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THE AMERICAN

# MIDLAND NATURALIST

DEVOTED TO NATURAL HISTORY, PRIMARILY  
THAT OF THE PRAIRIE STATES

JULIUS A. NIEUWLAND, C. S. C., PH. D., Sc. D.  
EDITOR

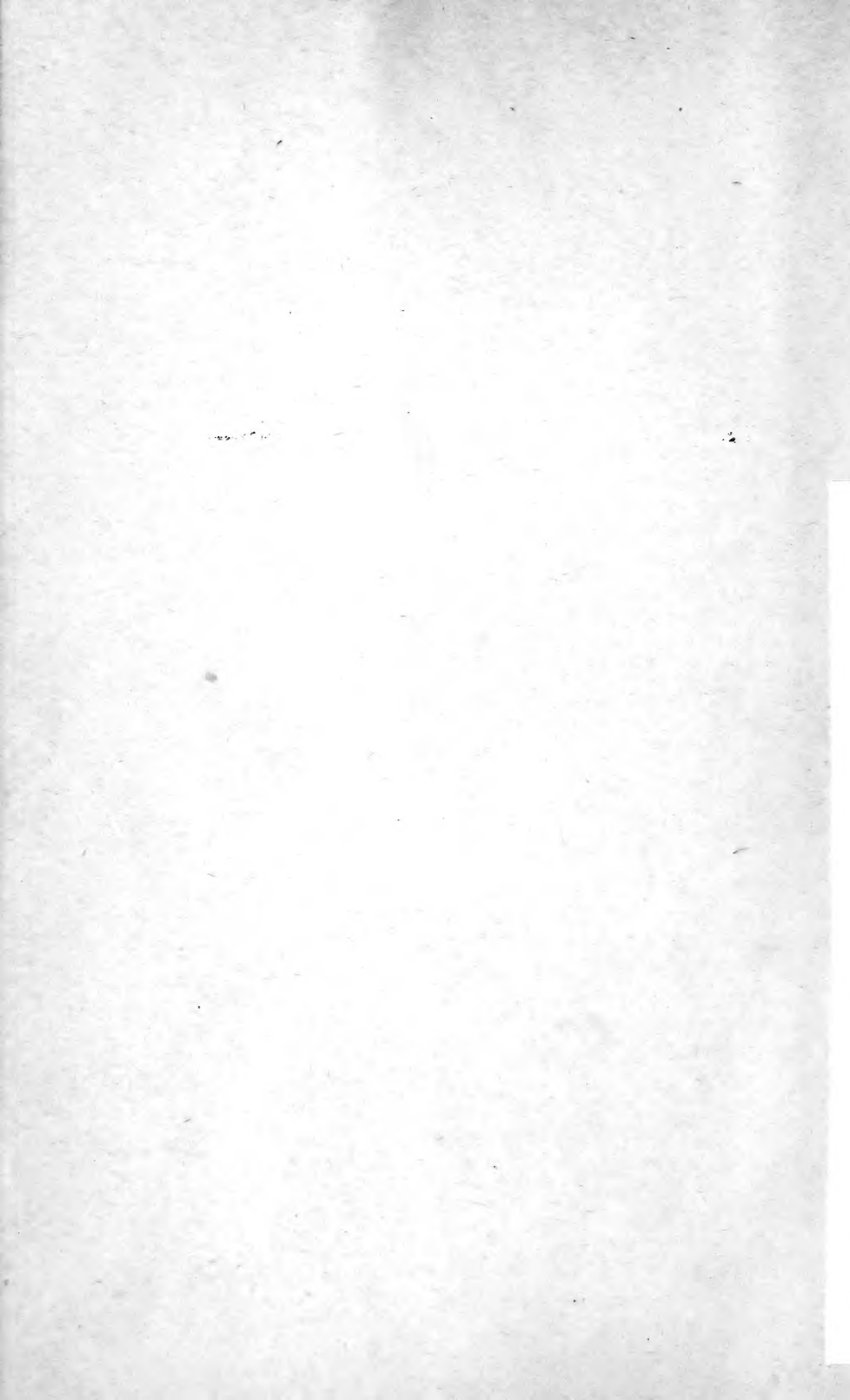
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that of the Prairie States

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J. A. NIEUWLAND, C. S. C., Ph. D., Editor

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## OUR AMPHIBIOUS PERSICARIAS.

— — — — —  
J. A. NIEUWLAND.  
— — — — —

There seems to be a rather widespread opinion among plant students and even botanists of note that *Persicaria* *amphibia* Linn., the Water Persicaria, is an aquatic plant, and *Persicaria* *Hartwrightii* A. Gray, is a terrestrial variety of it brought about by the fact that the aquatic plant was somehow made to take up a terrestrial or xerophytic habit. This idea seems to have gained strong hold particularly since the new Gray's Manual of Fernald and Robinson entirely suppressed the latter species reducing it to the rank of a mere variety. No one since the publication of the species by Dr. Gray seriously questioned its right to specific standing. Even when this rank was recognized the former was invariably described or illustrated as an aquatic and the latter as a land plant, because *P. Hartwrightii* was only known as a rough pubescent terrestrial and because *P. amphibia* was by American writers at least, not described or illustrated as anything, but a water-plant. Most of the information for students regarding it was gleaned from manuals. Britton and Brown's Illustrated Flora of N. America, and Small's Monograph of N. Am. Species of *Polygonum* show only aquatic phases of *P. amphibia* and all the manuals describe it as a submerged water plant with floating smooth leaves, and a rose to purple short spike of flowers. Though the specimens of the European plant that have come under my observation are not many, *P. amphibia* of the old world, I have nearly always seen in herbaria as a rough leaved terrestrial plant without the least indication of aquatic habit. It would seem strange then that this rough leaved plant hardly appears to be mentioned in the manuals during the

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\* January 15, 1911.—Pages 1 to 28.

last two decades. The earlier manuals mention several varieties of *P. amphibium*, but since the publication of *P. Hartwrightii* the idea began to spread that all the dry land plants were to be referred to the latter and the aquatic to the former.

Some botanists have tried of late to persuade me—referring to the Symposium\* at the fourteenth annual meeting of several botanical societies of America, and also calling my attention to the excellent and thorough work of Massart† on the accommodation of *Polygonum amphibium* to various habits—that *P. amphibium* had been changed into *P. Hartwrightii* and back again. The first idea that struck me on receiving this wonderful information was: “Why then is *P. Hartwrightii* even retained as a variety of the other?” Plants that change into different forms no matter how different, can hardly be considered even as varieties of one another. It would be absurd, for instance, to consider a caterpillar as a variety of butterfly once it has been shown that one evolved from the other. If some one had shown that *P. amphibia* became *P. Hartwrightii*, the logical thing to do would have been to suppress one of the names and relegate it altogether to synonymy, just as the scientists of old ceased considering caterpillars as species of worms when it was shown that they were only stages or phases in the development of butterflies.

The proposition was put to me that *P. Hartwrightii* was suppressed as a *distinct species* because Massart had shown that *P. Hartwrightii* had been converted by actual experiment into *P. amphibia* and back again, by growing these plants in aquatic and terrestrial or xerophytic conditions. Here certainly there seemed to be ample provocation to take a sarcastic fling at taxonomists, especially those suspected of wanton species making, but the species *P. Hartwrightii* by a strange fate was of the making of one of the most conservative of all our American botanists!

Not long ago there appeared a criticism of a botanist who presumed to publish a new species exhibiting certain differences from a previously known one, such as variation in intranodal separation and pubescence. It was found the difference was but a change in

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\* Report of the Symposium at the Fourteenth Annual Meeting, Chicago, Jan. 1, 1908. Cowles, H. C., An Ecological Aspect of the Conception of Species. Baltimore, Md., 1908, 266, 276.

† Massart, J. C. L'Accommodation Individuelle Chez *Polygonum amphibium* Bull. Jard. Bot. Vol. I. Fasc. 2, 1902.

passing from the spring to the fall plant of one individual; or that the plants which "in spring and early summer were *Helianthus illinoensis* were at the time of blooming and fruiting simply *Helianthus occidentalis*." Instead of suppressing the former the investigator "proposes that these plants should bear the name *Helianthus occidentalis illinoensis* Comb. nov." Strange as this may seem, the author of the *Helianthus* "subspecies" has made a proposition not a jot more absurd than the suppression of *P. Hartwrightii* from specific to varietal standing if it was done because Massart had shown that it changed into *P. amphibia* according to habitat in which it was found. Such was not the reason for relegation of *P. Hartwrightii* as a variety of *P. amphibia* though some symposium members seem to think so. This is evident from the manual itself as the terrestrial form, *Polygonum amphibium* var. *terrestre* is also mentioned, which may be taken, perhaps, for the phase spoken of by Massart. It would seem, however, that in view of Massart's discovery the use of the term "var. *terrestre*" would be eminently objectionable, for one might as well say that the caterpillar is a variety of butterfly, a method of phraseology which I doubt the authors of the Manual would tolerate or subscribe to.

I have in my personal investigations in the field found that the plant which the editors of the new Gray's Manual designate as *P. amphibia* with its varieties *terrestre* and *Hartwrightii*, has been known to have all the three kinds falling under the description of that book, on one and the same individual. In other words, by uprooting the rhizome near the water's edge I found branches coming from it and taking to the water, appear as shiny glabrous floating aquatic phase. The shore branches were upright and rough pubescent, and the shoots coming out in the grass farther up the bank had at least earlier in the season spreading herbaceous tips to the ochreae which according to the manual are characteristic of the variety *Hartwrightii*. Three "varieties" on one individual rootstock! And yet not one of these phases or forms of the same individual were either *P. amphibium* Linn., or the *P. Hartwrightii* A. Gray, but as I shall indicate later three distinct phases of *Persicaria mesochora* Greene!

On hearing of the assertion that *P. amphibia* had been converted into *P. Hartwrightii* I made it a point carefully to study Massart's work, and I was not a little surprised on first reading

it that it contained no mention whatever of the latter species nor of any other varieties whatever. In fact almost at the very opening of his article he says: "Le *Polygonum amphibium* ne varie guère; il ne presente, a ma connaissance, ni variétés, ni races." In spite of this I found it asserted without the least hesitation in the Symposium that "*P. hartwrightii*† can be developed at will by growing *P. amphibium* on land instead of in water." Dr. Cowles‡ does not tell us what warrant he has for such a statement, whether the result of investigations of his own not as yet published, or that the statement was made on the strength of another investigators' conclusions. Massart's researches were made on the European plant *P. amphibia* and as Dr. E. L. Greene\* has shown this is a distinctively Old-world plant, not found in America, and that our plants have in all their phases characteristic, and distinctive marks by which they may readily be distinguished from the *P. amphibia* of Europe. As far as the ecological import of Massart's work on *P. amphibia* is concerned most of his results were known over 200 hundred years ago, and when these are made to be the principal part of his paper, one overlooks entirely the anatomical researches which are really the characteristic part of the article; for every thing in it centres around them for its originality. It would, to say the least, be very unsafe to draw conclusions about our American plants before it has been definitely ascertained that they are specifically identical with the old world *Persicaria amphibia*.

Dr. Gray can hardly be accused of being a reckless species maker, and such an implication need hardly have come from the editors of the New Manual, which would certainly seem to be the case in regard to the suppression of *P. Hartwrightii* therein. They

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† *P. Hartwrightii* would be more correct.

‡ "One of the noblest aims of ecology is the destruction of many of the "species" of our manuals. Where the critical study of species is confined to the herbarium it often happens that ecological varieties or habitat forms are given specific rank. An excellent instance of this is seen in the case of *Polygonum amphibium* and *P. hartwrightii*. The latter, which looks wonderfully different from the former in herbaria, can be developed at will by growing *P. amphibium* on land instead of in water. Not infrequently a plant may be found on the edge of a pond, showing branches that would be regarded as *P. hartwrightii*. Symposium I. c. p. 266. H. C. Cowles "An Ecological Aspect of the Conception of Species."

\* E. L. Greene. Leaflets of Botanical Observations and Criticism. Vol. I. 1904. pp. 24, 25.



meant to imply that Dr. Gray failed to see that *P. amphibia* though it has its terrestrial phase never has spreading herbaceous tips to the ochreae, has different pubescence and different inflorescence, even compared to the land phase of the American *P. Hartwrightii* which latter, as a matter of fact, has not till lately been reported in its aquatic phase. A careful study of the various phases of the Persicarias described by Dr. Greene in his classical researches on that most difficult group of plants—all the more so since so little, and often such poor specimens of plants have until lately been collected in that group with little or no data,—will reveal the fact that the plants discovered by him differ from one another greatly in their respective phases. In other words the European *P. amphibia* differs from the American *P. Hartwrightii* in its two phases, aquatic and terrestrial, compared with one another in each phase. *P. amphibia* has, moreover, been shown to have a third or xerophytic stage first pointed out by Massart. *P. fluitans* Eaton is not yet known in its terrestrial stage, which may not be present, but its aquatic form resembles in no way that of either *P. Hartwrightii* or *P. mesochora*. The latter known only heretofore in the aquatic phase, I have found in terrestrial and riparian forms in the lakes near the University.

*P. coccinea* Muhl. has its several phases more closely related usually, and often succeeding one another in the vicissitudes consequent on drying up of pools later in the season, but these forms differ widely from the respective phases of the other species mentioned. When Dr. Gray, therefore, published *Polygonum Hartwrightii* we may expect that as an experienced phytologist, and not at all a reckless one, that he must have seen that without the aquatic form even it was not to be confounded with the terrestrial form of *P. amphibium*. As to the validity of *Polygonum fluitans* Eat. the author of the name spent several years studying the plant in its native habitat, his description is unmistakable, and he distinguishes it perfectly from *P. amphibium* described on the same page, and yet to make an easy exit out of a difficult taxonomic problem the modern manual makers have been invariably content to jumble together a number of plants totally different by constant and definite characters, and excuse ignorance of them under the often used phrase "a very variable species." When, however, the student of ecology is tempted to sit in judgment on the taxonomists for wantonly and recklessly multiplying names of plants,

let him remember that up until a few years ago the taxonomist had to do and actually did the ecologist's work besides his own of determination and classification. I dare say he was well prepared for his work being doubly trained to it by necessity as an observer in the field, and an exact student keen and quick to see distinctions which are noticed only after long experience.

I had for a long time entertained the suspicion that Linnaeus was not the first to have noticed that the European Water Smartweed, lived on land and in water in different phases. I had spent some time even before becoming at all generally interested in the members of this group of plants, in tracing back the history of *P. amphibia*, a matter not as easy to a beginner as it might at first seem; for the names given by some pre-Linnaean writers were not the same as ours. A clue to the possible origin of the Linnaean trivial name *P. amphibium* was found when coming by chance upon a reference to the plant in Gilibert's History of Plants of 1806.\* *The Flora Suecica* 1745 of Linnaeus contains the description of a possible clue to the origin of the name itself, whereas J. Ray's History of Plants quoted by Gilibert describes the ecological facts that probably led to the giving of the name. I shall quote as much of the passages in the original as are necessary to make the statements clear.

"909 La Persicaire amphibie, *Polygonum amphibium* L. A fleur à cinq étamines; à style fendu en deux; à épi ovale; à feuilles ovales, lancéolées, ciliées. Dans les lieux aquatiques, au Broteaux, à Oullins, et dans les terrains secs, à la Carette. Fleurit en Août.

*Persicaria Salicis folio, Potamogeton angustifolium dictum.* Rai. hist. 184. *Persicaria Salicis folio, perennis.* Hort. Lugdun. Batav. Dod. pempt. 482, fig. 1. Lob. icon. 307, fig. 2. Hist. Lugd. 1008, fig. 1.

