeus. Diameter about 33μ, without, and 75μ with, the aculei.

Near Manchester, Ocean Co., and Green's Lake, Warren Co., New Jersey.

ST. MINNESOTENSE, *n. sp.* (Figs. 7 and 8).—Large, punctate, spinous, about as long as broad; semi-cells broadly elliptic, twice as wide as long, lateral angles each with two large, straight or incurved spines or aculei, three more pairs of similar spines placed slightly within the margin of the end, one on each side of the semi-cell; six more, often inconspicuous, arranged around the centre; end view triangular, with two spines at each angle, and two pairs near the margin between the angles, one on each side of semi-cell; around the centre are nine more, but often indistinct, spines. Diameter 65–75μ without and 90–100μ with the spines.

Frequent in Minnesota ponds.

ST. WOLLEANUM, Butler. (Figs. 1 and 2). Medium size, membrane punctate, about one-half longer than broad, moderately constricted, sinuses obtuse angles; semi-cell broadly oval or subhexagonal, superior and lateral angles produced into subcylindrical, somewhat swollen processes or arms, slightly notched at the apex; four more similar processes within the margin; end view regular, hexagonal, each angle furnished with an arm as in front view; within the margin, arranged in a circle around the centre, are six more and less conspicuous processes. Diameter of body 40 by 50μ; with arms, 65 by 83μ.

Vicinity of Minneapolis, Minn.

This species was discovered and identified as new by Miss E. Butler, who declines to have the name changed.

New Grasses.

By GEO. VASEY.

TRISETUM LUDOVICIANUM.—Culms 2 to 2.5 ft. high, stout, erect, smooth, leafy; lower 3 or 4 leaves near the base 6–10 inches long, the margins and sheaths pubescent; upper leaves (2) larger and with long, striate, smooth sheaths, the upper sheath 9–10 inches long and reaching to the base of the panicle, blade 6–10 inches long, 3–4 lines wide, roughish. Panicle 6–10 inches long and about one inch wide, erect, nodding at the apex, rather loose, the branches semiverticillate, erect, mostly in fives, unequal, the longer ones 2 to 4 inches long and flowering nearly to the base, the rachis and pedicels smooth or nearly so, pedicels about as long as the flowers; spikelets 2- to 3- (mostly 2-) flowered, the lower flower unawned; outer glumes smooth or slightly hispid on the keel, 2.5 to 3.5 lines long, 3-nerved, acute, with broadly scarious margins, the upper obovate, the lower rather shorter and narrower; the flowering-glume of the lower flower 3–3.5 lines long, narrowly lanceolate, nearly smooth, acute or acutish, but not bifid; second flowering-glume 2–2.5 lines long, punctulate scabrous, rather thicker than the lower one, with a rather scarious margin, acuminate, but hardly toothed at the apex, obscurely 3-nerved, dorsal awn from the upper fourth, as long as or longer than its glume, the palets one-third shorter than the glumes, membranaceous, bifid at the apex; rhachilla sparsely pubescent, terminated with a short rudiment, or occasionally with an imperfect flower.

Found along the borders of a cane-field in Louisiana, by Rev. A. B. Langlois. Doubtfully referred to the genus *Ventenata* by Prof.

Hackel, but I think its affinity is clearly with *Trisetum.* Very nearly the same structure of flowers occurs in *T. palustre.*

LEPTOCHLOA LANGLOISII.—Culm smooth, stout, leafy, 3 to 4 ft. high, the radical leaves one-third as long as the culm, loosely sheathing the base of the culm, joints or nodes 7 or 8, the sheaths compressed, striate, loose, rather glaucous, the leaves a foot long, 3 to 4 lines wide, keeled, somewhat scabrous, the upper one sheathing the base of the panicle; panicle racemose, 10–12 inches long, 2 inches wide, loose, erect or nodding above, the simple branches very numerous (100 or more), crowded below, erect-spreading, irregular on the axis, singly or 2–3 together, 2 to 3 inches long, mostly less than half an inch apart, flower-bearing throughout; spikelets 3–4-flowered, sessile and imbricated, about one and a half lines long; outer glumes unequal, membranaceous, ovate-lanceolate, acute, slightly scabrous on the keel, the lower about half a line, the upper about one line long; flowering-glumes little more than one line, lanceolate, acute or short-mucronate, 3-nerved, slightly pubescent on the keel, and ciliate on the marginal nerves below; palet a little shorter, bidentate.

This large and showy species was found in Louisiana by Rev. A. B. Langlois, for whom it is named.

LEPTOCHLOA NEALLEYI.—Culms 2 to 2.5 ft. high, and, with the sheaths, smooth, with about three nodes; leaves 6–10 inches long, 2–3 lines wide, the sheaths loose and striate, the upper one long and sheathing the base of the panicle; panicle 8–10 inches long, narrow, the simple branches about one inch long, in threes or fives, or partly scattered, closely flowered; spikelets small (little more than a line long), 3–5-flowered; outer glumes unequal, ovate, acutish, thick and green on the keel, the lower, half as long; flowering-glumes .5 to .75 line long, 3-nerved, oblong, sparsely pubescent on the nerves, the apex emarginate, obtuse and finely denticulate; palet narrow, as long as the flowering-glume, 2-keeled, finely pubescent on the keels.

Collected in Texas by Mr. G. C. Nealley, for whom it is named. Probably this and the preceding have been collected before, but so far as I know have not previously been named.

A New Cyperus.

By N. L. BRITTON.

CYPERUS PRINGLEI, *n. sp.*—Culm upright, about 2 ft. high, sharply triangular. Leaves smooth, except the scabrous margins, 8–12 inches long, 2–3 lines wide. Involucre of 5 or 6 narrow leaves, the longer 6–8 inches in length. Umbel simple or somewhat compound, of 5–6 rays, 2–3 inches long and with several sessile heads. Simple heads one inch long, 2–3 lines wide, involucellate, with setaceous bracts, composed of 20–30, scattered, lanceolate, acute spikelets. In the compound heads the spikelets are more numerous, and the involucels more prominent. Spikelets 1.5–2 lines long, of 3 or 4, acute, ovate to ovate-lanceolate, 9–11-nerved scales, a single one fertile in each, the lowest one persistent on the axis of the head. Spikelets minutely subulate-bracted. Achenium oblong or oblong-obovate, acutely triangular, a line or less in length. Style 3-cleft. Stamens 3. Root hard, bulbous, provided with thick fibres.

Recently received from Mr. C. G. Pringle; collected in August, 1884, in Southern Arizona.

The plant somewhat resembles *C. Californicus*, Watson,* but differs in its narrow leaves, shorter involucre, shorter and non-flexuose, fewer-flowered spikelets.

A Third Coat in the Spores of the Genus Onoclea.—The presence of three coats in the spores of *Equisetum* has long been known to botanists, but, as far as I am aware, it is generally supposed that no ferns have more than two.

Having had occasion to repeatedly study the germination of the spores of *Onoclea Struthiopteris*, I was for a long time perplexed by


Fig. 1


Fig. 2.

Fig. 3

Fig. 4.

the appearance of certain lines on the surface of the spore which I could not explain.

For some time these were not noticed in the spore at the commencement of germination, owing to the opaque nature of the contents; but, as the cells became larger and the contents clearer, these lines became very conspicuous.

After repeated sowings of spores, and careful study of the first stages of germination, specimens in the condltion of Fig. 3 were found in which the root-hair was apparently developed from the interior of the spore and protruded through the wall. Further investigation showed beyond any doubt that the supposed endospore

*Bot. Cal., ii., 216 (*C. speciosus*, Torr., Mex. Bound. Surv., 226.)

actually split, and that through the cleft at one end the root-hair protruded, and at the other the first cell of the prothallium. The spores of the ferns of the genus *Onoclea*, as is usual in other ferns, are covered with a thick, dark brown exospore, or coat. (Fig. 1.) In most ferns this remains attached to the basal cell of the prothallium, concealing a large portion of it, and, indeed, this is often the case in both *O. Struthiopteris* and *O. sensibilis*, but in many cases in both ferns it is completely detached by the swelling of the spore in germinating, leaving the spore apparently covered only with a thin, transparent membrane (Fig. 2.) At the commencement of active growth, however, this membrane is seen to split along one side, and through the cleft thus formed the true endospore protrudes in the form of a root-hair at one end, and the basal cell of the prothallium at the other, which soon becomes separated from the root-hair by a transverse septum (Figs. 3 and 4.) In Fig. 4 the basal cell has become again divided so as to form two cells besides the first root-hair. At this stage, with a little care, the two lobes of the second covering (Figs. 4 and 5, L) can be clearly seen. The edges of

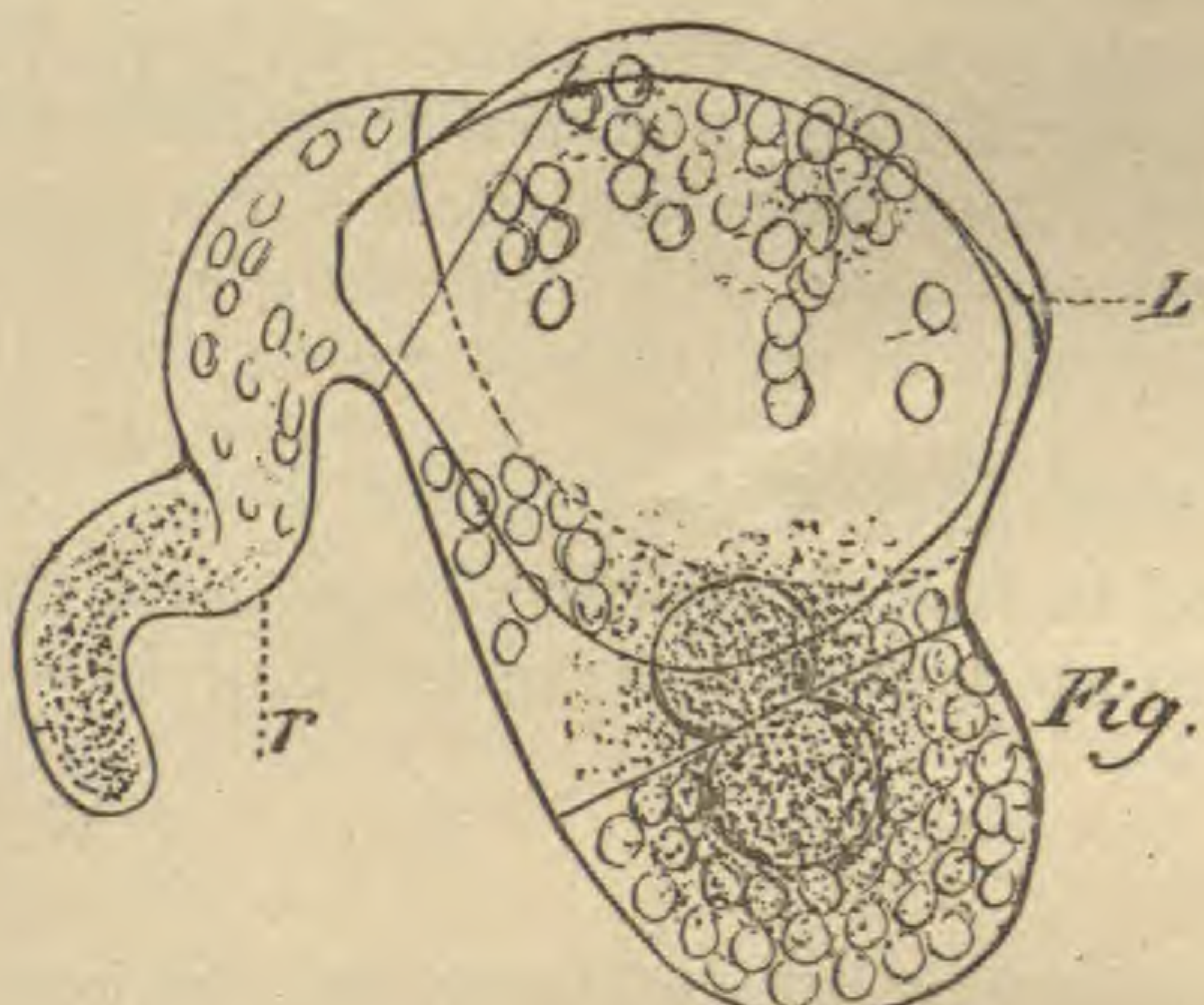

Fig. 5.

these lobes were the lines that puzzled me first. These lobes follow so nearly the lobes of the exospore, in those cases where it remains attached, that it is then impossible to detect them.

This accessory covering of the spore was first observed in *O. Struthiopteris*, but, knowing the close resemblance of the spores of *O. sensibilis* to those of the former species, I conjectured that the same peculiarity might be detected in them, and experiment showed that this was the case. I have not detected it in other genera examined, but, as in all cases, the exospore adhered so firmly to the spore as to interfere seriously with observations, I do not think it at all impossible that it does exist.

These observations may be readily verified in either species, as the spores germinate in a few days if simply placed in water and kept in a warm place.

Explanation of Figures.—1. Spore of *O. Struthiopteris* still enclosed in the exospore. 2. A similar spore in which the exospore has been cast off. 3. Spore with the second coat split, allowing the root-hair (*r*) to protrude. 4. Older prothallium, showing the lobes of the second coat (L.) 5. Similar prothallium of *O. sensibilis*. All magnified 500 diameters.

Douglas H. Campbell.

The Introduction of Extra-limital Plants.—To what degree is our flora influenced by designed introduction of extra-limital plants? A person in no way a botanist, though after his fashion a lover of the woods, confessed to me that he was in the habit during his rambles of scattering seeds of foreign or western plants here in Rhode Island. Now, if these germinated, as no doubt they often did, they would give rise to plants quite extra-regional. This, when it first was noticed, might cause the experienced student no great annoyance, but it is easy to see that after a while, and when well established, they might easily mislead. There is no way that I can suggest of stopping such a custom in our free country. The question is how far is it reprehensible?

W. W. BAILEY.

Leaves of the Abietineæ.—Botanists will be glad to avail themselves of the opportunity to study the structure of the leaves of the *Abietineæ* of the United States and judge for themselves as to the value of the specific characters afforded by the position of the resin-ducts and the number and nature of the hypodermic cells; and I therefore take pleasure in announcing that Mr. J. D. King, of Cottage City, Mass., has prepared from material furnished from the collections of the Harvard Arboretum, and now offers for sale, beautifully mounted sets of microscopic slides showing cross-sections of the leaves of the sixty species of the United States.

C. S. SARGENT.

Corema.—I find in Rev. J. Fowler's list of New Brunswick plants, *Corema Conradii* " abundant in sphagnous bog in rear of Carleton, N. B."

W. W. BAILEY.

Shortia.—A correspondent, referring to the note on *Shortia* in the December BULLETIN, suggests that Mr. Hyams would have come nearer the truth had he said the plant " is *sold* out " instead of "*dying* out," in view of the fact that he has for the last few years been advertizing to supply specimens at ten dollars each.

James F. Robinson, a well-known collector, at one time Secretary of the Botanical Exchange Club, and more lately connected with Owens College, Manchester, died quite suddenly on the 1st of November last, aged 46 years. A few years since he felt compelled to part with his herbarium, library and diagrams, and the writer secured many of his plants, volumes and maps, either for himself or Providence institutions.

W. W. B.

Botanical Notes.

The Nectar-Glands of the Cruciferæ.—M. J. Velenovsky, in a paper of fifty-six pages (*Bull. de la Soc. Tcheque des Sciences*, 6, xii., 1884), has drawn attention to the characters of the nectariferous glands in the Cruciferæ, which he believes might be employed in characterizing some genera and even larger groups. Thus the absence of the superior nectaries may be said to characterize the *Alyssineæ*, *Lunariæ* and *Cheirantheæ*. The form of the nectaries may also serve as a diagnostic character of some genera. The author gives a table of the classification of the Cruciferæ with the application of the new characters.

Botanical Literature.

Botanical Contributions, 1884–85. By Asa Gray. Proc. Amer. Acad. Arts and Sci., xx., 257–317.

The first part of this paper by Dr. Gray consists of a critical revision of some genera of *Borragineæ*, made necessary by recent discoveries. The revisions give us now two species of *Omphalodes*. one arctic, and one (*O. Howardi*, Gray, n. sp.) from Montana and Washington Territory, also two species in Western Mexico. A number of species of *Eritrichium* and some of other genera are referred to the genus *Krynitzia*, Fisch. and Meyer, the characters of which are extended, and which contains 45 North American species, eight of them new to science. Other species of *Eritrichium* and *Echidiocarya* become *Plagiobothrys*, Fisch. and Meyer, of which we have 13 rep resentatives. *Echidiocarya* has but a single species, *E. Arizonica*.

Under "Notes on some American Species of *Utricularia*" reference is made to the drawings of Major Le Conte intended for illustrating his observations on the genus, *and now in possession of Mr. I. C. Martindale. *U. personata*, Le Conte, is *U. juncea*, Vahl.; *U. longiciliata*, A. DC., and *U. simplex*, C. Wright, both Cuban species, have been detected in Florida; "*U. tubulata*, L., var. *cleistogama*, Gray, seems to be not uncommon. The late Dr. Garber collected it in Florida, and Mrs. Owen sends it from the island of Nantucket." We may add that it has recently been found again in the New Jersey pines by Prof. J. A. Allen.

Six new genera, each of a single species, are described from the Southwest. They are *Veatchia* (*Rhus Veatchiana*, Kellogg) from Lower California; *Lyonothamnus* from Santa Catalina Island; *Pringleophytum* from Sonora; *Phanlothamnus* of the Phytolaccaceæ from Sonora; *Himantostemma*, also Sonoran; and *Rothrockia* of Southern Arizona. The last two genera are of the Asclepiadeæ. Two other new species of this order are described, viz : *Lachnostoma Arizonicum*, Gray, and *Acerates bifida*, Rusby, a very peculiar species with two-parted hoods, of which a single specimen only was secured.

Dr. Gray describes also thirty-nine new species of Gamopetalæ and remarks on others. Among the new ones we note *Schweinitzia Reynoldsiæ* from East Florida, and *Cassiope oxycoccoides* from Behring Island, off Kamtschatka.—N. L. B.

A Manual of the Medical Botany of North America. By Laurence Johnson, A.M., M.D. 8vo., pp. 290. Library of Standard Medical Authors. Wm. Wood & Co., New York, December, 1884.

Since the publication of Rafinesque's treatise on medical plants, no work of extensive scope has appeared in which our various native

*Ann. Lyc. Nat. Hist., i, 72.

and naturalized species reputed to be of value in the practice of medicine have been discussed and described. The book here noticed thus supplies a want which every intelligent practitioner and student must have felt, and presents in condensed form the results of the author's studies for a number of years in this neglected field. Commencing under the heading "Elements of Botany," it presents clearly and concisely the life-history of flowering-plants, explains the names given to their parts, and the principles of botanical classification, with a glossary of botanical terms. Succeeding this, and forming the larger portion of the work is a critical account of nearly all the American plants which are, or have been, employed in medicine, statements of their geographical distribution and habitat, the parts used in the various pharmaceutical preparations, with the chemical constituents of the same, and their medical properties and uses. It is noteworthy that comparatively few of the species which have been used in medicine are really proved of sufficient importance to be recognized as valuable therapeutical agents. The number condemned or questioned is far greater than that admitted to be useful The plants are considered in the order of their arrangement in Dr. Gray's Manual of Botany. The book is well printed, carefully indexed, and beautifully illustrated with 160 wood-cuts, and with superb chromo-lithographic plates of *Podophyllum peltatum*, L., *Liriodendron Tulipifera*, L., *Sanguinaria Canadensis*, L., *Geranium maculatum*, L., *Cornus florida*, L., *Viburnum prunifolium*, L., *Gelsemium sempervirens*, Ait., *Cypripedium pubescens*, Willd., and *Aspidium marginale*, Swartz, from original drawings by the author.—N. L. B.

The Fresh-Water Flora and Fauna of Central Park. By L. P. Gratacap and A. Woodward. Pamphlet, pp. 19, reprinted from *Sci. Amer. Supplem.*, ,Dec. 27, 1884.

This interesting paper concisely presents the results of the past year's study by Messrs. Gratacap and Woodward of the life existing in the larger fresh-water lakes. In the investigation of the flora they appear to have confined themselves to the Algæ, no phanerogams being given in the list of species detected. This includes 22 of *Confervoideæ*, 7 of Desmids, 26 of Diatoms and 3 Bacteria. The paper is preliminary to a more exhaustive report. It contains a valuable contribution to the bibliograpy of fresh-water floræ and faunæ of the United States, mostly microscopical.--N. L. B.

List of, and Notes upon, the Lichens collected by Dr. T. Bean in Alaska and the adjacent region in 1880. By Dr. J. T. Rothrock.. 8vo., pamph., pp. 10. (From Proceed. U. S. Nat. Museum. Vol. iii, No. 1.)

Preliminary List of the Parasitic Fungi of Wisconsin. By William Trelease. 8vo., pamph., pp. 40. (From the Transactions of the Wisconsin Acad. Science.)

Notes on some Species of Gymnosporangium and Chrysomyxa of the United States. By W. G. Farlow. 8vo., pamph., pp. 16. (From Proceedings of Amer. Acad. Arts and Sciences.)

Notes on a Fungus parasitic on Species of Potamogeton. By W. G. Farlow. (From Transactions of the Ottawa Field-Naturalists Club.)

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Notes on Limnanthemum lacunosum, GRISEB.

By JOSEPH SCHRENK.

(Plate XLVIII.)

In No. 3, Vol. x., of the BULLETIN (March, 1883), Miss E. G. Knight reported the discovery of some submersed leaves in two specimens of *Limnanthemum lacunosum*, Griseb., collected in Nova Scotia. These leaves were "3 by 2.5 in., of a delicate texture, diaphanous, and of a light green color with a tinge of red," and had "a broader sinus than the floating leaves." In examining some specimens of our *Limnanthemum* that I had taken from Squam Lake, N. H., in 1881 and 1882 (in the month of August), I found that the submersed leaves of my plants were quite different from those described by Miss Knight. In 1883 and 1884 I gathered some more specimens from Squam Lake, and also some from Rockland Lake, N. Y., and from Bantam Lake, Conn., and found the submersed leaves of all the plants from these localities to agree in size and form with those taken from Squam Lake in previous years.

The blades of these leaves are only from 5 to $10^{mm.}$ wide and about $10^{mm.}$ long, and of various shapes, oval, obovate, broadly ovate, sometimes with truncate base, but always *without* any sinus. They are of a bright green color, without the reddish tinge peculiar to the floating leaves. The petioles are flat and from $2.5^{cm.}$ to $9^{cm.}$ long.

After having examined this interesting plant and its descriptions by the various authors, I venture to offer the following remarks as a contribution to the better understanding of its morphology and histology. What I especially propose to show is that the inflorescence is not inserted on the *petiole*, as stated below.*

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* The latest published description of our *Limnanthemum* that I could find, is contained in the last edition (1883) of A. W. Chapman's Flora of the Southern United States, and reads thus: "*Limnanthemum*, Gmelin. Perennial aquatic herbs with floating, circular or cordate, spongy leaves, and white peduncled flowers clustered near the summit of the long petiole." In Wood's Classbook of Botany we find the following: "Petioles long, bearing the flowers in an umbellate cyme below the roundish leaf." Gray's Manual says: "Perennial aquatics, with rounded floating leaves on very long petioles, which, in most species, bear near their summit the umbel of (polygamous) flowers . . . sometimes shooting forth new leaves from the same place, and so spreading by a sort of proliferous stolons." In Gray's Synopt. Flora of N. A. we find the following passages: "*Limnanthemum*, Gmelin . . . the flowers in our species as if umbellate-fascicled on the petiole. . . . *L. lacunosum*, Griseb. Petioles and stolons filiform, much elongated: . . . umbel of flowers borne near to the base of the leaf. . . ." De Candolle, Prodr. ix., 139, Sect. ii., Nymphæanthe, Griseb.: "Cymæ petiolis insertæ." Cf. also Thos. Meehan, The Native Flowers and Ferns of the U. S., i., 93.

Limnanthemum lacunosum has a slender, ascending or horizontal rootstock provided with fleshy, fibrous roots, (Fig. 4). At the growing end of the rhizoma we first notice, above the sandy bottom of the lake or pond, a few of the submersed leaves described above *(sl)*. Their petioles are inserted by means of sheathing bases (Fig. 5, *sl*). Next, in centripetal order, we find growing on the rootstock some very long filiform petioles of uniform thickness and appearance (Fig. 4, *pt*), likewise provided with sheathing bases (Fig. 5, *pt*), and bearing the roundish floating blades with a deep acute-angled sinus. None of these undoubted petioles shows any sign of an inflorescence.

After removing the sheathing petiole-bases, we see some membranaceous scales about $10^{mm.}$ long, which taper from a broad clasping base to a sharp point (Figs. 4 and 5, *sc*). Occasionally these scales are more elongated and have green tips or even rudimentary blades; they are, in fact, much reduced leaves.

From the axils of the scales grow those organs which are described by authors as filiform *petioles* bearing near their summit the umbel of flowers, etc. (Fig. 4, *st*). As we shall presently see, they bear lateral organs; therefore, I do not hesitate to consider them as caulomes, and will henceforth call them *stems*. They are, indeed, very much like the filiform petioles metioned above, but from those they are readily distinguished by their position in the axils of the scales, by their somewhat flattened, but never clasping base (Fig. 5, *st*), and, above all, by their internal structure, to be discussed hereafter.

A short distance from the surface of the water *(sf)*, each stem bears a well developed node, from which one full-grown floating leaf is produced. The blade of this leaf is exactly like those of the leaves with filiform petioles, but its petiole is only from 1 to $5^{cm.}$ long (in one exceptional case as long as $24^{cm.}$), rather thicker than the stem, and has, at its base, a membranaceous sheath from which the clustered inflorescence and, closely above the same, the apex of the main axis are growing. This apex, however, rarely continues its growth vigorously during the same season; but we can often observe very small rudimentary leaves starting at this point, during and after the flowering season (Fig. 4).*

The apex of the stem is usually subtended by a cluster of spur-shaped, thick and fleshy rootlets (not tubers, as they are called by some authors), (Fig. 4, *sp*, and Fig. 7.) There can be no doubt that these rootlets sink to the bottom at the end of the growing season carrying with them the apex of the stem, which, in the next spring, gives rise to a new plant. I have frequently found these rootlets attached to the rootstock of young as well as older plants, indicating, in the latter case, by their withered and shrunken condition, the function which they had performed (Fig. 6).

We see from what I have said above that in *L. lacunosum* we meet with four distinct kinds of leaf-organs: 1st, the submersed

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* According to A. Gray (Manual) the long petioles sometimes shoot forth new leaves from near the spur-like roots, thus spreading by a sort of proliferous stolons.

leaves, 2d, the floating leaves with filiform petioles, 3d, the scales on the rootstock, and 4th, the floating leaves with short petioles.

But in order to obtain entire satisfaction as to the difference between the filiform petioles and stems we must examine the internal structure of the same. The fibro-vascular centre of the *stem* (Fig. 2) is distinctly divided by a zone of parenchymatic ground-tissue into two bundles, each of which contains both vascular (*v*) and sieve tissue (*sv*), the latter situated toward the endodermis (*en*). In the fibro-vascular bundle of the filiform *petiole* (Fig. 3) there is but one set of xylem (*v)* and phloem (*sv*) with the woody tissue on the inner side. A line bisecting the two bundles of the stem forms an angle of about 45° with the median line, while the bundle of the petiole is symmetrically arranged, *i. e.*, it is bisected by the median line. The petioles of the other two kinds of leaves are, in this respect, exactly like the filiform ones. It is instructive to observe how the double bundle of the stem separates into two branches on approaching the node, one of them leading to the inflorescence and apex, the other continuing its course into the leaf.

Otherwise the stem and the petiole do not present any material differences. Both have two additional, much more reduced fibro-vascular bundles near the circumference, on opposite sides from the central one, with which they anastomize, at certain intervals, by means of obliquely ascending, tender branches. The bulk of the stems and petioles consists of large parenchyma cells which have very large intercellular channels between them, in the manner of so many aquatic plants. We find, stretched obliquely across these air-canals, some peculiar diaphragms formed of rather flat cells and pierced with numerous triangular intercellular spaces. Such diaphragms are considered as a mechanical contrivance to stiffen the walls of the air-canals in which they grow. Their occurrence in *Limnanthemum* is particularly interesting, because together with them are found those star-shaped cells so frequently observed in *Nuphar* and *Nymphæa*; for it has heretofore been thought that plants having these stellate "interior hairs" are not provided with any diaphragms.* The manner in which the former grow, leaves, with me, no doubt as to their office.

The walls of the intercellular channels (Fig. 8, *p*) are formed of single layers of cells among which the star-shaped ones are conspicuous by their great number, their form and their very thick, lignified walls. There are, however, not any of the granular crystals of calcium oxalate imbedded in the substance of the wall and projecting from it as with *Nuphar* and *Nymphæa*.† The several arms into which such a cell branches project into the intercellular passages (Figs. 8 and 9), and spread in front of the partitions (Fig. 10) into which the main body of the cell is inserted. Considering the length

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*G. Haberlandt, Physiologische Pflanzenanatomie (1884), p. 300.

†G. Haberlandt, *l. c.*; E. Strasburger, Das botanische Practicum, p. 171. In our *Nymphæa odorata*, Ait., however, I have found very many "stellate hairs" with quite smooth walls, without the crystals mentioned in the text. They occur together with such cells as those of *N. alba* described by Strasburger, *l. c.*

of these branches, as well as the hardness and rigidity of these peculiar cells, together with their great number, we must assume that they serve as a mechanical contrivance to prevent the collapse of the wide air-passages which, without them, might take place on a sudden or gradual change in the radial pressure exerted on the plant by the water and the atmosphere.

This summer I planted a cluster of the spur-like rootlets mentioned above in some sand contained in a shallow dish and covered with a few inches of water. The bud above the rootlets soon sent up some of the submersed leaves, which, in shape and size, exactly resembled the ones collected from the actual habitat of the plant. But on closely examining their petioles I was surprised to find that they did not contain a single stellate cell! I do not venture to consider this single observation as a proof of the correctness of the above theory, but it certainly does not contradict it, and invites closer investigation.

Hoboken, December 1884.

EXPLANATION OF PLATE XLVIII.—Fig. 1. Cross-section of filiform stem. *e*, epidermis; *se*, sub-epidermal layer of parenchyma consisting of two or three rows of cells with few and small interstices; *i*, intercellular air-canals; *ic*, air-canal magnified in Fig. 8; *p*, partitions between air-canals; *cb*, central fibro-vascular bundle; *lb*, lateral bundles; x 36. Fig. 2. The central fibro-vascular bundle of Fig. 1, x 370. *en*, endodermis; *v*, ducts (annular and spiral); *sv*, sieve tissue. Fig. 3. Central fibro-vascular bundle of filiform petiole. Letters as in Fig. 2; x 370. Fig. 4. A few of the numerous stems, leaves, etc., of a full grown plant to illustrate its habit. The filiform petioles and stems of the original were about .5$^{m.}$ long. *bt*, bottom of lake; *sl*, submersed leaves, *sc*, scales; *pt*, filiform petioles; *st*, filiform stems; *sp*. spur-like roots; *sf*, surface of water. Fig. 5. Bases of leaf-organs. Letters as in Fig. 4. Fig. 6. Young plant that has grown from the spur-like roots, *sp*. Fig. 7. Cross-section of one of the spur-like rootlets (Fig. 4). *e*, epidermis; *pc*, parenchyma cells; *en*, endodermis; *v*, ducts; *sv*, sieve-tissue; x 36. Fig. 8. Intercellular canal, *ic*, Fig. 1, x 36. *sh*, stellate "hairs"; other letters as in Fig. 1. Fig. 9. Longitudinal section through air-canal and stellate "hair"; x 370. Fig. 10. Longitudinal section through air-canal, giving front-view of stellate "hair", the invisible half of which extends behind the partition into the contiguous air-passage; x 370.

All the powers given refer to the original figures as drawn with the camera; in the plate they appear reduced to one-half their size.

On the Mechanism of Anthesis in the Ericaceæ

By H. H. RUSBY.

As to the anthers, a strong distinction exists between the Pyrolineæ and the remainder of the Ericaceæ, in that the pores are basal in the former, apical in the latter. But this characteristic is not so readily made out as would at first appear. On examining a mature flower in any sub-order, the pores are found uppermost, and the only apparent indication of inversion in the Pyrolineæ is the common extrorseness of the pores, the anther itself being introrse. But even this distinction vanishes, nearly, in *Clethra*, where the poriferous horns are twisted so as to face laterally, and quite so in *Chimaphila*, where the horns are very short, and the openings look obliquely upward and inward. When we turn to the bud of *Clethra*, we find the filament doubled upon itself, so that the poriferous horns are pointing downward. In very young buds this reduplication of the filament is not apparent, the fold being so closely appressed to the anther. When, now, we read that the anther in Pyrolineæ is "normally extrorse in the bud" and that the pores are "really basal," the ordinary inference must be that it is this folding of the filament that constitutes the normal condition, and renders the pores truly basal. But again we are puzzled on finding that this same folding of the filament, producing reversion of the anther, in the bud, prevails in a number of genera of Ericineæ, particularly in the first and second tribes. Why then should the same condition be called normal in one case and abnormal in the other? Why should pores similarly placed be called basal in the one sub-order and apical in the other? Why should *Arctostaphylos* and *Arbutus* form one extreme, and *Clethra* and *Pyrola* the other, of a large family, the intervening genera differing in the most important characteristic in which these extremes agree? An answer is found in the existence in the Pyrolineæ of a second fold or turn of the filament at its point of attachment, thus placing it erect in the bud, and inverted in the flower, when the larger first fold has become obliterated. A careful study of this subject has proven so interesting that my observations have been committed to paper, and, with a few diagrams, are here given.

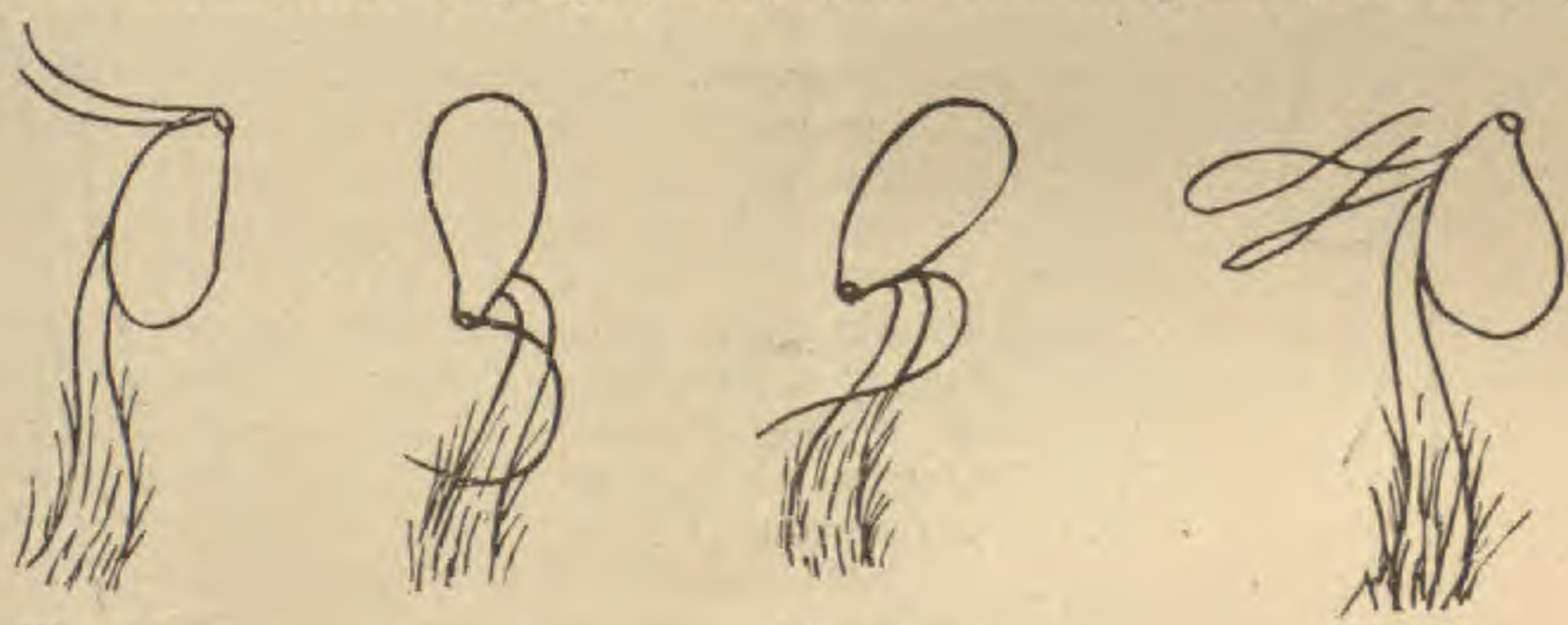

Fig. 1. Fig. 2 Fig. 3. Fig. 4.

I shall speak of the primary, obscure fold in Pyrolineæ as an *inversion*, which it really is, and the more evident, secondary fold, common to many genera, as a *reversion*. Suitable buds for this study not being commonly collected, I heve been unable to examine some genera at all, and in several others the buds were so old as to leave the truth merely inferential.

Inversion has been clearly demonstrated in *Clethra*, *Chimaphila* and *Pyrola*—*Moneses* not having been examined.

Reversion is certainly present in *Arbutus*, *Arctostaphylos* and *Cassiope*, and probably in *Gaultheria* and *Cassandra*. It has been excluded in *Leucothoe*, *Oxydendron*, *Epigæa*, *Andromeda*, *Calluna*, *Ledum* and *Rhododendron*. In *Menziesia*, so far as my observations go, it is very doubtful, and the other genera I have had no opportunity of examining.

My observations began with the study of *Arctostaphylos*, in February, 1881, when among the mountains of South-eastern Arizona I was waiting for the spring flowers to open, only *Arctostaphylos pungens*, HBK., *Brodiæa pauciflora*, Wats., and *Carphochæta Bigelovii*, Gray, being in flower.

The drawings made at that time are lost, but the plan of reversion and restitution, being much the same as in *Arbutus*, I may illustrate by reference to figures of that genus. Fig. 1 illustrates a mature stamen of *Arbutus Menziesii*. The anther is erect, introrse both as to position and pores, attached very near its upper extremity, and furnished with a pair of curved horns projecting backward, the concavity of the curve looking directly upward. These horns seem to have their origin at, or very near, the upper edge of the pore, and to be adnate to an extent which varies in different genera and species, and in the same species at different periods. If now, we imagine this anther tipped over backward until it is exactly upside down, we shall have a part of what we find in Fig. 2, an illustration of a stamen from a young bud of the same species. That is, the anther would be reverted, and extrorse as to both position and pores, and the filament folded upon itself. But the horns would assume a different position, for they would project inward, the concavity of the curve looking directly downward. Such, however, is not the case in the bud. The filament is bordered by thin, but strong, transparent wings, and to this the horns

Fig. 5.

Fig. 6.

Fig. 7.

are firmly attached, apparently imbedded in its substance. The filament is at this time very short. From these observations, the design of the arrangement, and the use of the horns is very apparent. As the filament lengthens in its narrow quarters it becomes variously curved and cramped, so that at the first intimation of freedom, from the spreading of the corolla, which it probably hastens, it begins to straighten by pressing the anther in the only direction possible, namely, the apex (lower end) outward. It is evident that powerful assistance must be rendered by the elasticity of the growing horns, pressed, as they are, far out of their normal line. (See also Figs. 3 and 4.)

In *Arctostaphylos* the principle is the same, with slight differences in the details. It must be remarked that in this genus especially, the development and growth of the horns is very rapid. In the youngest buds that can be readily examined, the horns are scarcely discernible. The rapidity of their subsequent growth is well seen by comparing their length in the five precocious, with that in the other five anthers (best seen in *Arctostaphylos Uva-ursi*), for in all of these changes, five of the anthers are constantly much in advance of the others. In this genus they become much longer, and instead of being, in the bud state, imbedded in the substance of a transparent wing of the filament, they are attached thereto by abundant glutinous hairs belonging both to themselves and to the filament. Here, at least, the horns apparently have some part in cross-fertilization. In *A. glauca* they are so far doubled backward that their hairy and glutinous tips are approximated to the anther pores, so that being jarred by departing insects, a quantity of the pollen is shaken out upon them, to be held until the arrival of the next visitor. Futher evidence of the flowers being proterogynous was found in the presence, among the filaments and upon the viscid stigma, of a considerable quantity of pollen before the anthers of those flowers were yet mature. A large number of flowers was found punctured near the base with a large, angular aperture. Careful and long continued observation placed the mischief to the account of a humming-bird, which passed a large part of its time among the shrubs.

Cassiope does not differ essentially from *Arbutus*. Its horns are like those of *Arbutus* in slenderness, but are not quite so long, and are rather straighter.

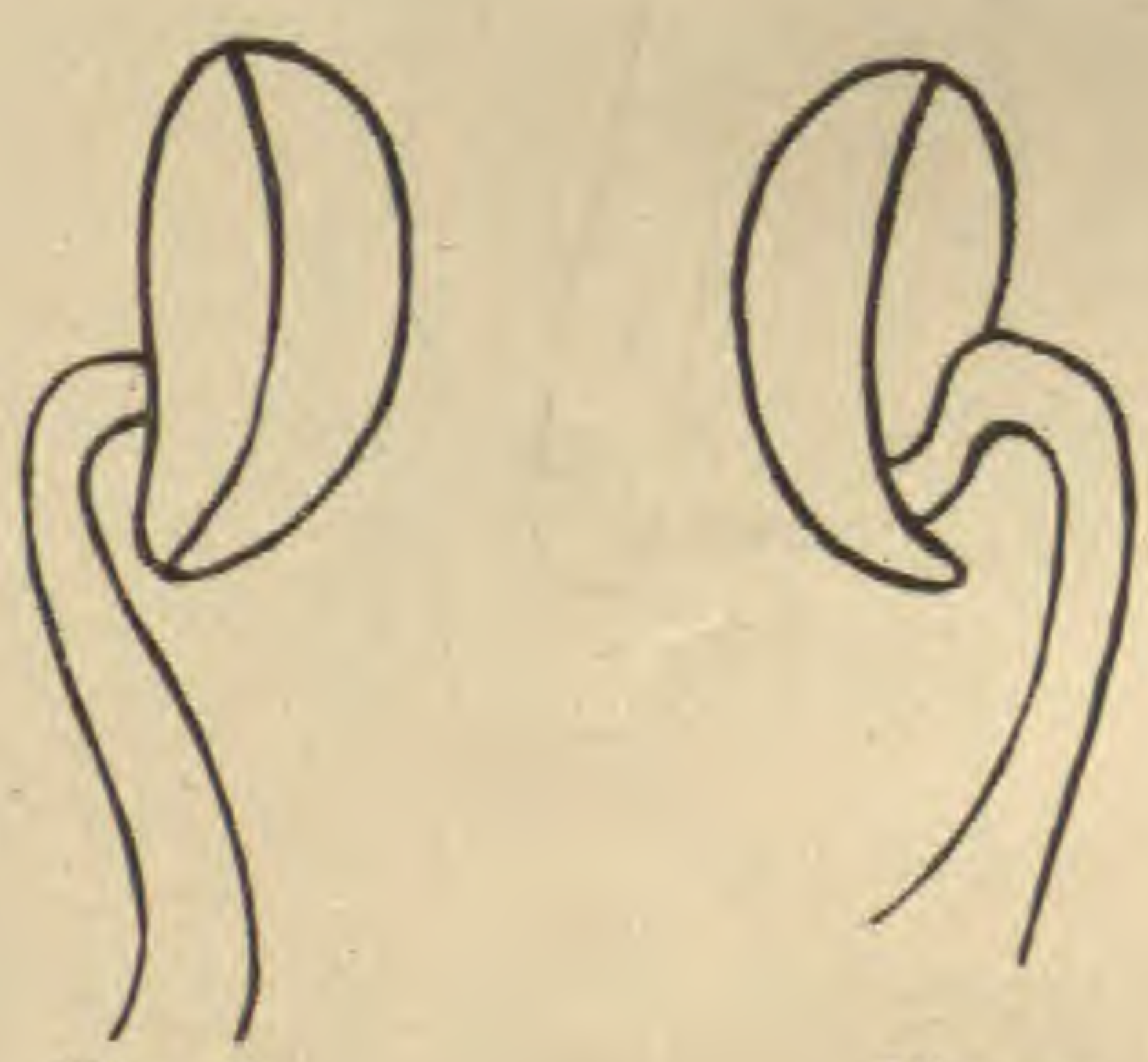

Fig. 8. Fig. 9.

The stamens of all the above genera agree in two important particulars: the filaments are attached quite near the apex of the anther, and the latter possesses backwardly projecting horns. Both these characters, as we have seen, are useful in overcoming the reversion of the anther. Now in *Gaultheria*, of which I have but a single bud to examine, and that an old one, we see the first step toward a condition in which both these characters are wanting, and where the anthers are never reverted. For in *Gaultheria* we have the "dorsal" awns, but the filament is not attached near the apex of the anther. (Fig. 5.)

In *Cassandra* (Fig. 6) the mechanism is still farther lost by the insertion of the filament near the lower end of the anther, and the almost straight direction of the stout horns, which thus become beaks. Here we are obliged to entertain the question as to the dorsal horns of *Arbutus* being the homologues of the terminal beaks of Vaccineæ (and *Cassandra*, etc.) which have become narrowed, recurved, and broken through at the base on the inner side to form the ventral pores.