Rai a fort bien remarqué que cette plante n'étoit qu'une variété du *Potamogeton Salicis folio*, C. Bauhin. Pin., qui se trouvant hors de l'eau, change de forme, et en impose aux plus habiles Botanistes; mais il est aisé de voir que ce n'est qu'un déguisement de la même plante, puisqu'on trouve souvent sur le même pied des feuilles lisses et luisantes, et d'autres qui sont semblable a celles du Saule, mais plus longues, rudes, et velues: il faut rapporter

\* Gilibert, J. E. Histoire des Plantes D'Europe et Etrangers, Ou Elemens de Botanique Pratique, 2nd. Edition, 1806. p. Vol. I., p. 453.

a cette espece la *Persicaria major*, *foliis hirsutis*, *gustu acerbis*, *floribus albis aut purpureis*, Lobel. observat. 17, et la *Persicaria major*, *caule sesquicubitali*, *striato*, *tereti geniculato*, *Thalii*. Tournefort.

*Observat.* La racine très-longue, de quarte pieds, trace dans la vase, jetant de ses noeuds des radicules; les feuilles lisses, cori-acées, a nervures parallèles, transversales, ciliées ou dentelées sur les marges; l'épi des fleurs épais; le calice rose, ovale, campanulé les anthères posées transversalement sur le filament sont de couleur de chair; telle est l'aquatique; la terrestre à feuilles plus larges, plus dures; à fleurs d'un rouge-foncé."

Gilibert's observations are not claimed by him as original, and he refers to Ray when he describes the two different phases, aquatic and terrestrial, which he says are often found on the same rootstock. Gilibert does not, moreover, describe the phases as even different varieties, which of course, we could not expect him to do in view of the identity of the plants phases "found even on the same rootstock or base." He also seems to approach the method of describing these phases separately though not in separate paragraphs, a system Dr. E. L. Greene has so often insisted on, and a system which alone can give a true idea of all plants that exist in two or several entirely distinct phases, a method too, not appealing favorably to the authors who must be guided by the bibliopole aspect of the species question.\*

It is hard to convince manual makers that when phases exist in various stages it should be desirable to describe each in a separate paragraph in order to bring out differences in such a way that the student may recognize them in whatever form or stage he finds them. Besides the *Persicarias*, other plants seem to show a very different appearance at various stages of development. Probably one reason why the violets are considered a difficult group of plants for the beginner, is that he finds them often in a stage of growth in which the foliage and other characters are not the same as the manual maker found them. Violets might well be described, as the amphibious *persicarias* should, in separate paragraphs for their different phases. Few there are that have not noted the difference between the characters of these plants in the stage when they bear petaliferous flowers, in contrast to that in which the second or cleistogamous flowers appear.

\* Am. Mid. Nat. Vol I., 248, Aug. 1910.

The following is found in John Ray's History of Plants,† which, as far as I am able to find, is the earliest reference to the fact that *P. amphibia* existed in totally different forms as the same identical plant. I shall quote the whole paragraph in full:

"A. 6. *Persicaria Salicis folio*.

*Potamogiton angustifolium dicta*.

*Potamogiton angustifolium* Ger. 2, sive *Salicis folio* C. B.  
*Potamogiton sive Fontalis Persicariae foliis* J. B. *Fontalis minor longifolia* Park,

*Narrow-leaved Pondweed or Arsmart*.

Folia huic *Persicariae maculosae foliis similia sed majora, venis obliquis et transversis in marginem a nervo, qui unicus secundum longitudinem dirimit exporrectis; alioquin etiam non ita sunt obtusa sed in acumen desinentia, et pro loci situ [extra aquas] nonnunquam hirsuta, aquis plurimum innatantia, pediculo sescunciali aut sextantali ex caulium geniculis orto inter quae palmo saepe brevior pediculus exit, in spicam congestos flosculos *Persicariae* gerens ex albo rubentes. Gustu est subacido.*

In paludibus, lacubus, stagnis necnon in rivulis et aquis fluentibus ubique frequens reperitur. Cum extra aquas crescit (quod non raro fit vel aquis exsiccatis eam deferentibus, vel ipsius radicibus in fossarum aggeres ejectis) folia obtinet hirsuta, aspera et *Persicariae* in modum maculosa, unde tunc a nonnullis pro nova *Persicariae* specie, a *Potamogitone angustifolio* diversa habita est. Quin in eadem individua (ut loqui amant) planta folia nunnula nimirum extra aquas nascentia, observavimus aspera et hirsuta, alis, aquis scilicet innatantia, laevia et lucida.

Haec ergo planta *Persicaria acida* peculiaris *Cat Altdorf* nobis videtur, *Persicaria hirsuta* radice perenni *Cat Lugd. Bat.* *Persicaria longissimis et angustis foliis seu fol. Salicinis* *D. Merret* quam pro specie a *Potamogitone angustifolio* distincta per errorem habuerunt, quamvis recte eam *Persicariis* annumerarunt. Nos etiam (nec pudet fateri) in eodem errore aliquamdiu haerimus nimirum hanc *Persicariae* speciem fuisse a *Potamogitone angustifolio dicto* diversam."

I believe that it will be admitted by all that as an ecological study of *P. amphibia* together with a right interpretation of the facts, the above mentioned work of Ray is as clever an investigation

† Ray, J. Hist. Vol. 1, p. 185 (1686.)

as would be done in our own time with all our modern advantages. It will seem the more marvellous when we consider it to have been worked out correctly about two centuries and a quarter ago. It looks too as if Massart had not added, from an ecological point of view, very much to the work of Ray except perhaps the finding of the xerophytic phase of the plant. It is being found gradually that not a few of the discoveries attributed to modern scientists are modestly recorded in the older herbals and writings of the botanists of hundreds of years ago. With the fashion growing that 1753 is the beginning of taxonomy it is also not infrequently come to be believed by some that plant physiology, ecology and anatomy go back no further.

The remarks of Ray need no comment of mine to make them more emphatic, except that had the present day student known as much of the ecology of *P. amphibia*, we might have been spared much misunderstanding about the plant. It is a sad commentary on modern ecology that we must yet learn over again the discoveries of centuries ago and admit that in forgetting, or not thinking it worth while to study old dusty tomes, we have to learn again by the hard method of renewed experience what we could find out in a few minutes consultation of the much derided herbalists of old.

Ray's statement that the smooth, floating aquatic plant known to the ancients and older writers as *Potamogeton*,\* is positively the same as and identical with the plant called, up to his time, *Persicaria salicis folio*, the terrestrial, is worthy of note. He no longer sees the need of the former name and reduces it to synonymy. He says that botanists of his time had taken them for separate species, and warns future investigators not to do the same, noting that some had thought the hairy plant (his *Persicaria salicis folio*,) as a distinct species from the water plant, (*Potamogeton angustifolia*.) He admits that he himself had in error formerly thought these plants as different species though not ashamed as he is now to confess it, intimating too thereby how easy he might

\* There is no doubt at present that *Potamogeton* of Dioscorides, Pliny of the ancients and of the herbalists of the 15th and 16th centuries is no other plant than *P. amphibia*. See E. L. Greene. Leaflets, Vol. 1. p. 24, Bubani. P., Flora Pyrenaea Vol IV. p. 10. See also Dodonaeus, R. Pempt. p. 572. (1583) also Kruid Boeck. (1644) p. 623. Lobelius, M. Observ. p. 164. (1576.) Chabraeus D. Stirp. Sciag. p. 563 (1677). See also Morison Dalechamps, Tabernaemontanus. etc, etc.

have found out the simple facts had he sooner taken up the study of their habitat. He claims that he had found these two phases of the plant—though he does not call them such,—on the same rootstock,—“in eadem individua.” In every respect does he give the habitat of the two stages of the plant even describing the circumstances that lead to the change of the aquatic to terrestrial that is, by drying up of the pools, not a rare circumstance, and the casting up of the roots from ditches, and that then the leaves become “hirsute rough and spotted like a *Persicaria*\*.” He says even that certain authorities whom he quotes, though they consider these phases as different plants, yet they thought them both *Persicarias*.

That Linnaeus himself knew of the amphibious nature of the European plant is evident from the following taken from the *Flora Suecica* of 1745.†

“318. *PERSICARIA floribus petandris digynis corolla staminibus brevior.*

*Persicaria florum staminibus quinis corollam superantibus, stylo bifido.* Hort. Cliff. 216. *Persicaria major amphibia, radice perenni.* Pluk. alm. 288.

*Potamogeton salicis folio* Bauh. pin. 193.

β. *Persicaria palustris fluitans, foliis brevioribus et latioribus florum spica purpurea compactiore.* Rupp. jen. 72.

Habitat α *ubique erecta in pratis argillosis juxta vias et agros at β fluitans in fossis et paludibus; singulari varietate.*”

It is evident from the above that Linnaeus referred to the floating plant which he calls variety β of Ruppilius as a mere variation of the rough terrestrial form, α. It is also evident where he gets his trivial name *P. amphibia* of the *Species Plantarum* of 1753. It is borrowed from Plukenet's description quoted above. Another fact worthy of notice is that in the *Species Plantarum* of 1753 and subsequent editions he no longer considered the floating form as even a variety, but in view of the fact that Ray had found that one changed spontaneously into the other according to habitat, Linnaeus suppressed entirely the varietal standing of the phases well

\* Reference probably is made to *Persicaria maculosa* or *Polygonum Persicaria* Linn.

† Linnaeus, C. *Flora Suecica*, 1745, p. 115.

aware that no matter how different two stages of one plant could be, as long as their absolute identity was shown they can no longer be considered as even varieties of one another in the strict sense. This fact, self evident as it may appear, in view of the above discussion does not for some reason or other or because of want of knowledge of the identity of the phases seem to have been apparent even to our American manual makers, or if known is deliberately concealed or superficially passed over.

A still more interesting passage may be quoted from the *Hortus Cliffortianus* of Linnaeus, (1737), pp 41, 42.

"I. PERSICARIA florum staminibus quinis, corollam superantibus stylo bifido.  
stylo bifido.

Persicaria major amphibia radice perenni. Pluk. Alm. 288.

Persicaria, salicis folia, Potamogeton angustifolium dicta Raj. hist. 184.

Potamogeton salicis folio. Bauh. pin. 193.

α. Persicaria, salicis folio perennis. Herm. Lugd. 488.

β. Persicaria palustris fluitans, foliis brevioribus et latioribus, florum spica speciosa purpurea compactiore. Rupp. jen. 78.

*Crescit haec planta vulgaris per Europam in humidis praesertim.*

*Variat si qua alia, maxime manifeste utpote quae (α) in argillosis agris caule gaudet erecto, foliis lanceolatis acutis scabris & hispidis communiterque sterilis persistit; at (β) in aquis caule flaccido foliis ovato-obliquis, obtusis, glabris & nitidis, spicamque florum subovatam et crassam gerit: unam tamen eandemque plantam esse cum Rajo, et recentioribus agnoscunt etiam varietatem aestimatores; unde non illepide a Plukenetio amphibia\* dicta fuit."*

From this reference it is perfectly evident that Linnaeus was early acquainted with Ray's researches on the ecology of the plant and also that, as I have already intimated, he picked the name *amphibia* from Plukenet's short diagnosis or name. Though in the *Hortus Cliffortianus* and the first edition of the *Genera Plantarum* (1737) Linnaeus admitted the natural genus *Persicaria* he afterwards suppressed it in the *Genera Plantarum* of 1754 and the name does not appear with any of the species in 1753.

Haller† also insists on emphasizing the fact that the plant

\* Misprint for *amphibia* without doubt.

† Haller, A. Hist. Stirp. Index. Helvet. Vol. II: (1768) p. 261.

exists in two forms which he describes in separate paragraphs headed as follows:

"1856. POLYGONUM foliis ovato-lanceolatis, ciliatis, spicis ovatis.

*α.* Planta foliis aquae innatantibus. (Various references are here given.)

*β.* Planta terrestris, caule recto, foliis manifeste hirsutis." (References to older authors.)

Then follow two separate paragraphs on the aquatic phase and then one on the description of the terrestrial phase.

The last paragraph refers to such general characters as taste and pharmaceutical properties.

In view of the classical work of Dr. E. L. Greene in distinguishing the various phases of many of our American amphibious *Persicarias*, and also first describing these phases in separate paragraphs,—a new modern taxonomic feature for plants, and the only logical method of treatment,—it would seem that any statement of facts that I have here made were but tautological repetition. Certain prejudices, and especially taxonomic ones, are, however, with difficulty removed, and it often takes more than one emphatic repetition to establish what is looked on as but an unfriendly comment on popular misbelief. Dr. Greene's treatment of the *Persicarias* was published in limited edition, for the masters of botanical science rather than for its students, and the fact of the matter is that few have taken the trouble to have access to his work, and many have doubtless preferred to pass it by with a prejudiced attitude of mind.

Regarding the European specimens of amphibious *Persicarias* not at all common or numerous in our American herbaria, I have usually found that the terrestrial phase is oftener found. It may be,—and I may say it here in passing—that one of the reasons we on our side of the Atlantic know often less of the distinctive characters of American plants, is that we have neglected to study properly the plants of Europe, and our herbaria in general are sadly devoid of such. This fact is all the more to be lamented that we must know that the types of cosmopolitan plants are of course generally the European specimens, and so it not infrequently happens that new American plants are published not by our botanists but by old world students who, perfectly acquainted



with their own specimens are quick to see that they differ from ours.

If we consider that Dr. Gray may as likely as not have seen the terrestrial phase of the old world *P. amphibia*, we can see that in comparing it with *P. Hartwrightii* he must have found sufficient reasons for considering it a new species, even if he only saw the terrestrial stage of the latter. Its aquatic phase was, as far as I have been able to find, not known until discovered by Mr. L. Andrews in New England. As the Old world plant according to Dr. Greene has its separate and distinctly different aquatic as well as terrestrial phases we want something more than a mere jumping at unwarranted conclusions on the part of some American botanists before we can be blamed for not believing that *P. Hartwrightii* can be developed at will from *P. amphibia* by changing its habitat, or before we can feel that the most conservative Dr. Gray should have published *P. Hartwrightii* as a new species with insufficient reasons.

Having spent so much of this discussion of the American botanists' view of these plants,—a more or less theoretical aspect—I shall now pass to the study of the plants themselves as distributed in our locality. In enumerating the plants I shall include first the synonymy of the European *P. amphibia*, even though it is not found in our country. I shall trace particularly its pre-Linnaean history, aware of the fact that it is not as difficult a matter to give its synonymy since 1753.

As far as I am able to find no one has as yet suggested putting the amphibious *Persicarias* in a separate genus. They certainly seem distinctive enough to deserve being gathered together as a special group in the genus *Persicaria*.

Rafinesque had suggested the genus (or subgenus) *Chulusium* for those species 'with unequal calyx, five stamens, two stigmas and a lenticular seed.' He mentions this in reference to *P. punctatum* (?) and as the characters are either inconstant or not applicable to the amphibious solely and distinctively, I doubt whether the name could rightly be applied them. Though no type is mentioned *P. punctatum* would be considered such were the name ever taken up for so peculiar a group, because that is the species under which the publication of *Chulusium* is made. Moreover, it does not seem clear just what *P. punctatum* Raf. really is, and this makes the publication of the genus even a matter of some uncertainty.

I suggest as a section of the amphibious smartweeds under the genus *Persicaria*, the name POTAMOCALLIS.

Genus PERSICARIA Tragus, 1531 in Brunfel's Herb. Viv. Icones. Brunfels. App. p. 18. (1531), also Tragus do. p. 161. (1531), also *Pulicaria* Burnfels 1531.

*Persicaria* Trew in Herb. Black (1754) Tab. 118 and 119.

#### Section POTAMOCALLIS.

PERSICARIA AMPHIBIA (Linn.) S. F. Gray, (1821) Nat. Arr. Br. Pl. Vol. II., 208.

*Potamogeton* Dioscorides Ex Comment. Ruellii (1547).

(See also references on p. 9)

*Potamogeton angustifolium* Gerard. 821. 2 also *Tabernaemontanus* l. c.

*Phyllitis lacustis* Cordus, V. Hist. (1561).

*Potamogeton ἰτέοφύλλων* Thalius, Sylva Hyrc. (1588.)

*Potamogeton* 2. Dalechamps. also *Caesalpinus*. De Plantis p. 332.

*Potamogeton Salicis folio* Bauhin, C. Pinax, 193, (1623)

*Persicaria salicis folio*, *Potamogeton angustifolium dicta* Ray J. Hist. p. 184.

*Persicaria major amphibia*, *radice perenni* Plukenett, L. Alm. 288.

*Persicaria Salicis folio perennis* Hermann P. (1687) p. 488.

*Persicaria floribus pentandris digynis*, *corolla staminibus brevior* Linn. Fl. Suec. p. 115.

*Persicaria florum staminibus quinis corollam superantibus*, *stylo befido*. Linn. Hist. Cliff. p. 41.

*Fontalis major longifolia* Parkinson J., Theat. 1254 1a.

*Potamogeton angustifoliam seu Salicis folio*, *nobis etc.* Morison, R. Plant. Hist. Univ. Vol. II. p. 587. (1715).

*Polygonum amphibium* Linn., 1753. Sp. Pl. p. 361, not of American authors.

Flowering specimens in the terrestrial phase No. 2823 of the University Herbarium gathered in 1856 in England (Miss A. Smith) Seashore... (?)... Aug. 1856. A specimen which I studied in Dr. Greene's herbarium is also in the terrestrial phase.

PERSICARIA HARTWRIGHTII (A. Gray) Greene, (1904.) Leaflets  
Vol. I. p. 24.

*Polygonum Hartwrightii* A. Gray, (1870) Am. Acad. VIII. p. 294.  
Including *Persicaria abscissa* Greene, (1905.) Leaflets,  
Vol. I. p. 108.

*Terrestrial Phase.* Plant low, densely leafy, roughish pubescent or almost glabrous, from a creeping underground rootstock, internodes short less than 2.5 cm. and naked one third their length, the rest invested with an appressed bristly hairy ochrea, the limb of which is bristly ciliate, or sometimes without limb or border: leaves oblong to oblong-lanceolate 8.5-12.5 cm. long, acutish at both ends, glabrous above to sparsely strigose, the upper surface near the margin with a few hair points or often strongly but appressed hairy: margin appressed spinulose: lower surface glabrous or with a few scattered spinulose hairs along the midvein, lower veins and veinlets often muricate scabrous or the murications each with a long hair: peduncle of the oval spike more or less hirtellous; bracts strigose or hirtellous.

*Aquatic Phase* not known as yet from our region.

Specimens slightly more hairy than the type were collected by me in terrestrial phase at Bankson Lake, Michigan. No. 593951 of the U. S. National Herbarium collected by O. A. Farwell, Sept. 3, 1892, agrees better with the type except as to slight difference in pubescence of the peduncle.

No. 593948 also of the U. S. National Herbarium and collected by the same, at Belle Isle, Mich., Aug. 1904, may also be referred here.

*Aquatic Phase.* Leaves glabrous shiny floating, with long slender petioles: leafblades tapering to the petiole, not subcordate or cordate as in aquatic state of other *Persicarias*. (See Greene, E. L. Leaflets. Vol. I., p. 109.)

Hairy sterile specimens found by me in low fields and marshy places may possibly be referred to *P. Hartwrightii*. Such plants are invariably sterile, and even appear in cultivated fields, or along ditches growing from sand or mud recently cast up. I have collected such at Benton Harbor, Mich., Mishawaka, Ind., near and at Webster's Crossing in a marsh north of Notre Dame.

PERSICARIA FLUITANS (Eaton) Greene, (1904) Leaflets, Vol. I.  
p. 26.

*Polygonum fluitans* Eaton, (1840.) in Eaton and Wright N. Am.  
Botany, p. 368.

*Polygonum amphibium* of the American authors either in part or by mistake, not of Linnaeus.

*Aquatic Phase.* Stems very slender, submerged internodes 8-15 cm. long, the floating ones 2.5-3 cm. Leafblades perfectly glabrous and slimy when young, elliptical to elliptic-oblong usually dark red on the lower surface, 3-12 cm. long hardly ever even subcordate at the base, but tapering abruptly at both ends: spike solitary, short cylindrical, slender peduncled; bracts, broad ovate, acute, glabrous: peduncle purple smooth.

Riparian and Terrestrial phases not known. Found floating mostly far away from the shore of sandy bottomed or sometimes muddy lakes, usually so far from the shore that any attempt to connect it with a land phase seemed hopeless. Though hairy and sterile forms with a spreading rim to the ochrea were found in the sand some yards from the water line, no connection between them could be shown. It was not infrequently found over 100 or even 130 feet from the water's edge. Collected at Bankson Lake, San José Park, near Lawton, Mich. by myself. It is No. 262 of my herbarium. The plant differs from the European *P. amphibium* in that the latter has lanceolate and subcordate leaves with sharply scabrous margins.

The plants were growing with *P. grandifolia* but usually farther out and in a depth of several metres of water.

PERSICARIA MESOCHORA Greene (1904) Leaflets, Vol. I., p. 28.\*

*Polygonum amphibium* of American authors in part. Not of Linnaeus.

*Aquatic Phase.* Plant larger and stouter than *P. fluitans*: petioles as long, but not as slender: leafblades different in shape and color, light green with but a slight indication of purple brown or red, commonly 12 cm. long, and 3-5 cm. broad, ovate to elliptic lanceolate according as the base is broad or subcordate or rounded, or somewhat tapering, glabrous and slimy when young sometimes minutely punctulate: spike solitary, rather long stalked, cylindrical 2.5-3.5 c. long: peduncle dark purple glabrous: bracts ovate acute glabrous usually partly colored like the flowers.

*Riparian Phase.* Stems stouter: internodes 7.5-10 cm. long and somewhat fistulous, especially lower down: leafblades

\* This plant is probably the one most commonly taken for *P. amphibium* in our region.

broadly lanceolate, very acute, rounded, truncate or subcordate at the base; petioles 7.5–10 cm. long, those of the uppermost showing slight traces of hairs in form of a diminutive muriculation: spikes often 2, cylindric, longer and narrower than that of the aquatic phase. Leaves with a slight gloss of purple beneath particularly noticeable when fresh leaves are viewed at angle; ochreae close-appressed, glabrous, shiny: young leaves slimy in the water, the slime drying to a thin silvery film on recession of the water: margin of the leaves often minutely and appressed scabrous ciliate.

*Transition Phase.* (a) Offshoots from the rootstock at the very edge of the water often become prostrate and as they lengthen out by growth, become floating riparian or aquatic phases: the leaves at first more or less roughish pubescent "slime off" their hairiness, the newer leaves often being almost smooth: shape of the leaves passing gradually into those of the aquatic from the terrestrial. (b).

(b.) Erect stems at the water's edge or in a few inches of water arising from a subterranean rootstock: leaves in shape nearly like those of the terrestrial form much narrower than those of the aquatic or riparian, about one half as wide, usually nearly as long, rather long acuminate to a bluntish apex, subcordate or obtuse: leaves bright green and when in flower usually glabrous except minutely scabrous on the veins and margin: the lower earlier leaves often scabrous on the upper surface near the margin: ochreae very thin, glabrous the lower ones often with some long scattered appressed hairs. Herbaceous spreading margin of ochrea never developed by any phase late in the season.

(c.) *Early Spring and Summer Transition Phase.* Plant more or less hirsute or hirtellous varying with the age of the shoot, the earlier plant with long scattered spreading hairs, especially on the midrib veins and the upper half of the ochrea, the latter usually appressed: ochrea with a more or less wide spreading green, hirsute ciliate herbaceous border in spring plants, absent in summer: spike slightly narrower than the aquatic; peduncle usually dark purple, scabrous, glandular in all transition forms: bracts of the flowers in all phases ovate glabrous, acute at the apex.

*Terrestrial Phase.* Plant more or less hirsute scabrous pubescent or even glabrous according to the season; never known to flower: ochrea with spreading tips seldom present or small at

least when the other phases are blooming: leaves in general as long but only about half or little more than half as broad as those of the aquatic phases, always rough margined and scabrous on the veins and midrib, varying as to ochrea border according to the season as above; pubescent as in the preceding. Early in the season the whole surface of the leaf, upper as well as lower, as also the ochrea are sparingly hirsute with long white hairs: general shape of the leaves lanceolate to oblong, but the base usually subcordate, apex long acuminate: petioles 5-8 mm. long: internodes about 2 cm. in length above and 3-6 cm. below where the older leaves have wilted: young leaves dark purple on the lower surface.

As far as I am able to learn this is the first report of discovery of the terrestrial phase and its varieties as connected with *P. mesochora*. Complete description of any one phase is quite difficult as plants may be found in which the lower leaves (developed in spring) are very hairy and the upper ones quite glabrous except on the margins and midrib. I have several times unearthed rootstocks having on one and the same plant all the different phases mentioned above, from the strictly aquatic or riparian forms to the most hairy terrestrial branches. Such specimens, owing to their length often 2 or 3 metres or more, are difficult to preserve. In spite of this wonderful variation of the different phases, *P. mesochora* is readily distinguished by constant characters of leaf shape, spike and ochrea from all the other aquatic or terrestrial forms of other amphibious Persicarias. Ochreae never have spreading borders in the blooming forms, thus distinguishing it easily from *P. Hartwrightii*, as well as in shape of leaves and flowering spike. On the other hand *P. fluitans* is readily distinguished in the aquatic phases by smaller foliage, leaf shape, and long wiry stems with slender leafstalks. The shape of the leaves of the European *P. amphibia* as well as the spike are totally different, apart from the fact that the old world plant never had spreading herbaceous borders in any of the stages of its various phases. Besides that, the leaves of *P. amphibia* are mucronulate at the apex.

Plants representing *P. mesochora* in my herbarium are Nos. 263a, 263b, 263c. from St. Mary's Lake, also 267a, 267b, 267c from St. Joseph's Lake, Notre Dame, Ind., gathered in the summer of 1909. I have also found the plant in 1908 and 1909 in a deep ditch along the South Bend & Chicago Interurban Electric Line

near Hudson Lake. I was unable to collect specimens here. Farwell's No. 593946 of U. S. Nat. Herb. collected near Detroit may be referred to *P. mesochora*.

From both of the Notre Dame Lakes I have several times with considerable trouble obtained shoots having all the phases in one individual. The fact that the high shore or terrestrial phase never matures flowers seems to show that the plant is normally aquatic. I have observed specimens of the terrestrial on what must have been the old shore line of the drained and lowered lakes at Notre Dame in 1843. Some years after the lowering of the water these plants were left high and dry in the grass, 50 feet or more from the present shore. They appear annually and the rootstocks even seem to spread. Only once or twice within the last five or six years have I observed a spike of buds which wilted invariably before reaching the flowering stages. It is undoubtedly *P. mesochora* and the patch is only a short distance from another on an island of the lake formed in the last dredging a few years ago.

In another place near St. Mary's Lake the terrestrial plant is usually mowed down in summer. The young shoots appear with spreading borders to the ochreae, which are absent in older growing plants at this time. This too is undoubtedly *P. mesochora* as it is but two or three metres from the shore where riparian and aquatic phases flourish, and where I collected specimens with all phases on one individual. Moreover, no other *Persicaria* grows anywhere around either of the lakes. I have watched all these plants during several seasons from spring till fall and studied the different stages in the development and transition of the phases. As has been noted in the description of the phases, matters are complicated even more by the fact that the phases themselves, especially the terrestrial in case of *P. mesochora*, vary somewhat in appearance from one part of a season to another, so that the terrestrial phase looks quite different in summer and early fall from what it did in spring. Dr. Greene\* has pointed out that our knowledge of the aquatic *Persicarias* will then of necessity progress slowly until botanists in their respective sections of the country begin to study carefully the variations of the plants under changing conditions throughout the year.

\* Greene, E. L. Leaflets, p. 25, 26.

PERSICARIA COCCINEA (Muhl.) Greene, (1904) variety ASPRELLA.  
Leaflets Vol. I., p. 24 & 36.

*Polygonum coccineum* Muhl., (1809.) in Willd. Enum. Hort.  
Berol. p. 428.

Probably (?) *Polygonum amphibium* var  $\beta$ . *emersum* Rich.  
in Michx. (1803) Flor. Bor. Am. I. 240.

*Polygonum Muhlenbergii* S. Wats. (1879) Proc. Am. Ac.  
XIV. p. 295.

*Polygonum emersum* (Michx.,) Britton, (1889) Trans. N. Y., Acad.  
Sc. VIII. p. 73.

*Persicaria emersa* (Michx.,) Small., (1903). Fl. S. E. U. S., p. 376

*Terrestrial Phase.* Plant upright from a creeping or under-ground rootstock about 6 dm. high, rather leafy, foliage petiolate ascending: blades ovate elliptic or elliptic lanceolate, 12-20 cm. long abruptly acuminate, both faces of the leaf rough with scattered short hairs or nearly glabrous, veins and veinlets rough with appressed bristly hairiness instead of muricate, scabrous: bracts of the spike strigose on the back and ciliate with long hairs on the margin: spike 3-7.5 cm. long: peduncle purple with short spreading glandular hispidulous hairs: ochreae thin sparingly strigulose roughened with short sharp hairs.

*Riparian stage* of the variety not as yet found in our locality. I have found the plants in great abundance in low places where but a few inches of water stood in spring which was completely dried up in summer and fall. It does not seem to invade deep water in our region, and blooms normally in the terrestrial phase. I have collected it from a small pool in the middle of a cultivated field southeast of the University, also near the ice house east of the University, where its terrestrial sterile branches run high up on the sand and gravel embankment of the road. It is here found together with another amphibious *Persicaria* which for want of proper material collected in flower, I have not been able to determine but which may be a terrestrial form of *P. mesochora*, stranded when the marshy pool was cut off by the road from one of the lakes. I have also found the plant during the last season around Hudson Lake west of South Bend, Ind., abundantly in flower and fruit. Nos. 260 and 261 of my herbarium.

PERSICARIA GRANDIFOLIA Greene, (1904) Leaflets Vol. I., p. 37.

*Terrestrial Phase.* Stems  $\frac{2}{3}$ -1 m. rather slender very leafy to



the summit: nodes abruptly swollen, internodes about 5 cm. long: leaves 12-20 cm. long with a petiole of 2-3 cm. included; blades cordate oblong, subcordate varying to obtuse and the upper even acutish at the base, vivid green, glabrous or beset with numerous short soft hairs (leaves not even roughish to the touch) hairs on the midvein scouter roughish, petioles rough scabrous.

This phase found usually around deep muddy ponds where the fertile aquatic phase grows. The plant becomes ranker in growth as it approaches to the water, and gradually merges into what may be called the strictly fertile aquatic phase. Plants on dry land never produce flowers, and sparingly so in mud. Terrestrial plants creeping in mud covered with several inches of water have been found with smaller spikes of rose to deep purple flowers.

*Aquatic Phase.* Internodes much longer, fistulous in the floating form often 2-3 metres long, rooting from the nodes, the branching roots floating like plumes in the water: leaves 10-25 cm. long and the larger 7 cm. broad cordate oblong; with blunt points on the basal lobes giving the larger leaves a subsagittate appearance; leaves glabrous, slimy, dark green, the margins somewhat scabrous-serrulate with hair points, acute at the apex: petiole 7-10 cm. long, spikes linear, 3-9 cm. long rich rose red, bracts hirtellous uncommonly long pointed cuspidately rather than acuminate: peduncles slender strigose glandular or hirtellous often one of the spikes glandular and the other at least partly.