As above stated, in neither of the two last genera was reversion clearly seen, and it was clearly excluded in all the others examined up to Pyrolineæ. But, in passing, one would call attention to the existence of beaks in the thecæ of *Andromeda Mariana*. Fig. 7 illustrates a stamen from a rather young bud. The beaks, here so distinct, become less so as the flower matures, by their close approximation and adherence below. In the other species of that section, they are, even in the young state, beakless as described.

We now come to consider a very different condition, best seen in *Pyrola*. Fig. 8 represents a stamen from a moderately developed bud of *P. rotundifolia*. Here we see the same folding of the filament (reversion) as in the first class of cases, the poriferous extremities of the thecæ pointing downward, but at the same time inward. In the last particular they differ from all the above genera, and point to the inversion which is clearly shown in Fig. 9. In this case, one theca has been torn away, so that the direction of the fibres of the filament can be plainly seen at their actual point of insertion, again turning upward to become continuous with the connective. If, with a needle, we attempt to strip off the filament in a downward direction at the point *a*, we succeed in getting a transverse fracture at that point; while the same experiment with an anther of *Arbutus* similarly prepared results in the splitting off of the filament to the extreme end

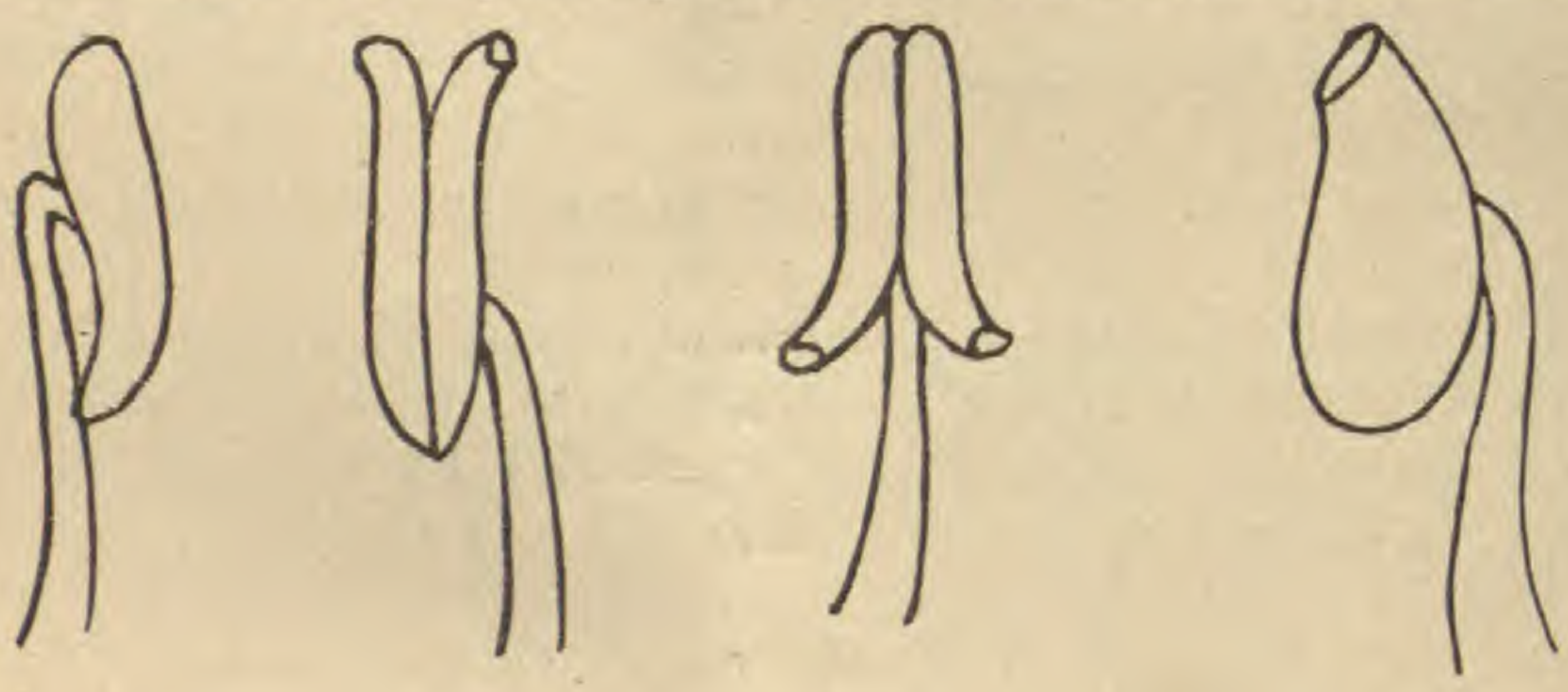

Fig. 10. Fig. 11. Fig. 12. Fig. 13.

of the connective. It is clearly, then, this folding of the filament, hidden between the thecæ, that produces the inversion proper, and proves the anther to be erect in the bud, and the pores to be basal; notwithstanding that in the mature flower they are uppermost. As to the direction of the pores, it is evident that, pointing inward in the bud, their normal position, they must point outward in the flower, when the inversion has become effective by the disappearance of the counterbalancing reversion.

This extrorseness of the pores is permanent in *Pyrola*, but not in *Clethra* or *Chimaphila*, and in that genus it is overcome, at least partially, by the unilateral depression of the anthers. But in *Clethra* (Fig. 10, stamen from bud, Fig. 11, from mature flower) the beaks are elongated, divergent and twisted, so that the pores face laterally or nearly so. In *Chimaphila* (Fig. 12, bud-stamen of *C. maculata*, Fig. 13, flower-stamen of the same), the pores are practically introrse The manner in which they have become so is not clear, for in my only bud I found them extrorse in their reverted condition, and it is not known to how early a period this relation could be traced.

Some one will probably find a study of the buds of *Rhododendron* very interesting during the coming season.

Fern Notes. VII.

By Geo. E. Davenport.

Cheilanthes lanuginosa, Nutt., var. FIBRILLOSA. (*C. fibrillosa*, Davenport, provisionally, in herbarium Mass. Hort. Soc'y).—I have now had in my possession for more than a year a strange *Cheilanthes* from California which has puzzled me greatly. Not being able to place it to my entire satisfaction, it was placed in the herbarium under the provisional name of *C. fibrillosa*, and held in reserve until the present time, when a careful re-examination leads me to refer it to *C. lanuginosa*, Nutt., as a variety. My principal object, however, in publishing it here is to call the attention of California botanists to it with the hope that it may lead to its re-discovery, and the collection of sufficient material to render its positive determination more certain.

It apparently comes between, and may ultimately unite, *C. lanuginosa* and *C. Parishii* (possibly *C. Szovitzii* as well), and the specimens indicate a plant of corresponding size. It lacks the characteristic scales of *Parishii*, and, while in every other way nearer to *lanuginosa* than to *Parishii*, differs from the former by its more rhizomataceous rootstocks, the presence of distinct fibrous hairs, or scales, intermixed with the tomentum, and a remarkable resemblance to *Notholæna Newberryi*, for which it might be mistaken, but for the strongly revolute margins of the segments.

A plant with so many characters not distinctly its own is not likely to be a welcome addition to this section of *Cheilanthes*, and may prove hereafter to be a source of much perplexity to botanists.

I give a partial description as an aid to those who may have opportunities to search for it:

Plant 3′ to 6′ (or more ?) tall; rootstock rhizomataceous, forming dense, entangled clumps of short rhizomes clothed with dark, or blackish-brown, linear-lanceolate scales that gradually pass into lighter brown, linear (more slender than in *lanuginosa*) scales mixed with coarse fibres and tomentum at the base of the stipites, the latter chestnut-brown, terete, 2′ to 3′ long, at first tomentose with fibrous scales and wool (similar to that on the roots), becoming smooth with age; laminæ of equal length with, or slightly longer than, the stipites, ·75′ to 1.5′ broad, tripinnate, loosely covered with deciduous tomentum, that along the rachises beneath persistent, tawny, and mixed with coarse fibres—whence the name *fibrillosa*.

Collected by the brothers Parish well down in one of the passes that open out on the south side of the San Jacinto Mts., in June 1882. Mr. Parish thinks that it had descended from a higher altitude, where it may be looked for.

Cheilanthes myriophylla, Desv., (*C. elegans*, Desv.; *C. villosa*, Davenport, provisionally, in herb. Mass. Hort. Soc'y only. Catal. Supplement).—I have received from Mr. Pringle's rich collection of 1884 an unusually fine series of forms of this species collected by him on limestone cliffs on the Santa Rita Mts. in Arizona.

The series shows great variation in characters that have frequently been made use of for specific purposes (such as the size and shape of the fronds or segments; the presence or absence, or character of the tomentum; or the color, size and character of the scales) the value of which I am now led to question more seriously than ever. Such characters, it seems to me, can only be taken in connection with others of a more reliable nature, and must occupy a secondary place in any description.

Some of Mr. Pringle's specimens run very close to *C. scariosa*, and I suspect fairly represent that species as reported from Mexico; others are inseparable from *C. elegans*, Desv., and others again from *myriophylla*. All of these differences are clearly due to the different conditions under which the different plants grew.

In reply to my inquiries in this direction, Mr. Pringle wrote:

"It (this species) is at home only in limestone ledges, in dryest situations where there is least soil 'short and rigid,' as you note, and in shaded places with more earth, or richer mould 'taller and more lax.' But it is all one species."

The series is identical with that previously collected in the Huachuca Mts. by Mr. and Mrs. Lemmon, which Prof. Eaton (correctly as I think) referred to *C. myriophylla*, with the exception that Mr. Pringle's plants vary more in the direction of *C. elegans*, Desv., and some of them are more densely squamose than any received from Lemmon.*

One can see from these collections that Dr. Hooker acted wisely in writing *C. elegans* and *C. myriophylla* under one name.

The plant given in the Supplement to my Catalogue, merely as a matter of record for the herbarium, under the provisional name of *C. villosa*, is probably only a form of this species, to which it must be referred.

Botrychium Virginianum, Swz., why *Botrychium Virginicum*?— I had supposed that the correct synonomy of the *Botrychia* had become so clearly established through the labors of Dr. Milde, as pointed out by Prof. Eaton and myself, that no further corrections would be necessary, but Mr. Gilbert's note in the BULLETIN for July 1884, seems to indicate otherwise.

The right, *per se*, of every one to choose whatever name best pleases him may be undeniable, but in practice the wisdom of exercising that right is at least questionable as not tending to that uniformity so desirable in botanical science.

If we are to pay any regard to the laws of botanical nomenclature, then *B. Virginicum* ought no longer to be tolerated as against *B.*

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* Prof. Lemmon tells me that Mr. Baker refers his Huachuca Mt. plant to *C. seariosa*, but while I am inclined to believe that the very scaly forms of both Lemmon's and Pringle's collections are the same as the plaut from Mexico, which has been referred to *C. scariosa*, although I have no specimen for comparison, I think a more careful investigation will be needed to show that they are identical with the Peruvian type of that species. Prof. Eaton thinks they are not, and until such time as I can make a satisfactory investigation for myself I should defer wholly to his judgment.

The large series of forms which I have received from Prof. Lemmon and Mr. Pringle, to both of whom I am under great obligations, has placed in my hands some long wished for material and I hope now shortly to finish my paper on the *Myriophylla-Fendleri* group of *Cheilanthes*.

Virginianum, which takes precedence by at least ten years earlier publication (O. Swartz, in Schrad. *Journ. Botan.* 1800–1801).

The species was collected in Arizona during the past year by Mr. Pringle along with *Ophioglossum nudicaule*, *Notholæna Aschenborniana*, *Pellæa cordata*, *Pellæa atropurpurea Notholæna nivea*, *Asplenium parvulum* and *monanthemum*, *Aspidium Filix-mas*, *Cheilanthes Pringlei*, and others.

Botrychium matricariæfolium, A. Br., why *Botrychium rutaceum*, Swz.?—The use of the name *B. rutaceum*, Swz. (Gilbert *l. c.*), as a synonym for this species is somewhat misleading. Dr. Milde has shown that Swartz was not acquainted with our plant, and that his *rutaceum* was only a form of *B. ternatum*, as verified in Swartz's own herbarium by Angström. There is therefore no propriety in writing *B. rutaceum*, Swz., for *B. matricariæfolium*, A. Br., at this late day, however much there might have been before the confusion into which the synonomy of the *Botrychia* was thrown by various writers was unravelled by Dr. Milde's masterly treatise.

I read Mr. Gilbert's note (*l. c.*) on the variation in the bud-forms in this species with much interest and pleasure.

I have myself previously recorded (see BULLETIN for September 1881) a single instance of variation in the bud-form of a mature specimen of this species, and of *B. simplex* also. Since that time I have examined a great many specimens without finding another instance, but have found the general character of the buds as heretofore described remarkably uniform and reliable. It should be remembered in connection with this that the full descriptions of the different buds in my vernation notes (BULLETIN, January 1878) were based upon mature vernation, and that sufficient qualification was made in the text for different stages of development. In reference to the present species, I therein stated that while the matured form of the bud is so distinct from that of every other species that one could not possibly mistake it for any other, yet, in its earlier stages of development, it at one time bears some resemblance to the matured bud of *B. simplex*, at another time to the matured bud of *B. Lunaria*, and only gradually assumes with its growth its distinctive character. It will be observed, however, that even in its youngest condition it is not only distinguished from the bud of *B. simplex* by the partially curved apex of the sterile portion, but by the significant development of the common stalk, that being by far the longest portion of the whole bud, whereas in *B. simplex* the common stalk is usually the shortest. To this, adding that, in the three smaller species, being given specimens of an equal and corresponding growth, the buds will be found to be distinct and characteristic.

These views I have as yet seen no reason to change, and it is to be expected from them that in this species, whenever from any cause plants fail to mature fully, some deviation from the fully described, matured venation is to be looked for, though not of sufficient character to prevent determination.

In cases, however, where there may be a doubt otherwise, an examination of the spores must be resorted to, as previously stated. (Vernation Notes, *l. c.*)

Woodsia Mexicana, Fée.—The *Woodsia* from Lower California mentioned in my Distribution Notes as likely to be *W. obtusa* proves to be this species instead.

Mr. Orcutt has now re-collected it and supplied me with sufficient material to render its positive determination reasonably certain.

My thanks are due to Mr. Orcutt for his kindness in this, and also for his efforts to procure for me other ferns, in which I trust he will yet meet with equal success.

Notes on the Flora of Yellowstone Park.

By Frank Tweedy.

There is probably not an area of equal size in the United States which has as varied topographical features as the region of the Yellowstone Park, with its elevated plateaux and lofty mountain ranges, cañons, rivers and cataracts. Here also is the great continental water-shed. The central portion is mainly a high, rolling, heavily timbered plateau varying from 7,500–8,500 feet above sea-level and bordered by mountain ranges on the west, north and east. It is to this interior region and to a few adjacent mountain summits that the following observations were limited. On travelling through the Park one is struck by the monotony of the forests as regards variety in species. The black pine (*Pinus contorta*, Dougl., var. *Murrayana*, Engelm.) is the prevailing tree at low altitudes, forming at least 90 per cent. of the forest area, mingled with a scanty growth of Douglas spruce (*Pseudotsuga Douglasii*, Engelm.) on sparsely wooded slopes. The latter are small and not to be compared with the noble tree of the Pacific coast. We were surprised at the general absence of the yellow pine (*Pinus ponderosa*, Dougl.), but probably the rainfall is too great for the healthy development of this species. Above 8,000 feet, and even lower, dependent upon situation as regards temperature and moisture, occur the spruce (*Picea Engelmanni*, Engelm.) and the fir (*Abies subalpina*, Engelm.). The latter, much resembling the eastern balsam fir in growth and habit, clothes the cold, wet mountain slopes up to the timber-line, which here is nearly 1,000 feet. The black pine is not entirely confined to the plateau region, but often ascends to the timber-line along the dryer ridges where it is frequently found with the western white pine (*Pinus flexilis*, James). A few red cedars are scattered over the sage-brush areas, and *Juniperus communis*, L., var. *alpina*, L., on alpine summits and more rarely around the geyser basins. A birch (*Betula occidentalis*) and the aspen (*Populus tremuloides*, Michx.) are mostly confined to moist bottoms along streams. Early in August we occupied a camp in a small opening, half bog, half meadow, on the eastern slope of the Gallatin Range. On either side were the fir-clad slopes of high mountain peaks. Scattered over the meadow were patches of low willows (*Salix Geyeriana*, Anders.) and birches (*Betula glandulosa*, Michx.) mingled with great quantities of *Potentilla fruticosa*, L., the most characteristic shrub of the mountain bogs. Blue gentians were massed in great profusion over the surface of the bog, *Gentiana serrata*, Gunner, everywhere, *G. Forwoodii*, Gray, and *G. amarella*, L., var. *acuta*, Hook., less common, yellow senecios (*S. lugens*, Rich., and *S. subnudus*, DC.) and white flowers of various species. *Zygadenus elegans*, Pursh., *Antennaria carpathica*, R. Br., *Trifolium longipes*, Nutt., *Polygonum viviparum*, L., *Parnassia fimbriata*, Banks, and *Habenaria hyperborea*, R. Br. *Pedicularis* was represented by several species, *P. Grœnlandica*, Retz, *P. bracteosa*, Benth., and *P. racemosa*, Dougl. *Valeriana edulis*, Nutt., is a characteristic bog plant of the region. Hidden by this luxuriant growth were the more modest *Slellariæ* (*S. borealis*, Big., *S. longipes*, Goldie, *S. umbellata*, Turcz., *S. crassifolia*, Ehrh.) and *Androsaces* (*A. filiformis*, Retz, *A. septentrionalis*, L.). One of the most striking plants was a large cream-colored *Wyethia* (*W. helianthoides*, Nutt.), the species upon which Nuttall founded the genus. Grasses there were in abundance, many of the most nutritious kinds: the native timothy (*Phleum alpinum*, L.), *Deyeuxia Langsdorfii*, Trin., the blue joint of the region, *Poa Nevadensis*, Vasey, var. *glauca*, V. & S., a characteristic meadow grass, several species of *Bromus* (*B. brevaristatus*, Hook., *B. ciliatus*, *B. Kalmii*, Gray), *Danthonia*, *Melica*, *Trisetum*, *Festuca*, *Glyceria*, etc., all of which our horses and mules seemed to appreciate highly in the odd moments they snatched from fighting the myriads of gnats and immense horse-flies during the day time and the equally numerous and more persistent mosquitos at morning and evening. On the ascent of Mount Holmes the following day, new beauties and varieties in the flora met our gaze on every hand. The little streams tumbling down the grassy slopes of the mountain side were bordered with flowers growing with weed-like luxuriance, waist deep, blue *Mertensiæ* (*M. Sibirica*, Don.), yellow *Aquilegiæ* (*A. flavescens*, Wats.), white and crimson geraniums (*G. Richardsonii*, F. & M., *G. incisum*, F. & M. , the showy *Mimulus Lewissii*, Pursh., and above all waved the wand-like stems of aconites and larkspurs (*Aconitum Fischeri* and *Delphinium scopulorum*, Gray). On the borders of the scattered groves of fir were banks of melting snow, and over the cold wet ground around them were growing several pretty little alpine plants. Two clovers (*Trifolium Parryi*, Gray, and *T. Kingii*, Wats.), a dwarf *Ranunculus* with large, golden-yellow flowers (*R. affinis*, R. Br.), a prostrate *Mertensia* (*M. alpina*, Don.) and a delicate little aster very appropriately bearing the name of *Aster pulchellus*, Eaton.

A steep ascent of several hundred feet brought us upon an elevated plateau where a scene of great beauty burst upon our view. Spread out before us was a magnificent natural flower-garden, vivid scarlet and crimson *Castilleiæ* vied with purple lupines and carpet-like masses of snow-white phlox (*P. Douglasii*, Hook.) mingled with golden-yellow and orange flowers of every shade, *Helianthella Douglasii*, T. & G., *Ivesia Gordoni*, T. & G., *Sedum stenopetalum*, Pursh., arnicas and *Aplopappi*. A large-flowered *Townsendia* (*T. Parryi*, Eaton) was a conspicuous feature of the flora. Besides these there were *Clematis Douglasii*, Hook., the pretty *Cerastium arvense*, L., and erigerons and asters of several species. On reaching the bare summit of the mountain at an altitude of 10,000 feet, we stood for some moments gazing upon the panorama of the Park spread out before us. To the southward extended a rolling sea of dark green forest, broken here and there by the white surfaces of the geyser basins, from which at intervals clouds of steam would shoot upwards, telling us of some geyser in eruption. Over the plateau below us were several elk leisurely making their way, and on a peak near by we watched a band of Rocky Mountain sheep travelling along what seemed to us to be the face of an almost perpendicular precipice. The bleak wind which swept the summit that we occupied hardly seemed favorable to plant-life other than the hardy lichens and mosses, and yet its flora proved to be quite extensive and varied, as the following species, collected over an area of a few square rods, will show: *Douglasia montana*, Gray., *Salix reticulata*, L., *Draba crassifolia*, Graham, *D. alpina*, L., *Smelowskia calycina*, *Myosotis sylvatica*, Hoffm., var. *alpestris*, Koch., *Eritrichium nanum*, Schroder, var. *aretioides*, Herder., *Arenaria stricta*, Wats , *Silene acaulis*, L., *Saxifraga oppositifolia*, L., *Oxytropis Lamberti*, Pursh., *Astragalus tegetarius*, Wats., var. *implexus*, Canby., *Dryas octopetala*, L., *Sibbaldia procumbens*, L., *Antennaria alpina*, Gaertn., *Artemisia scopulorum*, Gray., *Erigeron uniflorus*, L., *E. radicatus*, Hook.

In the treacherous hot spring bogs throughout the Park one will meet with a peculiar flora containing many species which are more or less familiar sea-coast plants, such as *Ranunculus Cymbalaria*, Pursh., *Potentilla Anserina*, L., *Rumex maritimus*, L., *Potamogeton pectinatus* (L.?) *Ruppia maritima*, L., and *Triglochin maritimum*, L.

There is a characteristic plant of the region, *Cnicus Drummondii*, Gray, which has a little romance connected with it in spite of its unpreposessing appearance. In 1870 one of a band of explorers in the then unknown region which is now the Yellowstone Park became separated from his companions and wandered alone for thirty-seven days through the dense forests and over the mountains, and was only saved from starvation by the nourishment derived from the roots of this thistle.

Contributions toward a List of the State and Local Floras of the United States.

The Indian Territory.

Catalogue of Plants collected in the Exploration, by Capt. R. B. Marcy, of the Red River. By John Torrey. (C.)
Washington, 1853. Appendix G.

List of some of the most interesting Plants collected in the Indian Territory. By G. D. Butler. (B.)
In Bot. Gazette iii., 1878, Logansport, Ind.

Catalogues of Transcontinental Expeditions.

Descriptions of new Species and Genera of Plants in the Natural Order Compositæ, collected in a tour across the Continent to the Pacific, a Residence in Oregon, and a visit to the Sandwich Islands and Upper California during the years 1834 and 1835. By Thomas Nuttall. (D.)
In Trans. Amer. Philos. Soc. vii. (new series) 282.

List of Plants collected on a Military Reconnoissance from Fort Leavenworth, Mo., to San Diego, Cal. By John Torrey, M. D. (C.)

In Emory's Report of Reconnoissance, p. 136. Washington, 1848.

Botany of the United States and Mexican Boundary Survey. By John Torrey, the Cactaceæ by Geo. Engelmann. (C.)

Rep. U. S. and Mex. Bound. Survey, Vol. ii. Washington, 1859.

Botany of the United States Exploration of the Fortieth Parallel. (King's Reports.) By Sereno Watson, D. C. Eaton and others. (C.)

In Rep. of Exploration, Vol. v., 4to. Washington, 1871.

List of Plants collected by the North Pacific R. R. Expedition of 1873 under Gen. D. S. Stanley. By J. A. Allen. (B.)

In Proc. Bost. Soc. Nat. Hist. xvii., 1875.

THE UPPER MISSOURI REGION.

Catalogue of Plants collected in Long's Second Expedition. By L. D. DeSchweinttz.

In Keating's Rep. of Expedition. Washington, 1825.

The Sylva of Montana. By J. G. Cooper, M.D.

In Amer. Nat., iii., 405. (A.)

Catalogue of Plants collected during the Expedition of F. V. Hayden to the Headwaters of the Yellowstone River in the Summer of 1871, with a small number gathered by Dr. George Smith in August, 1871, on Gray's Peak and near Georgetown, Colo. By T. C. Porter. (The Mosses by L. Lesquereux and Lichens by E. Tuckerman.) (C.)

In U. S. Geol. and Geog. Surv. Montana and adjacent Terr., p. 477. Washington, 1871.

Catalogue of Phænogamous and Vascular Cryptogamous Plants collected during the summers of 1873 and 1874 in Dakota and Montana by Dr. Elliott Coues; with which are incorporated those collected in the same region at the same times by Mr. G. M. Dawson. By J. W. Chickering. (B.)

In Bull. U. S. Geol. and Geog. Surv., 1878, Vol. iv., No. 4. Washington.

Botany of the Black Hills of Dakota. By Asa Gray. (C.)

In Rep. on Geol. and Resources of the Black Hills by Henry Newton and W. P. Jenney. Washington, 1880, p. 531.

THE ROCKY MOUNTAIN REGION.

Catalogue of Plants collected during a journey to and from the Rocky Mountains during the summer of 1820. By E. P. James. (B.)

In Trans. Amer. Phil. Soc., Phila., Vol. ii., (new series) 1825. (Includes many species from the plains, and east of the Mississippi.)

Some account of a Collection of Plants made during a journey to and from the Rocky Mountains in the summer of 1820, by Edwin P. James, M.D. By John Torrey. (C.)

In Ann. Lyc. Nat. Hist., ii., 161, 1828.

Catalogue of a Collection of Plants made chiefly in the valleys of the Rocky Mts. or Northern Andes toward the sources of the Columbia River by Nathaniel B. Wyeth. By T. Nuttall. (C.)

In Journ. Phila. Acad. Sci., vii., 1834.

Catalogue of Plants collected in Wyoming and Colorado by Dr. F. V. Hayden and Mr. B. H. Smith, 1868, 1869, 1870. By T. C. Porter. (C.)

In U. S. Geol. Sur. Wyoming and contiguous Territory, 1870, p. 472. Washington, 1872.

A List of Plants collected by C. Thomas in Eastern Colorado and N. E. New Mexico during the Survey of 1866. By C. C. Parry, M.D. (A.)

In U. S. Geol. Surv. Wyoming and contiguous Territory, 1870, p. 484. Washington, 1872.

Enumeration of the Species of Plants collected by Dr. C. C. Parry and Messrs. E. Hall and J. P. Harbour, during the summer and autumn of 1862 on and near the Rocky Mts. in Colorado Terr., latitude 39° to 41°. By Asa Gray. (C.)

In Proc. Acad. Nat. Sci. Phila., 1863, p 55.

Synopsis of the Flora of Colorado. By T. C. Porter and J. M. Coulter. (C.)

U. S. Geol. and Geog. Surv. Terr., Misc. Public., No. 4, 8vo. pamphlet. Washington, 1874.

The Flora of Southwestern Colorado. By T. S. Brandegee. (B.)

In Bull. U. S. Geol. and Geog. Surv. Terr., Vol. ii., No. 3, p. 227. Washington.

List of Colorado Musci and Hepaticæ, collected by T. L. Brandegee in 1873–75. By E. A. Rau with the assistance of C. F. Austin and T. P. James. (A.)

In Bull. Torr. Bot. Club., vi., 89, May, 1876.

Colorado Plants. By I. C. Martindale. (B.)

In Amer. Nat. xiii., 675. November, 1879.

Grasses of the Plains and Eastern Slope of the Rocky Mountains. (B.) Author not given.

In Dept. Agric. Rept., Washington, 1870, p. 217.

A catalogue of Plants collected in 1872 in portions of Montana, Idaho, Wyoming and Utah. By J. M. Coulter. (C.)

In 6th Ann. Rep. U. S. Geol. Surv. Terr. (Hayden) p. 747. Washington, 1873.

THE GREAT BASIN REGION.

Catalogue and Description of Plants collected on Stansbury's Expedition to the Great Salt Lake. By John Torrey, M.D., (D.)

In Expl. and Surv. Valley of the Great Salt Lake of Utah by Howard Stansbury, p. 383. Philadelphia, 1852.

Catalogue of Plants collected on an Expedition down the Zuni and Colorado Rivers by Capt. L. Sitgreaves. By John Torrey, M.D. (C.)

In Report of Expedition, p. 155. Washington, 1854.

W. R. G.
N. L. B.

Spiked form of Cypripedium insigne.—This orchid from Nepal, common in cultivation, has usually but a solitary flower on a single scape as in our *C. acaule.* A correspondent sends me one with two flowers. It is evident that the flower is solitary only because of the suppression of the terminal bud in an inflorescence intended to be spicate. Here that bud has overcome retardation and another internode with a flower has been formed. At this second node another bud has been developed, and from the number of small scales on this bud, it is evident that, under still more favorable conditions, a spike of several flowers might result. It would be worth while to look for similar manifestations in *Cypripedium acaule.* It would further be interesting to attempt to expose the law by which suppression is accomplished in these one-flowered species.

THOMAS MEEHAN.

Mimicry in a Fungus.—We are indebted to the courtesy of the *Scientific American* for the accompanying cut, which illustrates a curious form of *Polyporus lucidus*, Fr., a fungus that not unfre-

quently assumes odd shapes. "Its likeness to a profile view of the Duke of Wellington is striking. It was found growing from the side of a partially decayed hemlock log, with the face side up, which now has the seamed and wrinkled appearance shown in the illustration of the face of the Iron Duke in his later years. The shrunken mouth and lips and the prominent nose are all plainly indicated."

Humulus.—In all botanical works that give the etymons of generic names it is either asserted or suggested that *Humulus* is a derivative from *humus*, 'moist earth,' the allusion being to the plant's growth in rich soil. Were this the case *Humulus* would mean 'little moist earth,' a nonsensical name to apply to a plant.

Du Cange, in his Glossarium mediæ et infimæ Latinitatis gives the forms *humlo*, *humulo*, *humelo*, *humolo*, *humulus*, and, under one of them, says, "ex Gall. *houblon*, quod a Latino *lupulum* formatum, elisa litera *l*."! This, although pretty bad etymologizing, was good enough for the period at which it was put forth, and is of value as showing that Du Cange considered these low Latin words as borrowed from a living language, as is indeed the case. They are probably, as Skeat (Etymol. Dict.) states, of Teutonic origin (O. Du. *hommell*, O. Norse *humall*, Swed., Dan. and Norweg. *humle*), although similar names for the hop are to be found in the Slavonic dialects, and in Finnic and Tartaric. Other Teutonic names for the hop are: O. H. Ger. *hopfo*, M. H. Ger. *hopfe*, *hoppe*, Ger. *hopfen*, Flem. *hoppe* (whence O. Eng. *hoppe*, Eng. *hop)*, Du. *hop*. Skeat would connect these two forms, and derive the latter from the Aryan root *kap*, 'to undulate,' 'bend,' in allusion to the twining nature of the plant, and the former from this same root nasalized—*kamp*.*

W. R. G.

Botanical Notes.

The Coloration of Autumn Leaves.—Mr. H. C. Sorby, who has for several years been studying the subject of the coloration of autumn leaves, gives (in *Nature*) the following conclusions in regard to it.

As a general rule the color of leaves in their normal condition depends on a variable mixture of two perfectly distinct green pigments and of at least four perfectly distinct yellow substances. The development of the autumnal tints is mainly due to the disappearance or change of the green constituents and to the production of highly-colored pigments by the oxidization of previously existing very pale or colorless substances. It is, in fact, due to a more or less complete loss of the vitality which previously counteracted these chemical changes, and the order in which the tints are developed can be easily explained, if we assume that the death of the leaves takes place somewhat gradually. The first visible effect of the reduced vitality is the change in the green pigments. In many cases they appear to be converted into colorless products, since the resulting bright yellow leaves differ from the normal green in the absence of chlorophyll, and merely contain the usual previously existing yellow pigments. At the same time it is quite possible that an increased quantity of some of these yellow substances may be formed as a product during the change, but of this there is no positive proof. In the case of such trees as the alder, the chlorophyll does not thus dirappear, but is changed by the presence of a weak acid into a very stable brownish-green product which resists further change. The production of bright yellows or dull browns thus clearly depends on whether the chlorophyll does or does not disappear before being modified by the action of acids, as may be verified experimentally by exposing suitable

* It is well to note here, however, that Nemnich (Allgemeines Polyglotten Lexicon der Natur-geschichte) gives *hymel* as the Persian name of the plant.

solutions to sunlight. It is, however, very clear that the manner in which it changes depends very much on the conditions of the case. Thus, if chlorophyll is exposed to sunlight dissolved in bisulphide of carbon, a reddish-colored product is formed, and, though this differs very greatly from the red pigment met with in many autumnal leaves, it seems probable that under some conditions the chlorophyll in leaves is changed by the action of light into a red substance. By taking green sorrel leaves and keeping them somewhat fresh by sticking the stalks into moist ground, I found that those exposed to the sun with the under side upwards turned to a bright red, whereas those kept in the shade did not develop any fine coloring. We may often see that partially broken leaves or twigs undergo this change when all other parts of the tree remain green, and this and various other facts lead me to conclude that the change of chlorophyll into a red product depends on a certain amount of reduced vitality as well as on little-understood conditions varying in different kinds of plants. Though I fully admit that there are some facts not easy to understand, yet on the whole it seems to me that these principles fairly well explain why certain leaves turn red in autumn. Slight frosts reduce their vitality in such a manner that the chlorophyll is changed by the action of the light into a red product. Thus, according to the character of the season and the nature of the plants, the first effect of the reduced vitality in the leaves is that the chlorophyll is removed so as to show their normal yellow color, or is changed into a red pigment, or is altered into a comparitively stable dull brown-green product. These are the three extreme changes, but in many cases intermediate mixed results give rise to such less perfect and well-marked tints as dirty yellows and reds.

The next series of changes is best studied in the case of those leaves which in the first instance turn to a bright yellow, and it appears to me that they depend mainly, if not entirely, on the production of deeply-colored pigments by the oxidization of tannic acid and other more or less colorless substances. The difference in the resulting tint seems to depend on the nature these substances. Thus, for exemple, the tannic acid in the yellow oak leaves changes into a brown substance, whereas the quinotannic acid in yellow beech leaves changes into the fine orange-brown color which makes those trees so ornamental in autumn. On the contrary, the bright yellow poplar leaves rapidly pass to a dark dirty brown by the alteration of another constituent. Other kinds of leaves give rise to tints of an intermediate and less well marked character. In many cases it is almost impossible to draw the line between the color of this stage in the change and the final dark and dirty browns of dead and decaying leaves. For fine effect very much depends upon the production of each special tint in a fairly pure state, so as to show bright yellows, reds and browns. This seems to be influenced by the character of the weather. It is also, of course, important that the half dead leaves should hang long on the trees, so as to develop their full coloring before being blown off by the wind.

Taking thus all the facts into consideration, it appears clear that all the bright and beautiful tints of autumn are merely the earliest stages of decomposition, and are due to the more or less considerable triumph of chemical forces over the weakened or destroyed vitality of the living plant. One cannot but feel that this is a very unpoetical way in which to regard the magnificent tints of a fine autumnal landscape, but it is no less true than that the colored clouds of evening mark the departing day.

Botanical Literature.

Memorial of George Bentham. By Asa Gray. (Reprinted from the *American Journal of Science*, xxix.)

Flora of Southern and Lower California. A Check-list of the Flowering Plants and Ferns. By Chas. R. Orcutt. 8vo., pamph., pp. 13. San Diego, Cal., 1885.

Marine Algæ of San Diego, Cal. By Daniel Cleveland.

Memorial of George Bentham. By Asa Gray. (Reprinted from the *American Journal of Science*, xxix.)

Proceedings of the Torrey Club.—The regular meeting of the Club was held at Columbia College, Tuesday evening, January 13th, 1885. In the absence of the presiding officers, Dr. Britton occupied the chair..

This being the Annual Meeting, officers for the ensuing year were balloted for with the following result: President, J. S. Newberry; Vice President, Addison Brown; Treasurer, W. H. Rudkin; Recording Secretary, Arthur Hollick; Corresponding Secretary, Miss Maria O. Steele; Editor, W. R. Gerard; Associate Editor, Benj. Braman; Curator, Miss E. G. Knight; Librarian N. L. Britton.

Miss Knight announced that she had recently detected *Azolla Caroliniana* growing luxuriantly in the water-lily tanks of a greenhouse on Staten Island.

Dr. Britton exhibited specimens of *Dioclea Boykinii* lately collected in Arkansas by Prof. F. L. Harvey, and also a new species of *Cyperus* (described in the January BULLETIN) from S. Arizona.

Mr. Schrenk read a paper upon the structure of *Limnanthemum lacunosum*, (see page 13.)

At the regular meeting of the Club, Tuesday evening, Feb. 10th, the chair was occupied by Dr. Britton in the absence of the presiding officers, and sixteen persons were present.

The chairman gave a brief account of the difference between *Stellaria longifolia* and *S. graminea.* The latter has often been mistaken for a variety of the former and appears to be spreading. Specimens were shown from localities on Long Island, Staten Island and the Newark Mountains.

Mr. Schrenk remarked upon the presence of peculiar hairs in the intercellular canals of *Brasenia peltata*, and which are quite different from those found in *Nymphæa* and other aquatic plants.

Two persons were elected active members.


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BULLETIN

OF THE

TORREY BOTANICAL CLUB.

Vol. XII.] New York, April, 1885. [No. 4.

New Species of Fungi.

By Chas. H. Peck.

(Plate XLIX.)

Boletus sphærosporus. (Figs. 1 and 2).—Pileus glabrous, viscid, reddish brown or chestnut-colored, 3 to 4 inches broad; tubes large, angular, adnate or slightly decurrent; stem short, about 1.5 in. long, bearing near the base a thick, well-developed, volva-like annulus; spores globose or broadly elliptical, generally uninucleate; .0003 to .00035 in. long.

Wisconsin. Prof. W. Trelease.

The specific characters here given are derived from a single dried specimen of the fungus. Prof. Trelease informs me that one of the students of the University collected two specimens of the plant, but no notes concerning it were preserved. Consequently its colors and some of its characters in the fresh state cannot now be accurately given. Ordinarily I should not feel justified in attempting to describe a species under such circumstances and from so scanty material, but this species is evidently so remarkable and so distinct in two of its characters that it seems worthy of some notice. The first and most notable character is found at the base of the stem. I have called it a volva-like annulus. It appears in the dried specimen very much as if it were a real volva, whose ruptured, spreading margin forms a cup-like annulus. Still, it may be only a thick peronate or sheathing veil, and as such I prefer to consider it, though it is unlike that of any other species of *Boletus* known to me. The other noticeable character is found in the spores. These are almost globular, while in other *Boleti* they are generally fusiform or oblong-fusiform. Such a departure from the usual form is the chief distinguishing character of the genus *Strobilomyces*, Berk., and it is also given as the most available means of distinguishing *Paxillus porosus* from species of *Boleti*. Fries did not consider such a variation in the spore-character a sufficient ground for the removal of a species from the genus *Boletus*, but, when combined with such an annulus as we have in this species, the two together seem to be of greater importance and may yet render the formation of another genus desirable. It is to be hoped that the young plant may be observed and the real nature of our supposed veil or annulus be ascertained. Should it prove to be a volva it would indicate a most interesting parallelism between the genera *Boletus* and *Agaricus*.

Septoria astragalicola.—Spots indefinite or obsolete; perithecia hypophyllous, lenticular, .005 to .007 in. broad, black; spores subcylindrical, straight or but slightly curved, obtuse, .0016 to .0025 in. long, .0002 to .00025 broad, sometimes plurinucleate, oozing out and forming whitish or faintly pinkish masses or tendrils.

On living or languishing leaves of *Astragalus.* Arizona. August. M. E. Jones.

The affected leaves turn yellowish. The spores are generally cylindrical, but sometimes they are slightly narrowed toward one end, and occasionally one appears to be obscurely septate in the inside. The species is distinct from *S. Astragali* both in the situation of the perithecia and in the character of the spots.

PUCCINIA TUMIDIPES. (Figs. 3 to 8.)—I. Not seen.

II. Sori small, amphigenous, surrounded by the ruptured epidermis, reddish brown or rubiginous ; stylospores ovate elliptical or oblong-ovate, rough at one end, .0014 to .0016 in. long, .001 to .0011 broad.

III. Spots none ; sori amphigenous, unequal, obliterating the remains of the ruptured epidermis, black ; teleutospores elliptical or oblong elliptical, not at all or but slightly constricted at the septum, .002 to .0025 in. long, .0011 to .0014 broad, supported on an inflated hyaline pedicel, which is generally a little longer and broader than the spore itself.

On living leaves of *Lycium Andersonii.* Arizona. September. M. E. Jones.

The two kinds of sori sometimes occur on separate leaves; sometimes they are intermingled on the same leaf and the stylospores and teleutospores are occasionally intermingled in the same sorus. The species is remarkable for the enlarged, membranous, hyaline pedicels. When the spores and their pedicels are moistened they fall over, the one upon the other, and lie side by side, thus appearing to possess a sort of hygrometric character.

PUCCINIA GLOBOSIPES. (Figs. 9 to 10).—Spots none ; sori small, rotund, prominent, black ; teleutospores broadly elliptical, rough, not constricted, opaque, .002 to .0027 in. long, .0016 to .002 broad ; pedicel subglobose, inflated, hyaline, equal to or a little smaller than the spore itself.

On leaves of *Lycium Californicum.* California. M. E. Jones.

This species, by its inflated vesicle-like pedicel, is related to the preceding one, but is clearly distinct from it by its broader, rough or verrucose spores and their more globose pedicels. I have not seen the æcidial and uredo forms, and the sori of the teleutospores are very scarce in the specimens sent. *P. Lycii*, K., whose host-plant is *Lycium tubulosum*, has much smaller spores, and the description does not indicate that they possess an inflated pedicel.

PUCCINIA BRICKELLIÆ.—I. Not seen.

II. Spots none ; sori clustered, often concentrically arranged, at first covered by the epidermis, then surrounded by its ruptured remains, reddish brown ; stylospores subglobose, broadly ovate or oblong-ovate, generally uninucleate, .0012 to .0016 in. long, .0009 to .001 broad.

III. Sori as in the uredo-form ; teleutospores intermingled with the stylospores, elliptical or oblong-elliptical, not at all or but slightly constricted at the septum, .002 to .0025 in. long, .0014 to .0016 broad ; pedicels equalling or exceeding the spores in length.

On living leaves of *Brickellia*. Arizona. September. M. E. Jones.

PUCCINIA PENTSTEMONIS.—Spots none ; sori amphigenous, unequal in size, prominent, black ; teleutospores elliptical or oblong-elliptical, .0012 to .002 in long, .0008 to .0011 broad ; pedicel hyaline, generally much longer than the spore.

Living leaves of *Pentstemon linarioides*. Arizona. September. M. E. Jones.

Æcidial and uredo-forms not present. Whether *Æcidium Pentstemonis*, Schw., belongs to this *Puccinia* is uncertain.

PUCCINIA MALVASTRI.—Spots obliterated ; sori clustered, confluent, amphigenous, dark reddish brown, compact, prominent ; spores oblong-elliptical, scarcely constricted, even, obtuse or rarely obtusely pointed, .0019 to .0025 in. long, .0009 to .0012 broad ; the pedicel longer than the spore, generally two to four times its length, hyaline.

On living leaves of *Malvastrum*. Arizona. September, M. E. Jones.

This differs from *P. Malvacearum*, of which I was at first inclined to believe it a variety, in its different habit, darker colored sori, comparatively broader spores and generally longer pedicels.

PUCCINIA VIGUIERÆ.—Sori numerous, prominent, amphigenous, blackish brown; spores oval or broadly elliptical, obtuse, slightly constricted at the septum, .0016 to .002 in. long, .0011 to .0012 broad, with a hyaline pedicel longer than the spore.

Leaves of *Viguiera*. New Mexico. April. M. E. Jones.

The species is closely related to *P. Helianthi*, Schw., and *P. variolans*, Hark., from both of which it is distinguished by its broader spores.

UROMYCES SOPHORÆ.—Sori numerous, small, amphigenous, reddish brown; spores subelliptical, nearly even, .0011 to .0014 in. long, .00065 to .0008 broad, the epispore thickened at the apex, the pedicel shorter than the spore.

Living leaves of *Sophora sericea*. New Mexico. October. M. E. Jones.

The sori are thickly scattered over both surfaces of the leaves. The species is closely related to *U. apiculatus*.

USTILAGO ARISTIDÆ.—Spores small, .0003 to .00035 in. in diameter, subglobose, more or less angular, even, black, occupying the whole interior of the seed.

Spikelets of *Aristida*. El Paso, Texas. September. M. E. Jones.

Every seed in the panicles sent me is affected by the fungus. The seeds do not appear to be much enlarged, but the whole interior is transformed to a dusty mass of spores enclosed by the thin external shell or membrane. The species is apparently related to the South American *U. Lorentziana*, Thum., and the African *U. Penniseti*, Rabh., but is easily distinguished from both of these by its more angular spores.

UREDO JONESII.—Sori hypophyllous, numerous, orbicular, compact, bright orange, surrounded by the ruptured epidermis; spores subglobose, rough, .0009 to .00011 in. broad, orange yellow fading to whitish.

Living leaves of *Ribes*. New Mexico. October. M. E. Jones.

The sori occupy the whole lower surface of the leaf and by their bright color give it a beautiful appearance.