The above description holds good only regarding the submerged and the flowering part of the aquatic phase. As the stems rise assurgently out of the water nearly a metre deep, and exposing the tops of the stems above the water to the height of 3-5 dm. the upper five or six leaves take on the character of the foliage of the terrestrial sterile phase regarding pubescence, shape etc. All the gradations of character may be found in passing from these more or less pubescent leaves to the larger, slimy, glossy, aquatic leaves below on the same shoot. The submerged leaves as the stem sinks, by the weight of the flowering top, soon turn yellow and decay.

The flowering phase thrives best in nearly a metre of water. Only the submerged stems are thickly fistulous often nearly 1.5-2 cm. thick and bright green. This peculiar habit of the aquatic in growing out of water with the leaf variation is characteristic.

It is easily distinguished from *P. coccinea* which blooms only in the terrestrial phase. The terrestrial phase growing in great abundance on the shore never produces flowers in *P. grandifolia*. The spike too is usually longer than that of any amphibious *Persicaria* known to me. I have found one spike nearly 10 cm. long! The peduncle is usually brownish hirtellous but often with short spreading purple rough glandular hairs.

I have found both phases of this plant in great abundance in a muddy pond near Bankson Lake, Mich. where it is associated with *P. fluitans*, but not growing so far from the shore as the latter. It is not found in Bankson Lake proper as *P. fluitans* is, as it does not seem to thrive in the sand where waves usually disturb the equilibrium of the emerged tops. The plant is more abundant among long high sedges and grasses which partially help in keeping it erect. I found it in open water only in such parts of the pond as were protected by a high hilly bank from the prevailing wind of the locality.

The plants were collected by me in both phases at the aforementioned place on July 13, 1909, and the specimens are No. 265a and 265b, of my herbarium.

I have compared all the plants described above with the types in Dr. Greene's herbarium in Washington, or those in the U. S. National Herbarium. What is considered as sufficiently typical *P. Hartwrightii* is in the U. S. Dept. of Agriculture Herbarium collected by Mr. S. Hart Wright himself at Penn Yan, N. Y. and with which I compared my specimens of that plant.

I can not pass by this enumeration and study of our local amphibious *Persicarias* without referring to a plant of the group whose aquatic and terrestrial forms I found near Portland, Oregon in Aug. 1908, and 1909, because the case may be illustrative of conditions found in certain localities of our region. The plants were collected in two places though in each case subject to the same habitat and conditions. One of these was found along the Willamette River near St. Johns, Ore., the other on the shore of a backwater or slough called Mox's Bottoms in front of Columbia University, near Portland, Oregon. During the last summer while doing some research in the U. S. National Museum, I compared the specimens carefully with Dr. Greene's type plants, and found them to be *Persicaria oregana* Greene. The plants are Nos. 264 and 266 of my herbarium.

The conditions under which these plants grew were exactly the same although in the first case the plant was found over one hundred yards from the river bank. The specimen from the bottoms grew on a rather high sandy and stony bank which rose precipitously a few metres beyond up to Willamette Boulevard to the height of over one hundred feet.

The other plant was found in the aquatic stage high on dry land at the considerable distance from shore mentioned. The stem devoid of any leaves except a few aquatic glabrous pale green ones at the end of the branches, were spread promiscuously over old water washed weathered logs, tin cans, and rocks. The stems were several metres long and all could be traced to a number of rootstocks in the sand. From the place where the aquatic phase grew there appeared also short hirsute shoots with rough green leaves, and broad spreading borders to their ochreae. These came from the same rootstock from which the long stringy aquatic shoots appeared, and yet were totally different in appearance. One of the shoots was distinct aquatic without the least trace of pubescence, the other sterile terrestrial shoots densely covered all over leaves, stem and ochrea with long spreading hairs. The plant in the other locality showed essentially the same characters. The aquatic phases only bore at the ends of the long branches a short spike of rose-colored flowers arising from the three or four leaves. Both plant groups were growing from a point several decimetres below the line at which *Marsilia vestita* grew abundantly and in fruit. Beyond this and sometimes lower down the sand was in the moist places near springs of surface water covered with mats of *Lysimachia Nummularia*, and a little higher up beyond the reach of water even in the rainy season began the terrestrial flora, conspicuous among which were several species of Oregon Grape (*Odostemon nervosum* and *Odostemon Aquifolium*) and some species of roses.

On studying the conditions of the habitat of the *Persicaria* it was soon evident how both phases were present at once, and why, strangest of all, the aquatic form was growing high and dry on the shore. No aquatic plants whatever were found in the water anywhere at this time.

It seems that the Willamette River annually rises during the rainy winter and spring seasons, the water often subsiding to the lowest mark until July or even later. During this period all

the low land along the stream is flooded. The roots of the *Persicaria* were then below water during the spring freshets and naturally developed the long stems of the floating aquatic stage. The associated *Marsilia vestita* too comes out then. The water rapidly lowers in July and August and after the low water mark has been reached in August the flowers of the *Persicaria* appear while the long stranded stems of the former floating aquatic phase are spread on the arid sand. The sterile terrestrial shoots after a while appear from the base of the aquatic stems, and not infrequently on them, but in this case only at the nodes where they happen to strike root. The probable reason why no aquatic *persicaria* stage was found in the water at low mark is that the shoots always sprout in spring, and when the water at that point is too deep for the branches to reach to the surface. The conditions near St. John's, Oregon are essentially the same regarding the plant, except that there is a large low stretch of meadow between the river and the plants which is submerged in spring.

It will be seen that the ecologic study of the amphibious *Persicarias* is absolutely necessary before we shall be able to say the final word concerning their taxonomical relations. It was probably due to lack of sufficiently observing these plants and studying them untiringly in their native habitat that we have not the knowledge of this difficult group which we ought to have at present when a new impetus has moved many to specialize in ecologic research.

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## OUR WINTER BIRDS.

---

BROTHER ALPHONSUS, C. S. C.

---

The winter of 1909-1910 was long but not very severe. Snow covered the ground for three months. Only for a short time, early in December and January, the temperature went below zero. The winter proved a poor one for birds—few species appeared, and of these, most were seen but rarely. The continual snow that covered up everything may have been one reason for the great scarcity of birds.

But the writer was unable to account for the total absence

of the Snowflake, a snow-loving species. True, these birds are erratic in their movements and may avoid certain localities altogether. But a more favorable winter for the appearance of this species has seldom been known. The writer was, therefore, greatly disappointed in not finding a flock of Snowflakes.

The Chickadee, as usual, was conspicuous by his absence, not one individual having been seen during the entire winter. The Hairy Woodpecker, Northern Shrike and Bobwhite also were neither seen nor heard.

## DECEMBER.

Birds seen on the dates after their names:

White-breasted Nuthatch, 1, 2,	Downy Woodpecker, 1, 2, 3, 14,
3, 4, 6, 14, 15, 21, 22, 24, 30, 31.	16, 18, 20, 21, 23, 24, 27.
Snowbird, 1, 2, 3, 4, 6, 11, 15, 16,	Goldfinch, 1, 31.
18, 21, 24,	Tree Sparrow, 1, 2, 5, 16,
	Screech Owl, 31.

Birds seen every day except on the dates after their names:

Blue Jay, 5, 7, 8, 12, 19, 21, 22,	Crow, 1, 4, 5, 7, 8, 12, 16, 19, 25,
24, 28.	28, 19, 30.

Number of species seen each day:

Dec. 1, 6.	Dec. 11 3,	Dec. 21, 4.
" 2, 4.	" 12, 0	" 22, 2.
" 3, 5.	" 13, 2.	" 23, 3.
" 4, 4.	" 14, 3.	" 24, 5.
" 5, 1.	" 15, 4.	" 25, 0.
" 6, 4.	" 16, 4.	" 26, 2.
" 7, 0.	" 17, 2.	" 27, 3.
" 8, 0.	" 18, 4.	" 28, 0.
" 9, 2.	" 19, 0.	" 29, 1.
" 10, 2	" 20, 3.	" 30, 2.
		" 31, 5.

Total number of species seen, 8.

## JANUARY.

Birds seen on the dates after their names:

White-breasted Nuthatch, 6, 8,	Tree Sparrow, 8, 28.
11, 14, 15, 18, 24, 25, 27, 28, 29.	Downy Woodpecker, 11, 15, 31.
Snowbird, 2, 8, 10, 19, 20, 24.	

Birds seen every day except on the dates after their names:

Blue Jay, 4, 7, 14, 23. Crow, 2-7, 9, 12, 13.

Number of species seen each day.

Jan. 1, 2.	Jan. 11, 4.	Jan. 21, 2.
" 2, 2.	" 12, 1.	" 22, 2.
" 3, 1.	" 13, 1.	" 23, 1.
" 4, 0.	" 14, 2.	" 24, 4.
" 5, 1.	" 15, 4.	" 25, 3.
" 6, 2.	" 16, 2.	" 26, 2.
" 7, 0.	" 17, 2.	" 27, 3.
" 8, 5.	" 18, 3.	" 28, 4.
" 9, 1.	" 19, 3.	" 29, 3.
" 10, 3.		" 31, 3.

Total number of species seen, 6.

#### FEBRUARY.

Birds seen on the dates after their names:

Downy Woodpecker, 13, Bluebird, 22, 28.  
 White-breasted Nuthatch, 7, 9 Snowbird, 12, 27.  
 11, 19, 22, 27, 28. Tree Sparrow, 6, 15.  
 Screech Owl, 7, 8.

Birds seen every day except on the dates after their names:

Blue Jay, 11, 13, 23. Crow, 2, 3, 4, 13, 19, 20, 21, 23.

Number of species seen each day:

Feb. 1, 2.	Feb. 10, 2.	Feb. 20, 1.
" 2, 1.	" 11, 2.	" 21, 1.
" 3, 1.	" 12, 3.	" 22, 4.
" 4, 1.	" 13, 1.	" 23, 0.
" 5, 2.	" 14, 2.	" 24, 2.
" 6, 3.	" 15, 3.	" 25, 2.
" 7, 4.	" 16, 2.	" 26, 2.
" 8, 3.	" 17, 2.	" 27, 4.
" 9, 3.	" 18, 2.	" 28, 4.
	" 19, 2.	

Total number of species seen, 8.

Total number seen during the three winter months, 9.

## OUR SONG BIRDS.—I.

## BROTHER ALPHONSUS, C. S. C.

## WARBLING VIREO.

*Vireosylvia gilva.*

Of the three vireos that are common in our woods or groves, the Warbling is the most gifted songster. Its notes, as the bird's name indicates, are running, and are exceedingly sweet. The song is also loud, and may be heard throughout the summer.

## YELLOW-THROATED VIREO.

*Lanivireo flavifrons.*

The song of this vireo resembles somewhat that of the Red-eyed Vireo. There is heartiness in the notes, but little variety. The bird sings with great deliberation as it passes from tree to tree. Like the Warbling, the Yellow-throat's notes are frequently heard near dwellings.

## RED-EYED VIREO.

*Vireosylvia olivacea.*

This vireo has a very pretty song, with more variety in it than in that of the Yellow-throat. Soft as a lullaby, the notes follow in sweet succession. It is regrettable that this charming songster is heard usually in uninhabited woods.

## ROSE-BREADED GROSBEAK.

*Zamelodia ludoviciana.*

The notes of this handsome bird are sweet and tender not unlike those of the Baltimore Oriole, but less lively and with a more plaintive quality. Of late years, I have heard the song only a few times in spring.

## PURPLE MARTIN.

*Progne subis.*

The liquid notes of this species are heard as the birds sail through the air or rest on buildings. They live in colonies, which gives the observer an opportunity to hear their notes constantly. During the rearing of their two broods, until about the first of August, the song may be heard most frequently.

## PURPLE FINCH.

*Carpodacus purpureus.*

Perhaps the sweetest of all our song birds is the Purple Finch.

Its charming strain is heard only for a short time in early spring, while it carries on its way northward. Some years, either in spring or autumn, this species fails to appear in this locality.

REDSTART.

*Setophaga ruticilla.*

This species is common for a short time in spring, when its song, quite similar, but louder than the Yellow Warbler's, may be heard. I have found families of Redstarts in deep woods in summer, but have not heard their song at that time.

TREE SPARROW.

*Spizella monticola.*

After spending the winter months with us, roving around in flocks, these sparrows begin to sing just before departing for their northern summer homes. Their notes are as tender as those of the Goldfinch. When they have gone, they leave a void in the heart of the bird-lover.

WHITE-THROATED SPARROW.

*Zonotrichia albicollis.*

This beautiful sparrow spends a considerable period with us in spring, when its plaintive notes may often be heard in gardens. In autumn, this species is very plentiful, especially in swampy places, where its song is occasionally heard. During spring, however, there is more heartiness in the song.

MARYLAND YELLOW-THROAT.

*Geothlypis trichas.*

When the spring rains have moistened the lowlands, we are sure to hear the clear notes of the Maryland Yellow-throat. His song is not varied, but loud for such a small bird. Once heard, the song will be easily distinguished from any other bird notes. The yellow-throat sings all summer.

BLUE JAY.

*Cyanocitta cristata.*

Besides its harsh call, this well-known bird has some very pleasing notes. Their quality is somewhat like that of a bell. In the spring, when mating, the jay has a distinctive song, not heard at any other time of the year. Low, sweet and varied—gives a correct idea of this song.

(To be continued.)



# THE AMERICAN MIDLAND NATURALIST

Devoted to Natural History, Primarily  
that of the Prairie States

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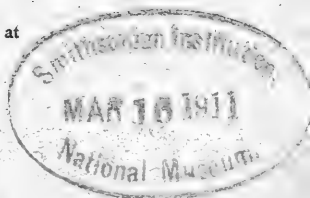
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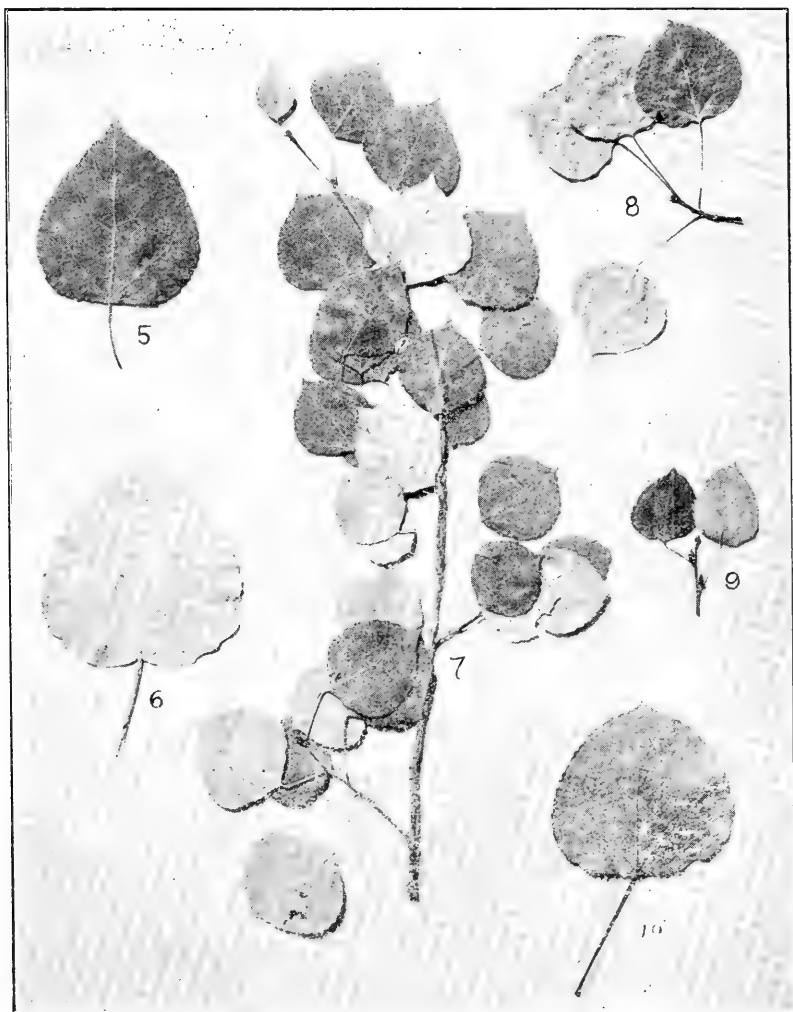
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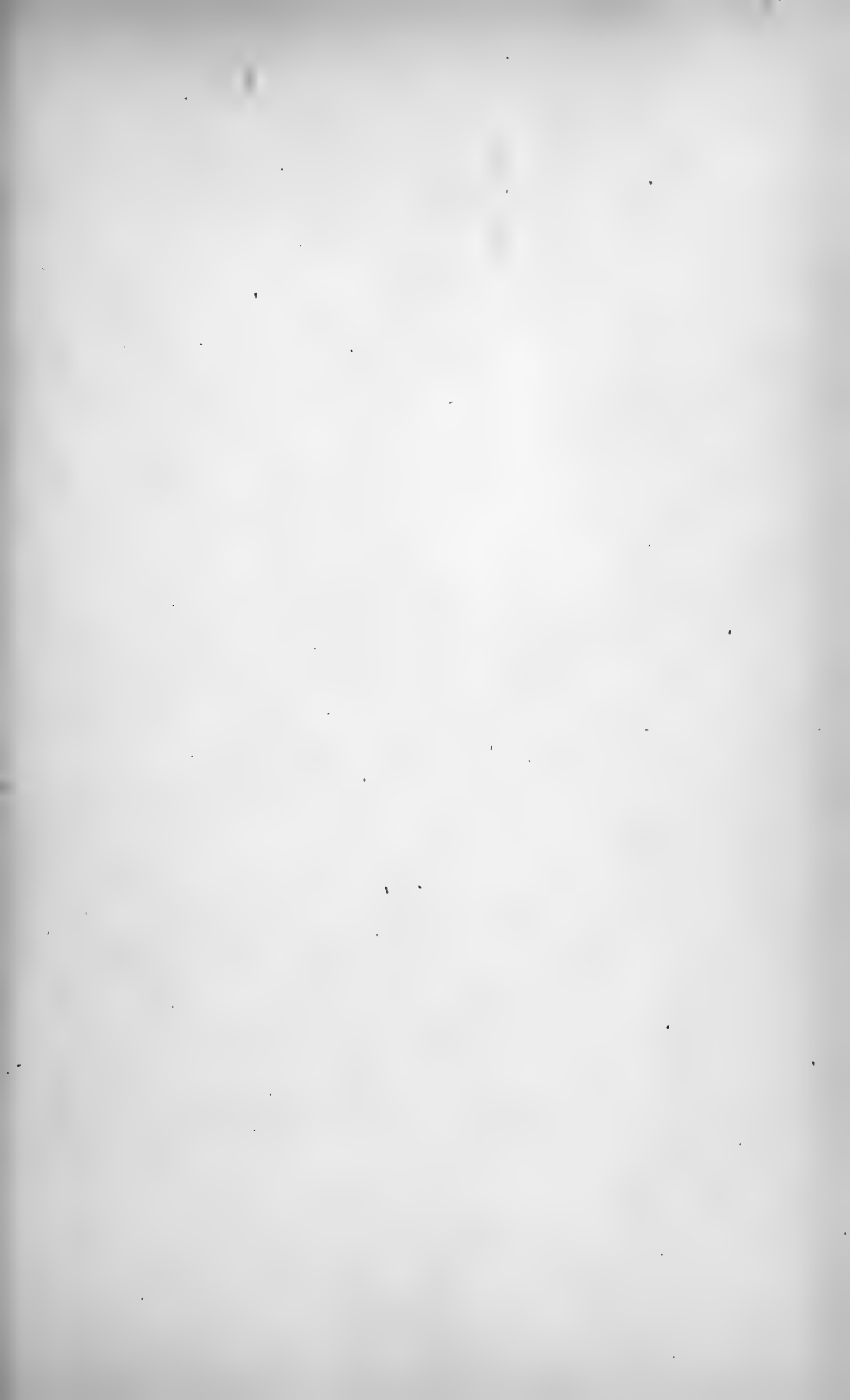


f. 5, 6—*Populus aurea* (root-shoot leaves)

f. 7—*Populus aurea* (normal leaves)

f. 8, 9—*Populus tremuloides* (normal leaves) f. 10—*P. tremuloides*  $\beta$ . *Davisiana* (normal leaves)

PLATE I. TIDESTROM on POPULUS, PLINIUS





# The American Midland Naturalist

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## NOTES ON POPULUS, PLINIUS.

IVAR TIDESTROM.

### IV. *Populus tremula* L.

The European Quaking Aspen appears to have been known to the old Greeks under the name *ξερσις*—a name which is still applied to the species in Greece. The name *λευκη* (pronounced by modern Greeks "leffke") is also applied to the Quaking Aspen. Some pre-Linnaean authors have doubted the identity of *Populus tremula* with *ξερσις* although the tree appears to be common in certain parts of Greece, particularly in the mountain district. Halacsy (Consp. Fl. Gr. 3: 135, 1904) gives a number of localities where the tree has been found. One of these localities is the famed Mount Olympus in Thessaly. That so conspicuous a tree as the Aspen with its ever trembling leaves should have escaped a master like Theophrastus, is not likely. Furthermore, that author's description of *ξερσις* points to *Populus tremula*.

"*Cercis similis est populo albae et magnitudine et surcutorum albore; folium hederaceum sed parte altera sine angulo, alterius angulo oblongo in acumen contracto; colore supina et prona pagina similes: pedunculo affixum est longo tenuique, quamobrem folium non rectum sed inclinatum; cortex asperior quam populi albae et squamatus ut pirastris; sterilis est.*" Theophr. Hist. Pl. 3: 14, 2 (Wimmer Gr. & Latin text.)

In Plini *Historia Naturalis* we find *Populus tremula* under the name *Populus Libyca*—a name which is still in use, although transformed, in Italy. Pioppo libico is one of several names applied to the Aspen in modern Italy.

Possessing neither the stature nor the beauty of *Populus alba* this tree does not appear to have been an object of praise by poets

and writers as in the case of *P. alba*. Of earlier accounts of the tree, the following appears to describe it with certainty:

*Populus Lybica. The Aspen Tree.*

3. *The third kinde of Popular is also a great tree: the barke and substance of the wood is somewhat like that of the former [P. nigra]: this tree is garnished by many brittle and tender branches, set full of leaves, in a manner round, much blacker and harder than the blacke Poplar, hanging upon long and slender stems, which are for the most part still wauering, and make a great noise being beaten one to another, yea though the weather be calme, and scarce any winde blowing; it is known by the name of the Aspen tree: the roots hereof are stronger and grow deeper into the ground than those of the white Poplar.* (Gerard, Herbal 1486, f. 3. 1636).

A similar account of it is given by Parkinson (Theatr. 1411, fig., 1640). This author has the following in addition to Gerard's account: "*the catkins thereof are longer and of a brownish ash colour, which continue a while and then fall away with the seede in it; the wood is white but nothing so tough. This tree saith Pliny hath the best Mushromes growing under it.*"

The synonymy of *Populus tremula* as far as we have been able to ascertain is:

*Populus Libyca* Plini Hist. Dodon. Stirp. Hist. 824, f., 1583.

Dalech. Hist. 1: 87, f., 1587. Matt. Com. Diosc. 130, f., 1598. Weinm. Iconogr. 137, t. 827, f. a. 1745.

*Populus tremula* Johnst. Dendr. 437, t. 123. 1662. L. Sp. Pl. 1034, 1753. Duham. Traite des Arb. 2: 183, t. 53, 1804. Willd. Sp. Pl. 4. pt. 2. 803, 1806. Reichenb. Icon. Fl. Germ. 11: 30, t. 618, 1849. Wesm. in DC. Prodr. 16: pt. 2, 325, 1868.

*Populus foliis subrotundis dentato-angulato, utrinque glabris*, L. Hort. Cliff. 460, 1737.

*Populus foliis glabris orbiculatis, laxe serratis*. Haller, Stirp. 2: 303, 1768.

*Populus australis* Ten. Syll. Fl. Neap. 482; fide Wesmael.

The description given by Kunth (Fl. Berol. 2: 219, 1838), being both brief and exact is given below:

"*Foliis subrotundis, sinuato-dentatis, utrinque ramulisque glabris, in ramulis radicalibus plantisque junioribus hirtis; squamis amenti palmato-laceratis, dense villosa-ciliatis.*" "*Petioli elongati,*



*compressi. Stylus brevis. Stigmata 2, valde dilatata, recurvata, irregulariter quadriloba."*

There is a great deal of variation both as to form and size of the leaves in this species. In normal leaves the petiole is nearly as long as the lamina, and sometimes longer. In specimens which I collected near Stockholm in August, 1897, the laminae are 7 cm. more or less in length and fully as wide, while the length of the petioles is fully 5 cm. The root-shoot leaves are cordate, acute, while normal leaves are rounded, the former are more or less pubescent, while the latter are glabrous. The indentation of the normal leaves is more or less irregularly crenate-dentate.

Hartman (Skand. Fl. 187, 1870) mentions two forms of *P. tremula*,—var. *serrulata* Frist. with small, serrulate leaves and var.  $\beta$ . (*P. villosa* Lang) with leaves pubescent on both faces. Since I have not seen these forms I am unable to discuss them.

Poplars seem to have had a charm for the early settlers of Maryland; for in every old settlement, as Bladensburg, Annapolis, and others which I have visited, they thrive and add much to the picturesqueness of these places. *P. canescens* is the common species: this tree was evidently brought over and planted by the early colonists. As to its claim to specific rank, there are good reasons both for and against it. It is evidently intermediate between *P. alba* and *P. tremula*. As to leaf form it occupies a mean position. In examining the leaves of three species it appears that the relative lengths of the petiole and the leaf blade of *P. alba* bear the relation of 5-10; in *P. tremula* this relation is normally 5-5 or 5-6. In *P. canescens*, on the other hand, the relation appears to be a mean between *P. alba* and *P. tremula* or 5-8. Besides, the full-grown leaves of *P. alba* are permanently white tomentose beneath and glabrous in *P. tremula*, while in *P. canescens* I have observed forms unlike in no appreciable way except as to pubescence on the lower face of the leaf. Normally the pubescence of the lower face of the leaf of *P. canescens* is a scant gray tomentum. This character, however, appears to be so variable as to approach *P. alba* in some cases and *P. tremula* in others. The same might be said about the form of the leaves.

The wood of *P. tremula* is used in the manufacture of the celebrated Swedish matches and also in the wood pulp industry. The leaves have served as food for domestic animals in Europe from time immemorial.

"Le Tremble a feuilles vient par-tout, même dans les sables assez secs; l'autre (*P. alba.*) ne peut profiter que dans les lieux tres humides; tous les deux poussent des rejets en abondance. Leur bois est fort tendre; on en fait d'assez mauvais sabots, des barres, des chevilles pour retenir le fond des futailles, et du palisson pour garnir les entre-voux sous le carreau des planches." (Duhamel l. c.). "Les ébénistes s'en servent à la place du sapin pour l'intérieur de leurs ouvrages, parcequ'il n'a pas autant de noeuds. Il fait la principale nourriture des castors; les chevres, les moutons, les chevreuils, les daims broutent aussi les jeunes branches de cet arbre ou mangent ses feuilles. (Duhamel l. c.).

*Populus tremula* is found occasionally in Maryland and Virginia, and it was evidently introduced early. I have collected specimens from trees at Brookland, D. C., and at Hampton, Virginia. These undoubtedly belong to this species but they are not quite typical so far as the leaves are concerned. They correspond more nearly to the form growing in France. Specimens from Herbarium Copineau collected in the forest of Rambouillet (Seine and Oise) are nearly identical with ours. The variation in leaf-form of *P. tremula* is very great, but the species is readily recognized by its long compressed petioles (in some cases the latter are much longer than the laminae) and its rounded, crenate-dentate glabrous leaves. There is also a great variation in the indentation of the leaf-margin. The color of the bark is light gray with some tinge of yellow or green. The young twigs are usually brownish.

#### V. *Populus tremuloides* Michx.

The American Quaking Aspen does not appear to have been distinguished by botanists of the 18th century from *Populus tremula*. It was definitely described by Marshall as follows:

*Populus tremula.* American Aspen Tree.

This grows frequently to the height of about thirty feet, covered with a smooth whitish bark. The leaves are small, smooth on both sides, of a dark green color above, but lighter underneath: roundish, and a little pointed, or forming nearly an equilateral spherical triangle; slightly crenated, a little waved on the edges, and trimmed with a very narrow hairy border. Their footstalks are pretty long, roundish at the base, but compressed on their sides towards the base of the leaves. The katkins are large appearing early in the spring. (Marsh. Arb. 107, 1785.)

It was definitely separated from the European tree by Richard: "*Populus tremuloides*: *P. foliis parvulis, suborbiculatis, abrupte acuteque acuminatis, serrulatis, margine pubescentibus. Hab. in Canada et Novaboraco.*" [L. C. Rich.] Michx. Fl. Bor. Am. 2: 243, 1803.

In 1804, Duhamel (Traite des Arb. 2: 184, t. 53.) published the following note in addition to the brief description of *P. tremuloides* "*Ce Peuplier, dont on doit la decouverte a Michaux que l'a porté de l'Amerique septentrionale en Europe, ne differe notre Tremble que par les dentelures de ses feuilles. Le Tremble les a grandes et dans une direction droite; dans les faux Tremble elles sont fines et dirigées obliquement vers le sommet de la feuille. Ce Peuplier est maintenant en France dans quelques jardins.*"

The description given by Duhamel applies to *P. tremuloides* but the illustration (t. 53) represents *P. tremula* and not at all our American Aspen.

Pursh [Fl. Sept. Am. 2: 618, 1814.] refers the tree to *Populus trepida* of Willdenow [Sp. Pl. 4: pt. 2. 803, 1806?]. He cites the illustrations given by Michaux f. (Hist. Arb. 3: 285, t. 8, f. 1, 1813) and also that of Duhamel (l. c.). There are doubts as to the identity of *P. trepida* with *P. tremuloides*. The description given by Willdenow (l. c.) points to *P. grandidentata* rather than to *P. tremuloides*.

"*Populus trepida.*

*P. foliis suborbiculatis dentatis basi supra biglandulosis acuminatis glabris, junioribus sericeis. W.*

*Populus trepida* Muhlenberg in litt.

Langstielige Pappel. W.

Habitat in America borealis. [Arbor] (v. s. s. fl.)

Valde similis sequenti [*P. tremula*], sed folia acuminata, et petiolis non compressi licet longissimi. Folia juniora utrinque sericea alba, adulta vero glaberrima basi supra biglandulosa." (Willd. l. c.)

Muhlenberg, who evidently sent specimens to Willdenow, referred *P. grandidentata* to *P. trepida* (See Muhl. Cat. 92, 1813.) Moreover, the description of the leaves given by Willdenow would lead one to assume that he had *P. grandidentata* and not *P. tremuloides*. The young leaves of the former are strikingly sericeous and almost as conspicuous as those of *P. canescens*. In age the leaves are glabrous and some forms have somewhat of a resemblance

to those of *P. tremula*. I have collected specimens of *P. grandidentata* in which the petioles were nearly as long as the leaf-blades, so Willdenow's name "*Langstielige Pappel*" is fully as applicable to *P. grandidentata* as to *P. tremuloides*. In both species the petioles are more or less compressed. Darlington (Fl. Cestr. 568, 1837.) and Torrey (Fl. N. Y. 2: 214, 1843.) held *P. trepida* identical with *P. grandidentata*.