EXPLANATION OF PLATE, XLIX.—*Boletus sphærosporus*, Peck. Fig. 1. Lateral view of a plant. Fig. 2. Six spores x 400. *Puccinia tumidipes*, Peck. Fig. 3. A leaf bearing five sori of the uredo-form. Fig. 4. A leaf bearing sori of the teleutospores. Fig. 5. Three uredo-spores x 400. Fig. 6. Two teleutospores in erect position x 400. Fig. 7. A teleutospore recumbent on its pedicel, the apex directed downward, x 400. Fig. 8. A teleutospore in similar position, but the apex directed upward x 400. *Puccinia globosipes*, Peck. Fig. 9. A leaf bearing two sori. Fig. 10. Three teleutospores x 400.

Contributions toward a List of the State and Local Floras of the United States.*

Catalogue of Plants collected during the Exploration of the Colorado River of the West by Lieut. J. C. Ives in 1857–58. By Drs. Gray, Torrey, Thurber and Engelmann. (C.)

In Report of Expedition, part iv. Washington, 1861.

Description of the Species constituting the Botany of the Basin of the Great Salt Lake of Utah, as far as it is known. By E. Durand. (C.)

In Trans. Amer. Philos. Soc. Vol. xi., n. ser., 1860.

A Catalogue of Plants collected in 1872 in Utah, Wyoming, etc. By J. M. Coulter. (B.)

In U. S. Geol. Surv. Montana, Idaho, Wyoming and Utah, 1872, p. 758. Washington, 1873.

Botanical Observations in Western Wyoming. By C. C. Parry, M.D. In Amer. Nat. viii., pp. 9, 102, 175, 211. (B.)

Botanical Observations in Southern Utah. By C. C. Parry, M.D. In Amer. Nat. ix., pp. 14, 139, 199, 267, 346. (B.)

Catalogue of Plants collected in Nevada, Utah, Colorado, New Mexico and Arizona with Descriptions of those not contained in Gray's Manual of the Northern United States and Vol. v., Geol. Expl. of the 40th Parallel. By J. T. Rothrock and others. (C.)

In U. S. Geol. Surv. West of 100th Meridian, Vol. vi. 4to. Washington, 1878.

Catalogue of Plants collected in the years 1871, 1872 and 1873 with Descriptions of New Species. (Nevada, Utah, Arizona.) By S. Watson and J. T. Rothrock. (C.)

In U. S. Geog. and Geol. Expl. and Surv. West of the 100th Meridian, 8vo., pamphlet, Washington, 1874.

Plants collected during Capt. J. H. Simpson's Explorations across the Great Basin of the Territory of Utah. By George Engelmann. (C.)

In Rep. of Explorations, Appendix M. Washington, 1876.

W. R. G.
N. L. B.

*Continued from page 28.

Reliquiæ Rafinesquianæ.—It may be of interest to put on record, as an appendix to Dr. Gray's exhaustive account of Rafinesque and his writings,* the fact that there exists in the library of the New York Academy of Science, bound up in a volume of "Botanical Tracts" (Vol. C), a collection of 29 copper-plate engravings illustrating Rafinesque's "Select New Plants of North America." On the lower margin of the first plate is written in ink: "The following plates are the proofs of plates lost in my shipwreck of 1815," and on the reverse of the same plate is written in the same hand: "Collection of 29 Plates and 46 Figures of New Genera and Species of Plants, from North America, discovered by C. S. Ráfinesque in 1802–4. Published in 1807, 1808 and 1814. These Plates never published—only Proofs of Plates lost 1815, thus they are a unique collection. Deposited in the Lyceum at the foundation in 1817, by the author. N. B. The Phyllepidium alone was published in the Encycl. Journal of Sicily."

I give the inscription *verbatim et literatim.* The plates are of two different sizes, and illustrate new genera and species of both flowering-plants and fungi. The figures of phænogamous plants, although not very artistic, were probably copied from nature, and are as follows (the names in parenthesis being the author's corrections and notes in ink): *Burshia* (*Purshia*) *humilis*, *Gerardia maritima*, *Drosera filiformis*, *Diphryllum bifolium*, *Carpanthus axillaris*, *Asclepias lutea*, *Viburnum villosum*, *Arenaria imbricata* (Raf. 1802. *A. squarrosa*, Michx., 1803), *Ranunculus obtusiusculus*, *Phyllepidium squarrosum*, *Ludwigia hirtella*, *Arethusa medeoloides* (*Odonectis verticillata*), *Isotria verticillata*, *Chironia amœna* (*Sabbatia stellaris*, Pursh.). The fungi represented are as follows: *Volvaria coccinea* (*Volvycium coccineum*), *Hydnum barbatum*, *H. cerulescens*, *H. citrinum*, *H. dilatatum*, *Clavaria citrina-fusca*, *C. bicolor*, *C. dryophylla*, *C. tricolor*, *Acinophora aurantiaca*, *Phorima betutina*, *Druparia volvacea*, *Peziza albo-rufa*, *P. globulosa*, *P. lupularia*, *P. smiraldina*, *P. pulcherrima*, *P. depressa*, *P. ochro-chlora*, *Cerophora clavata*, *C. globularis*, *C. capitata*, *C. dichotoma*, *C. ramosa*, *C. pyriformis*, *Astrycum multifidum*, *A. dimidiatum*, *Dicarphus rubens*, *Ædycia alba*, *Colonnaria urceolata*, and *C. truncata*. Most of these figures of fungi seem to have been drawn from memory—possibly from imagination, and all are quite rudely executed. Those relating to known genera bear only a remote resemblance to the objects that they were designed to illustrate, and not one could possibly be of aid in the determination of a species. In the March, 1880, number of the BULLETIN I suggested that, from Rafinesque's brief diagnosis, his genus *Ædycia* may have been what is now known as *Corynites*, and that his *Colonnaria* was probably the same thing as the at present recognized genus *Laternea*—his two species being merely accidental varieties of what Bosc before him had named *Clathrus* (*Laternea*) *columnatus*. A reference to the plate, however, in which is figured an improbable fungus under the name of *Ædycia alba*, at once dispels any illusion that we might possess as to the identity of the latter with *Corynites*. The object looks not unlike a

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swollen root of some tree or shrub which has been sawed off at one end and broken off (so as to be ragged and fibrous) at the other. As for the figures of *Colonnaria*, they bear a general resemblance to *Laternea columnata*, in that they have a receptacle composed of four branches united at the top and base; but here the analogy ends, for *C. truncata* is surmounted by a perfectly square, sharp-cornered, open box, full as wide as the lower extremity of the fungus, and the edge of which is decorated with what looks like a cylindrical molding. The other species, *C. urceolata*, has somewhat the same habit, but differs in the substitution of a wide circular ring or collar for the "box"—its edge likewise being finished off with the ornamental molding. The species of neither of the genera are provided with a volva, and both of those of the last-mentioned genus remind me very strongly of certain quaint objects which I have seen in collections of Japanese ceramics. I venture to say that no so absurd fungi as these ever were, or ever will be, found on the face of the earth.

The small collection of plates is perhaps of interest in connection with the bibliography of American botany, and as unique relics of one of its earliest, as well as one of its most eccentric students. The figures of flowering-plants may be of use in helping to elucidate the author's vague descriptions, but the plates of fungi will only serve to show what a useless mass of rubbish would eertainly have been inflicted upon mycological science had not the fortunate shipwreck of 1815 supervened.

W. R. G.

Flora of Richmond Co., N. Y.—Additions, corrections and new localities, 1883–1884.

Delphinium Consolida, L.—Roadsides near Richmond.

Adonis autumnalis, L.--Stapleton Flats; introduced in ballast. (Miss C. O. Thompson.)

Thlaspi arvense, L.—Clove Lake.

Reseda odorata, L.—"Waste places, S. I., 1865;" (Wm. H. Leggett.) Mr. Samuel Henshaw, also, states that he knew of one plant which had grown and flourished for several successive years in the crevice of a stone wall in Stapleton.

Viola pubescens, Ait., var. *eriocarpa*, Nutt. Near Barrett's Dye Works, Port Richmond.

Ascyrum Crux-Andreæ, L.—Richmond Valley and Tottenville.

Vaccaria vulgaris, Host.—Stapleton Flats; introduced in ballast. (Miss C. O. Thompson.)

Silene nocturna, L.—Stapleton Flats; introduced in ballast. (Miss C. O. Thompson.)

Stellaria graminea, L. Tottenville, Four Corners, New Brighton and New Springville. Appears to be spreading and is much less rare than formerly. (Replaces *S. borealis*, Bigel., of our catalogue.)

Vicia hirsuta, Koch.—New Brighton. Rare.

Vitis cordifolia, Mchx., var. *riparia*, Gr.—Garretsons.

Cytissus triflorus, L'Her. Todt Hill; escaped from cultivation.

Prunus Americana, Marshall. Abundant in a limited locality near the Moravian Cemetery.

Rubus laciniatus, Willd.—Silver Lake; escaped from cultivation.

Pyrus arbutifolia, L., var. *erythrocarpa*, Gr.—Common.

Pyrus arbutifolia, L., var. *melanocarpa*, Gr.—Common. (This and the preceding variety should replace *P. arbutifolia*, L., in our catalogue.)

Lonicera Japonica, Thunb.—Woods and roadsides near Four Corners and Richmond. Rapidly spreading, from pieces thrown out of gardens.

Viburnum Lentago, L.—Clove Lake Swamp.

Galium trifidum, L., var. *latifolium*, Torr.—"Clifton, S. I., 1870." (Wm. H. Leggett.)

Galium verum, L.—Stapleton Flats and New Brighton. (Miss C. O. Thompson.)

Galium Mollugo, L.—New Brighton. (Miss C. O. Thompson.)

Asperula arvensis, L.—Stapleton; introduced in ballast. (Miss C. O. Thompson.)

Aster multiflorus, Ait.—Abundant on the salt marshes near Green Ridge.

Aster Novæ-Angliæ, L., var. *roseus*, Gr.—Port Richmond and West New Brighton.

Solidago Canadensis, L., var. *scabra*, T. & G.—Tottenville.

Eclipta alba, Hassk.—Beginning to spread in waste places and gardens. (*E. procumbens*, Michx., of our catalogue.)

Chrysanthemum Parthenium, Pers.—"Rubbish heaps, S. I. 1869." (Wm. H. Leggett.) New Brighton. (Miss C. O. Thompson.)

Centaurea solstitialis, L.—Stapleton Flats; introduced in ballast. (Miss C. O. Thompson.) "Stapleton, S. I., 1870." (Wm. H. Leggett.) (Replaces *C. Militensis*, L., of our catalogue.)

Leontodon autumnale, L.—New Brighton. (Dr. F. Hollick.)

Mulgedium Floridanum, D. C. Todt Hill.

Gaultheria procumbens, L.—Watchogue. (E. M. Eadie.)

Campanula rapunculoides, L.—Roadsides, Richmond Valley.

Primula veris, L.—"Roadside, West New Brighton, 1879." (G. M. Wilber.)

Paulownia imperialis, Sieb. and Zucc.—Silver Lake; spreading quite extensively.

Trichostema lineare, Nutt. Tottenville.

Pycnanthemum Torreyi, Benth. "Richmond Valley, 1864." (Wm. H. Leggett.)

Monarda didyma, L. Willow Brook; escaped from gardens.

Physostegia Virginiana, Benth. "Staten Island, 1861." (Wm. H. Leggett.)

Marrubium vulgare, L.—Watchogue. (E. M. Eadie.)

Echium vulgare, L.—Kreischerville. (Wm. T. Davis.)

Asperugo procumbens, L. Stapleton Flats; introduced in ballast. (Miss C. O. Thompson.)

Ipomœa Nil, Roth.—New Brighton. Rare.

Nicandra physaloides, Gærtn,—Abundant at Tottenville.

Sabbatia chloroides, Pursh.—Chelsea. (E. M. Eadie.)

Gentiana Saponaria, L. Tottenville.

Asclepias variegata, L. Tottenville. (Wm. H. Rudkin.)

Atriplex rosea, L.—Waste places, Clifton.

Polygonum incarnatum, Ell.—New Brighton. (Miss C. O. Thompson.) Not, as first supposed, common.

Rumex pulcher, L.—Stapleton Flats; introduced in ballast. (Miss C. O. Thompson.)

Ulmus fulva, Michx.—Egbertville.

Quercus bicolor. Willd.—Green Ridge and Egbertville.

Quercus prinoides, Willd.—Watchogue.

Betula nigra, L.—A few trees near Bull's Head.

Sparganium simplex, Huds., var *Nuttallii*, Engelm.—"Tottenville, 1871." (Wm. H. Leggett.)

Potamogeton pulcher, Tuck.—Silver Lake.

Potamogeton amplifolius, Tuck.—Clove Lake.

Sagittaria variabilis, Engelm., var. *obtusa*, Gr.—Common.

Sagittaria variabilis, Engelm., var. *hastata*, Gr.—Common. (These varieties should replace *S. variabilis*, Engelm., in our catalogue.)

Habenaria ciliaris, R. Br.—Watchogue. (E. M. Eadie.)

Smilax Pseudo-China, L.—Linden Park Swamp.

Juncus dichotomus, Ell.—"Tottenville, 1871." (Wm. H. Leggett.)

Heleocharis prolifera, Torr. (?)—Found only in one clear deep spring, at Port Richmond. Has never been found in fruit, and hence the determination may prove to be wrong.

Heleocharis olivacea, Torr.—" Tottenville." (Wm. H. Leggett.)

Scleria triglomerata, Michx.—Linden Park.

Carex rosea, Schk., var. *radiata*, Desv.—"Huguenot, 1871." (Wm. H. Leggett.)

Carex Muhlenbergii, Schk., var. *enervis*, Boot.—New Dorp and Garretsons.

Carex debilis, Michx.—" Rossville, 1869." (Wm. H. Leggett.)

Eragrostis poœoides, Beauv.—Streets of Port Richmond.

Eragrostis Purshii, Schrader.—New Brighton and Court House.

Phalaris Canariensis, L.—New Dorp and New Brighton.

Isoetes echinospora, Durieu, var. *Braunii*, Engelm. (?)—Only one specimen, found near Huguenot; not in fruit, the determination may therefore not be correct.

N. L. BRITTON.
ARTHUR HOLLICK.

A new Locality for Nelumbium.—In a swamp a few miles to the west of Osterville, Mass., a village on the southern side of Cape Cod, *Nelumbium luteum*, Wild., grows more or less abundantly. Probably this is the most eastern locality of the species. One cannot say whether it originally grew here, because the swamp is near the reservation of the Marshpee Indians and it is quite possible that the *Nelumbium* was introduced by them. The swamp is visited by summer visitors at Osterville, but the existence of the *Nelumbium* so far east was, as far as I can ascertain, unsuspected by our botanists. The existence of a patch of *Genista tinctoria*, L., in the heart of Cambridge, and close to one of the dormitories occupied by Harvard students, surprised me very much until, about three years ago, in passing Felton Hall I noticed a vacant lot close by covered with a mass of yellow bloom. Except near Salem, the plant is rarely seen in Eastern Massachusetts.

W. G. FARLOW.

Botanical Notes.

On Derivation in Pinus edulis and Pinus monophylla.—At a meeting of the Botanical Section of the Philadelphia Academy of Natural Sciences on December 8th, Mr. Thomas Meehan called attention to some dried specimens of *Pinus monophylla* on the table, which were received in a fresh condition, a few months ago, from Mrs. Lewers, of Franktown, Nevada. At that time the phyllodes which took the place of the real leaves were all monophyllous. In drying, several had opened in some specimens, and others readily separated by a little aid, showing that the species might have been two-leaved but for some inability in the early stages of development to separate them. This monophyllous species was closely allied to *Pinus edulis,* which was confined to the Rocky Mountains, the monophyllous species being the form that prevailed further west. But in a small tree of *P. edulis* growing in a deep ravine in Queen Cañon, in the Rocky Mountains he had on the same tree found monophyllous, diphyllous, and triphyllous phyllodes, and there could not possibly be any doubt that the species were of one origin. The case was one worthy of note, because it had been charged that there was no actual evidence of the truth of the doctrine of derivation. Generally, when such evidences as these were offered, the objector was prepared to abandon his belief in the specific distinctness of the forms rather than to grant that two distinct species had been developed from one parent, and even in the case of these species there were some who regarded one as but a variety of the other. But there were other distinctions: The cones were not quite the same, and the seeds were very different in size and outline, so that one could readily separate the seeds if mixed together. There was, in fact, a whole series of distinctions fully as great as we could find in many well-recognized species, and which fully entitled the two forms to full specific rank, though in the face of the evident facts that they are derivations of one original parentage. Indeed, it was well known that when a plant changed its character in one respect it must do so in others; plants in some climates annual would become perennial or suffrutescent in others. The cotton-plant was a familiar example. In such cases the foliage and other characters varied from those connected with the annual form, and from this fact some botanists had regarded *Gossypium herbaceum* and *Gossypium arboreum* as distinct species. In the case of these two species of *Pinus*, the one which could not develop its phyllodes with two separate individuals would of necessity present some peculiarities in the scales of the cone, as these were, morphologically, but transformed phyllodes. Under morphological laws, that which affected the leaves ought to affect the carpels or other parts of fructification which were modified from them.

The true position of the species in development was that *Pinus* *edulis* had the highest rank. In raising both species from seed there was no difference whatever between the seedlings during the first season. In these young and delicate plants, true leaves were perfectly developed; these were flat, linear lanceolate, and of a deep glaucous hue. *Pinus edulis* assumed stout, vigorous branches the second year; then the true leaves were suppressed, a portion only being adnate with the stem, forming a sort of cushion, or as bud-scales, or bracts under the scales of the cone, from the axis of which the phyllodes—secondary leaves, or bundles of leaves of some authors—spring. In *Pinus monophylla* only a few branches made phyllodes the second year, and, from the seed, he had plants ten years old, which continued to bear branches with true leaves almost equally with those bearing phyllodia. The monophyllous branches were never as strong as those from *Pinus edulis*, and in ten years a plant of *Pinus edulis* would be double the size of *Pinus monophylla*. Assuming, as we may, that the two had one parentage, we see that the one had less vigor of growth; it retained more of its juvenile characteristics, and retained them longer than the other; and it never reached the power of development that *Pinus edulis* had attained. We may say, with confidence, that *Pinus monophylla* sprung from the same parentage as *Pinus edulis*, and became permanently different throughout, being subjected to conditions unfavorable to a full development. It would appear that the soil and climate of Nevada were not favorable to the usual development of *Pinus edulis*, and hence, through the long course of ages, the suppressed features that characterized full maturity in the original, became, under the law of heredity, permanent ones.

It was not often that we had so clear evidence of the unity of origin in two certainly distinct species, and, as supporting the modern ideas of evolution, the case was worthy of being placed on record.

Apospory in Ferns.—W. T. T. Dyer calls attention in *Nature* to a paper by Mr. E. T. Druery (not yet published) as containing a report of one of the most interesting botanical observations that has been made for some time.

Mr. Druery's paper relates to a singular mode of reproduction in *Athyrium Filix-fœmina*, var. *clarissima*. In this fern the sporangia do not follow their ordinary course of development, but, assuming a more vegetative character, develop more or less well-defined prothallia, which ultimately bear archegonia and antheridia. From these adventitious prothallia the production of seedling ferns of a new generation has been observed to take place in a perfectly normal way.

Mr. F. O. Bauer has confirmed Mr. Druery's observations and obtained from him specimens of another fern (*Polystichum angulare*, var. *palcherrima*) which altogether eclipses the *Athyrium*, remarkable as that is. In the *Polystichum* the apex of the pinnules grows out into an irregular prothallium, upon which was demonstrated the existence of characteristic archegonia and antherida. In this case the production of the prothallium is not even associated locally with the sporangia, but appears as a direct vegetative outgrowth of the normal spore-bearing plant. The oophore is a mere vegetative process of the sporophore, a suppression of the alternation of the two generations which exceeds even that which obtains in the flowering-plant.

Mr. Druery's discovery is the direct converse of the apogamy in ferns, discovered by Farlow. In this the sporophore is a vegetative outgrowth from the oophore. The parallel phenomena in the life-history of the moss have been known for some time. The obvious possibilities of discovery with regard to the reproduction of ferns may now be regarded as exhausted. It may be interesting to give the dates of the different steps:

1597	Gerard	Observed seedling plants near parents.
1648	Cæsius	Sporangia.
1669	Cole	Spores.
1686	Ray	Hygroscopic movements of sporangia.
1715	Morison	Raised seedlings from spores.
1788	Ehrhart	Prothallium.
1789	Lindsay	Germination of spores.
1827	Kaulfuss	Development of prothallium.
1844	Nägeli	Antheridia.
1846	Suminski	Archegonia.
1874	Farlow	Apogamy.
1884	Druery	Apospory.

—*Journ. Royal Micros. Society.*

The Life History of the Lycopodiaceæ, at least so far as regards the development of the prothallium from the spores, has until quite recently been almost unknown. Dr. Treub, however, has recently published in the Annals of the Botanic Garden of Buitenzorg, Java (Vol. iv., pp. 107, 138), a description of the prothallium of *Lycopodium cernuum*. This, according to an extract from the above paper published in *Nature* by Mr. W. T. T. Dyer, consists of a sort of short cylindrical axis, half immersed in the soil at one end, where it is furnished with root-hairs. The upper extremity bears a tuft of small leaf-like lobes. The archegonia and antheridia are found on the upper part of the cylindrical axis, forming a kind of ring or crown near the tuft of lobes.

Botanical Literature.

American Medicinal Plants. An illustrated and descriptive Guide to the American Plants used as Homœopathic Remedies ; their History, Preparation, Chemistry and Physiological Effects. By Chas. F. Millspaugh, M.D. New York and Philadelphia : Bœricke & Tafel. Nos. 1 to 5.

This is the first installment of a work which is to contain one hundred and eighty illustrations and descriptions of such native and naturalized plants as are used in homœopathic practice. Dr. Millspaugh has the advantage of being a skilful artist as well as a physician, and has thus been enabled to illustrate his work with figures drawn *in situ* by his own hand. The plates are reproduced in colors from the author's drawings, and the plants represented are in all cases quite true to nature.

The text accompanying each plate gives the systematic name, synonyms, popular name or names and minute description of the plant represented, the part used in homœopathic practice, and mode of preparation, chemical constituents and physiological action.

With the concluding part will be given a glossary of botanical terms and a complete index, together with a carefully arranged bibliography.

The work, when completed, will form a very beautiful volume—an ornament to the library of any physician.

Contributions to American Botany. XII. By Sereno Watson. From the Proceedings of the American Academy of Arts and Sciences. 8vo., pp. 55.

This twelfth contribution of Mr. Watson's embraces two papers, one devoted to a history and revision of the roses of North America, and the other to descriptions of some new species of plants chiefly from the western Territories.

The author recognizes 18 species of roses as indigenous to North America: *Rosa acicularis*, Lindl., *R. blanda*, Ait., *R. Sayi*, Schwein., *R. Arkansana*, Porter, *R. Nutkana*, Presl, *R. pisocarpa*, Gray, *R. Californica*, Cham. & Schlecht., *R. Fendleri*, Crepin, *R. Woodsii*, Lindl., *R. minutifolia*, Engelm., *R. Carolina*, L., *R. lucida*, Ehrh., *R. humilis*, Marsh., *R. nitida*, Willd., *R. foliolosa*, Nutt., *R. Mexicana*, Watson, *R. setigera*, Michx., and *R. gymnocarpa*, Nutt. This paper is preceded by an exhaustive and exceedingly interesting historical account of our wild roses.

The second paper contains descriptions of 81 new species and one new genus the latter by Dr. Engelmann.

El Guachamaca. Obra escrita de orden del ilustre Americana, General Guzman Blanco, por A. Ernest. Caracas, 1884.

On the Life-History of certain British Heterœcismal Uredines. (The *Ranunculi Æcidia* and *Puccinia Schœleriana.*) By Chas. B. Plowright. From the Quarterly Journal of Microscopical Sciences. 8vo., p. 22.

Proceedings of the Torrey Club.—At the regular meeting held Tuesday evening, March 10th, the President occupied the chair and 21 persons were present.

Mr. Hollick read a list of additions to the flora of Richmond Co., N. Y., with notes and specimens. The original catalogue, by Messrs. Britton and Hollick, in 1879 enumerated 1,050 species. Three appendices issued since then contain respectively 46, 67 and 48 additions, making a total of 1,211 species to date. Many of these can never be duplicated, owing to the localities having been destroyed. The herbarium of the late Wm. H. Leggett contributed many of these, some of which were collected more than twenty years ago, The entire State flora at the present time embraces about 1,800 species, distributed over an area of about 45,000 square miles. Richmond Co., with an area of only 59 square miles, contains two-thirds of this number. About fifty of these were new to the State when found.

A communication from Mr. Frank Tweedy upon the flora of the Yellowstone Region, was read by Dr. Britton, who showed specimens of the plants mentioned. Mr. Schrenk made some remarks upon the structure of pine wood, and referred particularly to the supposed function of the internal lenticular spaces.

One active member was elected.

BULLETIN

OF THE

TORREY BOTANICAL CLUB.

Vol. XII.] New York, May, 1885. [No. 5.

Notes on the Winter Flora of Bermuda.

By J. F. KEMP.

The Bermuda Islands consist of a group situated off the coast of the United States in N. Lat. 32° 14′ 45″, W. Long. 64° 40′ 55″. They are thus on nearly the same parallel of latitude as Charleston, S. C., and the same meridian as Halifax, N. S. As a British military and naval station they are of importance disproportionate to their small extent. Geologically, the formation is a coral island of the atoll type, but the portions above water, and indeed almost all the visible and investigated portions below water, are chiefly of Æolian origin, and have evidently been heaped up precisely as the peninsula of Florida has been pushed seaward. The inhabitable part is entirely on the south and south-western side of the ring, an evident consequence of the prevailing south-west winds. In addition to the more common and extensive soft sand-rock, which is evidently of very recent formation, there is a narrow ridge of hard, almost crystalline limestone, which is not fossiliferous, which appears to be older than the remainder and to have undergone some metamorphic action. It is honeycombed with caves, and bears the most interesting part of the insular flora and the larger portion of those plants which seem to have been introduced by natural as distinguished from artificial means.*

The general aspect of the country is similar to the rolling sand-dunes of Long Island, except that they are worn into perpendicular cliffs along the shore in many places. The coral sand becomes cemented on exposure into a compact rock, contrasting in this respect very strongly with the silicious beaches familiar to us. Above the water line the exposed faces of the cliffs exhibit the stratified structure due to their origin, but, below it, from some influence of the water, they are apparently massive. In the little bays which indent the coast are stretches of beach sand of a rich creamy color, which support a scrubby growth of shrubs back from the water line. The most important chemical constituents of this sand are shown in the first analysis below. It has doubtless been the source of the other soil whose composition is shown in the second, third and fourth analyses. This fills the hollows back from the shore, is of a red color, supports the market gardens, and is the great source of wealth to the inhabitants. It has evidently resulted from the leaching of the coral sand by rains, the soluble lime being removed and the less soluble constituents concentrated.

*Cf. Bulletin 25, U. S. Nat'l. Museum. List of Plants by Governor Lefroy.

	Coral Sand.	Red Soil.	Red Soil.	Red Soil.
Organic matter	3.806.	11.210.	13.00.	14.910.
SiO_2 and sand insol. in HCl	0.050.	40.127.	31.764.	20.134.
Fe_2O_3	0.050.	12.340.	10.000.	28.54.
Al_2O_3		13.75.	7.35.	22.90.
CaO	52.470.	3.508.	7.84.	3.335.

The omitted components are water, alkalies, magnesia, etc.

As might be expected from their insular position, they need nitrogenous fertilizers, and the gulf-weed which is washed ashore is carefully gathered to supply the deficiency.

The islands are on the eastern edge of the Gulf Stream, by which very naturally the climate is much influenced. The surface temperature of the water averages 70° F. For the last ten years the mean temperature of the air has been 71° F., the dew-point being 64° F. The highest observation in the shade is 90° F., lowest, 48° F., but in the sun the mercury has reached 158°. August is the hottest month, averaging 87°; February the coldest at 55°. The daily range is 6°–8°, annual 32°. During my visit, March 8th to April 2d, it was 60°–65°. To compare with the United States, it may be said that the isothermal of 72° runs across the middle of Florida at Tampa, and, crossing the upper part of the Gulf of Mexico, strikes Texas at Corpus Christi. The rain-fall is large. The average of ten years shows 155 rainy days in 365, and 56 inches. In one 24 hours while I was there over 4 inches fell. But the distribution through the year is very uniform, the wettest and dryest months differing only by 1″.5. By way of comparison, the rain-fall of New York is 40, and so high a rain-fall as this is reached only in the everglades of Florida, about the Mississippi Delta and on the far north-west coast. It would seem therefore that in physical features the islands closely resemble Southern Florida. Bermuda is best known in the "States" by reason of the early vegetables that come hither. Onions and potatoes are the most important, but tomatoes, beets and carrots are raised in abundance. Strange to say, the seed-onions and potatoes come entirely from abroad, as those produced on the islands do not afford palatable vegetables. The seed-onions come from Madeira and Teneriffe, the potatoes from the States. Carrots are much used locally as table-vegetables, and, when boiled, are exceedingly sweet and palatable, lacking entirely the strong taste that in the north makes them best adapted for fodder. Corn is raised in season and is said to be very good. Tomatoes were ripe March 1st, if not earlier. As if to compensate for natural advantages, the vegetables are much exposed to blights of various sorts, the potatoes suffering especially. But notwithstanding these and the small acreage the exports in 1882 were valued at over £80,000, and the amount is probably greater at present.

Of fruits, the chief one that was ripe in March was the banana. The dwarf variety (*Musa Cavendishii*) is most abundant. Oranges are less cultivated than in former years, but are said to be of unusual excellence. The Bermuda lemon has an exceedingly thick rind, but

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* Cf. Voyage of the Challenger. Vol. I., p.

the juice is very palatable. Peaches formerly abounded, but have of late been destroyed by an insect. The few trees that I noticed seemed strong, but the fruit, I was told, is invariably destroyed at the core by this pest. Apples and the allied fruits run to wood. Loquots and the avocado pear are abundant. Every garden is provided with several papaw-trees (*Carica papaya*) the clusters of fruit of which, with the tuft of leaves at the summit of a naked trunk, strike a stranger very forcibly. I heard of the recent introduction of grapes, but did not learn with what success.

Strawberries were ripe in March and were very good. Gooseberries, I was told, do well, but that other berries run to wood.

Of trees the most common, useful and noticeable is the Bermuda cedar (*Juniperus Bermudiensis*), which in former times covered the island and was an abundant source of timber for vessels. It is everywhere present now, but probably of smaller size, the larger trees having been cut for timber. The only other noticeable tree growing wild is the palmetto (*Sabal umbraculifera*), which standing, as it does, side by side with the cedar, gives the landscape a curiously mixed character, tropical and temperate zones seeming to be intermingled.

In addition to these, which were probably introduced by natural means, there are trees from all parts of the world. In former years the inhabitants were seafaring, and on their voyages brought back many trees that struck their fancy. These are scattered over the island in gardens and on lawns. There are several screw-pines, making with the cedar the only conifers proper growing on the island. The cocoa-nut palm is not uncommon, and the cabbage palm (*Oreodoxa oleracea*) has four magnificent representatives at the head of Hamilton Harbor. The trunks rise fifty feet or more and are about seven feet in circumference five feet above the base. Of the India-rubber tree, a magnificent specimen is one of the first things met by the visitor on landing. The calabash (*Crescentia Cujete*) is not uncommon. It supplies the colored people with many useful utensils. I saw one mahogany-tree, and, in a cool, moist dell, several coffee-trees. The true mangrove (*Rhizophora Mangle*) and the false mangrove (*Avicennia nitida*) fill the swamps and lagoons with their trunks and clustered roots. The oleander is very abundant, forming the common hedge. It is of great value in holding together the shifting sand, for it grows everywhere, even on the least promising dunes. The sago palm (*Cycas revoluta*) is a common ornament of the lawns. Though not properly to be mentioned with the trees, the century-plant is met with everywhere, and not infrequently I saw it in blossom or in fruit. The Spanish bayonet (*Yucca aloifolia*) is often used for hedges.

Governor Lefroy, in a list of plants published in Bulletin No. 25, U. S. Nat'l Museum, distinguishes about 150 species as introduced by natural means. He also gives a very full and interesting list of artificially introduced species and of others which refused to thrive. There is also a list locally published, prepared by Mr. Oswald A. Reade, a pharmaceutical chemist formerly stationed at the dock yard.

The following plants were collected between March 8th and April 2nd. Unless otherwise mentioned they were then in flower. Dr. N. L. Britton kindly aided in the preparation of the list of phanerogams and Miss E. G. Knight identified the ferns.

LIST OF BERMUDA PLANTS.—Collected March, 1885, and deposited in the Herbarium of Columbia College.

Ranunculus parviflorus, L.
Ranunculus muricatus, L.
Argemone Mexicana, L.
Papaver dubium, L.
Fumaria densiflora, DC.
Raphanus sativus, L.
Alyssum maritimum, L.
Cakile maritima, Scop., var. *æqualis*, Chapm.
Cerastium viscosum, L.
(*Stellaria media*, Smith.)*
Sida carpinifolia, L.
Oxalis corniculata, L.
Geranium Carolinianun, L.
(*Medicago denticulata*, Willd.)
Medicago lupulina, L.
Melilotus officinalis, Willd.
Œnothera rosea, Ait.
Bryophyllum calycinum, Sals.
(*Opuntia vulgaris*, Mill. In fruit.)
Smyrnium olusatrum, L
Spermacoce tenuior, Lam.
Sherardia arvensis, L.
Solidago sempervirens, Ait.
Bidens leucantha, Willd.
Cichorium Intybus, L.
(*Taraxacum officinale*, Weber.)
(*Plantago major*, L.)
(*Plantago lanceolata*, L.
Anagallis arvensis, L.
Erythræa Centaurium, Pers.
Nerium Oleander, L.
Asclepias curassavica, L.
Ipomœa Nil, Rth.
Dichondra repens, Forst.
(*Nicotiana Tabacum*, L.)
(*Tournefortia gnaphalodes*, R.Br.)
Salvia coccinea, L.
Stachys arvensis, L.
Stachytarpha Jamaicensis, V.
Lippia nodiflora, Rich.
Lantana crocea, Jacq.
Lantana odorata, L.
Avicennia nitida, Jacq. In fruit.
Veronica arvensis, L.
(*Rumex crispus*, L.)
Euphorbia Peplus, L.
Euphorbia buxifolia, Lam.
(*Urtica urens*, L.)
Aloe vulgaris, L.
Richardia Æthiopica, L.
Commelina nudiflora, L.
Stenotaphrum Americanum, Schrank.
Chloris petraca, Thurb.
Oplismenus setarius, Spreng.
Dichromena leucocephala, Michx.
Scirpus validus, Vahl.
Asplenium myriophyllum, Presl.
Asplenium Magellanicum, Kaulf.
Asplenium parvulum, M. & G.
Adiantum cuneatum, Lang. & Fisch.
Aspidium patens, Swartz.
Nephrolepis exaltata, Schott.

Note on Veronica Anagallis, L.

By N. L. BRITTON.

In the latter part of September, 1883, while botanizing near the village of Mahwah, Bergen Co., New Jersey, I noticed in a small stream which crosses the N. Y. L. E. & W. R. R., half a mile or so north of the station, a very strong and abundant growth of a *Veronica*, whose broad, obtuse, nearly sessile, slightly serrate leaves, and nearly erect habit seemed peculiar, and different from any form with which

* Plants in parenthesis were noticed but not collected.

I was acquainted. The plant was not noticed anywhere else in the immediate vicinity.

Since that time I have received specimens of what is evidently the same form from Dr. H. H. Rusby, collected at Franklin, Essex Co., from Prof. Porter, collected at Manunka Chunk, Warren Co., and have myself gathered a closely similar plant from the valley of the Delaware River, above Flatbrookville in Sussex Co. These last specimens were somewhat more erect in habit and not quite so broadly leaved as those from the other localities noted. It would therefore seem to be widely distributed through Northern New Jersey.

In general aspect it closely resembles *V. Beccabunga*, L., of Europe, differing mainly in the almost universally sessile, more or less clasping leaves, *V. Beccabunga* being described and figured (Engl. Bot. Pl. 655; Ettingshausen & Pokorny, Phys. Plant. Austr. t. 780) with petioles, which de Candolle (Prodr., x., 468) says are from one to two lines long, though in an English specimen they are a quarter inch. However, in a German specimen marked *V. Beccabunga*, in the Meisner herbarium the leaves are as sessile as in the ones now referred to, and indeed it resembles these very greatly. There is some doubt, therefore, to which species my plants belong; indeed they would seem to connect the two in certain respects, as the characters of pod and pedicel are not sufficiently different for diagnostic characters. The flowers likewise are intermediate in size between those of the two species, though perhaps more like those of *V. Anagallis* in this respect, but blue. As the species are considered distinct by foreign authorities, and as I do not wish to complicate synonomy, since genuine *V. Beccabunga* with strongly petioled leaves has not yet been detected in America, I propose that for the present we shall know this Northern New Jersey plant as *V. Anagallis*, L., var. LATIFOLIA. Dr. Rusby's specimen above alluded to has acute leaves tapering from a broad sessile base. If the German specimen mentioned had been collected in this country I should unhesitatingly include it in the variety here proposed.

V. Americana, Schwein. (*V. Beccabunga* of older American authors) is generally sufficiently characterized by its oblong or elliptical-lanceolate, strongly serrated leaves, subcordate, truncate or even acute at base and distinct petioles to be easily separated from the two other species. English specimens labelled *V. Beccabunga* in the Torrey Herbarium resemble the common American form very closely, however, and in some native plants which I have examined the serration is much less prominent than usual.

V. intermedia, Schwein. (*Amer. Journ. Sci.* I., viii., 268,) referred to *V. Americana* by Dr. Gray (Syn. Flor. N. A., ii., pt. i., 287) is shown by Schweinitz's specimen in the herbarium of the Academy of Natural Sciences of Philadelphia to be *V. Anagallis*, as Mr. J. H. Redfield has noted on the sheet.

The great variation in leaf-forms exhibited by these plants, without correspondingly wide variations in the inflorescence and fruit, gives credence to the supposition that they are but varieties of a single widely diffused species, to which other described forms may well belong.

The Relations of Pinus edulis and P. monophylla.—*Pinus monophylla*, Torr. and Frem., was described in Fremont's "Report of the Exploring Expedition to the Rocky Mountains in the Year 1842, and to Oregon and Northern California in 1843 and 4," Washington, 1845, House Doc. No. 166, p. 319. Pl. 4. The specimens upon which the description was based were obtained from "Northern California, longitude 111° to 120°"; mostly from an area now included in the State of Nevada. Among the specimens brought in by Fremont were some in which the leaves were both single and double, but the double leaves were rare exceptions to the general rule.

In the years 1857, 8 and 9, and later, I passed in many directions through most of the country occupied by *Pinus edulis* and the so-called *P. monophylla*, in the northern states of Mexico, Arizona, New Mexico, Colorado, Utah and Nevada, and I found the facts in regard to the relations of these two forms to be essentially these:

The chosen habitat and home of *Pinus edulis* is the belt or area of dry country lying between the saline and treeless portion of the "Great Basin" in Nevada and Utah and the higher and better watered mountain ranges which border or divide the desert areas.

In Southern Utah, between the summits of the Wasatch and the Western sage plains in Western New Mexico and Eastern Arizona, as well as some portions of Northern Mexico, the nut-pine attains the largest size and stands thickest on the ground. Here it ranges from 20 to 50 feet in height, has a trunk sometimes two feet in diameter and is universally two-leaved. In Nevada and Western Utah the trees are smaller in size, more scattered, and usually have but a single cylindrical leaf. Where the areas of these two varieties meet it is very common to find trees in which the foliage is about equally divided between the single and double forms. Hence it would seem that the single-leaved variety is a somewhat dwarfed and depauperate form, the effect of aridity of climate; and the single solid leaf is apparently an exhibition of the tendency so conspicuous among desert plants to reduce the ratio of surface to mass in the leaves, or the parts of the plant which perform the functions of leaves. In *Cactus*, *Holocantha*, *Canotia*, *Ephedra*, etc., we see the extreme form of this self-protective modification, no leaves but an epidermis which does what little there is for leaves to do, and in *Cactus*, *Holocantha*, etc., a formidable array of spines to protect this from possible injury. Dr. Torrey, to whom more than twenty years ago I showed my specimens of *Pinus monophylla* and *P. edulis*, agreed with me in considering them only varieties of one species. Mr. Thomas Meehan, in his interesting note lately published on this subject,* considers the two forms as of common origin, but as constituting distinct species. It seems to me, however, they are typical varieties of common origin and shading into each other, and of unusual interest, since their relationship can be easily traced, and, if I am right, the causes which have produced the differences are easily comprehensible.

J. S. NEWBERRY.

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* Proc. Phila. Acad. Nat. Sciences, 1884, p. 295, and this journal.

Three Desmids new to the United States.—In the year of 1875 there was published a series of various algæ, and (also many desmids), chiefly new species and varieties, from all parts of the world, by Paul Reinsch at Erlangen (Franconia, Germany.) This work, which was dedicated to the eminent algologists Sir W. Archer, O. Norstedt and L. Rabenhorst, contains quite a number of desmids, and is entitled Contributiones ad Algologiam et Fungologiam, auctore Paulo Friderico Reinsch. Vol. I. Accedunt tabulæ CXXXI. Melanophyceæ: tabulæ LXI. Rhodophyceæ: tabulæ LXII. Chlorophyllophyiceæ: tabulæ XVIII. Fungi: tabulæ IX. Lipsiæ T. O. Weigel. MDCCCLXXV. pp. XII. 103. 4to.

I find three new species of desmids in this work which are not enumerated in Wolle's "Desmids of the United States," and which for this reason, can be considered as new to the United States.

1. *Staurastrum Pseudo-Cosmarium.*—Semicellulæ a latere late ovato-cordatæ, margines laterales crenulato serrati; cellulæ a vertice trigonæ marginibus lateralibus rectis; isthmi latitudo $\frac{1}{3}$–$\frac{1}{4}$ semi cellulæ latitudinis. Longit. 0.0786$^{mm.}$. Latit. 0.056$^{mm.}$

Hab. Pennsylvania, North America.

Tab. ix., Fig. 1 *a*. Specimen a latere. Fig. 1 *b*. Specimen a vertice. p. 91–92.

2. *Xanthidium Nordstedtianum.*—Semicellulæ a latere late transverse ovato-truncatæ incisura acutangula latiore disjunctæ, anguli quatuor spinis tenuioribus binis armati, anguli laterales spino singulo armati. Longit. 0.053$^{mm.}$. Latit. 0.0333$^{mm.}$. Spin. longit. 0.0112$^{mm.}$

Hab. Pennsylvania, North America. Erlangæ Franconia.

A *Xanthid. cristato*, Bréb., differt dimensionibus minoribus, spinis tenuioribus in basi non dilatatis, semicellulis longioribus incisura acutangula disjunctis. Dimens. *Xanth. crist.*: longit. 0.0621$^{mm.}$, latit. 0.059$^{mm.}$ (spin. excl.)

Tab. x. Fig. 6. Specimen a latere, ex massa ex algis unicellularibus composita. p. 92.

3. The work also contains a third species, which is described and figured, but not named. It is a

Cosmarium spec.—Semicellulæ elliptico-ovales in inferiore parte se adtingentes margine superiore late rotundato; isthmi latitudo triens diametri transversalis, membrana verruculis dense absque ordine dispositis exasperata; diameter transversalis diametri longitudinalis dimidio paulo minus. Longit. 0.0448$^{mm.}$. Latit. 0.025$^{mm.}$

In massa algarum, Easton, Pennsylvania. America borealis.

A *Cosmario Botrytis* sat distincta species.

Tab. x., Fig. 7. Specimen a latere. p. 84.

I give this species the name *Reinschii* and will include it in the list of American desmids as COSMARIUM REINSCHII, m.

Kolosvar, Hungary. JULES SCHAARSCHMIDT.

Cleistogamy in Lamium.—Early in March there were brought to me some plants of *Lamium amplexicaule*, L., which, despite the earliness of the season, seemed to be on the point of flowering, many of the buds showing color.

Late in April other plants were examined. Still there were no open flowers; but the buds had enlarged and crimsoned in axillary clusters.

In all cases the projecting corolla tube was closed by what appeared to be a conical cap of densely crowded crimson hairs, the whole calling to mind the capsule of a moss with hairy terminal calyptra. This hairy cap proved to be formed by the villous upper lip of the corolla densely folded over the lower lip, which was colorless save a spot of pink on its central lobe. The lips could be separated by pressure.

Within, the stamens and pistils, arrested in their forward growth in the blind tube, had turned and twisted themselves into a contorted mass which perhaps would have pressed open the closed doors of their prison or burst its walls had it not been accommodated by the dilated throat of the corolla, which it will be remembered is a floral characteristic of the dead nettle and others of its family.

The confined anthers were discharging pollen. This consisted, as normally, of innumerable granules, but the entire product of each anther was united into a single mass by a moisture which pervaded the imprisoned floral organs. These pollen-masses, even before they were free from the anthers, were found adhering to the confined stigmas, so that anthers and stigmas were frequently joined together by the viscid mass.

In some of the flowers the imprisoned styles were double the length of the corolla, and in accommodating themselves to their cramped quarters had writhed into strangely twisted positions. In one case the slender style, finding its advance checked, had returned down the tubes and applied its stigmas to the clustered anthers from above them. In another case the stigmas in their ascent had become entangled and detained among the anthers, causing the lengthening style to twist in a circle on itself in the lower part of the tube.