The synonymy of *P. tremuloides* so far as we know is:

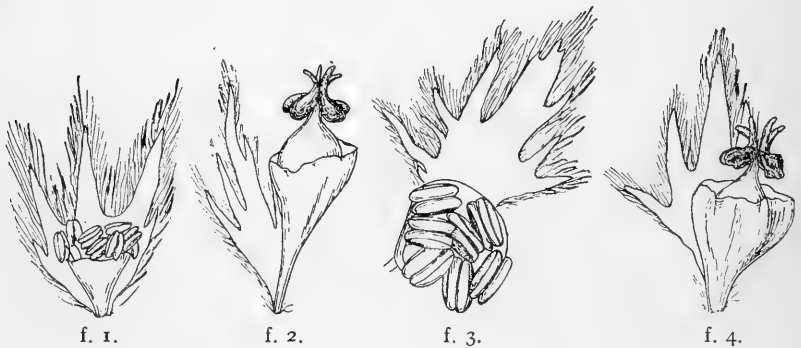
*Populus tremuloides* [L. C. Rich.]; Michx. Fl. Bor. Am. 2: 243, 1803. Duham. Traite des Arb. 2: 184, 1804 (excl. t. 53).

Michx. f. Hist. Arb. 3: 285, t. 8, f. I., 1813. Muhl. Cat. 92, 1813. Darl. l. c. Torr. l. c. Sarg. Silva 9: 158, t. 487, 1896 (in part). Man. 1905 (in part).

*P. trepida* Pursh, Fl. Am. Sept. 2: 618, 1814, not Willd.

*P. tremuliformis* Emerson, Trees 243, 1846.

Medium-sized tree with greenish-gray bark: twigs brown to chestnut color: leaves varying from sub-orbicular and acuminate



to orbicular and abruptly acuminate, serrulate, the callous teeth incurved, ciliate, normally 3.5-4 cm. in length; petioles compressed, equaling or exceeding in length the blade: staminate aments (f. 1.) about 5 cm. in length the caducous bracts rather regularly lacinate; stamens about 8, anthers small .5 mm., (more or less) long: pistillate aments (f. 2.) about 5 cm. long or more; the cupula rather coriaceous, 3 mm. more or less in length, tapering gradually towards the base.

I have observed this species in a number of places, particularly at Notre Dame, Indiana, and at St. Joseph, Michigan.

*Populus tremuloides*  $\beta$  *Davisiana* (fig. 10).

*Differt a forma typica foliis majoribus suborbicularibus 6-7 cm. longis, conspicue callososerrulatis: gemmis ovatis viscosis.*

Collected at Richmond, Ohio, Aug. 5, 1910 by Prof. C. A. Davis, U. S. Bureau of Mines.

## VI. *Populus aurea*.

*Populus tremuloides* Auct. Amer. pro parte.

*Arbor mediocris, cortice cano nonnumquam flavo-viridescenti ramulorum suffusco: gemmis glabris, viscosis, conicis, castaneis: stipulis angustis, 15 mm. longis, caducis: foliis suborbicularibus, abrupte acuminatis integris vel serrulatis, trinerviis, glabris, subtus glaucis; surculorum (fig. 6) majoribus basi truncatis vel cordatis, serrulatis; petiolo limbo brevioribus vel eum aequantibus; amentis masculis circa 4 cm. longis, bracteis irregulariter laciniatis, sericeis (f. 3), 5 mm. plus minus longis: amentis femineis circa 4 cm. longis, bracteis laciniatis sericeis, 5 mm. longis: cupula (f. 4.) 2 mm. longa diaphana, basin versus valde angustata, stipitata, margine paulum eroso; stigmatibus sessilibus.*

This species differs from *P. tremuloides* in its shorter and less dense aments, in its larger and more irregularly cleft bracts, in its larger anthers and the broader and shorter, somewhat translucent cupulae of the pistillate flowers. The leaves of *P. tremuloides* turn light yellow after frost, while those of *P. aurea* take on a golden or an orange hue. *P. aurea* forms forests throughout Colorado, Utah; and adjoining territory, at an elevation of 2400 meters and upward.

Typical flowering material examined: L. F. Ward no. 131, Aquarius Plateau, Utah, May 29, 1875; M. E. Jones no. 5169, Silver Reef, Utah, May 5, 1894; Tidestrom No. 2153, Horse Fly Mountain, Uncompahgre Plateau, Colorado, May 31, 1909; and No. 3448, (type), Vicinity of Mount Carbon, May 29, 1910.

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## BUBANI'S FLORA PYRENAEA.

By EDWARD L. GREENE.

That great range of European mountains, the Pyrenees, lying partly in France, partly in Spain, and along whose elevated crest runs sinuously the boundary between those two countries, for several centuries has been thought of as almost first among many delectable Old World fields of botanical exploration and research. It would be an interesting list, that of the mere names of the men, ardent botanists, who in the sixteenth century, the seventeenth and the eighteenth, explored each some one small part of this extensive field; but neither time nor space can be given here to the presenting of such a list; nor even to the naming of such as between the years 1781 and 1867 published books or important monographs on Pyrenaean botany. Suffice it to say that between those two dates, Pyrenaean floras were issued from the press—books by different authors—at the rate of more than one for every ten years; and until finally, in the last years of the nineteenth century and the first years of the twentieth, there was published a Pyrenaean Flora in four thick quarto volumes which, as evincing a thorough field knowledge of plants, joined to the profoundest erudition in all that appertains to systematic botany and nomenclature, must rank as second to no other flora of any state or country that has been published within the last hundred years.

Of the man who has produced a masterpiece in any art or science, the life, the training, the education, the means employed, and the method followed are of deep interest. More than that; a knowledge of these is helpful exceedingly to the best interpretation and the fullest appreciation of the work itself.

Pietro Bubani was born not far from Rome in the year 1806. That he was of gentle lineage, and in comfortable circumstances seem vouched for by this, that his childhood and youth were passed in the pursuit of academic study, so that at the age of 19 he was matriculated at the University of Bologna as a candidate for degrees in medicine. At 23 he received the doctorate. But the activities of his mind seem to have been directed not solely to the pursuit of academic and professional studies. Bubani

had been a patriotic youth; had early enrolled himself in, and was conspicuously active for the ends held in view by, a numerous guild of young Italians zealous for the overthrow of several foreign principalities which ruled various and important provinces of Italy 80 years since, and hopeful of a united kingdom under one and an Italian prince; and so prominent and influential had young Bubani been that, exiled from his native province, he removed to Tuscany, where also the restlessness of his political zeal shortened his sojourn. Removing to Lucca, he was banished from that Duchy; and so, in 1835 he left Italy for southern France, remaining for some time at Marseilles, thence passing to Montpellier. We do not know how long before having come to this ancient and celebrated center of botanical activity Bubani had become an enthusiastic student of botany; but at Montpellier it appears that an ardent friendship soon became cemented between the distinguished Professor Dunal and the young Italian, and the elder botanist suggested to the younger that he devote his time and means to the study of the botany of the Pyrenees as a life work. The suggestion was a pleasing one to Bubani, then 29 years old; and the very next season, that of the year 1836, he made his actual entrance upon the great field on the second day of July. The delight with which he pursued that season's work, the first beginnings of his great enterprise, was intimated afterwards in words which, translated, run thus: "How blissfully my days were passed in those high mountains, and with that never flagging enthusiasm I accomplished the summer's task, are not to be described." The ensuing winter was given to the study of his collections, aided by the library and herbaria at Montpellier. In the spring the mountains were returned to; and then, during nine more consecutive summers he continued this field work, passing the winters always in the study of his materials, sometimes with his friend Dunal at Montpellier, but often for weeks and months dwelling at Toulouse, there making use of the great Pyrenean herbarium of Lapeyrouse preserved in the museum of that city.

In 1847 an amnesty had been proclaimed in favor of all political exiles from Italy, and Doctor Bubani returned to the possession of his ancestral estate, carrying with him, as he informs us "Fourteen large boxes of specimens mostly Pyrenaean," also a manuscript, *Flora Pyrenaea*, unfinished, yet well advanced

toward completion, besides many books of notes made from nature alone; all these among the fruits of his eleven years of assiduous travel in and within sight of the mountains.

After three more years of study at home—making an aggregate of fourteen years of almost uninterrupted research on his chosen subject—any man at all covetous of contemporary fame would have finished and published his volumes; yet in 1850 he made another journey to the Pyrenees; and this was reiterated during five more consecutive summers. By this time Bubani was fifty years old. He had now devoted in all seventeen seasons to Pyrenaean field work, giving as many winters, as well as three whole years to the manuscript of his *Flora*. Would he not now add the final touches and give it to the waiting public? He did indeed complete the draft of it; and then, in place of giving it to the printer, he took it with him and went back to the mountains; and this was repeated during five more seasons in succession; his last journey thither, the twentieth, having been made in 1862. On this final expedition the last contributions were made to his great herbarium of Pyrenaean botany, a collection which afterwards found its place of safe keeping in the Royal Institute of Botany of Genoa. But again, having now in 1862 put a period to his long years of field study and observation, eleven years more were consecrated to revision and amendment of the manuscript, which finally, in the year 1873, he could regard as finished. It was not, however, even now his mind to publish it at once; for at the very outset of his undertaking, he had made something like a solemn vow not to let the work go to the press until after he should have devoted forty years to its preparation. In 1875 he had effected yet other corrections and improvements; and he recorded a few more each year thereafter until the 25th of July, 1880. The work had now engaged his energies, mental and physical, during some four years over the forty which he so early resolved to give to it. Why he did not now commit it to the press no one has told us. It does not appear to have been for want of means; but the man was now 74 years of age, and very probably one possessed of the ardent temperament that was this man's, and having worked as he had done incessantly for at least sixty years at high pressure, may find himself old at 74, so as no longer to feel equal to the final difficult and trying task of reading



the proofs of two thousand two hundred pages of most critical matter in small type.

Yet Bubani lived on, and apparently in health, during eight years more, then died suddenly in 1888, at the age of 82 years. He had committed the care of his great manuscript to his daughter, with directions as to its publication.

If it was something like the languor and listlessness of old age which prevented the printing of the volumes in his own lifetime, then extraordinary must have been Bubani's faith in a succeeding generation of botanists, or in some one of his younger contemporaries, to whom the superintendence of the publishing was to be confidently entrusted. Such a thoroughly competent and conscientiously faithful friend was found in Professor Otto Penzig, of the Royal Institute of Botany at Genoa, and only some eight or nine years after Bubani's demise the printing of the Flora was begun. Volume I. was issued in 1897; II. in 1900, and both III. and IV. in 1901. The four volumes of this Flora aggregate 2174 pages in quarto; and the author's every line is in Latin. It was not, then, designed to be a popular botany of the region. It was meant to be adapted to the wants of botanists almost exclusively, and one may venture to say, to botanists of very high attainment in particular, it may even be for those of future generations, more than for us, his later contemporaries. Some such conclusion as this might have been reached without knowledge of the volumes themselves, and deductively. That a man of uncommon erudition, keen intelligence and unflagging energy had given all the years of earlier and later manhood to the task, and had been willing to cease from life with it still unpublished, would argue that he had all the while felt himself to be laboring in behalf of posterity.

The eighteenth was of all the centuries the one most prolific of botanical books of great worth, and of predestined long usefulness. It was the century that gave the priceless volumes of the De Candolles and the Hookers, of Robert Brown, of Lindley and of Bentham, of Kunth, Endlicher and Engler and Prantl, of Ferdinand Mueller, of Cassini, Boissier and Baillon, Parlatores, Caruel, Saccardo, and, on our side of the Atlantic, of Nuttall, of Torrey and of Asa Gray; and every one of these enjoyed during long years the glory and the praise that were their due. Bubani was the contemporary of them all, lacked but sixteen years of

having lived through the century, accomplished a botanical work as great as the greatest that the century knew, and ended his career comparatively unknown. In this he stands alone among botanical celebrities of that century.

The reader will be wishing to be shown wherein lies the greatness of this merely local flora. We shall answer first, and in a general way, that it is not primarily as a great Botany of the Pyrenees Mountains that Bubani's "Flora Pyrenaea" is deeply interesting and instructive. Its greatness lies largely in its originality; the strong points wherein it differs from every other book of descriptive botany that was ever written. What science in all its departments, and in every generation of its progress, hails with the most cordial welcome, is the book that is original; the work, be it large or be it small, wherein the thoughts of an independantly thinking and sane mind find freedom and fulness of expression. Science is always waiting—often long and wearily waiting—for the man and his book who will lift it out of the old ruts.

Bubani has his own views about what constitutes sound and rational botany; his own idéas as to the philosophy of plant affinities, and the arrangement and sequence of families; opinions quite strongly opposed to those now prevailing as to the limit of genera and of species, the descriptions of them and their nomenclature. In all these parts and adjuncts of descriptive botany he has wrought out his scheme so carefully, so laboriously and so fully that it will be to any who study the work no wonder that the half of his time during forty years was occupied with reading, reflecting, arranging and writing out the matter that fills the four thick quartos of his work.

As to description, whether of families, genera or species, he abjures it, save only in case of new or rare species that have not before been adequately described; for the rest, only names and synonyms and the authors of them find expression. To those for whom Bubani writes there is no need of the descriptions. Thousands of the species which he catalogues have been known for many centuries, and have been described in many hundreds of different books. This fact, as he tells us in his Preface, is an all-sufficient reason for his having omitted all description of them; yet of new notes and critical remarks about many of them there is no lack on all his pages. But if formal descriptions

are wanting, the references to other men's descriptions are exceedingly abundant. There is not in existence another phytographic work of equal compass, which, as to the bibliography of species, makes even a near approach to this new Flora of the Pyrenees; and it is a bibliography not alone of phytography. Books that give information about plants are rather more in favor with this author, than books of bare diagnosis. Citations of works of Agricultural, Horticultural, Pomological, Medical and other economic Botany are made most copiously; and the botanist of competent erudition who contemplates those multitudinous paragraphs of bibliography which take the place of description, will reach quickly the conclusion that Bubani in the preparation of his masterpiece read and cited more books of botany than any other man who ever wrote a Flora. In the case of each species that has been long known, his bibliography is a clear index to everything of note that has been written about such species within 3000 years.

Some 21 of the pages of his Preface—large pages and closely printed—are given to the exposition of his views on nomenclature, and the reasons why he maintains them; a learned defense, as it were of the corrections, amendments and improvements in the denomination of families, genera and species with which the volumes abound. It is impossible to produce an abstract of the dissertation; for it is in itself an abstract, so terse and so compact is the whole. Where there is not a word in phrase to be left out without detriment to the forcefulness of statement, selection is hardly possible.

The problems of nomenclature must have confronted Bubani early in his botanical career; and he appears to have met them, and to have solved them for himself; exactly after the manner of a strong mind, acting with firmness, and in complete disregard of the cavillings of his contemporaries. Bubani was 61 years of age, and in the fulness of mental maturity and vigor when what is called the Paris Code was enacted. I am not at the moment prepared to speak of the personnel of that celebrated conclave; but I do not think Bubani, with what must then have been his familiarity with nomenclature, was in attendance. I have found in the pages referred to no mention of any codes of nomenclature, save that greatest and best of them all, that of Linnaeus, which our conclaves of recent years have seemed to know little or nothing of. Bubani has very much to say about the *Philosophia Botanica*,

and appears to have brought into requisition all that was said about this Linnaean Code in its day, whether favorable to it, or unfavorable; and all the codes that have been put forth between 1867 and 1910, as far as knowledge of the history of nomenclature is concerned, and the whole rationale of the subject, are dilute and inane in comparison with Bubani's twenty pages. The aforementioned documents are filled mainly with demagogics and dogmatic rulings. The latter is a densely compacted thesaurus of the views of clear thinking and independent minded botanists of the highest rank belonging to several centuries.