Now I would ask are these flowers to be considered as truly cleistogamous. Are they not rather the usual flowers cleistogamous through retarted development; in other words, adaptively cleistogamous? Plainly they are nothing more; they are the common flowers somewhat contracted and remaining closed.

It would seem that the plant resorted to self-fertilization when, from adverse conditions, no better opportunity of reproduction offered itself.

EUGENE P. BICKNELL.

Flora of Chenango County, N. Y.: some plants not previously reported from that region.*

Ranunculus bulbosus, L.—Not common.

Aconitum uncinatum, L.—A single specimen found on the bank of the Chenango River, near Oxford. Perhaps indigenous.

Nuphar luteum, Smith, var. *pumilum*, Preston. Not seen in flower.

Cardamine pratensis, L.—Rather common

Arabis perfoliata, Lam.—Occasional.

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* Read before the Natural History Society of Cornell University.

Viola Selkirkii, Pursh.—Oxford. Rare.

Hypericum pyramidatum, Ait.—Common along the Chenango River.

Mollugo verticillata, L.—Uncommon. Beginning to be introduced along railroads.

Acer saccharinum, Wang., var. *nigrum*, Gray.

Trifolium agrarium, L.—Quite firmly established.

Melilotus alba, Lam.—Beginning to be introduced along the Chenango River.

Potentilla palustris, Scop.—Borders of ponds, Preston.

Linnæa borealis, Gronov.—Oxford. Rare.

Valerianella radiata, Dufr.—Oxford. In an alluvial meadow, near the old Chenango Canal, and possibly introduced from it.

Cichorium Intybus, L.—Occasional at roadsides.

Andromeda ligustrina, Muhl.—Locally abundant on dry hills.

Chimaphila maculata, Pursh.—Oxford. Rare.

Pentstemon pubescens, Solander.—Not common.

Veronica Buxbaumii, Tenore.—Occasional in gardens.

Monarda fistulosa, L.—Preston. Locally abundant.

Mertensia Virginica, D C.—Uncommon. Banks of Chenango River.

Polemonium cæruleum, L.—Abundant on the borders of several small swamps, and in wet meadows, in Preston and McDonough, near East McDonough.

Euphorbia Peplus, L.—Not common, but abundant where found.

Humulus Lupulus, L.—Plainly indigenous on the Chenango River.

Arisæma Dracontium, Schott.—Not common.

Scheuchzeria palustris, L—Rare. Preston.

Habenaria blephariglottis, Hook.—Rare. Smithville.

Listera cordata, R. Br.—Rare. Smithville.

Corallorhiza innata, R. Br.—Rare. Oxford.

Smilacina trifolia, Desf.—Rather common in peat-bogs.

Erythronium albidum, Nutt.—Oxford. In an alluvial meadow near the village, a patch of perhaps fifty plants, growing with *E. Americanum*.

Camptosorus rhizophyllus, Link.—Oxford. Local.

Botrychium matricariæfolium, A. Br.—Common.

Botrychium lanceolatum, Angs.—Rather common.

FRED. V. COVILLE.

Botanical Notes.

Kalmia angustifolia.—Mr. Walter Hayden, who has resided for some time in the Hudson's Bay Territory, states that the twigs, with leaves and flowers of this plant are used by the Cree Indians in bowel complaints and as a tonic. Their name for the plant is *wisukapuk*, 'bitter leaf.' The leaves of the allied *Kalmia latifolia* are said to possess poisonous, narcotic properties, and to prove fatal to sheep and some other animals, although they are eaten with impunity by deer, goats and partridges. Dr. Barton, in his "Collections," states that the Indians sometimes use a decotion of the leaves to destroy themselves. It is pointed out in the U. S. Dispensatory that

Kalmia angustifolia probably possesses properties identical with those of *K. latifolia*. It is remarkable, therefore, that it should be used as a tonic by the Crees. The coldness of the climate of Canada, may however, modify the development of the poisonous principle, if the plant really possesses any.

Spicate Inflorescence in Cypripedium insigne.—At a recent meeting of the Philadelphia Academy of Natural Sciences, Mr. Thomas Meehan referred to specimen before him, of *Cypripedium insigne*, an orchid from the cooler parts of the East Indies, which had a spike with two flowers and other undeveloped buds, the normal character being a one-flowered scape. These departures from the normal form, he said, afforded valuable lessons, though frequently passed over as mere freaks of nature. A spicate infloresence was a common characteristic in allied species. From the present illustration we might infer that the one-flowered kinds were species in which the power to develop a proper spike had been arrested. We might expect to see attempts at this form of inflorescence in *Cypripedium acaule* of our own country.

A very important lesson from these occasional departures had but recently had the attention given to it that it properly deserved, and that was that whenever any particular plant departed from its normal form, there came into existence other characters, which, in a separate plant would, and often did, obtain for the new departure the rank of a species. In this instance, the second flower on the spike was different from the lower and normal one in the upper segment of the perianth (sepals) having a regular outline. In the normal form it was so crumpled as to present a trilobed appearance. In the normal form the labellum was so elongated as to be three times the length of the column. In the upper flower the labellum was but double the length, giving it a somewhat globular appearance. There were other variations that formed a combination of characters quite sufficient to mark a species if they were constantly produced in a separate state. Why could not this rare occurence become a continuous one, and thus a new species be formed—created, we may say—out of an older one? There can be no reason why not. We may call this a freak of nature, but it could not have occurred without that combination of circumstances which we call law. We have no warranty for saying that a law which has operated to produce a departure in a solitary instance like this, might not have a more permanent power at some other time. Nor is there any warranty for believing that a law which has operated as we see here on one plant, might not operate on a hundred, or on all the plants of a district, or even on plants in separate districts widely separated from each other.

Abrus precatorius.—The pretty scarlet seeds of this leguminous plant, known as 'red bean' and 'love pea,' contain a poisonous principle, and, according to Mr. Boverton Redwood, are used in the Punjab for poisoning cattle. The shell of the seed is removed, the seed softened in water and pounded into a paste, which is then rolled out into little cylinders, about three-quarters of inch long, sharpened at one end. After careful drying, the cylinders are further sharpened by being rubbed on a brick, and are finally soaked in animal fat, and fitted into a wooden handle with their point just protruding. Upon a blow being struck with this weapon, the point, called a *sui*, penetrates the flesh, and being but loosely fitted into the handle, remains in the wound. Death ensues, on an average, in forty-eight hours.

The Continuity of Protoplasm.—Dr. Schaarschmidt has recently pointed out that the continuity of protoplasm is well shown in the pith of the mistletoe, a transverse section of the stem colored with eosin showing the thread, visible as a faint streak almost entirely enclosed by the cell wall, the protoplasm which fills the cell sending six or eight delicate threads through the closing membrane. The continuity is also visible in the cortical parenchyma, and can be determined throughout the entire epidermis.—*Journ. Micr. Soc.*

Homology of the Floral Envelopes in the Gramineæ and Cyperaceæ.—In a paper with this title in the *Journal of Botany*, Mr. T. Townsend attempts to prove that the palea in the floret of grasses is the homologue of the ochrea and utriculus in *Carex*, that the latter is a single floral envelope, and that the seta found more or less developed in many species of *Carex* is the rudimentary development of a secondary axis, while the acicula of Dumortier is the terminal portion of the main axis of the spikelet, so that the seta and acicula are analogous portions of two different axes.

The formation of Oil Receptacles in the Fruit of the Umbelliferæ has been investigated by J. Lange. He finds that they originate from a group of four cells, distinguished from the surrounding ones by their greater refrangibility. They are arranged in the corners of a square with an intercellular space between them, which gradually develops into the oil receptacle. These secreting cells have very thin walls and a clear translucent protoplasm.—*Journ. Micr. Soc.*

The formation of Gum in Wood has been examined by B. Frank in a number of leguminous and rosaceous trees. He finds that it is the universal product of special conditions, and can always be induced by the production of these conditions, as, for instance, by wounding any part of the stem. After four or five weeks the cells of the medullary rays are nearly filled with gum, its formation commencing in the cavities of the vessels and wood cells, which assume a more or less yellow or red color due to small granules resulting partly from metamorphosis of starch grains. The purpose of the internal formation of gum appears to be to form air-tight plugs to the vessels, this oject being aided by the formation of thyllæ or cells inside the vessels.—*Journ. Micr. Soc.*

The Spores of Lycopodium.—Mr. D. H. Galloway, of the Chicago College of Pharmacy, has made some measurements of the spores of *Lycopodium* with the following results: He made careful measurements of 50 spores and found their average diameters to be seven six-thousandths of an inch, the largest having a diameter of eight six-thousandths and the smallest six six-thousandths of an inch. It would therefore take 857 of them laid side by side to make an inch in length; to cover a square inch 734,449 would be required; and to fill the space of a cubic inch 629,422,793. Or, in terms of the French system, a row one centimetre in length would contain 343 spores; a square centimetre, 117,649, and a cubic centimetre, 40,353,-607. On measuring the capacity of one of Powers & Weightman's dram morphine bottles he found that it was almost exactly $40^{cc.}$, therefore one of the bottles would contain 1,614,144,280 of these spores. The same bottle will hold 10,600 flax-seeds, 350 cubeb-berries, 250 grains of allspice, 66 *Coculus Indicus* seeds, 20 nux-vomica-seeds, 4,200 canary-seeds, 8,400 dill-seeds, 2,900 grains of paradise, 1,250 hemp-seeds, 500 black pepper berries, 661 white pepper berries, 3,250 stramonium-seeds, and 100 pumpkin-seeds. It will thus be seen that one hemp-seed equals in size 1,291,315 lycopodium spores.—*Western Druggist.*

Cowania Havardi.—Mr. Watson wishes us to state that the species described by him under this name in the *Proceedings* of the Amer. Acad. Arts and Sciences, xx., p. 364, is *C. ericæfolia*, Torr., collected previously only by Parry in the same region, and his specimens probably only in the Torrey herbarium.

Proceedings of the Torrey Club.—The regular meeting of the Club was held at Columbia College, Tuesday evening, April 14th, the President in the chair and 25 persons present.

Mr. J. F. Kemp read a paper upon the Winter Flora of the Bermudas.

Mr. Thos. Hogg gave an account of the flora of Nassau.

Dr. Britton exhibited stem of *Nesæa verticillata*, HBK., covered with a spongy parenchyma. Miss Knight exhibited and remarked upon gold fish that had succumbed to an attack of *Saprolegnia ferax.*

Two persons were elected active members.

Correct and Incorrect Addresses.—The recent receipt, in a round about way, by the Editor, of a letter which had been mailed to him some weeks previously, leads him to give the following directions in regard to addressing communications: All communications for the BULLETIN, all business matters relating to it, and all exchanges should be addressed simply to W. R. Gerard, 61 Clinton Place, New York. Please omit the useless words "Editor of the Bulletin of the Torrey Club." Communications for the Treasurer should be addressed for W. H. Rudkin, 74 William St., New York. Communications to the Club should be sent to the Secretary, Arthur Hollick, New Brighton, N. Y. Specimens of plants for the Club should be sent to Dr. N. L. Britton, School of Mines, Columbia College, New York.

Since we cannot, by letter, impress upon the minds of news agents that the BULLETIN has no business office, we shall ask them in print to address no letters to the "Torrey Botanical Club," or "Bulletin of the Torrey Botanical Club," or "Torrey's Botanical Bulletin," or "Publisher of the Torrey Bulletin." Letters so addressed may, through the perseverance of some letter-carrier, finally reach their destination, but they stand an equal chance of going to the Dead Letter Office.

BULLETIN

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Some Notes on Generic Names.

By W. R. GERARD.

AQUILEGIA.—"We read in botanical dictionaries that *Aquilegia* . . . . is derived from *aquila*, an 'eagle,' because of the fancied likeness of the flower to that bird. . . . However, to be a little critical, though *aquil-* might do very well for 'eagle,' the *egia* would puzzle the etymological genius of Cicero himself. There is, however, a good Latin word, *aquilegus*, meaning 'collecting water'; and Pliny tells us that well-sinkers were called by the Romans *aquileges—i. e.*, 'water collectors'; and who has not noticed the water-collecting habit of the curly leaves of the columbine, when they are covered with silver drops after a shower of spring? Would it not be more respectful to the intelligence of the giver of the name to believe that it was intended in this sense? . . . I do not claim to have made any new discovery about the word *Aquilegia*, my surprise is that any one knowing Latin could ever have given it any other meaning than that which I have given; but, on looking into different books, I find that all but one, which explain the name at all, explain why the plant is 'very like an eagle,' even including the lexicon of that admirable scholar, Littré, under *ancolie*, the modern French form of *Aquilegia*. The Penny Cyclopædia alone of books I have consulted explains *Aquilegia* as 'water-gatherer.'" Rev. C. Wolley Dod, in *Gardeners' Chronicle*, June 9th, 1883, pp. 719, 720.

In addition to the etymology proposed by Mr. Dod, and to the one universally given in botanical works, there is still another, which would derive the word from Aquileia, or Aquilegia, a Roman city on the confines of Italy, in the vicinity of which the columbine grows in great abundance.

In order to obtain the true meaning of any word it is necessary to first ascertain its earliest recorded form. This, in the case of the one under consideration, is *aquilea*, and is found in the works of Albertus Magnus (13th century). This old author, in speaking of the form that the flower assumes in different plants, says: "Aut enim prætendit obscuram quandam convenientiam cum avis figura, sicut flos oleris qui vocatur *aquilea*, eo quod quatuor aquilas flos ejus figurare videtur;" and, further along: "aliquid autem simile hujus habet flos urticæ mortuæ et violæ, nisi quod alas avis non ita exprimit sicut *aquilea*." (Parva Naturalia, p. 381.) From this it appears that Albertus regarded the Latin name of the columbine as due to an obscure resemblance of its petals to the *wings* of an eagle—and not of its spurs to the talons of that bird, as explained by some, or to the beak, as suggested by others. He probably had never seen the plant, but wrote from hearsay. However this may be, the early form of the word which he adduces disposes of the notion that the meaning is 'water-gatherer.'

Caspar Bauhin, probably regarding the first two syllables of *Aquilegia* as due to an original *acui*, from *acus* (cf. *aquifolium*, now the specific name of the European holly, for *acuifolium)*, says that the name was applied to the plant "ob florum mucrones aduncos." Grassmann (Deutsche Pflanzennamen, p. 28), commenting upon this explanation, says that it "is much more applicable to the German [name]." The German popular name of the columbine, *aglei*, is derived by Kluge, in his recent Etymologisches Wörterbuch der deutschen Sprache (Strassburg, 1884) from Lat. *aquilegia*, and the word is traced back by him, through M. H. Ger. *agleie*, to O. H. Ger. *ageleia*. But, if we examine the history of the Ger. word, we shall find that in O. H. Ger. (period between the 8th to the close of the 11th century) *ageleia* was the name, not of the columbine, but, of a totally different plant—*Dipsacus fullonum*, L. In M H. Ger. the same name, with its numerous variants, was applied to *Aquilegia vulgaris*, L., and, later still, to *Ranunculus arvensis*, L., and *Ononis spinosa*, L. What is there in common between these so diverse plants that they should have received the same popular name? The etymology of the O. H. Ger. word answers this: *Ageleia* is a derivative from old Ger. *agele*, 'chaff,' 'awn,' 'spike' (cognate with Lat. *aculeus*.) The *Dipsacus* was so called, then, from the aculeate chaff of its heads of fruit, *Aquilegia* from the aculeate spurs of its flowers, *Ranunculus* from its bur-like fruit, and *Ononis* from its spiny leaves.

In DuCange's Glossarium mediæ et infimæ Latinitatis we find *aquilea*, 'herba valens ad oculos.' This points to *Dipsacus*, the water contained in the cup-shaped bases of the leaves of which was anciently used as a collyrium. In the Middle Ages *aquileus* (changed from *aquilus*) was an adjective of color meaning 'brown' or 'black'; but *aquilea*, which at first sight would seem to be the feminine form of this adjective, must have had a different origin, and we may assume that it arose through a confusion, by the scribes, of the first two syllables of the Ger. name with *aqua*, 'water.'

There would appear to be no doubt, that *aquilea* (later, *aquilegia*) is a mere corruption of the Ger. word *ageleia*. This is the view of it taken by those who have investigated the Ger. popular names of plants, *e. g.*, E. Meyer, H. Grassmann, and Pritzel and Jessen.

It is worthy of remark that no people seem to have seen in the spurs of the *Aquilegia* a resemblance to the talons or beak of an eagle, and so in no language do we find any popular name for this plant that embodies any such idea.

The five spurred petals with incurved tips were at an early period compared to five doves, the sepals representing the wings; and this suggested the herbalist's Lat. name *columbina* (sc. *herba*) 'dove-like (herb),' whence O. Fr. *columbine*, Eng. *columbine* and Ital. *colombino*. The herbalist's name *aquilina*, used as a substitute for what was regarded as an irregularly formed derivative from *aquila*, gave Ital. *aquilina*, and the translated names, Polish *orlik*, 'aquiline' and

Bohem. *worlicek*, 'aquiline.' The corrupted Ger. name passed into other languages as: Du. *akelei*, Swed. *ackeia*, O. Fr. *anquelie*; Fr. *ancolie*, Walloon *âcolète*, Ital. *achellea*, *acquilegia*, Span. *quileña*, Port. *acquileja*, Gael. *a'cholmsin*. In French the plant has likewise been called *aiglantine* (a dimin. of O. Fr. *aiglant*, from L. Lat. *aculentus*, derivative from *aculeus;* referring, as in Ger., to the aculeate spurs), and, corruptly, *galantine*. The flowers of the columbine have by some been likened to bells; hence Du. *klokkebloem*, 'bell-flower,' Dan. *klokken*, 'bells', Swed. *tysk klockor* 'silent bells' Russ. *kolokoltschiki*, 'bell-flower,' Hung. *harangvirag*, 'bell-flower.' Finally, other popular names are: Fr. *fleur de parfait amour*, 'flower of perfect love,' Ital. *perfetto amore*, 'perfect love,' Port. *amor perfeito dos velhos*, 'old-folks' perfect love.' Polish *rozycyka*, 'little rose,' Fr. *gant de nôtre dame*, 'our lady's glove,' *manteau royal*, 'royal mantle,' *herbe de lion*, 'lion-wort,' and (as an offset to so much poetry) Swed. *torrvärks-gräs*, 'rheumatism-grass.'

SPERGULA.—Said by Prof. Eaton (Manual of Botany) to be from "Lat. *spergo*, 'to scatter,' from the dispersion of its seeds," a statement copied by Prof. Wood, in his Class-Book.* Dr. Gray, in his Manual, has corrected the Latin word to *spargo*. *Spergula*, however, has nothing to do with *spargo*, but is merely a Latinized form, by Dodoens, of the German popular name *spergel*.

Spergula arvensis, L., has for several centuries been cultivated throughout Germany as a forage-plant, and has hence received many popular names, several of which are corruptions of one and the same word. One of these names is *sperg* (found also in the forms *spark*, *sperk*, *spirk*, *spörk*, *spurk*), of which *spergel* is a dimintuive. *Sperg* is an abbreviation of *spergis* (*spurgis*, *sporges*), a corruption of M. Lat. *sparagus*, for Lat. *asparagus*. The plant was so named from its resemblance to the asparagus in its whorled branches and thread-shaped leaves.

BRUNELLA.—This word is, in botanical works, derived from Ger. *braune* (Gray), *brune* (Wood), *breune* (Darlington; Eaton). As a matter of fact, it is a Latinized form (by Brunfels) of the Ger. popular name *brunelle* a dim. of M. H. Ger. *brun*, 'brown.' The plant was so named in German from the brown color of its calyx after flowering, and this, on the doctrine of signatures, indicated the use of the herb for the cure of quinsy, called in German *braune*, 'brownness,' alluding to the color of the fauces when afflicted with that disease.

TROLLIUS.—An abbreviation of *trollius flos*, a translation (by Conrad Gesner) of the Ger. popular name *trollblumen*. "Trollius flos, ut nostrum vulgus appellat." (Gesner.) The meaning of *troll* in the compound is not very clear. It is usually suggested that it is an old German word signifying 'a globe,' or 'something round'; but there is no old German word having such a sense.

LEPIDIUM.—Gr. λεπίδιον, 'little scale,' explained in all botanical works as alluding to the small pods; but the original species, *L. latifolium*, L., was so called from its supposed usefulness in lepra.

CORYDALIS.—From κορυδαλίς (deriv. fr. κόρυς, a 'helmet,

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* Due to Linnæus: "*Spergula*, a sparsione seminis." Phil. Bot., Ed. Spreng. p. 255

with a crest'), the Greek name for the crested lark, transferred to *Fumaria bulbosa*, L. (*Corydalis cava*, Schweigg.), from a fancied resemblance of its flower to the crest of that bird. Hence also one of the Ger. names for the same plant, *lerchenhelm*.

ALYSSUM.—"Gr. α, privative, λύσσα 'rage;' supposed by the ancients to allay anger." (Wood.) "Gr. ἀλύσσω, 'to be mad,' from its being supposed to cure mental maladies." (Eaton.) "Greek name of a plant reputed to check the hiccups, as the etymology [α, privative, and λύζω] denotes." (Gray.) At least two plants were anciently called ἄλυσσον. That of Dioscorides has been identified as *Farsetia clypeata*, R. Br., and that of Galen as *Marrubium Alyssum*, L. The plant mentioned by Galen is said by him to have been so called from its being good for the bite of a mad dog, and the same properties are assigned by Dioscorides to the *Marrubium*.

VINCETOXICUM.—The root of *Vincetoxicum officinale*, the plant to which this name was originally applied, was once held in some repute in Germany as an antidote to poison, and was known to materia medica as *Contrayerva Germanorum*. Hence the popular and Lat. names: Eng. *tame-poison*, Fr. *dompte-venin*, Ger. *widergift*, and Lat. *vincetoxicum* (from *vincere* and *toxicum*).

LYTHRUM.—From Gr. λύθρον, 'clotted blood;' not, as usually stated, in all botanical works, from the color of the flowers, but from the original species (*Lythrum Salicaria*, L.) having, on account of his astringency, been used to arrest hemorrhages.

Use of Spines in Cactuses.—Our brethren across the water, assuming that thorns are simply for protection in a military sense, are exercising themselves in their serials over the spiny leaves of the holly. When young and vigorous, *i. e.*, in early life, the teeth are very spiny; when the tree is aged and the branches then a distance above the surface of the ground, losing vigor, the spines are weak or absent. Sir John Lubbock and others, following the poet Southey, see in this a beautiful adaptation for protective purposes. When within the reach of animals, spines are borne, when high up where animals cannot reach, spines are unnecessary. Numbers of species of plants have mucronate points to the leafy serrature, which are wanting in maturer years. It is at any rate difficult to imagine why a sharp point should be made especially for protection, and points less sharp for no protective use at all.

I have often reflected on the fact referred to by Dr. Newberry, that our thorniest plants are in much greater proportion in places where animal life is scarce, and the immense police force sustained by the great vegetable community absolutely thrown away. Cactuses and other thorny things I have seen covered with thorns and spines on deserts where the hot air seemed to be bounding up and down like the surging ocean, and where not even a lizard could have dared to show its face. Thorns cannot be, so I have thought, for protection where the climate gives all the protection desired. I am not one who doubts that nature has a purpose in every move she makes, but the main purposes I think we seldom reach, and that we do ourselves an injury in research by assuming mere incidental uses as the main purposes for which structures seem to be "adapted."

One of these uses in the spines of cactus has occurred to me after reading Dr. Newberry's remarks on *Pinus edulis* in the last number. They break the full force of the sun on the plant, a force it is made to endure and not to love, as we know who have learned to cultivate it. Plant lovers set out their treasures in summer under "arbors" of fish-netting or galvanized wire, and those who have no experience would be surprised to find how the moving shadows of the twine or wire lowers the temperature. A mass of spines on a cactus must certainly have the same effect. A cactus does not need much light on its epiderm to keep healthy. On the dry mesas along the Uncompahgre River I have seen some aggregated masses of *Echinocactus phœniceus* forming dense hemispheres a foot high and as much wide, with spines so thoroughly interlaced with spines as to rival the hedgehog, and leaving not a particle of the green surface visible; and there are species not cæspitose, such as *E. pectinatus*, which no one can see for spines without cutting apart, and forming a complete protection from the hot suns under which they are doomed to live.

I do not suppose I have yet reached the final purpose of spines in a cactus any more than we have the final purpose in the existence of the cactus itself, but that one use of cactus spines is to furnish a partial shade I feel to be beyond a doubt.

THOMAS MEEHAN.

Gyalecta lamprospora, Nyl.—In a recent number of the *Regensburg Flora*, Dr. Nylander, of Paris, has described a lichen sent him by me as follows: "Thallus white, opaque, thin; apothecia becoming black, superficial, opaque, subrugulose, about $0.5^{mm.}$ or less in diameter; spores 8, without color, narrowly oblong, muriform-divided 0.100–$110^{mm.}$ long, 0.010–11 broad, in the middle somewhat constricted, paraphyses slender, the epithecium, with the perithecium and the lower stratum of the hypothecium, dark colored. Reaction with iodine fulvous red. On unknown exotic bark. A marked species of a distinct type. Thallus not corticate, all its elements, with the conceptacle of the apothecia, fulvous red; the scanty and confusedly cellular portion reacting similarly. Gonidia mostly chroolepid, connected, medium-sized and emitting lichenose hyphoid filaments. Younger apothecia obtusely margined, with an impressed disk. Thekes pyriform, long stipitate below, spermatia bowed, about $0.018^{mm.}$ long."

To this description Dr. Nylander adds: "We have distinctly seen each gonidium, and even young gonidia, of this lichen emit from its walls one and even two filaments, characteristically lichenose. It is perfectly evident that these productions are lichenose, and continuations of the wall of the gonidium. What then becomes of 'symbiosis'? for where is here the 'fungus' and where the 'alga'? In the lichen there exist only lichenose elements, as is everywhere demonstrated."

This lichen was sent me by Dr. J. W. Eckfeldt as having been collected near Philadelphia, without further indication. But the evidently exotic nature of the wood and the fact that two distinctly tropical lichens, a *Pyrenula* and a *Chiodecton*, grew on the same substrate, show that it does not properly belong to the flora of the region where it was found.

H. WILLEY.

Arthrocladia villosa, Duby, at Woods Holl., Mass.—A number of specimens of the above-named alga was collected by me during July and August, 1884. As the Rev. A. B. Hervey has examined a specimen, there can be no doubt as to the identification.

Prof. W. G. Farlow puts *Arthrocladia villosa* into Addenda, p. 183, Marine Algæ of New England, upon the authority of specimens found by Mr. Frank S. Collins at Falmouth Heights. In TORREY BULLETIN, Vol. x., No. 9, p. 106, it is stated that Mr. Geo. W. Perry found specimens also at Menanhant, near Falmouth.

My find is hence (so far as I know) the third one, and the locality is the most southern one yet reported.

JOHN E. PETERS.

Fertilization in Arenaria serpyllifolia.—Those who are continually noting and recording adaptations for cross-fertilization in flowers are to my mind engaged in a useful work. Still, I often wonder why they miss the opposite illustrations. The common weed *Arenaria serpyllifolia* affords a neat instance of behavior, that results in securing self-fertilization. The flower is at its best state of expansion about 8 or 9 in the morning in this region. Examined with a lens it will be found that the three pistils, in expanding, have curved horizontally to the east. In rotating, the stigmatic apex of the pistil catches every one its anther, and holds and retains it to the end. About the hour named, when the flowers are expanded, the pollen may be seen oozing from its cells and completely covering the stigma. The stamens of the outer tier mature pollen later, if indeed they have any at all, for I have never seen any that I thought truly polleniferous. I have examined many flowers but never found a pistil that had not caught its anther and received pollen in the way described.

THOMAS MEEHAN.

Notes from Kansas.—In the Forest Trees of North America, *Rhamnus Caroliniana*, Walter, is mentioned as found in Eastern Kansas. I have not seen it, but *R. lanceolata*, Ph., is quite common here. *Sapindus marginatus*, Willd., grows in Southern Kansas, but it is not credited to this State in the Forest Trees of North America. The writer spent a few days in Southeastern Kansas, Indian Territory, and Southwestern Missouri the latter part of June, and collected *Lechea Drummondii*, T. & G., *Callirrhoe digitata*, Nutt., *Œnothera linifolia*, Nutt., *Galium pilosum*, Ait., in Kansas (not reported from the State before), *Marshallia cæspitosa*, Nutt., not found heretofore within our borders. I expect to take a trip west before long to see what I can find, that I may have something of much interest to exchange.

Paola, Kansas. J. H. OYSTER.

Albino Mertensia.—Several years ago I procured some pips of *Mertensia Virginica* and planted them out. This year a white one bloomed in the bed, and also several pink ones. The pink ones may have flowered before and escaped my notice, but the white could not have done so. Has it been blue until this year and suddenly changed, or has it failed to flower for six or seven years?

E. S. MILLER.

Botanical Notes.

Histological Investigation, as applied to drugs, is evidently becoming an important part of pharmaceutical education in this country, judging from an elaborate paper on *Illicium Floridanum*, published in the *American Journal of Pharmacy* for May. The paper is illustrated with four plates, showing the minute structure of the fruit, seed, leaves, stem, bark and root of the plant. In the same journal a chemical investigation of the root of *Collinsonia Canadensis*, by Mr. C. N. Lochman, is recorded. The author finds that the rhizome contains a resin soluble in ether and partly in alcohol, vegetable wax, tannin, mucilage and starch, while the leaves contain resin, tannin, wax and volatile oil.

The Yaupon (*Ilex Cassine*, L.).—As well known, the leaves of this plant were formerly used by the Southern Indians in making a preparation called "black drink." A large quantity of the leaves was thrown into a great kettle of water suspended over a fire, and the Indians, sitting around, helped themselves to large draughts, which after a short time induced free and easy vomiting. This treatment was continued during two or three days, until it was considered that a sufficient cleansing had been effected. Some of these leaves have been submitted to a chemical examination by Dr. Venable, who reports (*Journ. Amer. Chem. Soc.*, April, p. 100) that he obtained from them a small quantity of caffeine, equalling .27 per cent. of the weight of leaves used. It will be remembered that caeffeine has also been found in "mate" (*Ilex Paraguayensis*), used in South America as a beverage.

The Respiration of Plants.—In a note communicated by Messrs. G. Bonnier and L. Mangin to the Paris Academy of Sciences (*Comptes Rendus*, c. 1303), these authors point out that hitherto the amount of oxygen given out by plants to the air has been supposed to represent the total result of the fixation of carbon. They show that this is not the case, but that at the same time that the carbon is assimilated by the chlorophyll, the protoplasm absorbs oxygen and emits carbonic acid. An analysis of the gas emitted by a plant, therefore, only represents the difference between the amount of oxygen disengaged by assimilation of carbon and the amount absorbed by respiration, and on the other hand, between the carbonic acid decomposed by assimilation and the carbonic acid produced by respiration. Three methods are given for separating the result of the action of chlorophyll from that of respiration. One is by calculating the difference between the whole amount of gas emitted and absorbed by plants exposed to light, and the volume which they emit by respiration alone in the same light. A second method consists in suppressing assimilation by the use of chloroform or ether without altering the respiration. In the third method, two plants, of which physiological identity has previously been ascertained, are exposed, the one to ordinary air, and the other under similar conditions except that a concentrated solution of barium hydrate is placed in the containing apparatus to absorb the carbonic acid formed. Under these circumstances an excess of oxygen is found in the apparatus without baryta, while in the apparatus containing it the carbonic acid when set free by hydrochloric acid is found to be in excess of that in the other vessel. The conclusion arrived at by the authors from these experiments is that the volume of oxygen disengaged by assimilation is greater than that contained in the carbonic acid decomposed.

Four cases of poisoning through children eating snowberries (*Spmphoricarpus racemosus*) are recorded in the *British Medical Journal* for May 16. The symptoms produced were vomiting, purging and delirium, followed by a semi-comatose condition. All four children recovered, although one suffered very severely.

Fossil Fungus.—A certain proof of the existence of fungi at very remote epochs has been furnished by Messrs. B. Renault and E. E. Bertrand, who have found in the tissues of the nucleus of *Sphærospermum oblongum*, a plant of the coal measures, a fossil species preserved by silica. The mycelium of this fungus was composed of delicate branches, which were elongated or irregularly clustered, according to the dimensions of the cells by which they were enveloped. The cells of the hyphæ were 10μ in length by 5μ in width, and appear to have been capable of becoming sporangia or of remaining sterile. The sporangia were ovoid, and 40 to 45μ in length by 20 to 25 in width, and swollen at the side. The fungus belonged among the Chytridiaceæ.—*Revue Scientifique.*

Influence of Heat and Light upon Vegetation.—*Ciel et Terre* gives the researches of Mr. Hellriegel upon this subject. Mr. Hellriegel undertook in the first place to ascertain the lowest temperature at which seeds are capable of germinating, and confined his experiments to 18 species of cultivated plants. The seeds, sprinkled with distilled water, were planted in large receptacles filled with vegetable mould that were raised to constant temperatures of 48° F., 40°, 38°, 35°, and 32°, and kept there for from 35 to 60 hours.

It was found that rye and winter wheat geminated at 32°. Barley and oats showed their cotyledon at 32°, but the root did not start till 35° were reached. Indian corn required 48°. The turnip germinated at 32°, flax at 35°, the pea and clover at 35°, the bean and lupin at 38°, asparagus at 35°, the carrot at 38°, and the beet at 40°.

The respiratory function requires little heat, and operates even in the entire absence of light. Heat and light, on the contrary, are most favorable for the assimilation of carbonic acid and its conversion into carbon. Mr. Hellriegel attaches very little importance to the color of the light.

Influence of Sunlight upon Vegetation.—M. Buysman contributes to a recent number of *Nature* an article on the influence of direct sunlight upon vegetation. He remarks that in the tropics plants are less dependent upon sunlight than in the arctic regions, owing to the constant high temperature. The author considers that the direct solar heat is the cause of the rich vegetation in some parts of the mountains of the temperate zone. The action of the sun's heat is most evident in the arctic regions, where Middendorff observed in full flower a *Rhododendron*, of which the stem and roots were frozen hard in the soil. He also met with a fully developed willow catkin peeping out of the snow, although the branch on which it grew was solidly frozen two inches down from the flower. It is obvious, therefore, that the temperature in the shade is no criterion of the temperature by which the vegetation of plants is raised.

A new Use for Eucalyptus Trees.—The patenting of a process for the manufacture of a preparation of the gum of *Eucalyptus globulus*, which has the effect of thoroughly removing the scales which form on steam-engine boilers, and of preventing rust and pitting, has created a largely increased demand for it both in this country and in Europe. The effect of this preparation in preventing the pitting and corrosion of boilers will, it is expected, extend the period of their usefulness 100 or 150 per cent., and, at the same time, effect a great saving in fuel, as scale is a non-conductor of heat. The company owning the patent, at Piedmont (Cal.), has also embarked in the distillation of essential oils of the *Eucalyptus globulus* which have heretofore been supplied by Australia, it being found that they can be produced at profit. With this object in view, the company proposes to set out extensive forests of *Eucalyptus*-trees, in order to have at its command a sufficient supply of leaves, the portion of the tree consumed in the manufacture of the oils.

The Egyptian Lotus.—Sir Gardner Wilkinson says of this plant: The *Nymphæa Lotus* grows in ponds and small channels in the Delta during the inundation, which are dry during the rest of the year; but it is not found in the Nile itself. It is nearly the same as our white water-lily. There are two varieties, the white, and that with a bluish tinge, or the *Nymphæa cærulea.* Though the favorite flower of Egypt, there is no evidence of its having been sacred; but the god Nefer-Atum bore it on his head, and the name *Nufar* is probably related to *nofar*, "good," and connected with his title. It was thought to be a flower of Hades or Assiente, and on it also Harpocrates is often seated. He was the Egyptian Aurora, or day-spring; not the god of silence, as the Greeks supposed, but figured with his finger in his mouth, to show one of the habits of childhood of which he was the emblem. Hence he represented the beginning of day, or the rise and infancy of the sun, which was typically portrayed rising every morning from that flower, or from the water; and this may have given rise to the notion of Proclus that the lotus-flower was typical of the sun. The lotus-flower was always presented to guests at an Egyptian party. It is evident that the lotus was not borrowed from India, as it was the favorite plant of Egypt before the Hindoos had established their religion there.

Change in bifoliar Spurs of Pinus.—In a paper lately read at the Royal Botanical Society of Edinburgh, Professor Dickson exhibited specimens of *Pinus sylvestris*, in which some of the ordinary bifoliar spurs or shortened branches had been stimulated to develop leaves with internodes, as is sometimes seen in the terminal shoots of the larch, thus showing a reversion to the condition which is present in the seedling plants of *P. sylvestris*. He also called attention to the fact that these spurs in *Pinus* fall off bodily after a certain period, from two to five years according to the species, thus approximating, as previously pointed out by Dr. J. Stark (*Trans. Roy. Soc. Edin.*, vol. xxvii., pp. 651–9), to many Cupressineæ, in which the individual leaves do not fall off, but where there is from year to year a shedding of leafy twigs, a phenomenon to which the term cladoptosis has been applied. In the genera *Sciadopitys* and *Phyllocladus* there are no foliage leaves at all in the adult state, these being all reduced to scales, and the function of the leaf performed by cladodes, which are slender and needle-like in *Sciadopitys* and form flat expansions in *Phyllocladus*.

Fir Leaf Wool.—Fir wool is a textile fibre which in Saxony is manufactured out of the needles of the fir-tree, the process being partly chemical and partly mechanical. For this purpose the needles are gathered in spring and summer, when they are young and green, old and withered ones being unsuitable. They are taken into barns, and there dried in a current of air. When dried, they are subjected to a settling and fermenting process similar to that in use for flax. This softens the woody parts and loosens them from the fibre, but the complete separation is only obtained after a lengthy boiling by steam. During this boiling à by-product is obtained in the shape of an oil (fir-wood oil), which is gathered and sold to chemists as a remedy for rheumatism and gout, its properties being similar to those of turpentine. The complete separation of bast and fibre is produced exactly as with flax. The fibre is now passed through a milling machine similar to that in use for woolen cloth, and is then carded and spun like cotton. Generally the carded fibre is mixed with a certain proportion of cotton or wool, and thus a kind of merino yarn is produced, which is worked in the hosiery frames into singlets, drawers, and stockings, these fabrics being then sold as anti-rheumatics and as a preventive of gout. When examined under the microscope the fibre appears as a tube, and striped, and as if covered by a fine network. Goods made of this fibre are sold to a considerable extent in Germany, though they are dearer than the ordinary merino goods.

Thuja gigantea is, among the trees on the north-west coast, the Indian's best friend, for out of its wood and bark he manufactures endless articles of domestic, hunting, fishing, and warlike economy. Most of his canoes are hollowed out of it, at least in Vancouver Island; and there is a case quoted where a canoe made out of *Cupressus Nutkaensis*, in Vancouver, was quite an exception, and indeed the canoe was probably traded from some of the northern tribes, and not of Vancouver manufacture at all. The Indian ropes are also very commonly twisted out of its bark. North of latitude 53° *Cupressus Nutkaensis* takes the place of *Thuja gigantea*, and is applied by the Indians to all the useful purposes of the latter, and to some others in addition. For instance, at the Matlakatlah Mission, on the coast of British Columbia, in about latitude 54° north, where there are fine groves of it, it is sawn into lumber and sent to Victoria, where it meets a ready sale among the cabinetmakers, as it takes a fine polish and works beautifully. Most of the prettily polished discs and little cylinders used by the Indians in gambling are made either from this wood or from that of *Acer macrophyllum*. It is also valuable for ship- or boat-building. The wood of *T. gigantea* is whitish, but in its fresh state is yellower; hence the name yellow cypress applied to it. It is light, tough, durable and easily worked, and, in addition, has a pleasant fragrance. On this account the Russians about Sitka used to call it *dushnik*, or 'scented wood.' It was at one time exported to China, and returned marked with Chinese characters, which warranted it as "real Chinese camphor-wood," puissant for many purposes, and a sovereign remedy against moths in drawers! In repairing old Fort Simpson, the only log found sound after twenty-one years' trial of those used for under-pinning was a stock of this.—*The Garden*.

Botanical Literature.

Mushrooms of America, Edible and Poisonous. Edited by Julius A. Palmer, Jr. Published by L. Prang & Co., Boston.

This is a collection of twelve colored charts of edible and poisonous toadstools prepared for popular use rather than for students of science. All technical terms are therefore as far as possible avoided. The fungi illustrated are the more common edible species and such dangerous and suspicious ones as might be confounded with those given as esculent. Each chart contains a good description of the fungus or fungi illustrated, and, in the case of the esculent species, the best methods of preparing them for the table. The illustrations are in every case very true to nature, and by far the most accurate of the kind that we have ever seen.

While there is a large number of persons actively engaged in the scientific study of fungi in this country, there are few persons who have studied these plants solely with a view to ascertaining their edible or poisonous properties. Among the few who have done so is the editor of this collection, who has devoted more than ten years to experiment in this field of research. Of his ability to prepare such a work, then, there can be no doubt.

We do not agree with Mr. Palmer that the terms "mushroom" and "toadstool" "are both applied with equal reason to any fleshy fungus," and that they should be used as synonyms, "like the corresponding terms 'plant' and 'vegetable,' or 'shrub' and 'bush.'" Toadstool is a very useful general designation for fungi of the order Agaricini and the genus *Boletus*, but the name mushroom should be restricted to *Agaricus campestris*, to which it was transferred in early times from another edible species, *Agaricus Georgii*, Fr. (*A. Mouceron*, Secr.) Should these charts receive a welcome from the public, it is the intention of the publishers to furnish a supplement, from time to time, under Mr. Palmer's supervision, until the illustrations comprise all or nearly all of the edible fungi of America.

Bulletin of the Iowa Agricultural College, issued by the Department of Botany, Nov. 1884. Charles E. Bessey, Ph.D., Professor of Botany. 8vo, pp. 174.

A Revision of the North American Melicæ. By F. L. Scribner. 8vo., pamph., pp. 10, with one plate. From *Proceedings* of Philada. Acad. Nat. Sciences.

Thirty-fifth and Thirty-sixth Annual Reports on the State Museum of Natural History. By the Regents of the University of the State of New York. (Containing the Reports of the Botanist, Chas. H. Peck) Albany: Wells & Parson Co. 1884.

Recherches anatomiques sur les organes végétatifs de l' Urtica dioica, L. Par A. Gravis, Bruxelles: Librairie Médicale et Scientifique de A. Manceux, 1885. 4to, pp. 234, plates 23.

Catalogue of Musci and Hepaticæ of North America, north of Mexico. Arranged by Clara E. Cummings (of Wellesley College) Natick, Mass: Howard & Stiles. 1885. 8vo, pamph. pp. 24.

Proceedings of the Torrey Club.—The regular meeting of the Club was held Tuesday evening, May 12th, the President in the chair and twenty-four persons present.

Mr. Schrenk exhibited mounted specimens of the seeds of *Impatiens fulva* having three cotyledons. Dr. Britton exhibited some flowers of *Gaylussacia resinosa* and *Andromeda Mariana*, which were greatly enlarged through the hyphæ of an *Exobasidium.*

Dr. Kunzé exhibited a growing specimen of a large-bulbed species of *Ornithogalum* from Cape Colony. Mr. E. P. Bicknell read some notes upon cleistogamy in *Lamium amplexicaule;* Dr. Newberry presented a note upon derivation in *Pinus edulis* and *P. monophylla;* and Dr. Britton read a description of a new variety of *Veronica Anagallis*, and exhibited numerous dried specimens of it from various localities.

Four persons were elected active members, and one, a corresponding member.

At the regular meeting held Tuesday evening, June 9th, the President occupied the chair, and twenty-one persons were present.

Reports upon the field excursions that had been held were made by various members who had participated in them.

Mr. Schrenk showed young plants of *Impatiens fulva* with three cotyledonary leaves.

Dr. Newberry made some remarks upon the fossil flora of the Berea Grit of Ohio, and exhibited specimens of a *Lepidodendron* and *Spirophyton* belonging thereto. In regard to the drift of Ohio, Dr. Newberry said that a remarkable feature was the quantity of red-cedar wood scattered through it, much of which retained its well known fragrance and color.

On motion, the Club adjourned to the second Tuesday in September.

Fig 1

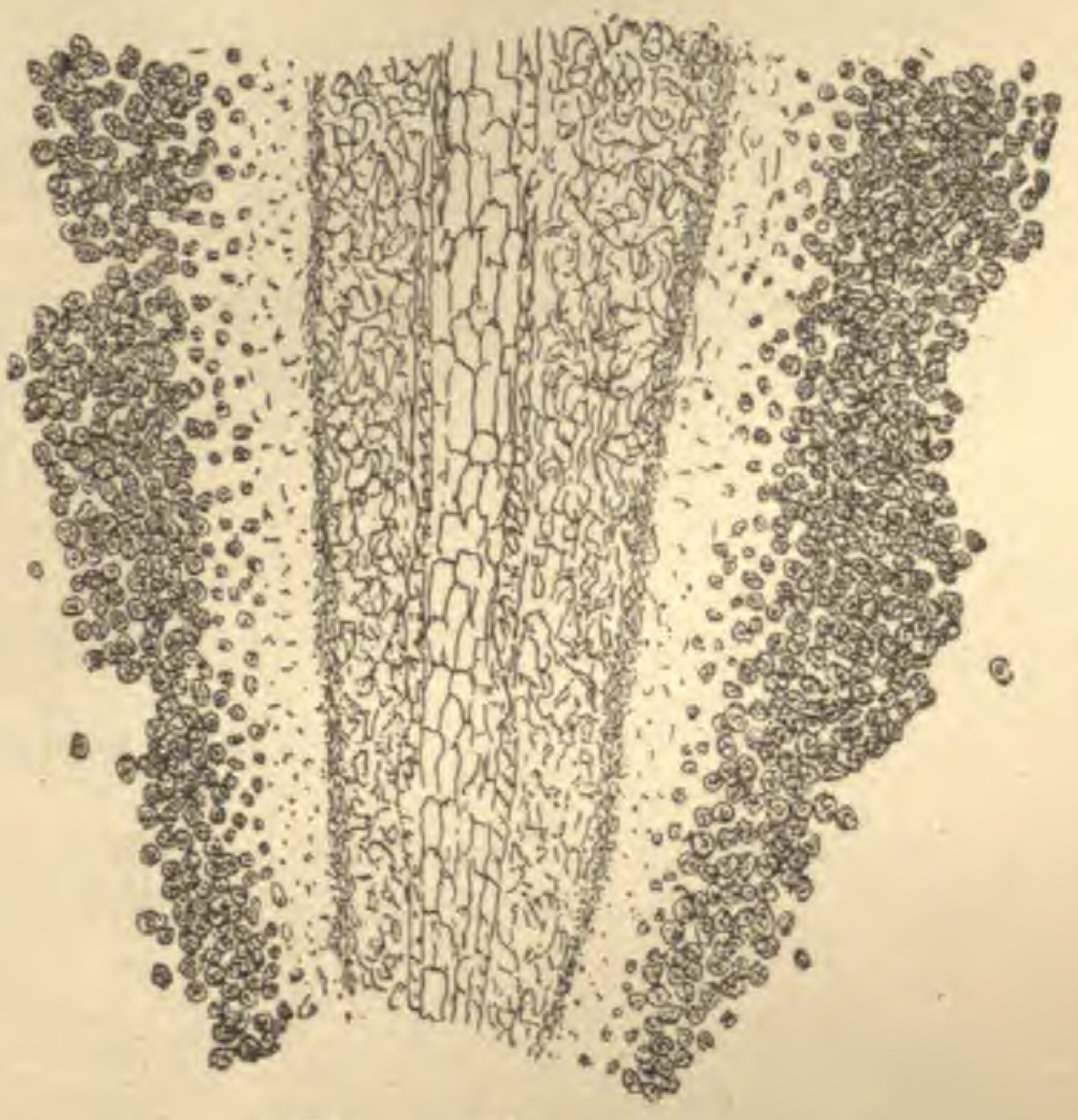

Fig 2

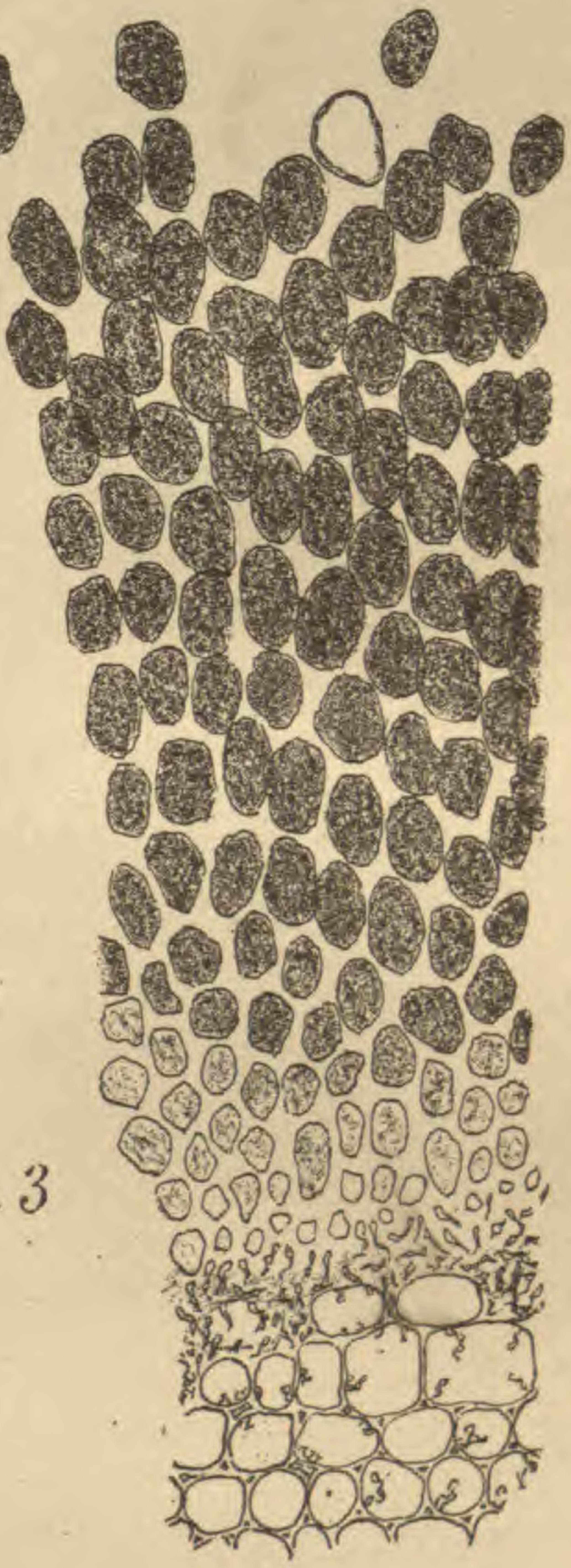

Fig. 3

BULLETIN

OF THE

TORREY BOTANICAL CLUB.

Vol. XII.] New York, July, 1885. [No. 7.

The Genus Cintractia.

By William Trelease.

(Plate L.)

In the Southern States and West Indies, species of *Cyperus* and *Fimbristylis* and, perhaps, other Cyperaceæ are attacked by a rare smut which forms compact, black, fusiform swellings in their flower-stalks. This fungus was named *Ustilago axicola*, by Berkeley, in an enumeration of fungi from San Domingo, published in the *Annals of Natural History* for March 1852. A variety is mentioned in *Grevillea*, iii., p. 59. Specimens from the Kew herbarium have been more recently studied by Cornu, who found the mode of fruiting so unlike that of other species of *Ustilago* that this species was made the type of a new genus called *Cintractia* in honor of a French botanist by the name of Cintract.*

This genus, which has a close affinity with *Testicularia*, possesses a persistent mycelium, which may be seen in the form of delicate, colorless threads in the central portion of the peduncle and other diseased parts, below the surface of which it becomes aggregated into a compact, gelatinous stroma, from the outside of which spores are successively differentiated, so that the innermost are always young and pale, while the outer spores, which are at first held together by the remnants of the stroma, deepen in color and gradually separate as they mature.

Specimens of *C. axicola* (B.), on *Fimbristylis*, collected in Cuba by Wright, and preserved in the Curtis herbarium under the number 721, for which I am indebted to Professor Farlow, agree in all essentials with the description drawn by Cornu from a specimen on *Cyperus*. In both, the mycelium forms a compact, dark-brown stroma, which surrounds the medullary and fibro-vascular portion of the stem, and is produced outward in a series of tapering ridges of the same color, between which the fertile hyphæ form wedge-shaped masses of spores that, when mature, are nearly spherical, smooth and of a deep brown color, and measure 12–18μ, the most usual size being about 14μ.

On the receipt of Cornu's paper, I was struck by the resemblance of a smut on *Juncus tenuis* to *Cintractia axicola*. This species,

* Maxime Cornu: Sur quelques ustilaginées nouvelles ou peu connues, in *Annales des Sciences Naturelles*, Botanique $\frac{6}{15}$, p. 277–279, pl. 15, fig. 1–3.

which forms rather firm, black sori about the peduncles, on the divisions of the perianth, etc., (Fig. 1) was named *Ustilago junci* by Schweinitz, in his Synopsis of North American Fungi, No. 2,816. As in the preceding species, its mycelium persists within the diseased parts of the host, though it is usually less abundant in the pith. Outside of the fibro-vascular bundles it becomes denser, forming a continuous, gelatinous stroma, which is colorless except for a narrow, yellowish band near its outer edge (Fig. 2). The outermost cells of this stroma are uniformly fertile, so that its entire outer portion passes into a mass of young spores that are gradually pushed outward as they mature (Figs. 2–3). At first the sori are covered by the epidermis, which renders them lead-colored. After its disappearance the mass of spores appears intensely black, and gradually crumbles away. The mature spores, as seen singly, are of a dark brown color and rather opaque. They are minutely granulated, irregularly rounded or ellipsoidal in form, and measure $12–15 \times 14–21 \mu$.

In the successive production of spores from a fertile stroma, this species closely resembles the last. It is evidently referrible to the same genus, and should bear the name *Cintractia junci* (Schw.) It differs from the other species in the character of its spores, which are darker, more angular, often elongated and minutely roughened, as well as somewhat larger, and in possessing a nearly colorless stroma, the entire outer surface of which is sporiferous and destitute of the sterile rays characteristic of *C. axicola*.

Spores of *C. junci* germinate readily in water while fresh, each emitting a colorless filament 1.5μ in diameter, which reaches a length of several millimetres within a few days in cell cultures. The refractive protoplasm which at first fills it passes toward the end as it grows, leaving the basal part empty. The formation of sporidia on these threads has not been observed. Similar hyphæ which are to be found in abundance in the outer portion of sori that have been exposed to rain or allowed to remain damp in the press are presumably of the same nature, though they have not been traced to the spores.

This species is found on *Juncus tenuis* in New York (Sartwell, *fide* Berkeley in *Grevillea* iii., p. 59; Howe, *fide* Peck in 22d Report on N. Y. Cabinet, p. 93), North Carolina (Curtis, Plants of N. C., p. 123), Iowa (Bessey, Bulletin Iowa Agl. College, Nov., 1884, p. 145; Arthur, *l. c.*, p. 172) and Wisconsin (Trelease, Parasitic Fungi of Wis., No. 252.) It is distributed from New Jersey by Martindale in Ellis's North American Fungi, No. 290; and I have also collected specimens in that State. As a rule, nearly every inflorescence will be attacked on a given stool of the host, while other plants immediately about it remain entirely free.

Description of Plate L.—1. Inflorescence of *Juncus tenuis* attacked by *Cintractia junci* (Schw.); natural size. 2. Longitudinal section through the lower part of a smut sorus, in the peduncle of the same plant, showing the stroma and spore-mass on either side of the nearly unaltered inner tissues of the plant (x70). 3. Fragment of a cross-section through a similar sorus, showing the mode of formation and maturation of the spores on the outside of the stroma (x400).


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Bronze Medallion Portrait of Dr. Gray.—We present on the preceeding page, from *Science*, an engraving of an admirable bronze medallion of Dr. Asa Gray, by Saint Gaudens, a gift to Harvard College from some of the doctor's friends and associates.

"It is an excellent likeness of our distinguished botanist, and a fine specimen of the artist's peculiar work. It has the earnestness and geniality of expression which the passing years seem to impress more forcibly upon Dr. Gray's countenance; and the artist has so wrought the stubborn material as to impart grace and apparent flexibility to the flowing locks. This admirable work of art, representing, as it does, in so thoroughly an artistic manner, one of the leading scientific men of America, will be worthily placed upon the walls of the college halls, with which his name and fame will be forever associated."

Sabal umbraculifera.—In Notes on the Winter Flora of Bermuda (Vol. xii., p. 47) I notice Mr. Kemp gives *Sabal umbraculifera* as one of the distinguishing features of the flora of Bermuda. As this palm is a native of the hottest parts of Jamaica (Lat. N., 18), I was much surprised to find it naturalized so far north as Bermuda (Lat. N., 32). On turning, however, to the Botany of Bermuda, by General Sir John H. Lefroy, I find he gives *Sabal Palmetto*, the palmetto of the Southern States, as the universal palm of Bermuda, and does not mention *S. umbraculifera* at all. Hence I think Mr. Kemp has by inadvertence given the latter for the former palm. This is an important point in geographical botany, for it would have been a singular instance of the hardihood of a plant which here lives under all the conditions of a coco-nut palm, but said to flourish and become universal when the latter had only a struggling existence.

Gordon Town, Jamaica. D. MORRIS.

Kalmia as a Tonic.—I note in the BULLETIN for May, 1885, the mention of *Kalmia angustifolia* being used as a tonic by Indians. Why not, even if it possesses the poisonous properties of its congener *K. latifolia*—which it most assuredly does—as far North as Nova Scotia? It kills lambs in the spring there, when but little other herbage has commenced growth, hence its name "lamb-kill." This I have verified by three years observation in that country. But why surprise should be excited at its use as a tonic I am at a loss to imagine, when some of our best tonics contain arsenic and nux vomica.

Gordon Town, Jamaica. J. HART.

(But arsenic and nux vomica are not remedies among the *Indians*, and we presume that the surprise of the author of the note alluded to was that a plant reputed as poisonous should be used by *them* as a tonic. Of course, among civilized peoples the selection of deadly drugs as remedies is of so common occurrence as to excite no comment.—ED.)

The Word Savoyanne.—In the article upon *Coptis*, in the Drugs and Medicines of North America, the editors say: "In French towns in Canada, we are informed by Dr. Mignault, it [*Coptis*] is known among the people under the name of *savoyanne*, from some old plant of France. It is sold in all the French markets, and is extensively used in domestic medicine as a tonic and appetizer. Don Miller states that it is known as *tisavoyanne* by the Canadian French." In a foot-note, Dr. Chas. Rice says: "There is no doubt in my mind that the syllable 'savoyanne' is a dialectic adjective of the name of Savoy (once a French province.) . . . The syllable *ti* may be a patois for the name of the plant, or some other corruption. . . . It would be quite natural for persons who call madder the *red Savoy* 'ti' (whatever this may mean) to call gold-thread or *Coptis* the *yellow Savoy* 'ti'. The names were, of course, carried by settlers to Canada."

These conjectures fall very short of the mark. The Canad. Fr. *tisavoyanne* (abbreviated to *savoyanne*), far from being an importation from France, is of Indian origin, and corresponds to Micmac (Algonkin) *tissaωhianne**, 'skin-dye' (Cree *atisâweyân*), which, like Cree *atisigan*, Odjibway *adissigan*, Shawnee *hâtethikâkh*† (words meaning 'dye-stuff'), is from the root *ati*, 'to color.' These are general names for such plants as yield these tribes a dye-color.

Kalm tells us that the leaves and stalks of the *Coptis* were used by the Indians of Canada for giving a fine yellow color to several kinds of articles that they made of prepared skins. The French learned the plant's tinctorial property from the Indians, and used it for dyeing wool and other materials. Hence the Algonko-French name *tisavoyanne jaune*, in contradistinction to *tisavoyanne rouge*, a name for *Galium boreale*, L., and *G. trifidum*, L., var., *tinctorium*, Gray, the roots of which were (and are still) used by the Indians for staining their porcupine quills red, and by French women for dyeing their clothes.

I notice that *savoyan* appears in the catalogues of some of our dealers in herbs as a popular name for *Galium Aparine*, L. The name has been transferred from the two species of *Galium* just mentioned.

W. R. Gerard.

The Botanical Club of the A. A. A. S. will hold its meeting during the week August 26th to September 2d at Ann Arbor, Mich., as an adjunct of the American Association. Any member of the Association who takes an interest in botany is eligible to membership in the Club. The only other requirement is that of registration, which should be attended to immediately after registering for the Association. The Club is tendered an afternoon excursion by carriage to the most interesting collecting grounds in the vicinity. The long excursion on Saturday will be so managed that botanists can spend some time in herborizing. If a sufficient number desires it, a trip can be arranged at small expense to Cedar Lake, a few hours ride by rail from Ann Arbor, where there is one of the few remaining

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* As written by French missionaries.

† These Indians speak with a lisp, a spirant *th* replacing the sibilant *s* of the other Algonkin dialects.

tracts of white pine that represents all that is left of one of the most magnificent pine regions of the continent. The excursion to the island of Mackinac and Sault Ste. Marie after adjournment will be especially attractive to botanists. Most of the prominent western botanists will be in attendance at this meeting, and many others from all parts of the country. No botanist should willingly miss so good an opportunity to become acquainted with his co-laborers and to obtain the inspiration to be secured through personal associations.

J. C. ARTHUR,
Secretary of Botanical Club of A. A. A. S.

Dr. Franklin B. Hough.—Science, especially botany and forestry, has lost an illustrious worker in Dr. Franklin B. Hough, who died at his residence in Lowville, New York, on the 9th of June, in his 63d year—he having been born at Martinsburg in Lewis County, New York, on the 20th of July, 1822. He practiced medicine in Somerville from 1838 to 1842, and continued to cultivate his natural taste for literary, historical and statistical work. In 1847 he published an account of the flora of Lewis County, which was so well received by the botanists of that day that he received his first scientific honors soon after by being elected a correspondent of the Academy of Natural Sciences of Philadelphia, which has been followed since by his election to some thirty-six other scientific or literary bodies. His statistical and historical labors, especially in connection with his own native State, have been enormous.

Dr. Hough, as a member of the American Association for the Advancement of Science, was a prime mover in the action of that body, which did so much to make the modern phase of forestry a national question; and when, in response to this movement, the national government undertook an investigation of the forestry question, Dr. Hough was placed in charge of the matter under the supervision of the Department of Agriculture. His reports in connection with this are models of pains-taking industry in the collection of facts. It was in just such work that his talent showed to advantage. It was always charming to engage him in conversation in connection with the history of any of our common studies. Anecdotes connected with men and things, with a ready recollection of dates and incidents, would be freely communicated with an easy freshness truly remarkable.

During the winter he was engaged at Albany in drafting, and watching through its various stages, the Forestry Bill which has since become the law of that State. He still contrived to work on other literary subjects that were quite enough for one man's time. It is believed this weakened his hitherto iron constitution, and brought on an attack of pneumonia about the beginning of April. After four weeks he seemed well enough to be removed to his home at Lowville, but only eventually to succumb.—*Gardeners' Monthly.*

Botanical Notes.

Origin of the Lombardy Poplar.—According to Mr. Bossier, a botanist who has lately studied oriental botany, this poplar is a distinct species, which he calls *Populus pyramidalis*. It is believed by the best authorities to have originated in Persia; some writers, on the other hand, state that it is truly indigenous to Italy, but the evidence, however, we think is strongest in favor of Persia, from whence most probably it was introduced into Italy, where it is now a favorite tree and extensively grown. Lord Rockford has the credit of having imported this Poplar into England, by means of cuttings brought from Turin in the year 1758. The original trees raised from those cuttings are supposed to have been planted at Blenheim, in Oxfordshire.—*Garden.*

Trees of the United States.—There has recently been placed on exhibition, at the New York Museum of Natural History, an almost complete representation of the trees of the United States, between 400 and 500 trunk sections of the different species. These specimens are about five feet eight inches long each, cut in such manner as to display their barks and the transverse and longitudinal sections of the wood. This is done by cutting away one side of each specimen at the top to the depth of one-half the diameter of the trunk and for one-third of its length. One-half of each exposed portion is polished to illustrate the effect of this treatment of the wood, the remainder being left in the natural condition, with the top of the upper divided part finished by beveling. In the case of trees of commercial importance this form of representation is supplemented by carefully selected planks, or by burls, showing better than the logs the true industrial value of the wood. Among specimens of this kind is a plank of redwood (*Sequoia sempervirens*), measuring 8½ feet in width. A species remarkable for slow growth, and which is only 24 inches in diameter, shows an age of 410 years, being the oldest tree in the collection. This is *Picea Engelmanni*, named for its discoverer, Dr. Engelmann, and known also as Engelmann's spruce. Another example of slow growth is seen in *Pinus edulis*, or edible pine, from Arizona, called also nut-pine. The seed of this pine, which resembles a good-sized bean, is used by the Indians for food. A tree of this species which is 300 years old measures only 15 inches in diameter. Another specimen, which is 341 years old, shows a diameter of 37 inches. It is the western shell-bark hickory (*Carya sulcata*), from Allenton, Mo. The same locality is represented by a specimen of *Tilia Americana*, or basswood, which is 40 inches in diameter, and 150 years old.

This valuable collection, numerically exceeding that made in connection with the census reports, includes examples of many curious and interesting species, of which probably the complete natural series could never have been viewed in their native soil by any single traveller, however diligent.

Among the extraordinary specimens is a representative of Texas. This is the *Cereus giganteus*, which resembles a fluted column. It is a plant which can be readily taken all to pieces. Its component parts are in the form of vertical sections of twisting curvatures in the line of their circumference, whereby one portion is fitted exactly to another. They can be separated without the slightest difficulty, in the absence of any heart at the centre for their attachment. The

Washington palm (*Washingtonia filifera*) from Southern California is also curious. The specimen includes the top of the tree, which is severed from the body, and bears its dried and yellow wide-spreading leaves. Its peculiarity is in the ring formations of the trunk, which are almost wholly detached from each other, standing one within another like a succession of forms of bark. They are easily detached from each other.

The cocoanut-tree from Key West and the finely odorous nutmeg-tree from Calitornia are among other specimens of importance. The catalpa is represented as a species most remarkable for its durability. Some of this wood known to have been buried in the earth for seventy-five years has been brought out in perfectly sound condition. Specimens of beautiful woods are seen in the arbutus, sweet bay (*Persea Carolinensis*), Alaska cedar (*Chamæcyparis Nutkaensis*), and the beautifully figured maple burl from Missouri.

With only seven unimportant exceptions, the specific gravity, ash, and fuel value of the wood of every indigeneous aborescent species of the United States have been scientifically determined. The specific gravity was obtained by weighing carefully measured specimens 100 millimetres long and about 35 millimetres square, previously subjected to a temperature of 100° until their weight became constant. The ash is given in percentages of dry wood, which were determined by burning small blocks of the wood in a muffle furnace at a low temperature. The relative approximate full value of any wood is obtained by deducting its percentage of ash from its specific gravity. The correctness of the result thus found is based npon the hypothesis, first proposed by Count Rumford, that the value of equal weight of all woods for fuel is the same, which is considered to be approximately true.—*Scientific American.*

Origin of the Cereals.—Recent numbers of *Naturen* contain interesting papers, by Prof. Schubeler, on the original habitat of some of the cereals, and the subsequent cultivation in the Scandinavian lands and Iceland of barley and rye more especially. It would appear that barley was cultivated before other cereals in Scandinavia, and that the generic term "corn" was applied among Northmen to this grain only, from the oldest times, and that in the Norwegian laws of the seventeenth and eighteenth centuries, wherever reference was made to "*kornskat*"—or standard by which land in the Northlands was, and still is, rated in accordance with the corn it is capable of yielding—the term was understood to apply to barley. Proof of the high latitude to which the cultivation was carried in early ages is afforded by the Egil's Saga, where mention is made of a barn in Helgeland (65° N. Lat.) used for the storing of corn, and which was so large that tables could be spread within it for the entertainment of 800 guests. In Iceland, barley was cultivated from the time of the colonization, in 870, till the middle of the fourteenth century, or, according to Jon Storrason, as lately as 1400.

From that period down to our own times barley has not been grown in Iceland, with any systematic attention, the islanders being dependent on the home country for their supplies of corn. In the last century, however, various attempts were made both by the Danish government and private individuals to obtain home-grown corn in Iceland, and the success with which these endeavors were attended gives additional importance to the systematic undertaking which has been set on foot by Dr. Schubeler and others within the last three years for the introduction into the island of the hardier cereals, vegetables and fruits. As many as 382 samples of seeds of ornamental and useful plants most of which were collected from the neighborhood of Christiania, are now being cultivated at Reykjavik under the special direction of the local government doctor, Herr Schierbeck, who succeeded, in 1883, in cutting barley ninety-eight days after the sowing of the seed, which had come from Alten (70° N. Lat.). And here it may be observed that this seems the polar limit in Norway for anything like good barley crops. The seed is generally sown at the end of May, and in favorable seasons it may be cut at the end of August; the growth of the stalk being often 2½ inches in twenty-four hours. North of 60° or 61° barley cannot be successfully grown in Norway at more than from 1,800 to 2,000 feet above the sea-level. In Sweden, the polar limit is about 68° or 66°, but even there, as in Finland, night frosts prove very destructive to the young barley.

In some of the field valleys of Norway, on the other hand, barley may, in favorable seasons, be cut eight or nine weeks after its sowing, and thus two crops may be reaped in one summer. According even to a tradition current in Thelemarken, a farm there owes its name, *Triset*, to the *three* crops reaped in the land in one year!

Rye early came into use as a breadstuff in Scandinavia, and in 1490 the Norwegian Council of State issued an ordinance making it obligatory on every peasant to lay down a certain proportion of his land in rye. In Norway the polar limit of summer rye is about 69°, and that of winter rye about 61°; but in Sweden it has been carried along the coast as far north as 65°. The summer rye crops are generally sown and fit for cutting about the same time as barley, although occasionally, in Southern Norway, less than ninety days are required for their full maturity.—*Nature.*

The Prickly Pear.—In some recently published Consular reports of the United States the following paragraph on the nopal, or prickly pear (*Opuntia cochinillifera*) occurs:—"The plant abounds in the whole territory of Mexico, Texas, New Mexico, Arizona and California, and extends much farther north. It has flat oval leaves, about six inches long and nearly half an inch thick, covered by long sharp thorns, and bears a fruit of a purple color resembling a pear, filled with numerous small seeds. The plant grows from three to six feet high. Its fruit is eaten freely by cattle, and the leaves, after having been burnt in a fire to get rid of the thorns, are thrown by the cartmen in place of fodder to their oxen by means of a long, sharp-pointed stick, especially when on a road where there is no grass. It also makes an excellent hedge, and once planted will last forever. There is another species of nopal called *nopal de castilla*, which has no thorns, and which is cultivated for the sake of its fruit. This nopal has much larger leaves than the wild species, and grows to the height of ten and twenty feet, and the fruit is much larger. Of this species there are a great many different kinds, each having its distinct name. They are of different colors—green, red, yellow, white and purple. The fruit is delicious, and in the interior of Mexico forms one of the principal means of sustenance for the inhabitants. From the purple tuna a liquid is made called *colonche*, and a sort of sweet cheese (*queso de tuna*). There is a small red tuna growing wild in the mountains near to Zacatecas, called cardona, which is highly prized on account of its fine flavor and digestible qualities, and several cartloads of which are sold daily in Zacatecas. They are sold at six cents for four dozen. Besides serving as food for men and beasts its leaves form the food of the cochineal insect.

The Tomato.—"In the United States its introduction preceded by many years its use as we at present know it. It is said to have reached Philadelphia from St. Domingo in 1798, but not to have been sold in the markets until 1829. It was used as an article of food in New Orleans in 1812. The first notice of it in American gardens was apparently by Jefferson, who notes it in Virginia gardens in 1781. It was introduced into Salem, Mass., about 1802, by an Italian, but he found it difficult to persuade people even to taste the fruit. Among American writers on gardening, McMahon, 1806, mentions the tomato, but no varieties, as 'in much esteem for culinary purposes'; Gardiner and Hepburn, 1818, say: 'make excellent pickles'; Fessenden, 1828, quotes from Loudon only; Bridgeman, 1832, says, 'much cultivated for its fruits in soups and sauces.' They were first grown in Western New York in 1825, the seed from Virginia, and in 1830 were not produced by the vegetable gardeners about Albany; yet directions for cultivating this fruit appeared in Thorburn's Gardeners' Kalendar, 2d. edit., New York, 1817. Buist writes that as an esculent plant in 1828–29 the tomato was almost detested, yet in ten years more every variety of pill and panacea was 'extract of tomato.' Mr. T. S. Gold, Secretary of the Connecticut Board of Agriculture writes me that 'we raised our first tomatoes about 1832, only as a curiosity, made no use of them though we had heard that the French ate them. They were called love-apples.' D. J. Browne, 1854, describes six varieties and says: 'the tomato until within the last twenty years was almost wholly unknown in this country as an esculent vegetable.' In 1835 they were sold by the dozen in Quincy Market, Boston. In the *Maine Farmer*, Oct. 16th, 1835, in an editorial on tomatoes, they are said to be cultivated in gardens in Maine, and to be 'a useful article of diet, and should be found on every man's table.' In a local lecture in one of the Western colleges about this time, a Dr. Bennett refers to the tomato or Jerusalem apple as being found in the markets in great abundance, and in the *New York Farmer* of this period one person is mentioned as having planted a large quantity for the purpose of making sauce. In 1844 the tomato was now acquiring that popularity which makes it so indispensable at present, writes R. Manning." From this it appears "that the esculent use of the tomato in America does not antedate the present century, and only became general about 1835 to 1840."—Dr. E. L. Sturtevant, in *Amer. Naturalist.*

The Ailantus.—An English exchange says: Many complaints have been made of the overpowering and offensive odor of the flowers of the *Ailantus* trees planted in the streets of Paris and other large cities. According to Mr. E. André, it is only the flowers of the male trees which exhale this unpleasant scent, and he recommends that none but female trees should be for the future planted in public or other places where the peculiar odor of the males might be offensive. This would seem an important point for Americans and others who plant the *Ailantus* largely as a street tree."

The fact pointed out by Mr. André belongs to the domain of ancient history in this country.

A Large Poplar.—In the Botanical Garden at Dijon there is a poplar of colossal dimensions (species not stated) to which Mr. Joly devotes a note in the *Journal de la Société Nationale d'Horticulture.* The height of this tree is 130 feet. Its circumference near the earth is 46 feet, and, at 16 feet above the earth, 21 feet. Its bulk is now 1,590 cubic feet, but six years ago, before the fall of one of the large branches, it was 1,940. From some historic researches made by Dr. Lavelle, and a comparison with trees of the same species in the vicinity, it has been pretty well ascertained that this poplar is at least 500 years old.

Unfortunately, it is now completely hollow up to the point whence the large branches spring. All the dead portions have been removed, and the interior has been filled in with beton.—*La Nature.*

Origin of the Name Tillandsia.—The long moss was named *Tillandsia* because of its aversion to water. Linnæus says he named it after a professor at Abo, who, in his youth, having an unpropitious passage from Stockholm to that place, no sooner set his foot on shore than he vowed never again to venture upon the sea. He changed his original name to Tillands, meaning (in Swedish) 'by land.' Afterwards, having occasion to return to Sweden, he took a circuitous journey of 200 Swedish miles through Lapland to avoid going eight miles by sea.—*Garden.*

Ginkgo.—According to Mr. B. S. Lyman (in *Science*), *ginkgo,* the usual orthography of the popular name for *Salisburia adiantifolia*, is due to a misprint in Kæmpfer's Amœnitates Exoticæ. In order to agree with the pronunciation as heard in Japan, the word (which means 'silver apricot,' or 'silver almond') should be written *ginkiyoo* (the *g* hard, and the two *o's* long.) *Ginkiyoo* is the name of the fruit, the tree itself being called *ichoo* (*ch* soft and the *o's* long, as before.) Mr. Lyman says: "The juice of the thick pulp outside the nut is very astringent, and is used in making a somewhat waterproof, tough paper, and a preservative black wash for fences and buildings. The meat of the nut is cooked and eaten."

Botanical Literature.

The Microscope in Botany. A guide for the Microscopical Investigation of Vegetable Substances. From the German of Dr. Julius Wilhelm Behrens. Translated and edited by Rev. A. B. Hervey, A.M., assisted by R. H. Ward, M.D., F.R.M.S. Illustrated with 13 plates and 153 cuts. Boston: S. E. Cassino & Co., 1885. 8vo, pp. 466.

This is a work which should be in the hands of every botanist who is interested in investigations into the deeper problems of plant-life. The first two chapters are devoted to brief descriptions of the microscopical apparatus necessary for his purposes, with directions for using them, and to the manner in which microscopical work should be performed. The translators have substituted descriptions and figures of American instruments for those of the Continental style described in the corresponding chapters in the German edition, inasmuch as the foreign apparatus are comparatively unused and unavailable in this country.

The third chapter contains very full directions for the preparation of microscopical objects. The fourth and fifth chapters are devoted, respectively, to microscopical re-agents and microscopical investigations of vegetable substances. In these two chapters, which constitute the most valuable portion of the work, the student will find a very large number of facts and hints that will aid him greatly in the practical performance of those delicate manipulations that he will be obliged to master before he can become an expert in the histological investigation of plants.

The book is very handsomely printed, and the illustrations are both numerous and excellent.

Canadian Filicineæ. By John Macoun, M.A., F.L.S., and T. J. W. Burgess, M.D. 4to, pp. 64. From *Transactions* of the Royal Society of Canada.

Note sur la Division des Noyaux dans le Tradescantia Virginica. Par E. Bernimoulin de l' Institut Botanique de l' Université de Liége. From the *Bulletin* de la Societé Royale de Botanique de Belgique.

A Catalogue of the Phænogamous Plants at present known to grow without cultivation in the State of Connecticut. By James N. Bishop. 8vo, pamph., pp. 18. Hartford, Conn., 1885.

Catalogue of the Phænogamous and Vascular Cryptogamous Plants found growing in Meriden, Conn. By Emily J. Leonard. In *Transactions* of the Scientific Association of Meriden. Vol. i., 1884, pp. 40.

A descriptive Catalogue of the Grasses of the United States, including especially the Grass Collections at the New Orleans Exposition. By Dr. Geo. Vasey, Washington: Gibson Bros. 1885. 8vo, pp. 110.

Notizie sulla Agricoltura in Italia da servire come Illustrazione alle Raccolte inviate dal Ministero di Agricoltura alla Esposizione Universale di Anversa nell' anno 1885. Roma: Tipografia Fratelli Centenari. 1885. 8vo, pp. 141.

Correction.—On page 60, line 14, *Farsetia* should be substituted for *Marrubium*.

BULLETIN

OF THE

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Pinus edulis and P. monophylla.—On reading Dr. Newberry's note on these trees (BULLETIN, p. 50), it occurred to me that I might have placed more value on the monophyllous character as a specific distinction than it deserved. Having plants of both of some age growing on my grounds, and growing within a few score feet of each other, I thought to watch them closely this summer. The result is, I think Dr. Newberry's views correct. The observation led to some interesting facts which may be worth placing on record.

Dr. Newberry believes the *P. monophylla* is "a somewhat dwarfed and depauperate form" of *edulis*. That this is correct is evidenced by the tendency to produce free leaves, which, as I showed in my paper on Adnation in Coniferæ, published some years ago in the Proceedings of the Chicago meeting of the American Association for the Advancement of Science, is evidence of a decline in vegetative vigor and attendant on depauperate forms.

In closely examining the young monophyllous growth early in the season, I found that by a light tap at the apex it divided and gave the two leaves of *P. edulis*. It is evident that the plant is only monophyllous from the want of power, by reason of its depauperate condition, to burst the membrane enveloping the fascicle in its early stages. It would scarcely do to claim a specific character for a condition which depends for its existence on a membrane so slight as this. It occurred to me then to examine the young growth of other species of pine, and I think I may almost say that, "as a general rule, all pines are monophyllous in the early stages of growth"; at least the divisions of the fascicle are held together by a thin membrane which is ruptured by a tendency to recurve from the apex. The extreme point of the fascicle is free, and, with the tendency to recurve, division follows. On a vigorous specimen of white pine, about seven feet high, I found a very large number of monophyllous bundles—as many as ten on one growing branch. A light tap on the apex, as in the case of *Pinus monophylla*, separated the sections. It was my thought to send the results of my observations then, but concluded to wait to see how long these bundles would retain the monophyllous character. Little by little they split apart, till to-day there is but one left, so far as I can find. It is evident that, with a slightly weakened power to expand from the apex, the white pine might present a monophyllous form.

Another interesting fact, though not connected with the main purpose of this note, is that the free apex of the monophyllous bundle shows it to be composed of three leaves, each a trifle shorter than the other. This indicates that a fascicle of pine-leaves is a depressed spiral, and that the "needles" are true leaves and not modifications of branches, as I was once inclined to believe. The bundle of "needles" is but an arrested branch, having a dormant bud at the apex, and which may even push and make a shoot in after years, as I have observed of late in Scotch pines that have been headed back. I send some fascicles that have been forced into growth from a three-year-old branch. The leaves of the pine may properly be said to proceed from hidden spurs.

THOMAS MEEHAN.

The Growth of Trees.—The appearance of lateral and terminal buds upon the new growth of trees and shrubs indicates, of course, the cessation of longitudinal growth for the season. Subsequent vegetative efforts are directed to the lignification of the tissues thus formed. The time occupied with this preliminary extension of growth is short as compared with that of its after development.

In the summer of 1884, in South-western New York, at about latitude 41° 21′, I noted the dates when the common woody plants had formed their buds. The results were rather surprising, though of course the observations are not to be considered as new or original. Collectively, however, they call attention to a condition of the growth not generally recognized.

As soon as June 1st the following trees and shrubs had formed both lateral and terminal buds: *Tilia Americana*, L., *Acer saccharinum*, Wang., *Acer rubrum*, L., *Hamamelis Virginica*, L., *Amelanchier Canadensis*, L., *Sambucus pubens*, Michx., *Kalmia latifolia*, L., *Ulmus Americana*, L., *U. fulva*, Michx., *Carya alba*, Nutt., *Quercus alba*, L., *Q. bicolor*, Willd., *Q. Prinus*, L., var. *monticola*, Michx., *Q. coccinea*, Wang., and *Fagus ferruginea*, *L.*, *Populus tremuloides*, Michx., and *Fraxinus Americana*, L. Fifteen days later these were added to the list as having completed their longitudinal growth for the season: *Prunus Cerasus*, L., *Juglans nigra*, *L.*, *Ostrya Virginica*, Willd., *Carpinus Americana*, Michx., *Betula lenta*, L., *Castanea vesca*, L., *Morus rubra*, L., *Lindera Benzoin*, Meisner.

July 19th, terminal and lateral buds were found on *Staphylea trifolia*, L., *Nyssa multiflora*, Wang., *Andromeda ligustrina*, Muhl., and *Alnus incana*, Willd.

These dates were fixed, not upon single, but, upon several specimens of each species. Some other species continued to grow throughout the season, or at least until near its close, without producing terminal buds. The more prominent of these were *Liriodendron Tulipifera*, L., species of *Vitis*, *Ampelopsis quinquefolia*, Michx., *Celastrus scandens*, L., species of *Rhus*, etc.

In this latitude, most trees and shrubs put forth their leaves from the 1st to the 15th of May, although the Cupuliferæ are rather behind this date. It seems, therefore, that our hardiest and most valuable deciduous forest trees, the oaks, maples, hickories, elms, birches, ashes, and the beech and aspen produce all their annual growth *in extension* in from three to six weeks from the date when growth commences. The remaining three months, more or less, are devoted to the ripening and maturing of this growth. It is as if the framework were pushed forward with the greatest possible rapidity, while the strengthening and finishing followed at a more leisurely pace. It is easy to see why the species which first complete this stage of growth should produce the hardest and strongest tissue, while those which go on pushing out their shoots indefinitely are more or less damaged by the winter weather.

Mass. Exper. Station, Amherst. WINTHROP E. STONE.

Verbascum Lychnitis.—Somebody, I cannot remember where or when, put it into my mind that *Verbascum Lychnitis* was "probably a hybrid" between *Verbascum Thapsus* and *V. Blattaria.* The plant has been known in the old world for ages, and, if a hybrid, it would be interesting to know that it has taken rank as a species, and been able to hold its own so long all over the world. So many statements have been started as actual facts that were introduced only as probabilities that I generally feel it does no harm to go over with an examination again whenever opportunities offer. I cannot find anywhere in print that a hybrid origin has been ascribed to this species (but it has been on my mind from some authority), and as the plant and its supposed two parents are all common hereabouts it has long been my desire to test what hybridization would result in. Now it is on record that *V. Lychnitis*, though it may not be in itself a hybrid, takes liberties with other species. Dr. Gray, in the Manual, 5th edition, says "hybridizes spontaneously with the common mullein." The Doctor does not say whether this is or not his own experience, but probably founds his statement on a paragraph in Willdenow's Species Plantarum, which notes that a plant which was thought worthy of being made a species, *V. thapsiforme*, appeared in a bed of *Lychnitis* plants in the Upsal Garden, in 1761, and the female parent was supposed to be *V. Lychnitis*, and the male parent *V. Thapsus.* Similar other specimens had, however, been sent by Bauhin and others. But by what we now know of natural variations and sports, this will not be regarded as decisive evidence of spontaneous hybridization. The three kinds grow freely together here, but I never saw any tendency to produce the form that appeared in the Upsal Garden. The spontaneity is certainly not active in this district.

I commenced testing the hybrid origin of *V. Lychnitis* years ago. It takes several years to get the results of work of this kind, so it is important to be sure of our facts as we go along. I chose *V. Blattaria* for the female parent. As soon as the flowers opened the anthers were immediately cut off and the pollen of *V. Thapsus* was applied. Some flowers emasculated had no pollen applied to their stigmas. These seeded as well as did those to which pollen was applied. I was therefore fearful of some interference by bees, and, not wishing to pin my faith on two or three years of watching, the seeds were not sown. Next year all the flowers on the spike that were not needed were cut off, so as not to tempt the bees; but still the ones to which I applied no pollen fruited as well as the others did. These seeds were again not sown. I was led to suspect that the flowers were fertilized in the bud, and that, notwithstanding the reputation the plant had for "spontaneous hybridizing," it was rather a case of in-and-in breeding. The next year I cut the flowers open with a sharp pen-knife before their natural time, and applied pollen to some and not to others. The last did not seed, the former did—pollen being applied twice at an interval of two days. I was now sure that I had a fair cross. Unfortunately, before ripe, though in an unfrequented spot which I thought safe enough, something broke off the stalk, and that ended the year's experiment. The next year I went to work again. This time I called the attention of my workmen to the plant as one that I wanted saved, and so felt safe. But, sure enough, one day I went over where the unlucky scythesman had been, and my flower stalk was cut down! This time it occured to me that if the stalk were planted deep in the ground it would still mature seeds; and it did, though not a large number. These were sown, and a few came up last year. To my intense annoyance, these plants were in some way destroyed. Feeling, however, that all the seeds could not have come up, and that some even from the same brood will remain two years in the ground, I let the spot remain undisturbed, and this spring I had six plants come up, which have grown nicely all summer. Unless some accident occur to them, they will flower next year. It is because of my unlucky experience that I want to place on record the results so far as they have gone, lest some woeful experience again cut off the story before it is completed. Well, the *V. Blattaria* has, in the young state, dark green, smooth and shining leaves, and they are deeply sinuately lobed. The leaves of my plants are quite unlike these, nor are they quite entire, thick and wooly like those of the common mullein, but they are precisely like those of the wild plants of the same age and size of *V. Lychnitis.* I pray, as only a botanist can pray, that my pets may be preserved till they flower, so that I may positively settle the question of the origin of *V. Lychnitis.* In the meantime, the following facts seem beyond dispute:

Verbascum Lychnitis in this part of the world has no particular tendency to spontaneous hybridizing with other species. It seems to be a self-fertilizer. It is, we may say, in great probability, a product originally of *V. Thapsus* and *V. Blattaria.* We have only to leave absolute certainty of this last proposition to the next season.

THOMAS MEEHAN.

The "Indian Peach."—John Lawson, who was in this country between 1700 and 1708, says in his New Voyage to Carolina (London, 1709), a propos of the peach: "I want to be satisfy'd about one sort of this Fruit, which the Indians claim as their own, and affirm they had it growing amongst them before any Europeans came to *America.* The Fruit I will describe as exactly as I can. The tree grows very large, most commonly as big as a handsome Apple-tree; the Flowers are of a reddish murrey Colour; the Fruit is rather more downy than the yellow Peach, and commonly very large and soft, being very full of Juice. They part very freely from the Stone, and the Stone is much thicker than all the other Peach Stones we have, which seems to me that it is a Spontaneous Fruit of *America;* yet in those Parts of *America* that we inhabit, I never could hear that any

Peach-Trees were ever found growing in the Woods; neither have the foreign Indians that live remote from the English any other sort. And those living amongst us have a hundred of this sort for one of the other; they are a hardy Fruit, and are seldom damaged by the North-East Blasts, as others are. Of this sort we make Vinegar; wherefore we call them Vinegar-Peaches, and sometimes *Indian* Peaches."

The peach was introduced into North America both by way of Mexico and the Atlantic seaboard. Its introduction into Mexico occurred at a very early period, for in Molina's Mexican Dictionary, published in 1571, fifty years after the conquest, we find three names for it, all hybrid, Hispano-Aztec compounds: *xuchipaldurazno*, 'orange-colored peach,' *cuzticdurazno*, 'yellow-peach,' and *xocotlmelocoton*, 'peach fruit.' From Mexico, the peach appears to have gradually worked its way northward through Texas to Louisiana, where, according to LePage DuPratz, it was found in cultivation among the Indians when the French settled that province (about 1698), and where it was seen by P. Montigny in cultivation among the Taensas in 1699. In an alleged Taensa vocabulary which was published at Paris two or three years ago, and which contains a curious assortment of names of tropical, sub-tropical, temperate and arctic plants and animals known to these Louisiana Indians, the name of the peach is given as *yŏsblü-ĭtwĕ*, 'marriage-fruit.' From the gulf region the peach appears to have reached Carolina at a date, according to Lawson's Indians, previous to the settlement of Europeans in that province, where it was known to the Tuscaroras as *ru-ue*, and to the Waccons as *yannĕ*.