As regards the matter of the Flora itself, not much can be said for the instruction of those who have not seen the work, unless we make a few quotations from it.

Opening the First Volume, we find the first page of the Flora proper beginning thus:

**Classis 1.<sup>a</sup> DICOTYLEDONEAE (Theophr., Caesalp.) Ray.**

**Sect. 1.<sup>a</sup> GYMNOSPERMAE Brong.**

**Ordo 1.<sup>o</sup> PINACEAE Lindl.**

**Trib. 1.<sup>a</sup> ABIETINEAE Rich. (L. Cl.) Endl.**

The designations of these major groups one and all indicate more than a little of the author's mind as to system. They tell us that Bubani, like almost all the most noted taxonomists that have been, judge that in a work of systematic botany the beginning should be made from the highest types and proceed to the lower; also that he has no doubt that the most advanced types in the world of plants are trees; and that among trees the conifers rank as the most highly organized. We note next that, whereas most writers of descriptive botany have failed to credit the honors of group authorship except as to varieties, species, and genera, this one thinks that such as have indicated and named the more comprehensive groups should be held in equal honor. More than a hundred years before Linnaeus the opinion was expressed by a greater than he, that the most important distinction that had been made in taxonomy was that which we of to-day know as the dicotyledonous and monocotyledonous groups. Probably no great systematist of the last century would

have disputed that opinion; and Bubani, as we see, with the help of the parenthesis, gives credit to the three botanical authors who had most to do with the founding of these two almost fundamental groups.

The authors whose names are in parenthesis are they who early indicated more or less clearly those distinctions. Theophrastus of Eresus, who wrote immortal chapters of botany more than two centuries before the Christian era, and Andrew Cesalpin who more than seventeen centuries after Theophrastus first called attention to, and emphasized this distinction (1583), also giving the first intimation of its taxonomic importance. Then outside the parenthesis, therefore in really immediate juxtaposition to the group name itself, the name of Ray is placed, because he was first—and that just 99 years after Cesalpin—to name these two Grand Divisions of the Phanerogams, the Dicotyledones and the Monocotyledones, and also actually to distribute the seed plants according to these distinctions. If, in the natural classification of plants the difficult and great thing is the laying of foundations and the indicating of primary and fundamental groups—something which it would be temerarious to call in question—then, what name is there in the long list of British botanists of worth greater than that of John Ray? To one who rejoices in botanical consistency, truthfulness and fair dealing, it is a delight to read, though by the mere accident of bibliographic citation, at the top of the first pages of a recent botanical masterpiece, the name of Ray.

It will be seen by the second line of the same page that the first group subordinate to the Dicotyledones, that of the Gymnospermae, is credited to Brongniart; also that there are no parenthetic authors placed before that one; this seeming to signify that the illustrious French Botanist, Bubani's contemporary, had both indicated and named the group. Here, however, one would have expected to see the name of Theophrastus again at least in parenthesis, for whoever reads the chapters of the old Greek founder as carefully as Bubani appears to have done would not be likely to overlook his having made and used the terms gymnosperm and angiosperm, and that was more than 2000 years before Brongniart. Perhaps Bubani's reason for the omission may have been that the Theophrastan use of the terms and

the Brongniartian and modern use are too far from being equivalents when viewed taxonomically.

Passing now to the third line of the page as given above, one may well be surprised that this man of more than a half-century ago, the contemporary of Hooker, Bentham, Endlicher, Parlatroe and Asa Gray declines to adopt the old and familiar ordinal name Coniferae, and substitutes the much later, indeed the comparatively recent name Pinaceae. Confronted here at the outset by this "aceae" ordinal name in place of the old one, Coniferae, the thoughtful reader will turn a few pages enquiringly to see whether Bubani in his old age was captivated by the very new fancy that these designations of orders—families, as we now say—are to be taken up not according to priority, but in deference to their ending with ACEAE. The enquirer will not turn many pages before ascertaining that the venerable author of this Flora had no such thought. With him, family names may terminate in almost any sort of a way, as if in complete indifference to the new fancy about uniformity; and these, like all other names of groups high or low, mostly stand or fall with him according to priority. But why, then, Pinaceae instead of Coniferae? I do not know; but my guess would be that fault is found with the term Coniferae as inapplicable because untruthful. In the order, as received by Bubani—and indeed by all authors—only a very insignificant proportion of the trees bear fruits approaching the cone-shaped. The firs bear cylinders, the spruces bear ovals as do the larches and many more. Cypressess have spherical fruits, while those of junipers are spherical and berry-like, and a number of genera yield fleshy one-seeded fruits as far from the cone-like as plums or olives are. Only certain pines, and by no means all of them, bear fruits more or less cone-like, while not one of them is veritably a cone in shape. Bubani we shall find to represent that school of nomenclators—in the long run, the strongly predominant school—who hold that in science no falsity must be tolerated, even in a name. This, I say, is my surmise as to his reason for abandoning the use of the familiar designation Coniferae, which also is much older than we should have believed; for Bubani in his bibliography of the Order as such finds the term Coniferae to have been used by his countryman Bellonius who, in the year 1533, in a treatise on these trees calls them by that group name.

The genus *Pinus*, as Bubani sets it forth, perfectly illustrates his views in general as to the comprehensiveness of a genus; and it contains *Abies*, *Picea*, *Cedrus* and *Larix* as well as the true pines. The genus was so received by most botanists after Linnaeus for a hundred years and more; but the genus is by name credited to Pliny; not that it had not been recognized as a genus, and its species much written about by Greek authors, and under the Greek generic name, long before Pliny's time; but Bubani stands evidently by the principle—it is only simply common sense,—that in Latin botany Greek generic names do not displace Latin names, however much more ancient.

This first page of the Flora furnishes us with one example of the authors methods in dealing with species; and it is so original, and so perfect an example of his way of presenting all species, that the reader of these comments will need to see, at least the most indicative and important first line, and here it is:

***Pinus Abies*** (Homer, Theophr., Virg., Plin.) Du Roi *Obs. Bot.* 39.

And now, first of all, a word of explanation is called for in relation to Bubani's parentheses. One who knows how, recently parenthetical author's names have come into frequent use in systematic botany may well be surprised that this man, belonging as he does to an older generation of men who scorned the use of them, should have employed them at all; but he makes much more use of them than any other author ever has done. But his parenthesis is not at all that of other people. It is peculiarly his own, and has its own purposes. While in recent books in which parenthesis appears freely, it has to do with nomenclature and nothing else, Bubani's parentheses, on the contrary, have nothing to do with it. The uninstructed, on reading the line would be apt to say that this author credits the name *Pinus Abies* partly at least to Homer, Theophrastus, Virgil and Pliny, which would be utterly wide of the truth. Neither Homer nor Theophrastus ever heard of the name *Pinus* even, or of the word *Abies*; and neither Virgil nor Pliny ever dreamed of a name *Pinus Abies*, though both those men were as familiar with binary plant names and tree names as we are. Bubani's meaning is simply that those authors whose names are printed parenthetically are they who wrote in their day important matter in relation to this kind of

tree. As for the name, that is creditable absolutely to Du Roi.

Next after the name *Pinus Abies* comes a closely compacted paragraph of 40 bibliographic citations; this subserving a double purpose, that of a description of the species—which description the student may find in the works cited—and that of the synonymy of the species.

Of synonyms for this one he cites 10 binary names, beginning with *Pinus Picea* of Linnaeus, which can not be received as the name for the reason that the tree is not what Linnaeus supposed it to be, namely the *Picea* of the ancients.

As to citation of authors, this part of the paragraph begins with the completing of those given only partially and suggestively within the parenthesis above. The reader is now furnished with the exact places in Homer, in Theophrastus, in Virgil and in Pliny, where this species is written about by those authors of the distant past; and the 40 authors cited include selections of them from almost all the centuries from before the Christian era, down to a point far past the middle of the nineteenth. And a particularly admirable feature of this copious bibliography is that the works cited are not alone treatises on strictly systematic and descriptive botany. References to authors on agriculture, pomological and especially medical botany are numerous, not to mention citations of poets who have sung the qualities and uses, and even the folk lore of old and long known trees and shrubs and herbs; so that economic botanists of whatever specialty, may find these wonderful bibliographies of Bubani's quartos a treasury of references to almost the whole earlier literature of applied botany; a treasury, too, such as does not elsewhere exist.

Our understanding of Bubani's mind may be in no better way helped than by following through the very next page of his discussion of *Pinus*, the second Pyrenean species being captioned thus:

**Pinus Pinea** (Homer, Arist., Theocr., Virg., Theophr., Diosc.; L. Sp.

Need one repeat, that here also the parenthetic names of authors have not any bearing upon the nomenclature of this pine? They are but preliminary hints of ancient classic writing about the tree. Only in the case of a passage in Theophrastus



is Bubani in doubt as to that author's having had just this species in view. He thinks that uncertain; and the name as a name is credited to Linnaeus alone. The bibliographic paragraph following the name numbers 37 definite references—references by volume, page, and often of figured illustration—to almost as many different authors early and late. In the midst of this bibliography are quoted four binary names for this pine, all of them about two hundred years older than Linnaeus' *Pinus Pinea*; yet is Bubani the ablest kind of a champion of the principle of priority without reference to, or predilection for, Linnaeus and the year 1753. He is one of a long list of botanists who have brought to the front many pre-Linnaean binary names, reducing the Linnaean equivalents of them to synonymy. How is it that he has done otherwise in this instance? He has not explained the case, and again we must make a guess; but it is needful that we present those four sixteenth-century names which are written down as synonyms. They are *P. domestica*, Mattioli (1565), *P. sativa*, Anguillara (1561), *P. vulgatissima*, Lobel (1570), *P. Italica*, Camerarius (1588). The first two are equally indicative of a cultivated thing, and from such a point of view as Bubani would take, are unsuited to be the name of a wild tree, or a wild type, as one may say. The third is bad for the same reason, conveying the idea, true enough as a fact, that the tree is widely disseminated under cultivation; though in a state of nature, that is, in that condition which every systematist must regard as the typical one, *Pinus Pinea* is of a much restricted habitat, being only maritime along certain Mediterranean shores. As for the last of the four, many authors anterior to Bubani were averse to geographic plant names as apt to be false or misleading; and this pine is not more fitly donominated *Italica* than it would have been had it been called *Hispanica* or *Gallica*.

Bubani's third species of pine illustrates another mode of expression. The line meaning the species is simply

***Pinus Pyrenaea*, La Peyrouse!**

This is a rather recently discovered species; at least, it was unknown to earlier botanists; hence no call for the usual parenthetic citations; yet the bibliographic paragraph is extensive, and the list of synonyms is large, for, according to Bubani's judgment two or three segregates from it that have been proposed

are forms rather than species; moreover, the author knows that the name he adopts has not priority, and says that they who prefer to do so may use the name *P. Salzmanni* which, as he shows, is six years older. Equally characteristic of the author is his amendment of the name imposed by La Peyrouse, who had it *Pyrenaica* rather than *Pyrenaea*; and he defends himself in this course by a terse and vigorous Latin paragraph which in English would run thus:

“The word *Pyrenaicum*, of bad latinity, I have altered to *Pyrenaeum*, following Caius Julius Caesar, and also Pliny, and in sheer contempt of the folly of those who not only will not improve a piece of bad Latin diction, but refuse to tolerate any kind of correction in a name.”

A few pages beyond the pines occurs another change as to a familiar specific adjective, the author's reason for which is stated as definitely. The case is that of the type species of the ancient genus *Taxus*; which genus, having been known for ages as a monotype, needed no specific name, and had none until Linnaeus called it *Taxus baccata*. Bubani's line introductory to the discussion of the new tree reads thus:

**Taxus baccifera** (Theophr., Diosc., Virg., C. J. Caesar, Nicand., Galen, etc).

Since the authors parenthetically named have nothing to do with this matter of nomenclature, they who adopt the new binary name will write it simply *Taxus baccifera*, Bubani. But why this amendment of the Linnaean name? He gives answer that it represents an altogether mistaken use of the adjective *baccata*. A *baccate* thing is a thing made of berries, as for example the strings of bead-like red berries with which women belonging to races not yet civilized have been wont to adorn themselves; and the woman thus adorned was a *baccata*, yet the tree or plant yielding berries is as invariably a *baccifera*.

I should like to carry Bubani's argument a little further, by noting that Linnaeus seems to have hit upon the right adjective when he named a certain shrub *Myrica cerifera*, and that had he made it *Myrica cerata*, he would still have been employing a good Latin adjective—the exact parallel to his *Taxus baccata*—but would have made an absurd use of it; for the Latins would

never have applied the term *cerata* but to a thing made of wax, as for example a wax plaster.

According to Bubani's way of thinking, botanical Latin ought to be Latin, anyhow, and the beautiful science not be made, through its nomenclature, a common dumping ground for all sorts of rubbish of impossible and intolerable Latinity. There have been, there are, and there will always be men of his opinion, though these are not likely soon to become multitudinous; and to the multitude of to-day, at least in this country, Latin names of plants are mostly terms of a set of meaningless cabalistics, and their use in books of vernacular botany a mere pedantry. It is even taught in some of the so-called codes, that the best policy is that of ceasing to think of names as having meaning at all.

But the name *Taxus baccifera* may not satisfy every one who may see the desirability of substituting something in place of the erroneous term *baccata*; for almost a century before Bubani, Salisbury had dispossessed the species of that mistaken adjective, and had named the tree *Taxus lugubris*, of which action Bubani was well aware, for he mentions the name in his synonymy. Perhaps his mind may have been that the name given by Linnaeus should but be corrected, and, as corrected, be retained in preference to one of later date that is of wholly different meaning.

The citation of Julius Caesar on *Taxus* has impelled me to consult the passage (Comm. Book VI., Ch. 31), where it is recorded that at the beginning of winter Catavolcus, the aged king of a Belgian tribe, burdened with years, and feeling himself unequal to the hardships of a winter campaign, "taxo se exanimavit," that is, poisoned himself to death with yew. Whether modern toxicologists know anything experimentally of this poison or not, I know not. The deadly principle does not reside in the fruits; for these have been eaten without harm in recent times, as they also were anciently.

Let us present a few more illustrations of our author's ways of expressing himself as to genera that have been long recognized; and *Quercus* may well come next, as a genus that has been written about ever since the beginnings of history. Without any parenthesis, he credits the genus to "Virgil, Plin., L." by which I suppose he means to show that *Quercus* has been the name the genus has borne with all botanists using Latin, the earliest as well as the

latest. The first species of the genus, as to its name, stands thus:

**Quercus vulgaris** (Bibl. Sacr.), Lóbel, Ger[arde].

Now while the untaught and superficial among botanical readers of our time might say: Here are the Sacred Scriptures cited for the name *Quercus vulgaris*, the expression would be wide of the truth; for in respect to species as well as genera Bubani likes to give an outline of its whole history in literature, and in the fuller bibliography next the name he refers to Genesis, Ch. 35, v. 8; then to Isaiah, Ch. 6, v. 13, not neglecting to give *Allon* as the Hebrew name of the tree. The binary Latin name he attributes to Lobel (1570), of course writing the Linnaean name, *Q. Robur*, as one of the synonyms, along with *Q. pedunculata*, Ehrh. etc.

In the case of the oak next after *Q. vulgaris*, namely that commonly known as *Q. sessiliflora*, he has the following appellation:

**Quercus latifolia** Plinii! Nat. h. l. 16. C. 6. vol. 8.

In the further bibliography some six or seven names for the species, all of them of the eighteenth century or the nineteenth; all are synonyms with Bubani because he respects the law of priority; and also as knowing that with Pliny in the first century binary names for trees and plants were in as familiar use as they were with Linnaeus in the eighteenth.