This antiquity of culture of some variety of the peach among the Southern Indians probably accounts for a curious fact to which it is more particularly the object of this note to call attention, and that is that among several of the prominent tribes which formerly inhabited what are now the Southern States there is a distinct name for this foreign fruit, whence are derived not only the names of other introduced fruits, but also those of our *native* ones. For example:

CHOCTAW (Choctaw-Muscogee):
- Prunus Persica, *takon* (a radical word.)
- P. Americana, *takon lŭsh*, or *takon ŭshi*, 'little peach.'
- P. Chicasa, *isi i^n takonlush*, the 'deer's little peach.'
- Pyrus coronaria, *isi i^n takon*, the 'deer's peach.'
- P. Malus, *takon tchito*, 'big peach.'
- P. communis, *takon tchito holba*, 'similar to the apple' literally, 'peach big like.')

MUSCOGEE (Choctaw-Muscogee):
- Prunus Persica, *pûkânû* (a radical word.)
- P. Americana, *p^{û}kânû'ho* 'barren peach.'*
- P. Chicasa, *itcho im pûkânû*, the 'deer's peach.'
- P. pumila, *pûkân tchi*, 'little peach.'

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* So called, says Mrs. A. E. W. Robertson, who kindly gave me these Muscogee names, because the tree does not bear so regularly as do two other species of plums common in the Indian Territory, where these Indians are now settled.

SHETIMASHA:

Prunus Persica, *wépt* (radical.)
P. Americana, *wépt-nákht-sĕbu*, 'little peach.'

CHEROKEE (Huron-Iroquois?):

Prunus Persica, *kwanu*ⁿ (radical.)
P. Americana, *kwanunasti*, 'little peach.'

Has the "Indian peach" described by Lawson been perpetuated?

W. R. G.

On the General Exuberance of Pollen.—It seems to me, as I read, that a want of power to make legitimate deductions from facts is a common weakness with otherwise intelligent observers, and this occurs to me particularly when the subject happens to have relation to the cross-fertilization of flowers. Before me is a paper contributed to that excellent serial, the London *Gardeners' Chronicle*, on the "cross-breeding of cereals," in which the author lays great stress on the fact that this class of plants—one may say the whole order of Gramineæ consists of self-fertilizers. He points out how the pollen begins to shed, and the stigmas are in receptive condition before the florets expand, and that the objects for which anthers are formed "are fully accomplished before the stamens make their appearance outside the ear." But after this the anthers give out to the atmosphere an enormous amount of waste pollen, as any one walking through a grain field at that particular period has reason to know by his well smudged clothing. It has been found that an anther of wheat contains 6,864 grains, and that it takes 390,000 of them to weight but one grain. Rye pollen is heavier than that of wheat, or is yielded in larger quantity, for he gives 2 cwt. as the product per acre, while 50 lbs. is the pollen-product of an acre of wheat. He then emphasizes the fact that wheat, barley and oats are fertilized before the anthers are visible outside. After a while the reason for the usual abundance of pollen is sought for, and our author concludes "that the clouds of pollen in excess of customary requirements are but the exuberant provision by which nature has rendered the assurance of reproduction doubly secure." Exuberant is a good word, but "doubling" when the figures are 6,864 to the 1 required, is certainly placing the lion's share of the two halves of the double on the side of "exuberance." But what one who is accustomed to look for logical sequence can see in "assurance of reproduction" by giving pollen to the winds in the case of plants that self-fertilize—fertilize before the florets expand—is inexplicable. I think it must be admitted that not even with exuberance before us can this cloud of pollen have relation to any service to the plant, individually or collectively. I would submit that the reasons given in my Montreal address are more logical, *i. e.*, that plants are made to contribute to the general good, just as we are.

THOMAS MEEHAN.

Notelets.—Mr. George Taft of Uxbridge, Mass., has called my attention to a peculiarity in the leaves of an American elm which stands before his house. The tree is a large and very old one. The leaves, in the proportion of about one in eight hundred, form a cup by a folding together and union of the basal edges, thus obliterating the usual sinus. No other elm in the vicinity presents this phenomenon.

I have seen within a few days, in Phenix, R. I., a fine plant of *Lilium superbum* with this peculiarity: all the flowers, and there were many, instead of the normal coloration, exhibited a clear yellow, without spots of any kind. I hope to secure bulbs, when I shall attempt to perpetuate this elegant sport.

W. WHITMAN BAILEY.

The Long Island Station for Magnolia glauca.—Near the end of last June, Mr. E. S. Miller, of Wading River, and I went in search of the locality at which the *Magnolia glauca* had been detected. There was no difficulty whatever in finding the place, as it is clearly described in Mr. W. H. Rudkin's note in the BULLETIN for August, 1883, (p. 95.) "Tuttle's Pond," a long, narrow mill-pond, formed by damming a brook, has, at its northern end, a swamp of several acres, through which passes the Long Island Railroad, which has here a culvert through which the brook enters the swamp. This is about two miles east of Speonk Station.

There were a few red maples and swamp laurels (*Kalmia angustifolia*), and scattered amongst these, in large numbers, were the magnolias, many of them from 15 to 20 feet in height and of remarkably vigorous growth. We were a few days too early to find the flowers fully out, and had to content ourselves with buds only.

G. M. WILBER.

Crantzia lineata.—I found this summer, in our salt meadows, *Crantzia lineata*, Nutt., which Mr. Peck (the State Botanist) says he considers a very rare plant in New York.

Wading River. E. S. MILLER.

Botanical Notes.

Production of Male and Female Plants.—Dr. H. Hoffmann (*Bot. Zeitung*, xliii., pp. 145–153, 161–169) has attempted to determine the conditions under which male or female individuals are produced in the case of the following diœcious plants: *Lychnis diurna* and *vespertina*, *Valeriana dioica*, *Mercurialis annua*, *Rumex Acetosella*, *Spinacia oleracea* and *Cannabis sativa*. He finds that in most, if not in all, of these cases, dense sowing increases the proportion of male plants produced, and this results from an insufficient supply of nutriment. As a general law, the production of male plants is promoted by the want of an adequate supply of food when in an embryonal condition. —*Jour. Roy. Microscop. Soc.*

Classification of Fungi.—In Cohn's Kryptogamen-Flora von Schlesien, Dr. J. Schröter proposes the division of the Fungi into the three following groups: I. Myxomycetes; II. Schizomycetes (parallel with the Phycochromaceæ; and III. Euomycetes, distinguished by their spores being formed by a sexual act.

The Euomycetes are again divided into seven families, viz.:

(1) Chytridiei; (2) Zygomycetes; (3) Oomycetes (related to the Siphoneæ); (4) Ascomycetes; (5) Uredinei; (6) Auriculariei; and (7) Basidiomycetes.

The Basidiomycetes are divided into (1) Tremellinei; (2) Dacromycetes; and (3) Eubasidiomycetes, which again are made up of (*a*) Hymenomycetes, (*b*) Phalloidei, and (*c*) Gasteromycetes.—*Jour. Roy. Microscop. Soc.*

Development of the Apothecia of Lichens.—Dr. M. Fünfstück has followed the development of the apothecia in three genera, *Peltigera*, *Peltidea* and *Nephroma*. In *Peltigera canina* an interval of several years passes between the first formation of an apothecium and the production of the first ripe spores. In *Peltigera* and *Peltidea* there are no spermogonia.

In *Peltigera malacea* the apothecia originate as extremely minute roundish dots on the margin of the thallus, where a few filaments, irregularly coiled into rosettes, the ascogonia, are formed close beneath the cortical layer, on a level with the gonidial zone; they are simply portions of the ordinary hyphæ, which increase in length by apical growth, while the ascogonial cells increase at the same time in size by intercalary growth. The cortical fibres and the ascogonial tissue are strongly differentiated from the first. The next period of development begins with the formation of the first paraphyses, commencing in the cortical layer of the apothecium. A mass of young cortical fibres in the middle of this layer displays delicate shoots, which develop into the paraphyses. These gradually extend over the entire cortical layer of the apothecium, new ones being formed between the older. At the same time, the separate ascogonial cells shoot out and form the ascogenous hyphal tissue. The process of disorganization of the ascogonia runs parallel with the formation of this tissue, and finally the asci are formed as bulgings of the ascogenous hyphæ; the outer part of the cortical layer bursts, and thus is formed the "excipulum thallodes" of lichenologists. The formation of the apothecium is not the result of any sexual process, the strong differentiation of the ascogenous hyphæ from those which develop into paraphyses being traced back to the youngest stage. The author regards the process as the same as that in *Podosphæra* among Ascomycetes, apogamy with rudimentary sexual organs.

The processes are nearly the same in *Peltidea aphthosa* and *venosa*, while in *Nephroma tomentosum* and *lævigatum* there are important deviations. In these species the author always found spermogonia, though always in a rudimentary condition. The first apothecial layer is formed beneath a thick, close, cortical layer in the margin of the thallus by a number of large, thin-walled cells arranged in a moniliform manner, and from the analogy of *Peltigera* and *Peltidea*, regarded as ascogonia, developed gradually from ordinary hyphæ of the thallus. The entire structure is enveloped in a dense hyphal tissue, which gradually disappears as the fructification develops; and the apothecia of *Nephroma* are hence described as gymnocarpous. The formation of the ascogonia was not clearly observed. The mode of formation of the paraphyses is similar to that in *Peltigera*, but takes place later. The paraphyses and asci are always formed on the under side of the thallus, so that the young apothecia at first face the substratum ; their position is subsequently reversed by a strong curving of the fertile layer. We have therefore in these lichens phenomena of apogamy, similar to those that have been observed in the Ascomycetes.—*Jour. Roy. Microscop. Soc.*

The Coloring Matter of Flowers and Fruits.—In an interesting communication on the subject of coloring matters in flowers and fruits, contributed to a society at Wurzburg (*Gard. Chron.*, June 20th, p. 794), Dr. A. Hansen gives reasons for supposing that a relatively small number of pigments suffices for the production of the apparently endless variety of tints. Taking flowers in the first instance, and setting aside chlorophyll green as being rarely met with in them, he recognizes three groups of colors, the yellows, the reds, and the blues and violets. White is due merely to the reflection of light through colorless tissues containing air, and blacks are attributed to a concentration of violet pigments. The yellow pigments are mostly in combination with plasmatic substances, whilst the reds and blues and violets are generally found in the cell-sap. The yellow of flowers is said to form an inslouble compound with fatty matters, which it is thought might explain the comparative permanence of that color in plants. The pigments of different yellow flowers have been found to agree with each other so closely in respect to their spectra as to point to identity, and Dr. Hansen obtained by saponification with soda, and extraction with light petroleum spirit, a crystalline yellow pigment which corresponded in its behavior to the "lipochrome" obtained by Krukenberg from the animal kingdom. Orange is due to a denser deposit of the yellow pigment, the color in orange rind being referrible to the same substance as that in the petals of *Ranunculus repens*. The pigment in yellow dahlias and lemon rind, however, behaves differently, both chemically and spectroscopically; it is soluble in water and seems to be very similar to the pigment of *Æthalium septicum*, the yellow fungus or mould of rotten wood. The reds of flowers Dr. Hansen reduces to a single pigment; the description of which, so far as it goes, appears to correspond to that given some years since by Mr. Harold Senier of a coloring matter isolated by him from the petals of *Rosa Gallica*. The varying intensity of the colors of roses, carnations and pæonies, it is thought might be due to the presence of acids, which, according to Mr. Senier, would deepen the shade of the red coloring matter, whilst the scarlets and brick-reds of poppies, scarlet lilies, and dog-rose hips are attributed to the modifying influence of some yellow pigment (lipochrome) present. The blue and violet pigments, Dr. Hansen looks upon as derivatives from the red, and in support of this view it is pointed out that certain flowers pass from red to blue or violet. It is also known that the pæony-red is changed to violet by salts of iron or sodium phosphate, whilst gardeners produce blue hydrangeas by adding iron to the soil. As to fruit and leaves, the change of color which takes place in the autumn is accounted for by the decomposition of chlorophyll, with the formation of new pigments, or the unmasking of yellow (lipochrome) previously dominated by the chlorophyll. Dr. Hansen therefore assumes that there are only four fundamental plant pigments—the two yellows and the red of flowers and chlorophyll green.

Rhubarb Culture in the United States.—Mr. J. W. Colcord, of Lynn, Massachusetts, who, during the last few years has been turning his attention to the acclimatization of medicinal plants in the United States, has been further experimenting as to the value of the leaf stalks of the home-grown *Rheum palmatum* as an esculent. He reports that plants raised from seed sown last May have now leaves two feet in length, with petioles an inch in diameter; and that these have been found to be equal in tenderness and flavor to the best pie rhubarb in the market. As there are indications that the therapeutic value of the home-grown root will also be established, Mr. Colcord looks forward to the utilization of the plant (which proves to be hardy) in both directions.

Two new Terms have recently been added to the already overburdened terminology of botany. Dr. F. Krasan has noticed that where the leaves of the oak are attacked by the *Orchestes Quercus*, the deposit of the eggs of the insect arrests the growth of the leaves attacked, which become thicker and more rigid than the ordinary leaves, and that in June these are followed by a second growth of leaves of very large size, and later by a growth of normal leaves. To these phenomena he gives the name of "pachyphyllosis" and "megalophyllosis." The distortions produced may, he believes, in some cases become hereditary and cause the appearance of apparently new species, as in the case of *Quercus brachyphylla*, Kotschy, probably derived from *Q. pubescens*. Similar changes occur in *Abies* and *Thymus serpyllum*.

Peptonizing Ferment of Ficus.—Dr. A. Hansen, having examined the latex of the common fig, *Ficus carica*, confirms the statements of previous observers concerning the presence of a peptonizing ferment in it. In its effect on fibrin and the coagulation of milk this ferment resembles pepsine. It also produces the diastasic reaction of the conversion of starch into sugar, and a syrup made from dried figs has the same peptonizing property as the latex. It is remarkable that no similar effect could be obtained from the milky juice of Euphorbiaceæ or of *Papaver somniferum*, *Chelidonium*, *Taraxacum* or *Scorzonera*, although the fluid secretion in the pitchers of *Nepenthes* possessed peptonizing properties similar to those of the latex of the fig tree.

The Qualities of Redwood (*Sequoia sempervirens*) are peculiar. Though light, soft, weak to resist a transvere strain, brittle, and easy to split, it excels oak in its power of resistance to the decomposing influences of the air and the soil. It is a little over a quarter of a century since the manufacture of redwood timber commenced, but the consumption is now enormous. In California it is preferred to any other lumber for all parts of the exterior of buildings, and is largely used also in the interiors. The roofs of almost all buildings in California, both in city and country, are covered with redwood shingles, while ruder erections are roofed with large rough shingles known as "shakes" throughout the State. It is the almost exclusive material for fence-posts, rails, telegraph poles, railway-ties, wine-casks, tanning and water-tanks, coffins and every purpose where durability is a greater requisite than strength. A novice in the country districts of California wonders why farmers wear gloves when moving a fence, but after a few of the sharp, needle-like splinters of the split rails have entered his hand and festered there, he wears gloves himself. Redwood shingles are coming into favor in the more eastern States which now use a large quantity of redwood timber.

The softness of the wood is the only objection that can be urged against its use in interior decorations. It is of a beautiful, clear light red color, and is susceptible of a good polish, but the ordinary varieties are so soft that the nail, even the knuckle, will make a dent. Yet, as it shrinks and swells less than any other wood, and neither checks nor warps, it is better fitted even for internal finish than many woods which are more used in the Atlantic States. The objection of softness does not apply to the knots or gnarls which grow on some tree trunks, and sometimes attain a diameter of eight or ten feet. These knots are full of tiny bird-eyes, are very hard, and, like bird's eye maple, are well adapted for ornamental cabinet-work, whether used solid or as veneer. Another ornamental variety much esteemed in California is the "curly" redwood, in which the grain is wavy throughout.

The best part of the redwood tree is the butt, the very part which it is, or rather was, the custom to leave in the ground to a height of several feet. Dark red, comparatively hard, heavy and close grained, these butts are indestructible by weather or by fire.

Redwood is a very poor fuel, for it contains little or no pitch. When dry and cut small it takes fire very easily, so much so that it makes good kindling, but a stoveful burns away in little time with little production of heat.

The wood of this *Sequoia* is much heavier than the wood of the *Sequoia gigantea* or big tree, the bark, usually deep-seamed, is often 12 to 18 inches thick: the cones or fruits are not more than an inch or an inch and a quarter, and the leaves small, flat, sharp-pointed, green above, and arranged in a row on each side of the twig which bears them.—*Southern Lumberman.*

Fossil Flora of the Rocky Mountain Region of Canada.—Dr. G. M. Dawson, in the *Transactions* of the Royal Society of Canada, describes a remarkable Jurasso Cretaceous flora recently discovered by him in the Rocky Mountain regions of Canada, and also the intermediate groups of plants between this and the Middle Cretaceous. The oldest of these floras is found in beds which it is proposed to call the Kootanie group, from a tribe of Indians of the name which hunted over that part of the Rocky Mountains between the 49th and 52d parallels. Plants of this age have been found in the branches of the Old Man River, on the Martin Creek, at Coal Creek, and at one locality far to the northwest on the Suskwa River. The containing rocks are sandstones, shales and conglomerates, with seams of coal, in some places anthracitic. The plants found are conifers, cycads and ferns, the cycads being especially abundant and belonging to the genera *Dioonites*, *Zamites*, *Podozamites* and *Anomozamites.* Some of these cycadaceous plants, as well as some of the conifers, are identical with species described by Heer from the Jurassic of Siberia, while others occur in the Lower Cretaceous of Greenland. The almost world-wide *Podozamites lanceolatus* is very characteristic, and there are leaves of *Salisburia Sibirica*, a Siberian Mesozoic species, and branches of *Sequoia Smittiana*, a species characteristic of the Lower Cretaceous of Greenland. No dicotyledonous leaves have been found in these beds, whose plants connect in a remarkable way the extinct floras of Asia and America and those of the Jurassic and Cretaceous periods.

Merulius lacrimans—the Dry Rot.—A short time before his death, Prof. H. R. Goppert, of Breslau, in connection with the chemist, Professor Poleck, made a study of the *hausschwamm*—a fungus commonly known with us as dry rot, which had caused great injury to buildings in Northern Germany. The results of their combined studies now appear in a pamphlet by Professor Poleck (Der Hausschwamm, Breslau, 1885). The dry rot, *Merulius lacrimans*, seems to be unknown in a wild state in Germany, but is confined to woodwork of different kinds, and attacks by preference coniferous timber. Strange to say, the fungus does not usually infest old structures, but generally makes its appearance in comparatively new buildings; and a startling series of figures shows the amount of damage done in the region of Breslau. Chemical analyses by Poleck show that the *Merulius* is particularly rich in nitrogenous compounds and fat, which is rather remarkable when one considers the chemical constituents of the timber on which it grows. Injury to health, or even death, is said to result from exposure to air containing large quantities of the spores of the fungus; and several authenticated cases are reported. In a supplementary note, Poleck considers the relationship of *Merulius* to *Actinomyces*, a fungus which causes a characteristic disease in man and cattle; and he apparently comes to the conclusion that what is called *Actinomyces* is probably only the *Merulius* altered by the peculiar matrix on which it is growing. His statements on this point can hardly be called conclusive, or, in fact other than vague.

Botanical Literature.

A Revision of the North American Species of the Genus Scleria. By N. L. Britton, Ph.D. 8vo, pamph. pp. 8. (From the *Annals* of the New York Academy of Sciences, iii., 7.)

Criticisms on J. Kruttschnitt's Papers and Preparations relating to Pollen-tubes. By N. L. Britton. 8vo, pamph., pp. 10. (From the *Journal* of the New York Microscopical Society.)

The Grape-Rot. By Wm. Trelease. 8vo, pamph., pp., 9. (From *Transactions* of Wisconsin State Horticultural Society.)

Hypericum Japonicum, Thunb., *in Deutschland gefunden.* Von R. v. Uechtritz und P. Ascherson. 8vo, pamph., pp. 10. (From *Berichte* der Deutschen Botanischen Gesellschaft.)

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Further Notes upon Corema.

By JOHN H. REDFIELD.

My notes (in BULLETIN for September 1884) upon the localities of *Corema Conradii* have had the desired effect of eliciting from other contributors many new facts in regard to its distribution, especially in the more eastern portions of its geographical area. Among the more interesting of these notices is that of Mrs. Owen announcing its occurrence in the open sandy plains of Nantucket, where the conditions are such as would lead us to expect it, and also that of Prof. Lawson relative to the varied conditions under which it appears in Nova Scotia. He has pointed out the fact that, when growing in sand or gravel, the plant becomes more gregarious, covering continuously large areas, while upon rocks it is restricted to more isolated patches. Its manner of growth, in all the localities I have seen, accords with the observations of Prof. Lawson.

Early in July of this year, after some ineffectual search in Martha's Vineyard, I had an opportunity to see one or two of the localities in Nantucket. My examination was necessarily hasty, and probably I did not strike the most abundant one mentioned by Mrs. Owen. But I saw very numerous and extensive areas of the *Corema* between the old and new roads to Siaconsett, about four miles out. Its associates were *Arctostaphylos Uva-ursi* (which grows upon this island in greater profusion than I have seen it elsewhere), *Hudsonia ericoides*, and *Comptonia*, with some *Myrica cerifera* in the vicinity. The soil appeared to be purely silicious.

Through Mrs. Haines of Bangor, I have received a specimen of *Corema* collected this summer by Mr. Robert Smith of Jersey City, at North Truro, Cape Cod, where it was associated with *Hudsonia ericoides*, "on the side of a hill near the foot of which was a growth of scrub-pine." This may be the locality mentioned to me by Mr. Benjamin M. Watson, Jr. (BULLETIN xi., 99.)

In August, I climbed Mt. Beatty and Mt. Magunticook, which lie just north of Camden, Me., and which I suppose are the eminences referred to by Prof. Chickering (BULLETIN xi., 116.) I was not successful in finding his locality. The summit rocks there are of quartzite, much glaciated, and would afford a suitable silicious soil. Much *Pinus Strobus* grows upon these hills, but I saw no *Pinus rigida*, the usual tree concomitant of *Corema*. There may perhaps be some error in Prof. Chickering's reference to this locality. Blue Mountain which he names lies not back of Camden, but about 22 miles northeastward, beyond Castine.

Nor did I succeed in finding this plant upon Green Mountain in Mt. Desert Island, though a large part of the bare ledges of its summit and of its western flanks was searched on the 7th of August of this year. Yet in so large an area it might easily elude discovery, and, even if now absent, it may once have existed previously to the fires which have so repeatedly overrun this mountain, and which have evidently made great changes in the character of the vegetation. On the rocks just east of the observatory I noticed limited quantities of *Hudsonia ericoides*, which may possibly have been mistaken for *Corema*. Nor did I observe *Empetrum* on that mountain, though so abundant on the headlands near the shore.

I can, however, announce the discovery of *Corema* in the southern part of Mt. Desert Island, near Seal Harbor, in three distinct localities. These are all upon the ridge called Jordan's Hills on the Coast Survey Chart, and on that portion of it which has been named Barr's Hill. My attention was called to the first of these localities by Mr. Arthur Chase of Haverhill, Mass. It is upon the western brow of the hill, upon a broad rock terrace overlooking Long Pond, about 150 feet above the level of the pond. Within a space of 50 feet square occur eight or ten patches of *Corema*, in scanty soil upon almost bare rock, disputing possession with *Gaylussacia resinosa* and *Vaccinium Pennsylvanicum*. Its other neighbors were *Potentilla tridentata*, *Kalmia angustifolia* and *Viburnum nudum*. The nearest trees were 40 or 50 feet distant, and were mainly *Populus alba*, var. *populifolia*, and *Pinus Strobus*. The rock is a sienite containing quartz and felspar in about equal proportions, with a very small admixture of hornblende, and the comminuted fragments make a sand of similar composition. A few days later, a second locality was found by Rev. Archibald M. Morrison of Orange, N. J. This is upon the eastern side of the ridge, a little northward from the head of the old path from the Seaside House, and nearly 300 feet above tide. Here there is but a single patch of the plant, six or eight feet in diameter, and here too it seems likely to be eventually stifled by a growth similar to that already mentioned. The rock is the same, with deeper soil. On the 19th of September, I found a third locality upon the southwest brow of the ridge, northeast from the "sea-wall" of Long Pond, 100 or 120 feet above tide. Here four or five patches are found under surroundings much like those of the other localities. The underlying rock is the same. The indications of dying out are more apparent here, there being a large amount of the dead plant on the margins of the patches, and one large patch of several feet in diameter was entirely dead, except for a few inches in the centre. We may note that, in all these localities upon Barr's Hill, the soil is less exclusively silicious than in any previously seen, and that the prevalent pine is not *Pinus rigidus*, but *Pinus Strobus*. This hill contains hundreds of acres of bare, horizontal ledges of rock just as well adapted to the growth of *Corema* as is the limited space actually occupied by it, and yet repeated and careful examination of its surface by numerous observers have brought to light not enough of it to cover a tenth of an acre.

The study of the various localities of *Corema* which I have been able to see convinces me that the plant had a very early introduction to our flora, perhaps following the glacial period, and that under less favoring circumstances it is becoming more and more restricted, and must eventually be supplanted by more vigorous competitors for existence.

The Botany of the Aztecs.—The various aspects of a scientific subject become in these days remarkably illustrated. We have seen an example of archæological botany in the light thrown upon the ancient flora of Egypt by the discussions of the evidence afforded by a few withered wreaths disentombed with the mummy of a Pharaoh. Recently, a Spanish writer has occupied the pages of the Anales del Museo Nacional de Mexico with an elaborate examination of the botanical lore of the ancient Aztecs and other dwellers in Mexico at the time of the conquest. A brief resumé of his conclusions may prove of interest in the pages of the BULLETIN, as the Anales are not widely distributed, and are not generally supposed to contain matter of value to botanists.

It seems conceded that the inhabitants of pre-Columbian Mexico had made very considerable progress in botanical study; they had, according to our author, formed an artificial classification, an extended glossology, and a system of iconographic representations by which they indicated plants by conventional symbols. At the time of the conquest, botanical science in Europe had itself made little progress beyond the limited developement that it had amongst the Greeks; the classification was largely medical, and trees and herbs constituted the two great divisions of the vegetable kingdom. At this time, in Mexico, the Aztecs and related tribes had established botanical gardens in which were grown plants that had been collected from the various districts of the kingdom, from newly acquired territories and from neighboring states or tribes. Thus, the handsome Bombacead known as *Cheirostemon*,* which was early found flourishing outside of the usual limit of its distribution, was regarded by Baron Humboldt as a plant transplanted by the ancient Matlatzincas.

The author of this treatise has used the famous work on the natural history of Mexico by Hernandez in its re-edited form, supplementing it with the testimony of other authors, and personal search amongst Indian vocabularies. The synonomy of the Mexicans, he claims, was extended, indicating our distinction between a scientific and a common name; thus, the plant called *totoycxitl*, 'bird's-foot,' in allusion to its quinquelobate leaves, was also called *caxtlatlapan*, which classed it with a botanical group—that of the Convolvulaceæ, it being an *Ipomœa*.

Quite frequently the various names of a plant arose from the form or other characteristic of some portion of it, or from its uses; thus, *chapulxochitl*, meaning 'locust-flower,' because of a resemblance of the flower to that insect, was also called *tenapalitl*,† also *mincapatli*, 'arrow-

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*Called by the Aztecs *macpalxochitl*, 'hand-flower,' from the peculiar shape and arrangement of the stamens.—ED.

† A name for several plants resembling *Sedum*, or life-everlasting.—ED.

medicine,' because it was employed to heal wounds; and also *comalpatli*, 'spleen-medicine,' in reference to a medical use. A regional name of *pinipiniche* was also used for this same plant. Other instances are explained where a classificatory name, and one indicating the use or properties of the plant existed. Hernandez has recorded 3,000 names of plants, of which 250 are in the Tarascan language. The remainder are Mexican, and, as a great many of these were originally found in the Mexican domain proper, where the Nahuatl language prevailed, the author concludes that the Mexicans in their marauding expeditions had observed and named them, and had also studied them in the gardens which they maintained for alien plants on the central plateau. Our author says that they availed themselves of comparisons between exotics and their indigenous plants, and "then, taking a plant with a known name as a type, and using the same name with a qualifying and expressive termination, applied it to another that was analogous or similar."

In glossology the Nahuans had reached a very considerable elaboration of descriptive and classificatory terms. Thus, in general, their terminology for plant-forms included the following: *quauhuitl*, 'tree,' *xihuitl*,* 'herb,' and *quaquauhtzin*, 'shrub.' *Copalquauhuitl*, the 'copal-tree,' was a tree-like terebinth; *copalxihuitl*, 'copal-herb,' was an herbaceous labiate; *micaquauhuitl*, the 'corpse-tree,' was an arborescent Convolvulad; and *micaxihuitl*, 'herb of the dead,' a *Lobelia*.† *Tic* was used as a suffix signifying the 'form of,' like the Greek *ειδος*; as *chichiantic*, 'like chian;' and this particle was constantly used in plant-names to indicate affinity or resemblance. The nature of the medium in which the plant grew was also considered in its nomenclature; thus *atl*, 'water,' was represented by the prefix *a* before the rest of the plant's name. If the stem of the plant was serpentine and flexible, a special term was employed, while the prostrate and recumbent positions were expressly recognized. The writer cites many examples of the application of these terms, and enters into an analysis of the expressive Mexican names for plants, one of which is in part a specific description, viz.: *tepehoilacapitzxochitl*, or, translated, an ornamental plant which grows in mountainous places, tall, and knotty, and slim.‡ The author continues in an interesting enumeration of the Indian terms for other characters of the stem, as its surface, length, thickness, coloration, composition, form, and durability,all displaying a surprising minuteness of descriptive terminology.

The Mexicans used four names for leaves: *maitl*, *atlapalli*, *amatlapalli* and *izhuatl*. The first of these terms arose from an interesting

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* *Xihuitl* is a generic term for herb, and *quilitl* for an edible one. To the above terminology should be added the words so frequently found in Aztec plant-names: *xochitl*, 'flower,' *xocotl*, sour 'fruit,' and *tzapotl*, sweet 'fruit' (whence Sp. *sapote*, and the name of the order Sapotaceæ.)—ED.

† *Lobelia acuminata;* called also *micaxochitl*, 'flower of the dead,' from its use in restoring epileptics to consciousness.—ED.

‡ This interpretation by the Spanish writer is very erroneous. The word means, literally, 'mountain flute-flower.'—ED.

generalization. It (*maitl*) means 'branch,'* and was frequently used in this sense. It was applied to old and young limbs, and it expressed the idea in the minds of these people that the tree was a group of branches of which the leaves were the last and most tenuous form. *Atlapalli* means both a 'leaf' and a 'bird's wing,' another interesting simile; *amatlapalli*, our author seems to think implies something thin, resembling paper (*amatl*); *izhuatl*, the last term, probably signified the frond of a palm.

The paper contains a long discussion of the involved and difficult subject of the Mexican graphic representation of plants. The Indians, for this purpose, employed three methods, the figurative, the symbolic, and the syllabic, either alone or combined. The figurative was generally used when the component parts of a plant were to be indicated, as branches, leaves, flower, fruit and seed; but the entire plant was indicated by combining the two methods of symbolism and syllabism. The conventional sign for a tree was a branching base, colored red, representing the root, from which sprang the trunk, almost always cylindrical, which was subdivided into three branches, usually gray in color, while from the extremity of each branch started a green object formed of obtuse segments representing leaves. This was the universal arborescent type, which was variously modified in separate cases. Our author asserts the use by the Indians of a sign of generic value. Thus, plants known under the general class of *zacatl* † had a special symbol which consisted of two parts, a central axis, with a series of parallel yellow lines disposed symetrically from one to the other side of the axis.

It is insisted that the Indians of Mexico possessed very considerable skill in drawing, judging from the symmetry, and the quality of execution of these hieroglyphics.

The botanic symbol, as used for a group of plants resembling each other in some particular, gave rise to classification and nomenclature, and the discussion of this forms the last portion of the author's instalment of his studies, which are yet unfinished.

Conoidal fructification formed the generic symbol of the pines, the pod that of the Leguminosæ, the tuberous root for certain Convolvulaceæ, a leaf with lateral spines for various Cactaceæ. These generic signs, modified by special ones, lent themselves as a flexible instrument for the indication of subordinate groups, as the lanceolate leaf joined to a tuber indicated a variety of the edible camote [sweet potato] the stone united with a spiny leaf a species of *Opuntia*.

Our author, through a number of pages, endeavors to show that the Indians had a nomenclature similar to that invented by Linnæus.‡

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* *Maitl* is the Aztec word for 'hand,' and it was the fingers spreading out from the palm that suggested the idea of branches. Hence the name *quilmaitl*, 'herb-hand,' for the branch of an herb, and *quamaitl*, 'tree-hand,' for the branch of a tree. We have met with no compound in which *maitl* signified 'leaf.'—ED.

† A word generic for 'grass.'—ED.

‡ We are inclined to think that the Spanish writer has a very vague idea of the Linnæan system. We have studied Hernandez's Thesaurus very carefully, as we have that rich repository of Aztec botany—Sahagun's work—but we have failed to observe any other sort of classification than that found in the popular nomenclature of plants in all languages.—ED.

This nomenclature consisted in using a specially descriptive term and prefixing it to the general name of the plant, as we might say a red rose, a climbing hop-vine, a trailing honeysuckle, etc. In this manner the Indians collected a large body of identifying names for plants, and the inference seems warranted that to this extent they possessed a nomenclature which was directly related to a useful if not altogether natural system of classification, the whole based upon striking features or useful properties of the plants they described.

In the names of plants the most interesting modifications are instanced, by some of which plants inhabiting moist places were indicated, those flowering at certain times, plants growing on the margins of streams, those commencing to flower with the first waters of the wet season, and declining with its increase, were all variously characterized. The soil in which plants grew and their habitat were also denoted by prefixes. The various parts of a plant were carefully distinguished, as the root, the trunk, the branches, the leaves, the flower, the fruit. These terms were again modified by specific designations when the parts assumed peculiar shapes or possessed peculiar properties.

The features of the trunk and branches and the disposition of the latter, and the habit of the growing plant found mention in the terms and names employed by these pre-Columbian botanists.

The enthusiasm of the author may lead him to overestimate the actual progress made by the Aztecs in this science, but every one who reads his elaborate essay must feel a curious shock of surprise at finding that so much can be probably claimed for them.

L. P. GRATACAP.

Contributions towards a List of the State and Local Floras of the United States.

THE PACIFIC COAST. CALIFORNIA.

Descriptions of Plants collected by Mr. William Gamble in the Rocky Mountains of Upper California. By Thos. Nuttall. (D.)

In Proc. Phila. Acad. Sci., Vol. iv. 1848.

Botanical Report on Routes in California, to connect with the Routes near the 35th and 32nd Parallels, explored by Lieut. R. S. Williamson, in 1853. By E. Durand and S. C. Hilgard, M.D. (C.)

In Rep. on Exp. and Surveys from Miss. River to Pacific Ocean, Vol. v., Part iii., Washington 1856 (33d Congress, 2nd Sess., Ex. Doc. No. 91.)

Descriptions of Plants collected along the Route, by W. P. Blake, and at Mouth of the Gila, by John Torrey. (C.)

In Rep. on Exp. and Surveys from Miss. River to Pacific Ocean, Vol. v., part ii., 359–370.

Botanical Report on Routes in California and Oregon, explored by Lieut. R. S. Williamson, and Lieut. Henry L. Abbot, in 1855. By J. S. Newberry. (C.)

(Comprises: Chapter i., Geographical Botany; Chapter ii., Description of the Forest Trees of Northern California and Oregon.)

In Expl. and Surveys from Miss. River to Pacific Ocean, Vol. iv., part iii., pp. 1–64.

General Catalogue of the Plants collected on the Expedition. By J. S. Newberry, Asa Gray and John Torrey; the Mosses and Liverworts by W. S. Sullivant, and the Lichens by Edward Tuckerman. (B.)

In Expl. and Surveys from Miss. River to Pacific Ocean, Vol. iv., part iii., pp. 65–94.

Botanical Report on Routes in California to connect with the Routes near the 35th and 32nd Parallels, and Route near the 32nd Parallel, between the Rio Grande and Pimas Villages, explored by Lieutenant John G. Parke in 1854 and 1856. By John Torrey, M.D. (C.)

In Expl. and Surveys from Miss. River to Pacific Ocean, Vol. vii., part iii., chap. i.

Synoptical Tables of Botanical Localities in Dr. Torrey's Report. By Thomas Antisell, M.D. (B.)

In Expl. and Surveys from Miss. River to Pacific Ocean, Vol. vii., part iii., chap. ii.

Catalogue of Pacific Coast Mosses. By Leo Lesquereux.

In Proc. Calif. Acad. Sci., Vol. i. San Francisco.

Botany of the Geological Survey of California, Vol. i., by W. H. Brewer, Sereno Watson and Asa Gray; Vol. ii., by Sereno Watson. (D.)

2 Vols., 4to. Cambridge, 1876 and 1880.

Catalogue of the Pacific Coast Fungi. By W. H. Harkness, M.D., and J. P. Moore. (B.)

Pub. by Calif. Acad. Sci., 8vo, pamphl. pp. 46, San Franisco, 1880.

Forest Trees of California. By A. Kellogg, M.D. (D.)

In 2nd Rep. State Mineralogist, Cal., (1882) Appendix, p. 1–116.

Flora of Southern and Lower California. By C. R. Orcutt. (A.)

8vo, pamph., pp. 13. San Diego, 1885.

San Francisco County.

Catalogue of the Plants growing in the vicinity of San Francisco. By H. W. Bolander, 1870.

San Diego County.

Marine Algæ of San Diego, California. By Daniel Cleveland. (A.) 1885.

OREGON.

Enumeration of a Collection of Plants made Mr. Elihu Hall in Oregon in the Summer of 1871. By Asa Gray. (C.)

In Proc. Amer. Acad. Arts and Sci., 1872.

Notes on the arboreous, arborescent and suffruticose Flora of Oregon. By Elihu Hall. (C.)

In Botan. Gazette, Vol. ii., pp. 85-89, 93–95, 1877.

Catalogue of the Flora of Oregon, Washington and Idaho. By Thomas Howell. (A.)

18vo, pamphlet, pp. 23, Arthur, Oregon, 1881.

ALASKA.

Sketch of the Flora of Alaska. By J. T. Rothrock, M.D. (C.)

In Rept. Smithsonian Institution for 1867, Washington, 1868, pp. 433–463 (Anophytes by Thomas P. James, Lichenes by H. Mann, Algæ by W. H. Harvey).

A List of Plants collected by Mr. J. Albert Rudkin on a trip to Mt. St. Elias, in the Summer of 1883. By N. L. Britton. (C.)
In Bull. Torr. Bot. Club, Vol. xi., p. 36, 1884.

Catalogue of Plants collected in July, 1883 during an Excursion along the Pacific Coast in Southeastern Alaska. By Thomas Meehan. (C.)
In Proc. Acad. Nat. Sci., Phila., pp. 76–96, 1884.

List of Plants collected by Charles L. McKay at Nushagak, Alaska, in 1881, for the United States National Museum. By Frank H. Knowlton. (B.)
In Proceedings of United States National Museum, 1885, pp. 213–221.

W. R. G.
N. L. B.

Broome County (N. Y.) Finds.—As far as I can determine, this county has never been thoroughly worked. Dr. Torrey, in his Flora of the State of New York, says: "The parts of the State that have been least explored botanically are the counties which lie on the borders of Pennsylvania, etc." In view of this fact, I have this year commenced a systematic exploration, so far finding two of the species that the doctor thought would be found in the State in this district, viz.: *Negundo aceroides*, Mœnch., and *Rudbeckia fulgida*, Ait. I append a few notes on my work this season, which, though incomplete, will give some idea of the probabilities of this locality. The following species, which I have met in counties west and north of this, I have not yet found here:

Claytonia Virginica, L., *Pinguicula vulgaris*, L., *Vesicaria Shortii*, T. & G., *Salix purpurea*, L., *Polygala Senega*, L., *Baptisia tinctoria*, R. Br., *Dicentra Canadensis*, DC., *Coptis trifolia*, Salisb., *Hydrastis Canadensis*, L., *Geum rivale*, L., *Sanguinaria Canadensis*, L. (strange as it may seem), *Rhus aromatica*, Ait., *Gymnocladus Canadensis*, Lam., *Asclepias tuberosa*, L., *Campanula rotundifolia*, L., and *Arisæma Dracontium*, Schott.

These I mention as plants that really ought to be found—except, mayhap, the second to fourth—and may hereafter be located.

Datura Stramonium, L.—Many individuals were found near a negro settlement on State St., city.

Datura Tatula, L.—One individual only, that near a comb factory, where the horns are kept, probably imported with them.

Melilotus officinalis, Willd.—Plentiful, but in one situation only, the *M. alba*.

Lychnis vespertina, Sibth.—In two situations.

Cassia Marilandica, L.—One individual only, that on Noyes Island, near the city, in the Chenango River.

Cypripedium acaule, Ait.—One individual only, and that a beautiful specimen, was found growing upon the upper side of a prostrate mossy trunk of *Abies Canadensis*, a strange situation for the largest and most perfect specimen I ever saw.

Betula papyracea, Ait.—Five clumps were found on the north aspect of South Mountain.

Chamælirium luteum, Gray., is plentiful and very characteristic, both male and female, in a deep wood a mile north of Port Crane.

Monotropa Hypopitys, L.—Ross Park (a natural reservation.)

Negundo aceroides, Mœnch.—At Hawleyton, near the Pennsylvania State line. A beautiful specimen has also been transplanted in the Court House square, this city.

Rudbeckia fulgida, Ait.—In an old field west of the city cemetery.

Menyanthes trifoliata, L.—Cranberry swamps near Gulf Summit.

Epilobium palustre, L., var. *lineare*, Gray.—Same locality.

Viola Selkirkii, Ph.—Dickson's ravine, Port Dickinson.

Tussilago Farfara, L.—Though this plant is common in most parts of the State, I have met but one individual here; that in Ross Park.

Gillenia trifoliata, Mœnch.—Not uncommon.

Humulus Lupulus, L.—I have met the plant along the Susquehanna River, but can hardly call it indigenous in its localities.

Lysimachia nummularia, L.—This beautiful plant has escaped in great profusion to the grassy banks of Trout Brook, near the city. I have not, however, seen it in cultivation here.

Verbascum Blattaria, L.—One individual only, found in the cemetery.

Cardamine pratensis, L.—Plentiful on the borders of Pond Lake.

Berberis vulgaris, L.—One bush grows, I judge spontaneously, about a mile and a half from the city, in an open wood along Trout Brook.

Cichorium Intybus, L.—Escaped to some of the city streets.

Galeopsis Tetrahit, L., flourishes in Dry Brook near the city.

Asclepias quadrifolia, Jacq.—Common on the southern slopes of Prospect Hill.

Polygala paucifolia, Willd.—The pure white variety was very common at Pond Lake.

Impatiens fulva, Nutt., and *pallida*, Nutt.—Spotless forms were met on Noyes Island.

Aralia quinquefolia, Gray., though being rapidly dug up by "root-gatherers," is still quite plentiful in the woods near the Pennsylvania line.

Chelidonium majus, L.—Escaped plentifully about the city.

Euphorbia Cyparissias, L.—Escaped.

Trifolium reflexum, L.—Found on the summit of South Mountain.

T. agrarium, L., is quite common.

Aquilegia vulgaris, L.—The form with greenish white flowers has largely escaped in quite out-of-the-way places.

Rubus Dalibarda, L., though mentioned as rarely met with in the adjoining counties west, is quite plentiful at South Mountain wood.

Hypericum pyramidatum, Ait.—Plentiful.

Goodyera pubescens, R. Br.—So common in many places that a peck could be gathered without moving one's feet; a rarely beautiful sight, especially in the wooded slopes of South Mountain.

Habenaria psycodes, Gray.—A pure white variety was found. This plant was depauperate in every part except its magnificent spike.

Trillium erectum, L., var. *album*, Ph., was plentiful at South

Mountain last year; not an individual was gathered this season, though many searches were made.

Binghamton, N. Y. CHAS. F. MILLSPAUGH.

Pine-needles.—We read with interest, in the BULLETIN for August, just issued, that Mr. Meehan now is in accord with the botanical world in general in the belief that pine-needles "are true leaves, and not modifications of branches," as he has formerly taught. And really the reasons for his former opinion seem to be fairly overborne by the assigned reason for his conversion, namely, that in certain three-leaved fascicles of a pine, "each is a trifle shorter than the other."

Perhaps his suggestion that "all pines are monophyllous in the early stages of growth" because the needles of a bundle sometimes stick together for a while, but separate by "a light tap" on the apex, may be equally overborne by the consideration that this is incompatible with his statement "that a fascicle of pine-leaves is a depressed spiral," and by the fact that the adjacent needles of the bundle of white pine-leaves in question merely stuck together, but were never united.

A. GRAY.

The "Mocker-Nut."—The word *mocker*, in the name "mocker-nut," affords an example of an accomodated spelling due to a popular, though very erroneous, etymology. Michaux (Hist. des Arbres forestiers de l'Amer. Sept., i., 178–9) says of the fruit of *Carya tomentosa:*

"The shell, which is very thick, slightly striate, and of extreme hardness, contains a kernel which is sweet, but small, and difficult to extract on account of the very strong dissepiments that divide it; and it is probably for this reason that this species has been called the mocker-nut hickory." By this he would have us to understand that the nut was so called because it *mocks at* one's efforts to extract its kernel.

This explanation, notwithstanding its absurdity, has been copied into various books, and is, I think, the only one that has ever been offered; at least I have never met with any other.

It seems useless to mention the fact that to speak of a mocker nut in the sense assigned to the prefix by Michaux would be as un-English as it would be to speak of a cryer baby, a barker dog or a flower stream.

The *c* in the word *mocker* is epenthetic, and the name mocker-nut stands for (New York) Dutch *moker-noot*, 'heavy-hammer nut,' *i. e.*, one which, owing to the thickness of its shell, it takes more than a light hammer to crack.

The old and correct spelling, moker-nut, should be restored in botanical works, and the other, which is entirely meaningless, should be left to the trade-language of the nut-market, where perhaps it originated.

W. R. G.

Insular Vegetation.—Great Duck Island is one of the outer islands of Penobscot Bay, Maine, and lies about 12 miles south of Mt. Desert Island. It has a length of one and a half mile, with a breadth of less than half a mile. The following plants were noticed upon it, during a two hours visit on 26th of August last:

Ranunculus Cymbalaria, Pursh.
Coptis trifolia, Salisb.
Capsella Bursa-pastoris, Moench.
Viola.
Drosera rotundifolia, L.
Hypericum Canadense, L.
Elodes Virginica, Nutt.
Stellaria media, Sm.
Cerastium viscosum, L.
Sagina procumbens, L.
Oxalis Acetosella, L.
Potentilla Canadensis, L.
P. argentea, L.
P. Norvegica, L.
Pyrus Americana, DC.
Hippuris vulgaris, L.
Circæa alpina, L.
Epilobium coloratum, Muhl.
Aster acuminatus, Mx.
Achillea Millefolium, L.
Gnaphalium uliginosum, L.
Senecio vulgaris, L.
Cirsium lanceolatum, Scop.
C. arvense, Scop.
Vaccinium Pennsylvanicum, Lam.
V. Vitis-Idæa, L.
Chiogenes hispidula, T. & Gr.
Trientalis Americana, Pursh.
Euphrasia officinalis, L.
Lycopus Virginicus, L.
Scutellaria galericulata, L.
Polygonum incarnatum, Ell.
Rumex Acetosella, L.
Empetrum nigrum, L.
Abies nigra, Poir.
A. alba, Mx.
A. balsamea, Marsh.
Iris versicolor, L.
Smilacina bifolia, Ker.
Juncus.
Hordeum jubatum, L.
Hierochloa borealis, R. &. S.
Aspidium spinulosum, Sw.
Osmunda (prob. *cinnamomea*, L.)

The species printed in Roman seem to be recent introductions on the cleared portions of the island, perhaps by the agency of sheep and birds. The remaining species belong to the flora of the neighboring mainland.

John H. Redfield.

George W. Clinton, LL.D.—In Professor Gray's brief mention of the death of Judge Clinton (contained in the last number of the *American Journal of Science*), the statement is made that, at the time of his death, he was probably the oldest of American botanists. There seems to be no reason for questioning the fact; and thus in the death of this venerable man another of the links which united the students of the present generation with those of the past has been broken.

Judge Clinton belonged to a family renowned in the history of this State. His grandfather was General James Clinton of the Continental Army, his granduncle was George Clinton, the first governor of the State, and his father was DeWitt Clinton, also, for several terms, the governor of the State, and yet more greatly distinguished as the author and chief promoter of the scheme of internal improvements which raised the commonwealth to the foremost place in the sisterhood of states. DeWitt Clinton, himself, during his entire life, was a devoted student of nature. In a pre-eminent degree, he was the friend and patron of naturalists and men of science, finding in their society and conversation the highest satisfaction. It is his name (because of his interest in science and especially botany) that is perpetuated in the genus *Clintonia* of Rafinesque. Samuel L. Mitchell, David Hosack and Amos Eaton, botanists of eighty years ago, were among his intimate friends. It is therefore not strange that in the influence of such associations, his son, the late Judge Clinton, should have found such taste for scientific pursuits as were his by inheritance strengthened and stimulated.

Born in New York City, on the 13th day of April, 1807, George William Clinton, as early as his eighteenth year, was a devoted student of botany and a zealous and indefatigable collector. A diary, kept by him at this early age, including the notes of an excursion made by him into the western part of the State, immediately after the completion of the Erie Canal, is still in existence to testify to that conscientious regard for scientific truth, which, to the close of his life, distinguished him. The little volume seems to recognize Professor Amos Eaton, of the Rennselaer Institute, as the guide of his botanical studies. His correspondence at this period, a portion of which is still preserved, shows that he was in receipt of letters from Rafinesque and others, whose names, to us, seem almost to belong to a mythological age.

His father died suddenly in February, 1828, while still governor; and, almost at once, upon the advice of near friends, among whom was Chief Justice Ambrose Spencer, he relinquished the study of medicine, to which he had already given the attention of two or three years, and, abandoning altogether the natural sciences, engaged with characteristic ardor and assiduity in the study of the law. As though to make his divorce from his earlier pursuits the more complete, he gave away his herbarium and his botanical library. Thereafter, for nearly half a century, he devoted himself to his profession, practising at the bar for more than twenty-three years, and, afterwards, occupying an honored place in the judiciary of the State for more than twenty-four years.

In 1836, he became a resident of Buffalo, where he lived until 1881, the recipient of the highest honors which his towns-people could bestow. His great ability and high character were recognized by the State in his appointment as one of the Regents of the University, in 1856; and Hamilton College, his *alma mater*, about the same time, honored him with the degree of Doctor of Laws.

In 1861, upon the establishment of the Buffalo Society of Natural Sciences, he accepted its presidency; and thereupon, returning to his first love, with all the devotion of his youth, he began an unremitting and most industrious exploration of the botany of the region in which he lived, giving to the undertaking almost all the leisure which remained after the performance of public and private duties. It may seem strange, yet the statement scarcely requires qualification, that in the interval of thirty-three years in which his attention had been turned aside from botanical pursuits, so complete had been his neglect of the favorite study of his early days, that, although he remembered a large proportion of the native plants of his neighborhood, he was almost entirely unacquainted with the natural system of classification of plants, and with the changes in their nomenclature. But the fact was to him only a trifling and temporary obstacle; and he was soon perfectly familiar with the leading principles of modern botanical classification.

It was characteristic of Judge Clinton that in his most earnest labors there was no thought of self. His arduous and unremitting efforts in the establishment of a herbarium in Buffalo were wholly for the benefit of the Society of which he was the chief. He collected most abundantly, and his specimens, by exchange, went into many hands. Those which he received in return were added to the collection of the Society, until, at the time when he removed from Buffalo, it embraced, as is supposed, specimens of more than 20,000 species of plants. These had all been mounted, labeled, arranged and catalogued by his own hands. The collection thus illustrates not only the flora of his neighborhood, but, very largely, that of the world.

How often his researches were rewarded by the discovery of plants not previously known or suspected in the vicinity of Buffalo, the later editions of Gray's Manual will bear witness. No name occurs more frequently than his as the authority that a certain plant occurs in some named locality. Yet, perhaps, after all, the abundance of species of the plants of Buffalo, as compared with those of other places, may prove to be due rather to the persistency and completeness of his explorations than to the fact that the vicinity of Buffalo is especially rich in species.

His labors being confined almost entirely to the neighborhood of Buffalo, the plants new to science which were detected by him could not be great in number. *Scirpus Clintonii*, Gray, *Aspidium cristatum*, Swartz, var. *Clintonianum*, Eaton, and several fungi, described by Mr. Peck, perpetuate his name.

Judge Clinton possessed, in a remarkable degree, the gift of eloquence. Upon topics of a scientific character he was a frequent and delightful speaker. The public was always anxious to hear him. It is probable, however, that his contributions to the press will be longest remembered. His style was most agreeable. Many of the observations which he made in his excursions were published in a series of papers printed in the Sunday *Courier*, of Buffalo, entitled "Notes of a Botanist." Nothing, perhaps, more characteristic of the man ever emanated from his pen. They aimed at none of the startling attempts at hypothesis and generalization which have been not inaptly called the "romance of science." He could present the truth with almost photographic fidelity, and yet, by the charm of a style of unusual beauty, he could make his matter as agreeable as a fairy tale.

His removal to Albany, in 1881, was occasioned by his being called there to arrange for publication the papers of Gov. George Clinton, now the property of the State. He found this labor one of great pleasure. Yet he would at times indulge himself in a botanical excursion into the suburbs of the city. In one of these, which he undertook on the 7th of September, 1885, he visited the Rural Cemetery, where, within a short time after he had passed through its gates, he was found dead. Only a few minutes before, he had been seen gathering botanical specimens, and apparently in as perfect health as can attend old age.

Thus at the very close of life, he was in the enjoyment of the things which he had always loved so well—the green turf, the blue sky and the sweet, autumnal air.

> "Then with no fiery, throbbing pain,
> No cold gradations of decay,
> Death broke at once the vital chain,
> And freed his soul the nearest way."

DAVID F. DAY.

Botanical Notes.

*Botanical Work of the American Association for the Advancement of Science.**—The Ann Arbor meeting of the Association, just closed, proved of more than usual interest to the botanists. There was a notable increase in the permanent value of the papers. They were more thoughtful, as a rule, than those presented at previous meetings, and came up more nearly to the standard demanded by the science of to-day. Below we give brief abstracts, which will show the general nature of the papers.

"An Observation on the Hybridization and Cross-breeding of Plants," by E. Lewis Sturtevant. This gave in detail the observations on crossed beans, maize, barley, peppers, tomatoes, lettuce and peas, made at the New York Agricultural Experiment Station. As a result of the observations the author concludes that in our domesticated vegetable plants cross-fertilization shows its effects at once in the reproduction of the form-species and varieties which are involved in the parentage of the crossed seed, or, in other words, the effect is *atavism* rather than a blending of properties.

"Germination Studies," by the same author, gave the results of making numerous duplicate germinations, showing that different percentage-results are obtained as the quantity of seeds used is large or small. The influence of various temperatures was also discussed.

"The Question of Bisexuality in the Pond-scums," by Charles E. Bessey. It has been held by some botanists that the pond-scums (Zygnemaceæ) show a distinct bisexuality, one of the filaments being male, the other female. Certain facts were presented which render such a view untenable. In many plants the cells of the same filament fertilize one another, as is notably the case in the forms which have been described as *Rhynchonema*. Several cases of hybridization were cited in which two filaments, both of which bore resting-spores, united with one another and produced a hybrid spore. The conclusion was that the pond-scums are not bisexual, but rather unisexual, that is, that while sexuality undoubtedly exists, there is as yet no differentiation into the proper male and female. Accordingly these plants must take a position just above the asexual prototypes, but below the clearly bisexual oöphytes.

"The Process of Fertilization in *Campanula Americana*," by Charles R. Barnes. This species is strongly proterandrous. The

* From the *American Naturalist.*

pollen is scraped out of the anthers by the hairy style and brushed off before the stigmas open, thus securing cross-fertilization. The development of the pollen is normal. The stigmas are held together till mature by interlocking papillæ. The hairs on the style become partially introverted, thus freeing the pollen.

The pollen-spore contains two nuclei, the larger of which, the vegetative, becomes disorganized shortly after entering the pollen-tube, while the smaller spindle-shaped generative nucleus persists.

The embryo-sac is cylindrical, with a gradual enlargement near the micropylar end, where is located the egg-apparatus, and an abrupt enlargment at the chalazal end, in which lie the antipodal cells. There are usually two sac-nuclei.

The pollen-tubes enter the style *between* the bases of the papillæ of the stigma, pass down in the strands of conducting tissue, and *not* through the central canal, around which this tissue is arranged. The paper was followed by an account of the methods used, and illustrated by figures drawn upon a large chart.

"Proof that Bacteria are the direct Cause of the Disease in Trees known as Pear-blight," by J. C. Arthur. Cultures of the bacterium taken from blighted twigs were made in sterilized corn-meal juice. After a few days some of the bacteria, which had increased rapidly in this medium, were transferred (a drop only) to another sterilized preparation of corn-meal juice. After a few days another transfer was made, and this was continued until the sixth culture had been reached, when there was presumably but an infinitesimal amount of the original diseased juice present. Inoculations made with the bacteria of the last culture resulted in producing the blight as certainly and rapidly as in the first case.

The crucial experiment was made by filtering a watery solution containing the bacteria, and then inoculating with the bacteria on the one hand and the filtration on the other, resulting in blight in the former and none at all in the latter case.

"The Mechanical Injury to Trees by Cold," by T. J. Burrill. There are two kinds of mechanical injury due to a low temperature, viz.: (1) The cracking and splitting of the bark and wood in a longitudinal-radial direction; and (2) the separation of the concentric layers of wood and bark, and especially the rupture of the cambium, thus destroying the bark and perhaps also killing the tree.

The first injury is due to the shrinking of the tissues by cold. The second is due to the growth of ice-crystals in the annual rings on the surface of the wood.

"Further Observations on the Adventitious Inflorescence of *Cuscuta glomerata*," by Charles E. Bessey. A further examination shows that it is the universal rule of this species for the infloresence to develop from lateral adventitious buds, and that no normal inflorescence is developed. The adventitious infloresence always bears a definite relation to the parasitic roots; that portion of the stem which bears roots produces adventitious inflorescence, and the greater the number of roots the greater the mass of infloresence. No adventitious inflorescence is produced upon any portion of the stem which does not bear roots.

The stem proper (main axis) all dies away very soon, not only between the inflorescences, but in the masses of inflorescence also. The flowering stems soon establish direct structural relations with the root, and thus with the host-plant. Of other species thus far examined, *Cuscuta arvensis* does not produce adventitious inflorescence, while *C. chlorocarpa* and *C. Gronovii* produce an abundance of both the normal and the adventitious flower-clusters, and in both cases the flowers, fruits and seeds appear to be well developed.

"On the Appearance of the Relation of Ovary and Perianth in the Development of Dicotyledons," by John M. Coulter. An examination of many species of dicotyledons (belonging to the orders Ranunculaceæ, Leguminosæ, Rosaceæ, Saxifragaceæ, Onagraceæ, Rubiaceæ, Umbelliferæ, Compositæ, Borraginaceæ, Scrophulariaceæ and Labiatæ) shows that in every case the first character recognized in the development of the flower is that of interior or superior ovary, and that a most simple grouping of the orders upon that basis is possible. Grouping the dicotyledons upon this basis results somewhat as follows: The Compositæ take place at the head of the list, then near them come the Umbelliferæ, Rubiaceæ, etc., etc., The intermediate orders whieh have inferior and superior ovaries, as the Rosaceæ and Saxifrageceæ, would occupy a proper intermediate position, and finally those with superior ovary or ovaries only, as the Scrophulariacæ, Labiatæ, Leguminosæ, etc., would be arrayed in a descending series.

"The Development of the Prothallium in Ferns," by Douglass H. Campbell. The paper gave the details of many observations upon the development of the prothallia of ferns, accompanied with figures of the various stages.

"Notes upon some Injurious Fungi of Californa," by William G. Farlow. The author observed *Peronospora Hyoscyami*, D. By., growing abundantly upon *Nicotiana glauca*, a shrubby plant, native of Buenos Ayres, which is now common in Northern Mexico and Southern California. As the shrub is a near relative of the cultivated tobacco, *Nicotiana Tabacum*, there is danger that the parasite may be transferred from the former to the latter.

The hollyhocks of California are affected by a rust (*Puccinia* of some species) which was at first supposed to be identical with the hollyhock disease of Europe (*Puccinia malvacearum*). It is, however, entirely distinct, being the same species as that which occurs upon species of *Malvastrum* in some of the Western States. There is danger that this may become transferred to the cotton-plant.

"A new Chromogenous *Bacillus*," by D. E. Salmon and Thomas Smith. A *Bacillus*, named *B. luteus suis*, was found in the pericardial effusion of hogs affected with swine plague.

The Botanical Club of the A. A. A. S.—About seventy members of the Association registered themselves as botanists at the Ann Arbor meeting. Every member of the club wore a yellow ribbon in addition to the regular association badge. Six sessions of the club were held in the university buildings, one of them occuring in the botanical laboratory.

During the first session a committee was appointed to take into consideration the question of English names for the fungi and the diseases produced by them. The committee is composed of J. C. Arthur of Geneva, N. Y., Wm. G. Farlow, Cambridge, Mass., and Wm. Trelease of St. Louis, Mo., who are to act in conjunction with F. L. Scribner of Washington, D. C.

A committee was also appointed to take into consideration the relations of the botanists of the country to the National Herbarium at Washington. This committee, consisting of John M. Coulter of Crawfordsville, Ind., and Wm. J. Beal of Lansing, Mich., reported in favor of asking that the herbarium prepare a catalogue of its specimens and books so that botanists may know what is to be found in it for consultation, and also in order that desiderata may be known to those who are able to supply them.

Professor Beal read a few notes upon laboratory methods. This was followed by discussion and a general interchange of notes.

Professor Halsted exhibited specimens of a wild grape from Iowa completely covered with *Peronospora viticola.* Near these specimens were many vines whose leaves were free from the parasite, but whose *berries* were badly affected.

D. H. Campbell exhibited an organism from the Detroit River which he thought to be an alga. Other members doubted its vegetable nature. It was referred for further examination and study.

Professor Coulter presented a list, with comments, of the plants collected by the Greely expedition.

Professor Barnes described the peculiar dehiscence of the fruit of *Campanula Americana*, in which a peculiar little flap opens and lets the seeds out when the weather is dry, but closes when it is wet.

Professor Lazenby presented an additional list of plants new to the Ohio flora.

During the session in the botanical laboratory the whole time was given to the discussion of laboratory methods, and examination of various microscopes and of the laboratory books on the shelves in the room.

Professor Burrill called attention to the grape disease due to *Sphaceloma ampelina*, D. By. Specimens were exhibited and passed around among the members of the club.

Mrs. Wolcott described au abnormal form of *Campanula* which had suddenly appeared in her garden, and which provoked a discussion on weed-seeds in which it was suggested that many weeds survive in fields and meadows by the yearly growth of depauperate plants which, though small, produce perfect seeds.

Professor Barnes showed that the figures of the stomata of *Marchantia polymorpha* given in most books are erroneous in not showing the guard-cells, which lie at the bottom of the chimney-like structure.

F. L. Scribner gave some hints upon the making of drawings from botanical specimens.

Geo. U. Hays, of St. Johns, N. B., sent a paper on the botanical features of New Brunswick, which was read by the secretary. The low temperature and damp air have affected the flora so that it is quite peculiar.

Professor Bessey described his herbarium cases, which have doors that are readily removed entirely, and that he uses for tables by placing them upon trestles or flat-backed chairs.

D. H. Campbell described the germination of *Botrychium* spores in so far as his observations had progressed. He succeeded in germinating the spores by constructing a box in such a way that the spores were under ground.

He also called attention to the crystals in the petiole of *Onoclea*

J. C. Arthur exhibited specimens of Nepaul barley (*Hordeum trifurcatum*) in which the awns take a hood-like development, and in this hood additional flowers are found. The structure is very puzzling, as it appears that here a flowering-glume (outer palet of the older books) bears flowers towards its upper extremity.

Dr. Walker, of New Orleans, mentioned a case of degeneracy of Indian corn. Kernels of Nebraska corn were planted in a pot in New Orleans, and produced perfect fruiting plants only fifteen inches in height.

The officers for the next meeting are John M. Coulter of Crawfordsville, Ind., chairman; J. C. Arthur of Geneva, N. Y., secretary.

The Chemical Action of Light on Plants.—Professor A. Vogel, in a communication to the "Sitzungsberichte der Munchener Akademie," brings into prominence the fact that the hemlock plant, which yields coniine in Bavaria, contains none in Scotland. Hence he concludes that solar light plays a part in the generation of the alkaloids in plants. This view is corroborated by the circumstance that the tropical cinchonas, if cultivated in our feebly lighted hothouses, yield scarcely any alkaloids. Prof. Vogel has proved this experimentally. He has examined the barks of cinchona plants obtained from different conservatories, but has not found in any of them the characteristic reaction of quinine. Of course it is still possible that quinine might be discovered in other conservatory-grown cinchonas, especially as the specimens operated upon were not fully developed. But as the reaction employed detects very small quantities of quinine, it may be safely assumed that the barks contained not a trace of this alkaloid, and it can scarcely be doubted that the deficiency of sunlight in our hothouses is one of the causes of the deficiency.

It will at once strike the reader as desirable that specimens of cinchonas should be cultivated in hothouses under the influence of the electric light, in addition to that of the sun.

If sunlight can be regarded as a factor in the formation of alkaloids in the living plant, it has, on the other had, a decidedly injurious action upon the quinine in the bark stripped from the tree. On drying such bark in full sunlight the quinine is decomposed, and there are formed dark-colored, amorphous, resin-like masses. In the manufacture of quinine, the bark is consequently dried in darkness.

This peculiar behavior of quinine on exposure to sunlight finds its parallel in the behavior of chlorophyll with the direct rays of the sun. It is well known that the origin of chlorophyll in the plant is entirely connected with light, so that etiolated leaves growing in the dark form none. But as soon as chlorophyll is removed from the sphere of vegetable life, a brief exposure to the direct rays of the sun destroys its green color completely.

Professor Vogel conjectures that the formation of tannin in the living plant is to some extent influenced by light. This supposition is supported by the fact that the proportion of tannin in beech or larch bark increases from below upward—that is, from the less illuminated to the more illuminated parts, and this in the proportions of 4:6 and 5:10.

Sunny mountain slopes of a medium height yield, according to wide experience, on an average the pine-barks richest in tannin. In woods in level districts the proportion of tannin is greatest in localities exposed to the light, while darkness seems to have an unfavorable effect. Here, also, we must refer to the observation that leaves exceptionally exposed to the light are relatively rich in tannin.

We may here add that in the very frequent cases where a leaf is shadowed by another in very close proximity, or where a portion of a leaf has been folded over by some insect, the portion thus shaded retains a pale green color, while adjacent leaves, or other portions of the same leaf, assume their yellow, red, or brown autumnal tints. If, as seems highly probable, these tints are due to transformation products of tannin, we may not unnaturally conclude that they will be absent where tannin has not been generated.—*Jour. of Science.*

Boxwood, which is almost exclusively used for wood engraving, is becoming more and more scarce. The largest wood comes from the countries bordering on the Black Sea. The quantity exported from Poti direct to England is immense; besides this, from 5,000 to 7,000 tons of the finest quality, brought from Southern Russia, annually pass through Constantinople. An inferior and smaller kind of wood, supplied from the neighborhood of Samsoun, is also shipped at Constantinople to the extent of about 1,500 tons annually. With regard to the boxwood forests of Turkey, the British consul at Constantinople reports that they are nearly exhausted, and that very little really good wood can be obtained from them. In Russia, however, where some little government care has been bestowed upon forestry, a considerable quantity of choice wood still exists; bui even there it can only be obtained at an ever-increasing cost, as the forests near the sea have been denuded of their best trees. The trade is now entirely in English hands, although formerly Greek merchants exclusively exported the wood. In the province of Trebizonde the wood is generally of an inferior quality; nevertheless, from 25,000 to 30,000 cwt. are annually shipped, chiefly to the United Kingdom.

Seeds of Weeds—The botanist of the Ohio Agricultural Station has been counting and estimating the number of seeds found upon a single plant of the most obnoxious weeds grown in that State. In the shepherd's purse he found the number of seeds in a medium-sized plant, 37,500; in the dandelion, 12,100; wild pepper-grass, 18,400; wheat-thief (*Lithospermum arvense*), 7,000; the common thistle (*Cirsium lanceolatum*), 65,366; camomile, 15,920; butter-weed, 8,587; rag-weed, 4,366; common purslane, 388,800; common plantain, 42,200; burdock, 38,860.

Procuring Fire with the Bamboo.—In the new edition of Mason's

" Burma " we read that among other uses to which the bamboo is applied, not the least useful is that of producing fire by friction. For this purpose a joint of thoroughly dry bamboo is selected, one and a half inch or two inches in diameter, and this joint is then split into halves. A ball is now prepared by scraping off shavings from a perfectly dry bamboo, and this ball being placed on some firm support, as a fallen log or piece of rock, one of the above halves is held by its ends firmly down on it, so that the ball of soft fibre is pressed with some force against its inner or concave surface. Another man now takes a piece of bamboo a foot or less long, and shaped with a blunt edge, something like a paper-knife, and commences a sawing motion backward and forword across the horizontal piece of bamboo, and just over the spot where the soft fibre is held. The motion is slow at first, and by degrees a groove is formed, which soon deepens as the motion increases in quickness. Soon smoke arises, and the motion is now made as rapid as possible, and, by the time the bamboo is cut through, not only smoke but sparks are seen, which soon ignite the materials of which the ball beneath is composed. The first tender spark is now carefully blown, and when well alight the ball is withdrawn, and leaves and other inflammable materials heaped over it, and a fire secured. This is the only method that I am aware of for procuring fire by friction in Burma.

Another method of obtaining fire by friction from bamboos is thus described by Captain T. H. Lewin (" Hill Tracts of Chittagong, and the Dwellers therein," Calcutta, 1869, p. 83), as practiced in the Chittagong Hills. The Tipporahs make use of an ingenious device to obtain fire; they take a piece of dry bamboo, about a foot long, split it in half, and on its outer round surface cut a nick, or notch, about an eighth of an inch broad, circling round the semi-circumference of the bamboo, shallow toward the edges, but deepening in the centre until a minute slit of about a line in breadth pierces the inner surface of the bamboo fire-stick. Then a flexible strip of bamboo is taken, about one and a half foot long and an eighth of an inch in breadth, to fit the circling notch, or groove, in the fire-stick. This slip or band is rubbed with fine dry sand, and then passed round the fire-stick, on which the operator stands, a foot on either end. Then the slip, grasped firmly, an end in each hand, is pulled steadily back and forth, increasing gradually in pressure and velocity as the smoke comes. By the time the fire-band snaps with the friction there ought to appear through the slit in the fire-stick some incandescent dust, and this placed, smouldering as it is, in a nest of dry bamboo shavings, can be gently blown into a flame.—*The Gardeners' Chronicle.*

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New North American Arthoniæ.

The learned Dr. Nylander of Paris has had the goodness to examine a collection of North American *Arthoniæ* sent him by me, and has published the descriptions of several new species in Nos. 16 and 24 of the Regensburg *Flora* of the present year, and which are here reproduced for the benefit of our lichenists.

I have to regret that Dr. Nylander was prevented by ill health and his numerous occupations from determining all the specimens sent him, but I am not without hopes that he may yet find himself able to do so. As being, as it were, the creator of the genus, no one else is so capable as he.

I would observe that *A. pyrrhuliza*, Nyl., has been distributed as *A. pyrrhula*, which, from the description, is quite a different plant. Of this, those with whom I have made exchanges will please take notice.—H. WILLEY.

Fastidiosum sane est novas species describere et infinitas ita minuties videri confusas exhibere. Sed non prætervideatur in scriptis præsertim hodiernis anatomicis vel physiologicis etiam multo magis prodiens nisus res minutulas inutiles amplissime prolixissimeque enarrare minutissimaque acriter consectari, ita ut meritum evadat prolixitas.

Novæ species expositæ parvi sunt momenti nisi ubi addunt notas ad alias species jam cognitas satius distinguendas et ubi constituendo systemati utiles sunt; unde sequitur, nullas descriptiones esse bonas sine additione notarum talium comparantium et simul descriptores parum cognitionibus generalibus methodoque optima initiatos vix descriptiones ullas rite facere valere.

Hic seriem incipimus Arthoniarum Americæ borealis, quas submisit præstantissimus H. Willey.

1. *Arthonia sanguinea*, Will.—Thallus vix ullus; apothecia obscure sanguinea, superficialia, oblonga vel subrotundata (latit. circiter 0.5 $^{mm.}$), convexula intus obscura; sporæ 8næ incolores ellipsoideæ murali-divisæ, longit. 0.022—30$^{mm.}$, crassit. 0.011—14$^{mm.}$ Iodo gelatina hymenialis cœrulescens, sporæ fulvo- rubescentes.

In California super corticem et lignum. Species mox distincta colore apotheciorum. Maxime accedens sit *A. distendens*, Nyl., e Cuba (inde a C. Wright data n^{is} 154 et 156), cui apothecia nigra et sporæ multo majores (longit. 0.073—90$^{mm.}$, crassit. 0.024—27$^{mm.}$)

2. *Arthonia xylographica*, Nyl.—Thallus macula pallescente indicatus; apothecia nigra adpressa lanceolato-difformia (latit. circiter 0.25

$^{mm.}$). vel subastroidea; sporæ 8næ ovoideo- oblongæ 3-septatæ, longit. 0.012—15$^{mm.}$, crassit. 0.004—5$^{mm.}$ Iodo gelatina hymenialis cœrulescens, dein protoplasma thecarum fulvescens.

Super lignum *Vaccinii corymbosi* in paludibus prope New Bedford. Forsan sola subspecies *A. astroideæ*, a qua præsertim sporis nonnihil minoribus et reactione iodica differt. Gonidia vix ulla.

3. *Arthonia subastroidella*, Nyl.—Thallus vix ullus; apothecia nigra minuta, confuse astroidea, inæqualia; sporæ 8næ oviformi-oblongæ 3-septatæ, longit. 0.011—12$^{mm.}$, crassit 0.004—5$^{mm.}$ Iodo gelatina hymenialis vix reagens, protoplasma thecarum fulvo-rubescens.

Super corticem *Coryli* ibidem. Affinis *A. astroideæ* vel potius *epipastoidi*, Nyl., sed reactione indicata differens.

4. *Arthonia quintaria*, Nyl.—Thallus macula pallescente indicatus; apothecia nigra subastroidea, minus divisa; sporæ 8næ oviformi-oblongæ 5-septatæ, longæ 0.018—21$^{mm.}$, crassit. 0.007—8$^{mm.}$, loculo supero majore. Iodo gelatina hymenialis et protoplasma thecarum vinose rubescens.

In Nova Cæsarea super corticem lævem. Affinis *A. astroideæ*, simplicior figura et sporis jam distincta. In *A. obscura*, Ach., sporæ minores.

5. *Arthonia subminutula*, Nyl.—Thallus vix ullus; apothecia nigra tenera gracilenta astroideo-ramosa inæqualia; sporæ 8næ oviformes 1-septatæ, longit. 0.011—15$^{mm.}$, crassit. 0.004—5$^{mm.}$ Iodo gelatina hymenialis vinose rubescens.

Super corticem *Pini Strobi* lævem ad N. Bedford. Species minutella affinis *A dispersæ*, Schrad. (*A. minutula*, Nyl., *Arth.* p. 102), sed apotheciis ramosis, reactione alia.

6. *Arthonia Hamamelidis*, Nyl.—Similis *A. astroideæ*, sporis minoribus (3-septatis), longit. 0.011—12$^{mm.}$, crassit. 0.004$^{mm.}$ differens et ab *A. astroidella* subsimili iodo gelatina hymeniali cœrulescente, dein fulvo-rubescente, protoplasmate thecarum similiter tincto.

Super corticem *Hamamelidis Virginicæ* ad New Bedford (H. Willey).

7. *Arthonia fissurinea*, Nyl.—Thallus macula alba vel albicante, lævigata, indicatus; apothecia pallida innata sublanceolata concaviuscula (latit. circiter 0.2$^{mm.}$), margine thallode parum distincto; sporæ 8næ incolores oviformi-oblongæ, æqualiter 7—9-septatæ, longit. 0.028—32$^{mm.}$, crassit. 0.009—0.011$^{mm.}$ Iodo gelatina hymenialis cœrulee tincta, dein fulvo-rubescens (sporæ etiam sic tinctæ).

Corticola in Florida. Species affinis *A fissurinellæ*, sed magis albicans et apotheciis pallidis (nec incoloribus) etc.

8. *Arthonia pyrrhuliza*, Nyl.—Thallus albidus opacus, tenuiter obscure limitatus; apothecia rubricosa obscuriora, gracilescentia, varia, varie divisa; sporæ 8næ fuscæ 3-septatæ, longit. 0.012—15$^{mm.}$, crassit. 0.0045$^{mm.}$ Iodo gelatina hymenialis cœrulescens, dein fulvescenti-rubescens.

Super *Ilicis* corticem prope New Bedford (H. Willey). Sporis obscuratis mox differt a comparandis, quales sunt *A. pyrrhula* et *A. Cascarillæ*, Fée, quarum definitiones hic addere liceat:

A. pyrrhula, Nyl., Enumer. Lich. suppl. p. 337 (nomen).—Thallus macula albicante lata, satis determinata indicatus; apothecia coccinea linearia, subsimplicia aut parum ramulosa, angulatim sæpe flexuosa, innata, plana, opaca; sporæ 6—8næ incolores, 5—6-septatæ, oblongæ, sat magnæ, longit. 0.030—36$^{mm.}$, crassit. 0.015$^{mm.}$, utroque apice fere æquales loculoque apicali utroque parvo subæquali. Iodo gelatina hymenialis vinose rubens (passim præcedente cœrulescentia).

Super cortices in Carolina (hb. Tuck.) Differt ab *A. cinnabarina* apotheciis gracilentis, sporis aliis.

A. Cascarillæ (Coniocarpon, Fée Ess. p. 98, t. 15, f. 4). Thallus albidus parum conspicuus, indeterminatus; apothecia obscure violacea vel fusca vel obsolete violacee tincta, innata, minuta, sat crebra, rotundata vel nonnihil difformia; sporæ 8næ incolores oblongo-oviformes 3-septatæ, longit. 0.014—16$^{mm.}$, crassit. 0.005$^{mm.}$ Iodo gelatina hymenialis intensive cœrulescens, dein fulvescens.

Super corticem *Crotonis Cascarillæ*. Vix differens ab *A. adspersa* (Mnt.) nisi apotheciis minoribus simplicioribus.

9. *Arthonia diffusa*, Nyl., Enumér. Lich. suppl. p. 337 (nomen). Thallus albus vel albidus, tenuis, effusus, opacus, sæpe tenuissimus; apothecia nigra sparsa rotundata vel nonnihil difformia (latit. 0.3—0.7 $^{mm.}$), innata plana vel convexiuscula, intus albicantia; sporæ 8næ incolores oblongo-oviformes 3-septatæ, longit. 0.009—0.013$^{mm.}$, crassit. 0.0035—0.0045$^{mm.}$ Iodo gelatina hymenialis cœrulescens.

Corticola. Facie fere *A. cinereopruinosæ*, Schaer., sed sporis minoribus. Spermatia oblonga.

10. *Arthonia impallens*, Nyl.—Subsimilis *A. stenographellæ*, Nyl., Nov. Granat. 2, p. 99, sed apotheciis omnino pallidis. Sporæ ovoideo-oblongæ 2—3-septatæ, longit. 0.011—12$^{mm.}$, crassit. 0.0035—45$^{mm.}$ Iodo gelatina hymenialis cœrulescens. dein vinose fulvo-rubescens.

In New Jersey, supra *Ilicem* (Eckfeldt).

11. *Arthonia terrigena*, Will.—Thallus vix ullus visibilis; apothecia nigra minutella lecideoliformia (latit. fere 0.2$^{mm.}$); sporæ 8næ incolores vel dilute fuscescentes oviformi-oblongæ 1-septatæ, longit. 0.011—12 $^{mm.}$, crassit. 0.0035$^{mm.}$ Iodo gelatina hymenialis non tincta, protoplasma thecarum vinose rubens.

Supra terram humosam nudam locis umbrosis prope New Bedford (Willey). Species inconspicua infima,, cum nulla alia comparanda.

12. *Arthoria subminutissima*, Nyl.—Thallus nullus visibilis; apothecia nigra minutissima rotundata vel oblonga (latit. vix 0.1$^{mm.}$); sporæ 8næ incolores oblongo-oviformes 1-septatæ, longit. 0.007—9$^{mm.}$ crassit. 0.003 $^{mm.}$ Iodo gelatina hymenialis vinose fulvescens.

Pinicola prope New Bedford. Comparanda cum *A. minutissima* (Ach.) Nyl., Scand. p. 263, quæ sporas habet majores.

Observatio.

Arthonia patellulata, f. *subpallidiuscula*, apotheciis humidis obscure pallescentibus. Super corticem *Hamamelidis* prope New Bedford.

Quercus gra.—While riding along the turnpike from Dix Hills to Comac, Suffolk County, I noticed an oak which I was satisfied was new to me. It seemed to be quite plentiful in that light, sandy soil. On my return home I found it to be *Quercus nigra*. As I have botanized over almost the whole county, I think it is confined to that (limited) locality, or I should have observed it before.

Wading River, L. I. E. S. MILLER.

Dr. Asa Gray's Seventy-fifth Birthday.—The seventy-fifth anniversary of the birth of Dr. Gray occurred on the 18th of November, when a number of American botanists united in presenting him with a highly artistic vase as a token of their esteem.

This vase, which we represent herewith from *Science*, was presented on the morning of the 18th, without formality. It is about eleven inches high, and is appropriately decorated *en repoussé* with those plants which are distinctively American, and which are most closely associated with Dr. Gray. The place of honor on one side is held by *Grayia polygaloides*, and on the other by *Shortia galacifolia*. Among others, *Aster Bigelovii*, *Solidago serotina*, *Lilium Grayi*, *Centaurea Americana*, *Notholæna Grayi* and *Rudbeckia speciosa* are prominent.

The vase stands upon an ebony pedestal, which is surrounded by a silver hoop bearing the inscription:

1810—November eighteenth—1885.
ASA GRAY
in token of the universal esteem
of American botanists.

The idea was originated and carried out by the editors of the *Botanical Gazette*, and was a complete surprise to Dr. Gray.

Pine-needles.—It is very pleasant to have my friend Dr. Gray's congratulations on my conversion as to the nature of pine-leaves. If the "botanical world" had given me the evidence, instead of allowing me to work it out for myself, the happy event need not have been so long delayed. And, of course, if I am now convinced that a fascicle of pine-needles is really but the leaves from a suppressed branch, I can have no hesitation in adopting the terms "early stuck together" instead of "monophyllous in the early stages," if that will make the idea clearer, for it was precisely my object to show that the term monophyllous as applied to the pine was simply a case of the "early sticking together" of the leaves of the plant.

THOMAS MEEHAN.

To Botanists.—I have published a Catalogue or Check-List of the Phænogamous and Vascular Cryptogamous Plants of North America, containing the names of nearly 10,000 species. It is, so far as I know, the most complete list ever published of the plants of this country. It contains 112 pages, and will be found of the utmost utility as an auxiliary to the successful arrangement of a herbarium, and invaluable for making exchanges.

Paola, Kansas. J. H. OYSTER.

Botanical Notes.

Systematic Position of the Bacteria.—In a Review of recent works on bacteria, Dr. C. Fisch (*Biolog. Centrabl.* v., pp. 97–102) shows that the assignment of the Schizomycetes to the fungi does not rest upon a sound morphological basis, the physological resemblance in the absence of chlorophyll not being sufficient of itself to show a genetic affinity. The history of development furnishes conclusive evidence against the Schizomycetes being connected with the fungi phytogenetically, either as an early form of development or as the result of retrogression. The nearest affinity of the bacteria lies unquestionably with certain green organisms, *Nostoc*, *Oscillaria*, etc., included under the Schizophyceæ or Cyanophyceæ; and these form together a natural group of Schizophyceæ, with no close affinity to any group of fungi. According to our present state of knowledge, the Schizophyta must be regarded as displaying the nearest genetic affinity with the Flagellata.—*Journ. Royal Microscop. Soc.*

The Filmy Ferns of Jamaica.—Under this title, Mr. J. H. Hart has contributed to the *West Indian Field* an interesting article to which he appends a list of all the *Trichomanes* and *Hymenophylla* known to inhabit the island of Jamaica—22 species of the former and 13 of the latter.

Forestry Statistics.—At the American Forestry Congress, recently in session in Boston, some very valuable statistics were presented relative to the timber supply of this country. The land area of the United States is placed at 1,856,070,400 acres; total forest area, 440,990,000 acres; total farm area, 295,650,000 acres. Of unimproved and waste lands, including "old fields," there are 1,115,430,400 acres. There are 150,000 miles of railway, including side tracks. It has required 396,000,000 ties for their construction. Supposing that the ties require to be renewed once in six years, and that 10,000 miles of new road are built annually; if twenty-five years be allowed as the time necessary for trees to attain a size suitable for making ties, then it would require 15,000,000 acres of standing timber to supply the annual demand for them. But with the increase of railroads, it is to be considered that the annual demand for ties is all the while increasing.

The census reports the consumption of 145,778,137 cords of wood and 74,000,000 bushels of charcoal for fuel in dwellings, stores, factories, steamboats and locomotives. This in a single year would clear the forests from an area of 30,000,000 acres. The census also reports that in 1880 forest fires consumed the trees on 10,274,089 acres, and there is no reason to believe that a less area will be burned over than in 1880. The census gives the amount of lumber cut in 1880 as 18,000,000,000 feet. Last year the cut had increased to 28,000,000,-000 feet, which would lay bare an area of 5,600,000 acres. Altogether, it appears that the forests of the country are subject to an annual drain of 50,750,089 acres. It may well be inquired how long the forests can endure this drain—how long the country can bear this rapid destruction of the most important material element of its prosperity.

The Shaw School of Botany, endowed by Mr. Henry Shaw as a Department of Washington University, at St. Louis, was formally inaugurated on the 6th instant., the address being delivered by Mr. William Trelease, who has been appointed to the chair of botany, which is to be known as the Engelmann Professorship. The work of the school, outside of the University classes, will begin with the formation of a class for the study of grasses. A class in analytical botany will take up the study of spring flowers on Tuesday and Thursday afternoons and Saturday mornings, from April 6th till June 12th, 1886.

Distribution of Crystals of Oxalate of Calcium in the Leaves of Leguminosæ.—Some investigations on this subject have been made by Prof. J. P. Borodin, who has examined 660 species with the following results: In the Mimoseæ the occurrence of the crystals is very constant, and they are arranged in a solitary manner parallel with the veins. In the Cæsalpineæ the distribution is the same, but, in addition, there are clusters of crystals scattered through the parenchyma of the leaf. These do not occur in the Papilionaceæ. In the Papilionaceæ there are three principal types: (1) Crystals altogether wanting (in the Genisteæ, many Galegeæ, as *Astragalus* and *Colutea*, and some genera of other groups; (2) clinorhombic crystals along the veins (in the Vicieæ and Trifoliaceæ), and clinorhombic crystals scattered through the parenchyma (in some Phaseoleæ and Galegeæ); clinorhombic crystals in groups in the epidermis (in *Dioclea* and *Canvalia*), and crystals in the membrane of the epidermis (in *Stylosanthes*). When crystals are wanting in the leaves, they are deficient also in the stem. (*Jour. Roy. Micros. Soc.*) These investigations after further elaboration may perhaps serve as a clue to the genus to which any leguminous plant belongs, in cases in which only a leaf can be obtained.

Experiments in Crossing Solana.—Some interesting experiments have lately been made by Messrs. Sutton, of Reading, in the crossing of potatoes already in cultivation with the *Solanum Maglia* of littoral Chili and with *S. Commersoni*. Hybrids with *S. Maglia* have been obtained, but a cross could not be effected with *S. Commersoni*. The same firm has also made the curious experiment of fertilizing the "Victoria" potato with the pollen of a tomato, and other potatoes with the pollen of *Solanum Dulcamara* and *S. nigrum*, reversing the cross in some instances. From these cross-fertilizations seed has been obtained, and the result of their cultivation will be awaited with interest.—*Gardeners' Chronicle.*

Variations in Quercus prinoides.—At a meeting of the Philadelphia Academy of Natural Sciences, August 4th, Mr. Meehan exhibited a series of fruiting specimens of branches of *Quercus prinoides.* In some, the leaves were almost orbicular and obtuse, in others narrowly lanceolate or saliciform and acute, others had lobed and wavy edges, while others were quite entire. The plants were all growing within a few feet of each other, and the parent plants were also all under the same conditions of environment, and were all at no distant date from one parentage.

They were exhibited, said Mr. Meehan, for two purposes—first to show that what was commonly understood as environment was not a main factor in the origination of variation, and secondly to show that variation was independent also of mere conditions of growth or sexual peculiarities to which variation was sometimes referred. It was indeed true that young plants often had leaves varying from those on the older plants, and plants or branches bearing flowers of one sex would have characters varying from those of another sex, but these specimens were all fertile, and with young acorns. There was no possible ground for any suggestion as to different conditions in any sense, and the variations could be attributed only to an innate and wholly unknown power to vary, which science had so far been unable to reach.

Sonora Gum.—A substance called "Sonora gum," somewhat resembling a gum-resin in external appearance, and of hitherto uncertain origin, is found sparingly in commerce in California, and is used by brewers there in the manufacture of porter. Upon an investigation of the matter, Mr. F. Grazer finds that this so-called gum is the exudation from the branches of *Larrea Mexicana,* which was referred to under the title of Arizona shellac in a paper read by Professor Stillman at a meeting of the California Academy of Sciences several years ago. Mr. B. B. Redding, at the same meeting, referred to the plant as a source from which our commercial shellac could be obtained, stating that these lac-yielding plants, including *Acacia Greggii,* were as plentiful as the so-called sage-brush, from Southern Utah to New Mexico, and from the Colorado desert to Western Texas, the lac being most abundant around stations on the Mojave and Colorado deserts. The exudation, which takes place as the result of an insect's sting, could be easily collected by boiling the twigs in water, the gum (?) which rises to the top being skimmed off, strained, and dried on smooth stones, and hand-pressed into flakes, ready to make sealing wax or varnish. The plant requires a rainfall of three inches a year.

Formation of Gum in Trees.—Some time since, Sir James Paget created considerable interest by quoting in one of his lectures the results of an investigation by Dr. Beijerinck into the cause of the formation of gum in trees, which led him to believe that it was due to a pathological change brought about by the influence of a fungus (BULLETIN, xi., 33). Working quite independently, and in ignorance of Dr. Beijerinck's researches, Dr. Wiesner has since arrived at a similar conclusion, except that he attributes the formation of gum to the action of an unformed ferment (*Monatshefte*, vi., 592). This ferment he considers to belong to the starch-converting or diastatic enzymes, but to differ from the ordinary members of this group in that, while it converts starch into dextrin, it produces no sugar that reduces Trommer's solution. The seat of the development of the gum ferment appears to be the granular protoplasmic matter of the parenchyma cells. From thence it attacks the cellulose of the cell walls, converting it into gum or mucilage, in the latter case disappearing itself from the finished product. The ferment probably converts any starch it may meet with into dextrin, though never into a reducing sugar; indeed it seems capable of arresting the action of diastase in this direction, when added to a solution of dextrin containing diastase.

A Square-Stemmed Bamboo.—The great predominance of the cylindrical form over all others in the trunks, branches and stems of plants renders an exception to the rule of considerable interest. The existence of a square-stemmed bamboo in China and Japan has several times been mentioned, but the assertions of travelers in regard to it have been received with some incredulity. There can be no doubt about the matter now, however. This variety of the bamboo is described and figured in a Japanese book, the *Sô Moku Kin Yô Siû* (Ornamental-leaved Trees and Shrubs), published at Kyota in 1829, and in the *Ju Moku Shiri-yaku* (Short Description of Trees) of Kinch, of Tokiyo. In 1880 some specimens of this bamboo were presented to the Kew Gardens, and it seems that it had been introduced into France some time before that. Nothing has been known of its presence in China until within a very recent period, say in 1882, when Mr. F. S. A. Bourne met with some specimens during the course of a voyage. It seems, from an extract from the *North China Herald* cited in *Nature*, that the Chinese hold the plant in great esteem, cultivate it as an ornament and put it to many uses. When young the stem is nearly cylindrical, but becomes square in time. It is, according to its age, manufactured into canes and pipe-stems. This peculiar variety of the bamboo is found in Chekiang, Tunnan and a few other regions. The Chinese attribute its form to supernatural power or to sorcery.

The Lechuguilla (*Agave heteracantha*, Zucc.), says Dr. Havard, is the most important of the soap or *amole* plants of Southwestern Texas and Northern Mexico. Iu the process employed for extracting the fibre, the parenchyma or pith squeezed out constitutes about 40 per cent. of the green leaf; when dried it is a white-yellowish, mucilaginous powder which possesses remarkable cleansing properties principally due to the presence of saponin. Its composition is very probably analogous to that of the root of *Yucca baccata*. Rubbed with water, it foams and lathers, answering the purpose of good soap without, owing to its freedom from alkali, its disadvantages. It imparts a smooth and satiny appearance to the skin, and is used successfully in removing stains from the most delicate fabrics. It tends rather to set than to displace colors, and articles likely to fade may be washed with it in safety. It is also an excellent wash for the scalp and hair, leaving the latter soft and glossy. If this powder could be compressed into small cakes or tablets it would doubtless become an important article of trade.

Mexicans and Indians, after removing the prickles, pound the leaves into a pulp which they use instead of soap.

The Root of Baptisia tinctoria has recently been examined by Dr. von Schroeder (*Chem. Zeit.*, Oct. 14th), who finds therein, among other constituents, an alkaloid which he calls baptitoxine, and which has a poisonous action even in small doses. In frogs this alkaloid produces cessation of the respiration and then paralysis; in warm-blooded animals it causes a slowing of the respiration and an increase in the reflex irritability of the medulla.

Economic Uses of Opuntias.—Dr. Harvard, in *Proceedings of U. S. National Museum*, says of the prickly pears: "The joints, erroneously called 'leaves,' are readily eaten by cattle and sheep, for which they are an important article of food. It is well, as far as far as practicable, to make them undergo a preliminary scorching for a few moments, over a bright fire, to burn off the bristles and blunt the spines. I have seen cattle eating nopal leaves with great relish in the open field, although there was good green grama near by, seemingly indifferent to the many bristles and spines sticking to their noses. There are times when they prefer them to any other food. These leaves contain a large proportion of water and often save cattle and sheep from great suffering in dry seasons. If the time of drought be much prolonged, however, they lose much of their water by evaporation and become very thin; the pulp shrinks and the fibrous framework preponderates; in this state they are liable to cause sickness in animals feeding on them. During the three or four winter months, on the Lower Rio Grande, sheep often get no other food than nopal leaves. Every morning the shepherd cuts down, with his hand-ax or *machete*, the amount required for the day; as a rule he does not fire them. It is to be noted that as long as they feed on them the sheep require no drinking water.

"The nopal leaf is much used by Mexicans and frontiersmen as a poultice in bruises, ulcers and sores of all kinds. It is first slightly toasted to remove bristles and thorns, as well as to warm and soften the pulp; then it is split in two, or simply one of the surfaces shaved off, and the exposed pulp applied to the part. From the testimony of many intelligent people I am inclined to regard this as an excellent healing and gently stimulating application.

"It is also useful to clarify water. After being scorched it is mashed into a pulp, which, when thrown into water, like egg albumen, drags all impurities to the bottom.

"Again, this leaf may be prepared for food by boiling it in salt water; if afterwards cut up into a hash with eggs and chile colorado, it makes quite a savory dish."

Preserving Plants.—For the last three years, says Mr. P. Henning, certain fruits, flowers and other portions of plants have been preserved in perfect condition at the Berlin University (Botanical Museum) by means of a solution consisting of four parts of water and one part of alcohol saturated with salicylic acid.

Retirement of Sir J. D. Hooker.—After occupying for nearly twenty years the position of director of the Royal Gardens, Kew, Sir Joseph Hooker now resigns that post. Though nearly seventy years of age, he seems as full of vigor and work as when, forty-five years ago, he joined Sir James Ross's Antarctic expedition as assistant surgeon in the *Erebus* and *Terror*. That voyage yielded a substantial contribution to botanical science. Not only as a botanist, but as a lecturer, he stands in the highest rank. His botanical work during his well-known wanderings in the Himalayas is of scarcely less scientific importance than that of the Antarctic regions, New Zealand and Tasmania; while it is difficult to conceive that his Himalayan Journals can ever be out of date, either for instruction or entertainment. Nor must the journey which he made in Morocco with Mr. John Ball be forgotten, and its substantial narrative, not to mention his run across America with that most genial of scientists, Prof. Asa Gray. No one probably did Darwin more service when working out his Origin of Species. As an eager fellow-worker and loyal assistant, few probably know the services Sir Joseph rendered to one who was the greatest of revolutionists, as well as the foremost of evolutionists. But it is as the director of Kew Gardens that Sir Joseph must be specially remembered at present. There he has held sway for thirty years—ten as his father's assistant and twenty as chief. It is mainly due to the Hookers that this royal domain has become the largest and finest garden in the world. The director of such an institution can have but little of that quiet and unworried leisure which is absolutely necessary for the best work in science, and it is this consideration, and not any feeling of failing faculties, that determined Sir Joseph to resign his trying post at the end of November.

The Papaw (*Carica papaya*).—All students of botany are well acquainted with the accounts given by travelers of the uses and wonderful properties of the fruit of *Carica papaya*, and most of us have read how the application of the juice of this fruit to a piece of tough meat will cause a disintegration of its fibres and consequently render it tender. Browne, in his Natural History of Jamaica, says that meat quickly becomes tender if it is washed in water to which some papaw juice has been added, and, if left in such water for ten minutes, it will drop from the spit while roasting, or separate into shreds while boiling. It is likewise said that in Barbadoes and other West India islands, it was once customary to feed pigs on the green fruit; but it was found that if these animals consumed any very large quantity without a sufficient proportion of other food, they not only suffered in health, but death actually followed in some cases from the intensity of the chemical action. Owing to the interest that has recently sprung up in Europe regarding the chemical action of this fruit, a large demand has risen for the dried juice and the commercial papain, both of which have lately been submitted to a new examination by Dr. S. H. C. Martin, who records his results in the *British Medical Journal* for July 25th.

Wurtz had described the ferment of the papaw as a proteid, soluble in distilled water, yet precipitated by nitric acid, but differing from a native albumen (as white of egg) in not being precipitated by boiling. In the material used by Dr. Martin in his former experiments (commercial papain) he found two proteids, a globulin and a "peptone"; and he could not come to any conclusion as to which of these bodies was the ferment, or, to speak more correctly, which was associated with it.

In the present investigation he has attempted to settle this point. In the first place, the body called a "peptone" in a previous paper is not a true peptone, but is one of the bodies intermediate between globulins and peptones, first described by Meissner as a peptone, and called by Kuhne *hemialbumose*. This body agrees with peptone in certain reactions, and experiment shows that the ferment-action is associated with hemialbumose.

Of the results obtained in the investigation of the action of papain on the proteids in papaw-juice only a brief summary can be given. Of late years the former ideas of the nature and constitution of vegetable proteids have been entirely revolutionized, chiefly by the researches of Denis ('Mémoire sur le sang'), Weyl, Hoppe-Seyler, Vines, and others; so that now we may state that the two chief proteids found in plants are globulins and "peptones." Vines considers that there is no true peptone in the seeds of plants; he thinks it is a hemialbumose, and explains away Ritthausen's "legumin" and "conglutin," obtained from the seeds of *Leguminosæ*, referring the former to the class of hemialbumoses and the latter to a changed form of proteid produced by the action of alkalies and globulin. By pursuing the method first instituted by Denis, Dr. Martin obtained from papaw-juice proteid bodies whose reactions agree with those of the globulins and hemialbumoses, or rather albumoses, leaving the question as to whether they are anti- or hemia-forms for further consideration. The albumose precipitated by sodio-magnesium sulphate corresponds to Vines's hemialbumose. This albumose gives the same reactions as those of the body with which the ferment is so closely associated: it is the proteid in the juice most like a peptone. Dr. Martin found no true peptone.

The action of papain on these different constituents is peculiar, because in Dr. Martin's former experiments he has been able to discover no true peptone as a result of digestion; the body which is formed from the globulins is the albumose found in small quantities in the salt extract, the body which corresponds to Vines's hemialbumose.

Botanical Literature.

Thirty-eighth Annual Report on the New York State Museum of Natural History. Report of the Botanist, Chas. H. Peck. Albany, Weed, Parsons & Company. 1885.

From this Report we learn that one hundred and ninety-two species of plants were last year mounted and added to the State herbarium, and that of these (of which very many were fungi not before published) one hundred and sixteen were not previously represented therein. To these must be added two State species sent by correspondents, and new to the herbarium, making the total number one hundred and eighteen.

In continuation of a series of monographs of our Hymenomycetous or fleshy fungi, begun in the 33d Report and continued in the succeeding ones, Mr. Peck gives in the present instance on account of our State species of *Lactarius* (which are forty in number), and of *Pluteus* (nine in number).

The gratifying promptness with which the Report under consideration has been printed and published is due to a law passed in 1883, which provides that the scientific printing of the Museum shall hereafter be done " under the direct care of the Museum staff. Under this law the scientific papers prepared by the Museum staff will be issued, whenever ready, as Museum bulletins." This is as it should have been many years ago.

The Mycologic Flora of the Miami Valley, Ohio. By A. P. Morgan. (From *Journal* of the Cincinnati Society of Natural History.)

Observations on several Zoogloeæ and related Forms. By William Trelease, Sc.D. 8vo., pamph., pp. 24. (From *Studies* from the Biological Laboratory of the Johns Hopkins University.)

(1.) *The Spot-Disease of Strawberry Leaves.* (2.) *When the Leaves Appear and Fall.* By William Trelease. 8vo. pamph., pp. 20. (From Second Ann. Report Wisc. Agric. Exper. Station.)

Proceedings of the Torrey Club.—At the regular meeting of the club, Tuesday evening, November 10th, the President occupied the chair, and twenty-one persons were present.

Dr. Britton read some notes upon *Carya microcarpa* and a paper upon *Quercus Muhlenbergii*, Engelm, and *Q. prinoides*, Willd., in which he maintained that the eastern shrubby form of *Q. prinoides* was a well-marked variety of Dr. Engelmann's *Q. Muhlenbergii* (*Q. Castanea*, Muhl., *Q. Prinus*, L., var. *acuminata*, Mx.), and therefore proposed for it the name of *Q. Muhlenbergii*, Engelm., var. *humilis*.

Mr. Hollick gave a brief account of the August flora of the vicinity of Tom's River, N. J., and exhibited specimens therefrom.

Dr. Newberry gave an interesting account of the fossil flora of the New Jersey cretaceous clays, and compared the forms that have been found with similar ones from the clays of Greenland and Aachen. Within the past few months upwards of a hundred and fifty species have been unearthed, these including about fifteen conifers, a dozen ferns, two or three cycads, several specimens of what appears to be a large composite flower-head, and a number of trees and shrubs, many of which are represented by living genera.

A white-flowered *Cnicus lanceolatus* was shown by Mrs. Britton, who also exhibited specimens of *Chrysanthemum Leucanthemum* in which the flower-heads appeared to be developed immediately from the root without the intervention of a stem—the latter, at least, if present, being too short to be visible.

Mr. Hollick showed an example of syncarpy in a cultivated cucurbit.

Two persons were elected active members.

NEW DESMIDS OF THE UNITED STATES.

BULLETIN

OF THE

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Fresh-Water Algæ. X.

By FRANCIS WOLLE.

(Plate LI.)

Two weeks spent in Florida, in the latter part of the month of March last, an occasional exploration nearer home and a few parcels from correspondents, suggested the following notes referring mainly to plants new to the United States. They are arranged in the order of proposed classification of our fresh-water algæ.

Ectocarpus, Lyngb. E. RIVULARIS, *n. sp.*—Tufts loose, 2–6 inches long, dark olive-green; filaments stout and firm, much branched; branches erect patent, mostly alternate, decompound; stems and branches tapering. Diameter of lower part of stems often 250μ, branches 100μ, more or less; articulations of stems and of branches rarely more than half as long as wide, often shorter; propagula rare, elliptic-oblong, acute, subsessile, constricted at base; older parts of stems corticulate, at first marked by longitudinal threads over the articulations, then by an irregular reticulation.

The *Ectocarpi* form a family of about fifteen species in our American marine waters, abundant along the Atlantic and Pacific coasts. The new species, *E. rivularis*, is claimed for fresh water. It has hitherto been found in only three known localities in Florida. The first discovery, made by myself, was in a fresh water marsh pool about two miles inland from Green Cove Spring, March, 1885. A month later, Rev. H. D. Kitchel found the same plant at Blue Springs on the St. John's River, more than two hundred miles from the sea. In a collection made by Capt. J. Donnell Smith in 1878, and sent to me, I discovered the same plant and made an illustration in my sketch book, but did not identify it then. The specimen came intermingled with other fresh-water algæ.

Among marine forms the plant is nearest *Ectocarpus Durkeei*, described by Harvey in his Nereis Boreali-Americana. More modern authors consider this form a mere variety of *E. granulosus*, Ag.; however this may be, it coincides with neither; besides affecting fresh water, it is much more rigid and robust, and the articulations of the stem are shorter, usually less than half the diameter.

Thorea, Bory. *T. ramosissima*, Bory.—Lake Osceola, Florida. The specimen found was small, but sufficient for identification.

Œdogonium, Link. *Œd. acrosporum*, D.B., var. LONGATUM, *n. var.*—Diameter of filament 7–8μ; much more slender than in the forms described, and the cells more elongated, averaging twice the usual length, 5–11 times longer than broad.

Œd. echinospermum, A. Br., var. SPERMOGONIO-MULTICELLULARE, *n. var.*—Gynandrosporous, oospores globose, echinulate, spines very slender, dense and long. Androsporangia 2–5-celled; dwarf males with spermogonia 8–10-celled. Fils. 25μ–30μ; oogon. 50μ; stipes of males 18μ; spermog. cells 15μ.

I collected finely developed specimens of this new variety in lakes at Winter Park, Florida, March, 1885.

ŒD. CATARACTUM, *n. sp.*—Idioandrosporous; oogonia often terminal, single or twin, obovate or subglobose, or broadly oval, pore in upper part; oospore globose or egg-shaped globose, nearly filling the oogonium; androsporangia 2–6-celled; dwarf males somewhat curved, seated on or sometimes below the supporting cell; spermogonia one-celled. Veg. cells 28μ–38μ long, 1.5–3μ diameter. Oogon. 55–60μ long, by 60–75μ. Oosp. 50–55μ long, by 50–60μ. Cell andro. 26–30μ long, by 10–15μ. Stip. dw. males 10μ long, by 65μ.

Rapid stream below High Falls, Dingman's Ferry, July, 1885.

Œd. punctato-striatum, D. By.—A good European species, for the first time here in lakes near Winter Park, Florida, March, 1885.

Cladophora, Ktz. *C. ægagropila*, Linn., var. THERMALIS, *n. var.* —Clusters attached, 1.5–2$^{cm.}$ in diameter, dark green; filaments rigid, much branched, more or less radiating from a common centre; branching lateral, erect patent, often enlarged towards the ends; articulations long, 10–20 diameters.

In manner of growth it has the appearance of *C. glomerata*, var. *pumila*, Bail., but the branching is lateral immediately below the apex, and not terminal as in that species. It has much in common also with sterile *Pithophora*. Comparing with European specimens of *ægagropila*, this is a fair representation, but it may be well to continue observations on fresh specimens in different seasons of the year for complete identification. The plant was found attached to the planked sides of the outlet of the large sulphur springs at Green Cove Spring, Florida, also attached to sticks of old wood in coves of bark at Silver Spring, Florida. The waters of both places are warm and sulphurous.

Dictyosphæreum, Naeg. D. HITCHCOCKII, *n. sp.*—Cells green, broadly oval, length about one and one-half time the diameter; others indicating division by transverse constriction in the middle; clustered in radiating branched series, held by slender, colorless, gelatinous threads; each cell having chlorophyll radiately gathered around a large central granule. The cells measure 12–13μ wide, 18–20μ long.

Frequent in Split Rock Pond, N. J.

Zygnema (Ag.) Ktz. Z. PURPUREA, *n. sp.*—Primarily yellowish green, but soon changing to a dark purple, articulation one diameter to more rarely two diameters; fruiting filaments more or less geniculate; zygospores spherical, cells not (or but slightly) swollen. Diameter of filaments 20μ to (rarely) 25μ.

This plant is common in ponds and lakes of New Jersey, floating in large masses often yards in extent, filaments often geniculately united, but never in perfect fruit. I was fortunate in finding the same plant last March in the Tocoi marshes near St. Augustine, Florida. Wide ditches alongside the railroad were literally covered with a smooth, glistening, dark purple mantle. Here for the first time were discovered good fruiting specimens which determined the hitherto doubtful generic position of the plant. The chlorophyll is usually more or less centrally contracted in each cell. There is no evidence of twin nuclei, a fact which, with the color and the geniculate feature of the filaments, makes a distinct specific character.

Mesocarpus, Hassal. M. CRASSUS, *n. sp.*—Vegetative cells robust, measuring, with slight variation, 50μ in diameter, 5–10 times as long as wide; fruiting cells very nearly, or perfectly straight; zygospores smooth, spherical, 65μ in diameter.

Floating in extended, pale yellow- green masses on ponds near St. Augustine, Florida. In every way much larger than the largest of described species, and the articulations proportionately longer.

Staurospermum, Ktz. *S. gracillimum*, Ktz.

Lakes near Winter Park, Florida.

Bambusina, Ktz. *B. gracilescens*, Nord. (Plate LI., Figs. 13–14). This is described in my Desmids of the United States as a variety of *B. Brebissonii.* Whether viewed as such or as a distinct species, it was an interesting discovery to find fine fruiting specimens frequent in a pond near Winter Park, Florida.

Diameter of cells, 14μ; length, 23μ; apices, 8μ; zygospore, 15μ.

An observation made by Rev. H. D. Kitchel, and by myself, on gatherings from the same marsh pond is worthy of special note. The plant conjugates, not like one of the Desmidiaceæ, but, like one of the Zygnemaceæ, in longer or shorter series; often when the zygospores are nearly matured, the cells of one side separate and cause the other side to bend backward in a reversed, semi-circular form. We found the fruiting specimens in many stages of conjugation, first putting out separately narrow gelatinous connecting tubes, then these uniting and forming complete conjugation, next the chlorophyll passing out of the cells, flowing together in the tube, and gradually developing the zygospore, until fully matured.

Judging by these specimens, the correctness of the generic position of *Bambusina* may be questioned.

Sphærozosma, Corda. *S. pulchrum*, Bail., var. CONSTRICTUM, *n. var.* (Plate LI., Fig. 12).—Cells half as long as wide, with a decided constriction in each lobe between the axis and the apex. Diameter, 70–75μ.

Lake near Kissimme, Fla.

S. moniliforme, Lund. (Plate LI., Fig. 11).—Diameter 20μ; length of cell 40μ.

Lake near Kissimme, Fla.

Cosmarium, Corda. *C. Eloisianum*, Wolle. A species hitherto found only in Minnesota now turns up also in Splitrock Pond, New Jersey.

Micrasterias, Ag. *M. verrucosa*, Roy. (Plate LI., Fig. 10.)—In outline this species agrees with forms of *M. denticulata* (Bréb) Ralfs., but differs from these and all other described forms by the remarkable row of crenulated, circular or oval basal inflations crossing from side to side, larger towards the centre, gradually growing smaller towards the margins. The original, typical plant was found in Scotland. The first from this country was from a pond near Minneapolis, Minn., in collections made by Miss E. Butler.

M. ringens, Bail., var. SERRULATA, *n. var.* (Plate LI., Fig. 15.) —In size and form the same as the original type from Florida. Bailey describes it as "granular near the margins," but not as serrated. This new variety has the margins distinctly serrated. Found in large numbers in White Bear Lake, near Minneapolis, Minn., by Miss E. Butler. Diameter 115–130μ by 125–145μ.

M. furcata, Ag., var. SIMPLEX, *n. var.* (Plate LI., Figs. 6 and 7.) —Cell equal in length and breadth, two-lobed, end lobe exserted, its divisions spreading, producing a wide, shallow sinus; lateral lobes usually simple, sometimes divided into two, narrow, linear divergent sections, furcate at apices. Length and breadth 140–150μ.

A singularly variable species; of thirty-one specimens examined by Rev. H. D. Kitchel and myself, twenty were of normal form, as in the upper half of figures 6 and 7, no arms divided; five had all the lateral arms divided like the lower half of figures; one had two arms divided and one single; two had only one arm divided, and three had each two arms divided.

All from pond near Winter Park, Florida.

The second form mentioned, with all the lateral arms divided, is near the form described (Desmids United States, p. 111) as *M. pseudofurcata*, and needs further observations.

Staurastrum, Meyer. *St. Wolleanum*, Butler, var. MISSIMMENSE, *n. var.* (Plate LI., Figs. 1, 2 and 3 front, side and end views.)—A large smooth and beautiful form, fully one-half larger than the typical plant from Minnesota. The arms are similarly constructed and arranged, but, in proportion with the body, are much longer, nearly equal in length to the diameter of the body; apices not notched, but tipped with several small spines. Diameter, including the arms, 100–125μ.

Grassy shores of lake at Kissimme, Florida, March, 1885.

ST. TOKOPEKALIGENSE, *n. sp.* (Plate LI., Figs. 4–5).—Cell smooth, semicell in front view oval with gradiating arms; end view triangular, each angle drawn out into a smooth arm nearly as long as the diameter of the body; two similar arms on each side; all at nearly equal distances, and furcate at the apices. Diameter, including arms, 75μ.

This species occurs frequently in small coves of Lake Tokopekaliga, at Kissimme, Florida. It bears features in common with *St. furcatum*, Bréb., but is about twice the size, has more arms, and has them differently arranged; the description "one spine at each angle, with two accessory spines at the base," or "three spines at each angle," does not apply.

St. paradoxum, Meyen., var. OSCEOLENSE, *n. var.* (Plate LI., Figs. 8–9.)—This variety is near the typical form, but larger, and with the apices of the arms much more prominently forked. Spread of arms, 60–70μ.

St. longispinum, Bail.—This species, hitherto recognized by Prof. Bailey only, was found by Rev. H. D. Kitchel, the past summer in Florida, and by myself in New Jersey.

The front view was not described by Bailey and hence not mentioned in my Desmids of the United States, p. 145. The semicells are smooth, broadly elliptic, with the angles terminated by two, long, stout, subulate spines.

Lyngbyapapyrina, Kir. (*Phormidium papyraceum*, Ktz.)—Collected by W. A. Setchell, New Haven, Conn.

Oscillaria chalybea, Mertens. Florida.

Beggiaboa leptomitiformis, Trevis.—Collected by Miss G. Lewis, Clifton Springs, N. Y. April, 1885.

Spirulina tenuissima, Desmaz.—Frequent in sulphur springs, Green Cove Spring, Florida, and Clifton Springs, N. Y.

The Origin of Herbaria.*—At a meeting of the Botanical Society of Lyons, May 5th, 1885, Dr. Saint-Lager gave the results of the researches that he had made regarding the historical origin of herbaria. He had been led to this study by reading a work recently published by Messrs. Gamus and Penzig upon the subject of a herbarium of the end of the sixteenth century discovered in the archives of Modena. In the first place, Dr. Saint-Lager stated that in the writings of the naturalists of antiquity no collection of plants that had been first dried and pressed and then united in volumes is ever spoken of. Yet it is certain that among the Greeks there were *botanologoi*, who, as the name indicates, devoted themselves to the gathering of plants. These persons were called also *rhizotomoi*, 'root-cutters,' and it was their business, particularly, to stock the shops of the *phytopolai*, or herb-dealers, called in Latin *herbarii*.

We know also that a botanical garden was established at Athens by Aristotle, and afterwards ceded to Theophrastus his pupil, and his successor at the Lyceum. Theophrastus bequeathed his garden, natural history museum and dwellings to his disciples. Pliny tells us that he often enjoyed visiting the garden wherein the venerable Antonius Castor cultivated all the plants of Italy, Greece, Asia Minor, Egypt and India. There was also a botanical garden near the celebrated School of Medicine of Alexandria. Later on, in the middle ages, the centre of phytological studies was transferred to Salerno, where Matthæus Silvaticus founded a garden which served as a model for all those that were established in several towns of Italy, Holland, Germany, England, Russia and France.

As botany, on account of the numerous applications formerly made of it in medicine, was, among the natural sciences, the one that had most adherents, it seems surprising at first sight that the art of preserving plants, dried and pressed, did not keep pace with that of cultivating them, and that Linnæus's aphorism that *omni botanico herbarium necessarium est* has not from all times been a fundamental clause in the cartulary of botanists. It is well to remark that the word *herbarium*, which might prove misleading, was used up to the middle of the sixteenth century to designate a botanical treatise accompanied with engravings opposite the text. Such is the *Herbarium* of Apuleius Platonicus and that of Giacomo Dondi, *Le Grant*

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* From the *Bulletin trimestrial de la Société botanique* de Lyon, April–June, 1885, p. 61.

Herbier in French translated from Latin, the *Herbarium* of Brunfels, the *Herbario Nuovo* of Castore Durante, and several others of the same kind. The expression *hortus siccus*, 'dry garden,' by which was designated what we now call a herbarium, did not make its appearance until towards the end of the sixteenth century, and, on another hand, the most ancient herbaria preserved up to our day are those of the Lyonais surgeon Gréault (1558), in the Paris Museum, of Aldrovandi (1560–68), in 16 volumes, at Bologna, of Rauwolf (1573–75), at Leyden, of an unknown botanist, in the archives of Modena, and of Gaspard Bauhin (1576–1623), at Basel.

Dr. Saint-Lager gave a description, from Messrs. Camus and Penzig, of the Modena herbarium, and, from Mr. Caruel, of the much more extensive one of Cæsalpinus, and he expressed his regrets that so little care had been taken of the herbaria formed by Lyonais botanists. No trace of Daléchamps's collections remains, and there are but a few fragments of those of Goiffon, who had the honor of being Jussieu's master. The herbarium of Claret de la Tourrette has, with the exception of the lichens, been distributed through the general herbarium of the Conservatory. No one has ever had the curiosity to visit the herbarium of Abbot Rozier. Finally, there has recently been found at the Conservatory of Botany a herbarium which was formed in 1699 by an apothecary named René Marmion, and which, on account of its antiquity, should have merited a better fate than that of being devoured by parasites.

It now remains to examine a question to which no one has ever paid any attention, and that is why herbaria were not formed before the sixteenth century? Assuredly it was not because the invention required a great effort of genius. Even children, without being taught, know how to form little herbaria by inserting flowers between the pages of a book during their walks in the fields. This word *book* contains the answer to the question proposed. The ancients did not prepare herbaria because they did not know the art of uniting into book-form sheets of that admirable material, paper, which, although very thin, is relatively quite stiff. They wrote upon papyrus, or upon sheets of parchment which they *rolled* into a volume (*volumen*, from *volvere*). Moreover, they would never have ventured to employ papyrus, a costly material, nor even parchment, for so vulgar a purpose.

In the twelfth century of our era the manufacture of paper from silk (*charta bombycina*) and from cotton (*charta cotonea*) was begun in Europe, according to processes long understood by the Chinese; but it was not till the fourteenth century that it was known how to make paper out of linen and hempen rags. And then, as all the operations were performed by hand, paper was quite a dear product. When, about the middle of the fifteenth century, the art of printing was invented, paper manufacturers taxed their ingenuity to reduce the cost of labor, and constructed machines adapted for comminuting rags and spreading the pulp in the form of endless sheets. Now it is worthy of remark that the appearance of herbaria coincides with the mechanical improvements by means of which it became possible to manufacture paper at a low price. Such economic result once obtained, the idea of preserving dried plants must have occurred to several botanists at the same time; and it seems to be useless to discuss at length the question as to whether the inventor of the forming of herbaria was Luca Ghini, as maintained by Meyer in his Geschichte der Botanik, or the Englishman Falconer, as thought by Messrs. Camus and Penzig. In fact, said Dr. Saint-Lager, the Lyonais surgeon Gréault formed a herbarium at the same period as did Ghini and Falconer, and without having been in communication with them. It is probable that other botanists likewise have simultaneously carried out the very legitimate desire of preserving in their library those plants which they had taken so much pleasure in gathering in a living state. The difficulty did not consist in conceiving of the idea of collecting dried and pressed plants together into a volume, for that is child's-play, but rather in finding a convenient and cheap mounting material.

Botanical Notes.

Red Snow.—At a recent meeting of the Biological Society of Washington, Mr. Romyn Hitchcock, of the National Museum, read a paper on Red Snow, and exhibited through the microscope specimens of the brilliant, minute, crimson globules which give color to the snow, and about the character of which there has been considerable difference of opinion among naturalists. Mr. Hitchcock remarked that the red snow that attracted much attention from scientific gentlemen when it was brought home from the Arctic regions by Capt. Ross, in the year 1818, was by no means unknown before that time. De Saussure, as early as 1760, observed it on Mount Breven, in Switzerland, and since then many others have noticed it in the Alps and Pyrenees, and it seems to occur frequently in all parts of the world. Particular interest, however, was manifested in the material brought home by Capt. Ross, and several botanists secured specimens for examination, and, among these, Mr. Francis Bauer, who thought the plant a *Uredo*, and named it *U. nivalis*. Baron Wrangel regarded the plant as a lichen, and gave it the name of *Lepraria Kermesina*.

In the latest literature of algæ the plant is classed as a *Chlamydococcus*. Until the method of propagation of this plant is more satisfactorily established, Mr. Hitchcock thinks it will be impossible to fix its systematic position. It is not improbable that in its actively vegetating condition the plant is green. This is indicated by the observations of early discoverers.

A specimen of the red snow collected by Dr. Kane from the crimson cliffs of Beverley is in the National Museum, but is now thoroughly dry.

A specimen sent by Mr. Alexander McDougall was received in January of this year from Poverty Gulch, Col.

Mr. Hitchcock made a few observations on this and attempted to cultivate some of the cells, but without success. The cells were of a bright red color, sometimes apparently quite naked, but frequently enclosed singly or three or more together, in a colorless, shrivelled envelope.

The contents of perfect and fresh cells appeared to be quite clear and transparent, with occasionally a well-defined sort of vesicle of a deeper color than the rest. When the endochrome was pressed out from the cells into the surrounding water it contracted into spherical, oil-like masses. The surrounding envelope was quite hard, tough and resisting.

Identification of Species by Cell-wall Markings.—Messrs. Lawrence and Raddin, of Evanston, Ill., have been making a study of the markings of the cell-walls of various exogenous trees with the object of ascertaining whether it is possible to distinguish species by this means. The results of their observations are published in the November number of the *Microscope.*

The conclusion that they reach is that species cannot be distinguished by this means, and they further observe that the same species collected in different localities presented differences that were oftentimes very great. They even assert that species of the same genus frequently bear no relation to each other in this respect, and that the markings on the cells of *Quercus rubra* sometimes so closely resemble those of *Pinus Strobus* that there is danger of confounding the woods of these two trees.

Vegetative Organs of Monotropa.—In studying the structure of *Monotropa Hypopitys*, Mr. F. Kamienski finds the root of this plant "to be covered externally by the mycelium of a fungus, which branches abundantly and forms a pseudoparenchymatous envelope, often two or three times the thickness of the epidermis itself, being especially well developed at the apex of the root. It is entirely superficial, not penetrating the living cells, though occasionally between the epidermal cells. The species of this fungus Mr. Kamienski was unable to determine, but considers it to be probably identical with that found on the roots of conifers and other trees. With regard to the mode of nutrition of *Monotropa*, Mr. Kamienski decides that it is not a parasite. The most careful examination failed to detect any haustoria or other parasitic union of the root with any "host." He regards it as deriving its nutriment from the soil through the medium of the fungus-mycelium by which the roots are invested; the only parts of the root which are in actual contact with the soil are composed of lifeless cells with no power of deriving nutriment from it. The connection of the fungus with the root of the *Monotropa* is not one of parasitism, but of true symbiosis, each of the two organisms deriving support and nutriment from the other.—*Journ. Roy. Microscop. Soc.*

The New Director of Kew Gardens.—We supplement the statement made in our last number as to the retirement of Sir Joseph D. Hooker from the post of Director of the Royal Gardens at Kew by the announcement that Mr. W. T. Thiselton Dyer, who for some time past has ably performed the duties of Assistant Director, has been nominated to succeed him.

The de Candolle Prize.—The Society of Physics and Natural History of Geneva offers a prize of 500 francs for the best original monograph of any family or class of plants. The prize was instituted by Mr. A. P. de Candolle. The manuscripts may be in Latin, French, German, English, or Italian, and must reach the president of the society before the first of October, 1889. The members of the society are not allowed to compete.

New American Desmids.—In a paper read before the Royal Microscopical Society, Nov. 11th (*Journal* of the Society, pp. 933–40) Mr. W. B. Turner describes a number of desmids, of which the following new species and varieties are North American: *Genicularia Americana* (Minn.), *Leptozosma** *catenula* (N. J.), *Onychonema Nordstedtiana*, *Cosmarium gemmatum* (Minn.), *C. rostratum* (Minn.), *Euastrum Floridanum* (Fla.), *E. pseudelegans*, *E. coronatum* (Minn.), *Micrasterias furcata*, var. *decurta* (N. Y.), *M. mamillata* (Pa.), *M. Americana*, var. *spinosa* (Nova Scotia), *M. denticulata*, var. *Minnesotensis* (Minn.), *M. papillifera*, var. *Novæ Scoticæ* (N. S.), *Arthrodesmus incus*, var. *Americana* (Pa.), *Xanthidium armatum*, vars. *Wolleanum* and *Americanum*, (N. J.), *Staurastrum gladiosum* (N. J.), *S. Pringsheimii*, var. *duplo-majus*, (N. S.), *Docidium occidentale*, and *Gonatozygon sex-spiniferum* (Minn.). The descriptions of the above are accompanied with two plates of figures.

The following are given as new to North America: *Cosmarium Cordanum*, Bréb. (N. S.), *Staurastrum dejectum*, Brêb., var. *Sudeticum*, Kirch. (Minn.), and *Penium spirostriolatum*, Barker (Minn.)

The Fruit of Opuntia.—At the meeting of the Philadelphia Academy of Natural Sciences, August 11th, Mr. Thomas Meehan exhibited a series of specimens of an unknown species of *Opuntia* closely allied to *O. Brasiliensis* and showing a gradual change from the joint or frond to the fruit. In one case there was the thin orbicular frond, then a frond with a slight rounding and tapering at the base, then one somewhat resembling a fruit, but very much compressed, and with an abortive flower-bud having a scar at the apex, then another with a perfect flower, but very much elongated and fluted, but with a perfect flower, though small, and lastly the frond reduced to an inch in length, pyriform, and with the perfect large yellow flower. He remarked that it could not be called a novel point to make that the fruit of a *Cactus* was simply a metamorphosed frond, or joint as the section is commonly called, and that the petals were the usually very much suppressed leaves, but it might serve a good purpose to place on record this excellent illustration of the fact.

A deep-water Moss.—Fishermen who capture the char off Yvoire Point on the southern shore of Lake Leman, says *La Nature*, often bring up in their nets fragments of rocks upon which is frequently found growing a moss of a beautiful green color. These stones, according to the distinguished naturalist Mr. J. B. Schnetzler, and to Prof. Bocion of the Industrial School of Lausanne, come from a depth of 200 feet. No stream of water enters the lake in this region, and the rock, with adhering moss, is found at a great distance from the shore. No moss has hitherto been found living at so great a depth. The fact is the more striking in that the cells of the species under

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* Leptozosma, *n. gen.*—Filamentous, long, cateniform; not twisted or but slightly so. Joints united by a strongly marked suture; cells attenuate at the ends towards the suture. Near to *Bambusina*, but differing in the suture.

consideration are filled with chlorophyll, a coloring matter which, save rare exceptions, can be developed only under the influence of light of a certain intensity.

Botanical Literature.

Manual of the Botany (Phænogamia and Pteridophyta) of the Rocky Mountain Regions, from New Mexico to the British Boundary. By John M. Coulter, Ph.D. Ivison, Blakeman, Taylor & Co.: New York and Chicago. 1885.

This book will be gladly welcomed by western botanists, as well as by those of their eastern confreres who have had occasion to identify western plants, and who know by experience how difficult it often is to obtain access to descriptions. The range of the work includes Colorado, Wyoming, Montana, Western Dakota, Western Nebraska and Western Kansas, the eastern boundary being very nearly represented by the hundredth meridian. The greater portion of contiguous floras is also described, so that "the western part of the Indian Territory, Northwestern Texas, Northern New Mexico and Arizona, and Eastern Utah and Idaho may be included for all except their own peculiar plants." This is a very wide range and embraces one of three regions west of the Mississippi Valley prairie country that possess well defined floras, the others being that of the Pacific slope, which is provided for in the Botany of California, and that which extends from the Great Basin to Arizona, New Mexico, Western Texas, and southward into Mexico, and which is found described partly in Mr. Watson's Botany of the Fortieth Parallel and partly in Dr. Rothrock's Botany of the Wheeler Survey.

As a general thing, Prof. Coulter follows the sequence of orders adopted by Bentham and Hooker, but he has transferred Gymnosperms to the end of Phænogams, and has subordinated Monocotyledons and Dicotyledons to Angiosperms, as this, he remarks, better expresses relationships that have long been recognized. The old term "Cryptogam" has been discarded for that of Pteridophyta, and the classes and orders have been arranged under this series in that sequence which the author thinks best expresses relationships.

The descriptions of adventive plants are in all cases printed in smaller type and placed at the bottom of the page.

In size, typography and general make up, the book is uniform with Dr. Gray's Manual. In view of the want that has long existed for a concise account of the flora of the Rocky Mountain region, in a convenient form for reference, we bespeak for Prof. Coulter's work a large sale.

Les Procédés operatoires en Histologie Végétale; Guide pour les Etudes de Microchimie. Par Louis Olivier. Paris: Savy. 1855.

In this volume, Mr. Olivier has brought together in systematic order, from various scattered papers, descriptions of the most approved methods of preparing microchemical reagents, and the mode of applying them to the study of plants. After pointing out how great a light is shed upon the minute anatomy of the tissues by the microchemical method, the author discusses the form, the structure, the contractility, and the various properties of protoplasm; the general structure and physiological rôle of the cellular nucleus; the degree of complication of the ternary membranes; the nature of the substances that exist in the cells, in solution or in an amorphous or crystalline state; and then proceeds to give the methods of examining each organ, tissue, or other plant element.

This book will prove a valuable addition to the libraries of those who are interested in the study of vegetable histology, although students in this country are perhaps well enough provided for in this respect in Prof. Trelease's translation of Poulsen's work on the same subject, published by S. E. Cassino & Co. last year.

Talks Afield about Plants and the Science of Plants. By L. H. Bailey, Jr. Boston: Houghton, Mifflin & Co., 1885. 12mo., pp. 168.

This is a pleasantly written little volume, well adapted to fulfil the mission for which its author intended it, *i. e.*, to give the non-botanical public "a popular account of some of the leading and external features of common plants." Some of the topics treated of are the following: the flower; the stem; the classification of flowering plants; the rose family; the composite family; a peep at the inside; the sexes of plants; cross fertilization; hidden flowers; the arrangement of leaves; carnivorous plants; a talk about roots; how plants are named, etc. The work is profusely illustrated and handsomely printed, and can be recommended as a safe guide to those who desire to obtain an intelligent idea of plant structure and classification, and who yet do not wish to take up the study of botany as a science.

Report on the Flora of Western and Southern Texas. By Dr. V. Havard, U. S. A. 8vo., pamph., pp. 85.

This very valuable report is based upon the observations and collections made by Dr. Havard during the last five years at various posts at which he has been stationed, and also, "and chiefly, while on duty with the expeditions for the exploration of Western Texas, under the command of Major W. K. Livermore, . . . in the summer and fall of 1881 and 1883." In the first part, the author describes, in a general way, the vegetation of Western and Southern Texas, and sketches the topographical features of the country. The second part is devoted to economic notes upon such plants of the Texano-Mexican flora as are known to have useful or baneful properties, or to be of value to the industries.

Les Champignons supérieurs. Physiologie. Organographie. Classification. Détermination du Genre; avec un Vocabulaire des Termes techniques. Par L. Forquignon. Paris: Octave Doin. 1885.

This is a little duodecimo volume dedicated to beginners in the study of the higher fungi, and gives excellent descriptions of some of the principal species of Agaricini, Polyporei, Hydnei, Thelephoræ, Clavariæ, etc., found in France. The descriptions are followed by a brief account of some exotic fungi; by a bibliographical index, which, although not exhaustive, is sufficiently complete in its enumeration of the most interesting works on mycology; and by a vocabulary in which the Latin words are explained. Finally, 105 excellent figures, due to Dr. Quelet, add to the value of the book, and give a correct idea of all the genera and of the principal species.

Henry Shaw School of Botany. Inaugural Exercises in Memorial Hall, St. Louis Museum of Fine Arts, Nov. 6th, 1885. 8vo. pamph., pp., 24.

Catalogue of the Phænogamous and Vascular Cryptogamous Plants of North America (exclusive of Mexico.) By J. H. Oyster. 8vo, pp. 112, Paola, Kansas. 1885.

Sketch of the Botanical Work of the Rev. Moses A. Curtis, A.M., D.D., F.A.A.S. By Thomas F. Wood. Raleigh: Edwards, Broughton & Co. 1885. 8vo, pamph., pp. 31; with steel plate portrait of the subject of the memoir.

Proceedings of the Torrey Club.—The regular meeting of the Club was held at Columbia College, Tuesday evening, Dec. 8th. In the absence of the President, Mr. Braman occupied the chair.

The committee appointed at the last meeting to extend to Dr. Gray the Club's congratulations on the completion of his seventy-fifth birthday submitted the following correspondence:

(RESOLUTIONS.)

Resolved: That the Torrey Botanical Club of New York sends its greetings to Dr. Asa Gray on the attainment of his seventy-fifth birthday, and its congratulations that it finds him in the enjoyment of health, the full possession of all his great powers and undiminished enthusiasm in the science to which he has devoted his life.

Resolved: That we tender to Dr. Gray our gratitude for the splendid contributions he has made to American botany, and our heartfelt wishes that many years of activity and happiness may yet be added to his already long and useful life.

J. S. NEWBERRY, M.D.,
ADDISON BROWN,
E. G. K. BRITTON, } *Committee.*

(REPLY.)

HERBARIUM OF HARVARD UNIVERSITY,
BOTANIC GARDEN, CAMBRIDGE, MASS.
November 20th, 1885.

To Arthur Hollick, Secretary, and Prof. J. S. Newberry, Addison Brown, Esq., Mrs. E. G. K. Britton, Committee of the Torrey Botanical Club:

Let me return my sincere thanks for the honor you have paid me and the pleasure you have given me by the congratulations which the Torrey Club has sent through you, on the occasion of my seventy-fifth birthday, with which I have been deeply touched and gratified.

With best wishes to you all personally, and for the prosperity of the Club which has so honored and venerated a name, I remain

Sincerely yours,
ASA GRAY.

Mr. O. R. Willis read a number of reminiscences of some of our earlier botanists—Torrey, Rafinesque, Short and others.

Mr. Britton showed a specimen from the Torrey herbarium labeled *Geranium*, simply, collected by Dr. Denslow in 1867 on the Kingsbridge road, and which proves to be *G. Sibiricum*, L.

Mrs. Britton remarked upon some additions to the flora of Westchester County, and exhibited specimens of double-flowered *Viola pubescens* from Pelham Manor.