Out of the 9 species of oak inhabiting the Pyrenees, 3 retain their Linnaean names as by right of priority, and I subjoin Bubani's own peculiar citations of three:

**Quercus Suber** (Theopter., Plin., Plutarch) L. Sp.

**Quercus Ilex** (Bibl. Sacr., Homer, Theocr. Theophr., etc) L. Sp.

**Quercus coccifera** (Bibl. Sacr., Theophr., Diosc., Plin.) L. Sp.

To have presented the names of genera all according to the law of priority for so comprehensive a flora as that of the Pyrenees was a very large enterprise; and the manner in which Bubani acquitted himself of that part of his task renders it easy to under-

stand how this study of generic nomenclature alone may have cost him at least the half of his forty winters of bibliographic work.

Some notion will now be given of what it means to take up generic names always by the rule of priority; and for this purpose we shall not need to turn many more of the Bubanian pages. Thus far our comments have been confined to selections from the first 70 only of our author's 2200 pages; and our instances of unfamiliar generic names may as well begin with one occurring on page 85 of the same Volume I. The name is *Stellina* displacing the *Callitriche* of Linnaeus, which was a name used by Pliny, with what plant in view is uncertain; Bubani thinks it was *Trichomanes*, and is certain it was not *Callitriche* of recent botany. The type was first described by Lobelius, who named it *Stellaria aquatica*. There were other types, several of them, named *Stellaria*, both before Lobelius and after his time; and so Bubani, constrained to propose a tenable name for the genus, tries to come as near as he can to the original *Stellaria*, Lobel.

Pages 90 to 116 of the volume are occupied with an elaborate treatment of 37 species of Pyrenaean euphorbias, all under the name of *Tithymalus*, of course, as having been the designation of these plants during two or three thousand years before Linnaeus, and which also is finding its place in other books that are more recent than even Bubani.

The 15 species of the docks and sorrels are of the classic name *Lapathum* rather *Rumex*, although both names, at least as to Latin nomenclature, are of equal antiquity, yet as a Greek generic name *Lapathon* is older. To the sorrels, however, received as the really natural genus which they seem to be, the name *Rumex* belongs. It was these which the Latins called *Rumex*. For the docks *Lapathum* was the accepted name by all botanists before Linnaeus, as it has been by many authors since his day; among the many Haller, Adanson, Scopoli, Lamarck, Moench, and S. F. Gray.

The Amarantaceae are represented in the Pyrenaean flora by two genera, by name in the Linnaean onomatology *Polyne-mum* and *Amarantus*, both of which are suppressed, and an entirely new name for each is proposed; for *Polyne-mum*, *Rovillea* is substituted, for *Amarantus*, *Galliaris*. He knows little about the vicissitudes of generic nomenclature in times past who is

unaware that by clearest right of priority *Amarantus* belongs to the plants now called *Celosia*. In that unbridled license of transposing generic names wherein Linnaeus loved to indulge, the real amaranths, the cockscombs as we call them in English, were bereft of their long established name, and it was transferred to the then perhaps nameless genus of homely weeds and *Celosia* was invented to take its place as a then new designation for the cockscomb.

The new name *Galliarria* for the tumbleweed type and its congeners, being founded on a personal name, is a good example of Bubani's fine predilection for commemorating in this way deserving men of science whose names were well on the way to oblivion for the reason that they did not write and publish books. He tells us (Vol. I., p. 185) that Bernardino Galliarri who lived in the eighteenth century, and was best known as an artist and a successful restorer of the art of scenic painting, was also the first of Italian private gentlemen to establish on his own estates a splendid botanic garden; who undertook many a journey for the procuring of rare plants for his gardens, was a great lover of botony and friend of botanists; to whose botanical zeal upper Italy was indebted for the introduction of many plants before unknown there.

There is a question of nomenclature which I, in thought only, thus far, and not in word, have entertained somewhat seriously, and that is, whether or not the name of a genus is to stand or fall according to whether or not it was made to cover, in the first instance, the typical species of the genus? The naming of the Linnaean *Amarantus* anew, by Bubani, is a case in point. Out of that, and quite before Bubani's time, *Euxolus* and *Albirsia* had been segregated and named as genera. The question is this: on the subsiding of *Amarantus*, by its restoration to that genus to which by right of priority it belongs, should either *Albersia* or *Euxolus* be taken up for the genus as a whole? Bubani, in practice, always answers this question negatively; so that, with him, the original or typical species, under such condition must be named anew generically, and the names of earlier segregates be left as synonyms so long as generic rank is not allowed them, and the genus in its comprehensiveness be maintained.

These comments must not be prolonged, though as to the whole work we have made mention of only here and there a paragraph; and even these from only the first volume of the four; and the

notes on these will be read mostly by botanists who never saw the work; perhaps never before heard the name of it.

I have said before that science hails with something like joy the book of science that is original, and in which an independently thoughtful mind has expressed itself without hesitation; but I have not said that *men* of science welcome always such books; and I am far from being alone in the observation that men of science may themselves be the most effectual hindrance to the advancement of science. Botanists in multitudes, and in every century, have their pet theories and their idol principles, their faith in which is implicit and firm, and to which they seem to have sworn such eternal allegiance that, when the new man comes along, the strong and fearless iconoclast, and laughs to scorn their idolatry, he must simply be ignored. It must not be noised abroad that he is here. Thus has it become notorious in the history of our science that the books that were most surely destined to accomplish great things for its advancement, in the day of their publication fell from the press as still born, and remained unnoticed for the space of a generation or two, or three. Such were the immortal treatises of Cesalpinus, of Adanson, of Lamarck, and of Salisbury besides those of many a man of lesser note than they.

It is of good augury, this fact that so great a work as Bubani's *Flora Pyrenaea*, though ten years published, is still almost unknown. It may have been reviewed in several journals of botany published in Latin Europe which I have not seen; but that I doubt; and I have looked in vain these last ten years in British and American journals for a word of mention of this treatise. Also I am confident that this silence is not everywhere that of ignorance as to the very existence of such a *Flora*. I know of several American botanists who have put themselves in possession of this work; and not one of these several ever heard of the treatise except through me; and I probably should not have known of its existence had not the publishers of it in Italy sent me their printed circular announcing it.

This silence, I repeat it, seems to me ominous; for no botanist competent to read Bubani, can peer into any one of the volumes at any page, and fail to see that it is a work of most extraordinary quality in other respects besides its amazing erudition. But botanical nomenclature is therein treated as if there had not been in the

nineteenth century a congress or a conclave or a code; and this silence of Bubani is the silence, not of foreboding, but of contempt. The work of his lifetime is a very notable monument; and it will not fall. The time will come, how soon or how late none may know, when the demand for Bubani's *Pyrenaea* will equal if not exceed the supply.

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## OUR BIRDS IN MARCH AND APRIL.

By BROTHER ALPHONSUS, C. S. C.

---

The remarkably warm weather, from March 16 until April 22, 1910, brought an unusually large number of migrants in March. The total number seen during this month last year was only seven. It is doubtful that such a large record of migrants will soon be made again.

Among the rare migrants seen by the writer this year was the Prairie Horned Lark. A pair of these birds was found feeding on low ground that is used as a garden. The birds were tame, and sometimes alighted in trees. Their note is a low whistle.

Another species, seen but once by the writer during his observations covering a number of years, was the Tufted Titmouse. As soon as he heard its loud, whistling note, he recognized it as one that he did not know.

The Purple Finch was not seen in March or April this year. The writer can not account for the absence of this species. The bird is conspicuous for its song in spring, and would surely have been heard if it were here.

### MARCH.

Birds seen every day except on the dates after their names:

Blue Jay, 13, 19.

Snowbird, 1, 2, 4, 6.

Robin, 1, 2, 3, 6, 11, 13, 14.

Purple Grackle, 1 to 5, 13.

Crow, 28, 29.

Bluebird, 1, 2, 6.

Song Sparrow, 1 to 4.

Meadowlark, 1 to 5, 7, 13.



Birds seen on the dates after their names:

White-breasted Nuthatch, 3, 16, 26.	Red-winged Blackbird, 5, 12, 16, 19, 22, 23, 24, 26, 27, 29, 30, 31.
Loggerhead Shirke, 4, 20, 22, 26.	Herring Gull, 8, 16.
Canada Goose, 6, 7, 8, 20.	Downy Woodpecker, 14, 24.
Tree Sparrow, 9, 10, 16, 25, 27, 28.	Towhee, 19, 24.
Cowbird, 16, 18, 21, 22, 23, 28, 29, 30, 31.	Prairie Horned Lark, 20, 21.
Flicker, 24, 26 to 31.	Chicken Hawk, 27.
Vesper Sparrow, 26 to 29, 31.	Field Sparrow, 25, 27 to 31.
Mourning Dove, 28, 30, 31.	Yellow-bellied Sapsucker, 26, 29, 30, 31.
Phoebe, 29, 30, 31.	Chipping Sparrow, 29, 30, 31.
Hairy Woodpecker, 29, 31.	Golden-crowned Kinglet, 30.
Kingfisher, 30.	Hell Diver, 31.
Killdeer, 4, 6, 18, 20 to 23, 26, 27.	Brown Creeper, 30, 31.

Number of species seen each day in March:

March 1, 2	March 11, 6	March 21, 10	
" 2, 2	" 12, 7	" 22, 12	
" 3, 5	" 13, 4	" 23, 10	
" 4, 6	" 14, 7	" 24, 11	
" 5, 7	" 15, 8	" 25, 9	
" 6, 7	" 16, 12	" 26, 15	
" 7, 8	" 17, 8	" 27, 15	
" 8, 9	" 18, 10	" 28, 13	
" 9, 9	" 19, 9	" 29, 15	
March 10, 8	March 20, 11	March 30, 19	March 31, 20

Total number of species seen in March, 32.

Total number of migrants seen in March, 26.

APRIL.

Birds seen every day:

Blue Jay	Robin
Song Sparrow	Purple Grackle
	Meadowlark

Birds not seen on any day:

Hell Diver	Hairy Woodpecker
Brown Creeper	Loggerhead Shrike

Birds seen every day except on the dates after their names:

Crow, 5, 8, 16, 23, 24, 28.	Snowbird, 11, 15, 18, 23, 24, 26, 30.
Bluebird, 5, 6, 15.	Cowbird, 1, 8, 26.
Red-winged Blackbird, 5, 6, 9, 11, 13, 17, 18, 19, 22, 23, 24, 26.	Flicker, 9, 12, 16, 19, 24, 25, 26.
Field Sparrow, 18, 26.	Vesper Sparrow, 1, 11, 12, 18, 20, 26.
Mourning Dove, 1, 5, 10, 15, 16, 17, 19, 20, 22, 26, 29.	Chipping Sparrow, 6, 26.
	Kingfisher, 1 to 6, 8, 9, 11, 16, 30.

Birds seen on dates after their names:

White-breasted Nutchath, 4, 5, 9, 10, 13, 27, 30.	Killdeer, 3, 8, 15, 24, 25, 28.
Sapsucker, 1, 2, 4, 5, 6, 8 to 15, 27, 30.	Phoebe, 7, 16, 19, 28, 29, 30.
Glodfish, 2, 11, 15, 24 to 30.	Golden-crowned Kinglet, 1, 4, 5, 6, 7, 23, 26.
Red-headerd Woodpecker, 4, 5, 6, 11, 24, 25, 27 to 30.	Hermit Thrush, 4, 6, 7, 11, 14, 16, 23, 27, 28, 29.
Cardinal, 7, 14, 28.	Tufted Titmouse, 5.
Ruby-crowned Kinglet, 10, 11, 19, 22, 25, 27, 29, 30.	Brown Thrasher, 10, 11, 15, 16, 17, 21, 22, 24, 26 to 30.
Downy Woodpecker, 9, 11, 13, 16, 17, 28.	Barn Swallow, 27.
White-throated Sparrow 26 to 30.	Sparrow Hawk, 12
	Herring Gull, 13.
	House Wren, 28, 30
	Spotted Sandpiper, 30.
	Towhee, 2, 6, 8, 14, 22, 25, 26, 27.

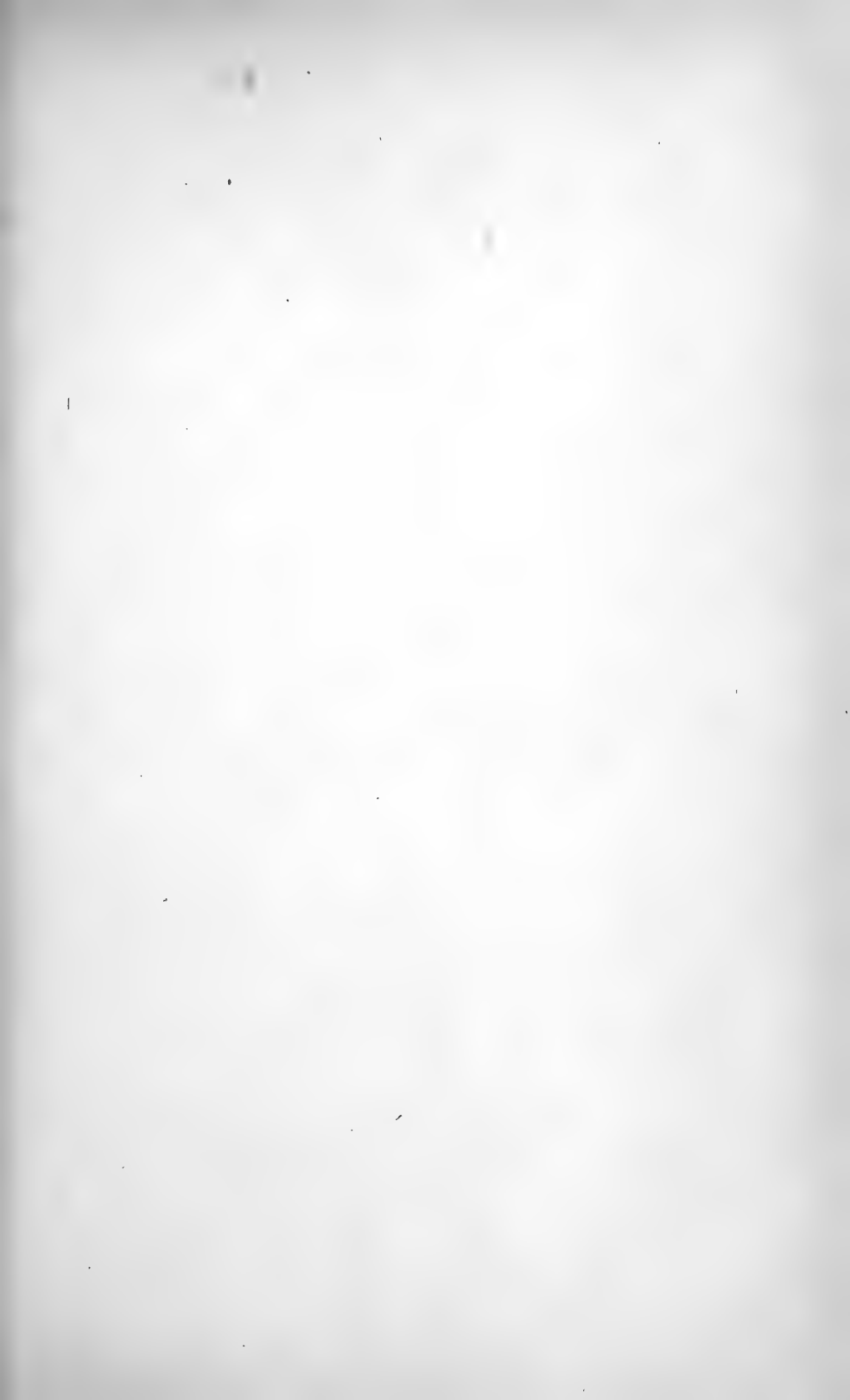
Number of species seen each day in April:

April 1, 14	April 11, 18	April 21, 16
" 2, 16	" 12, 15	" 22, 16
" 3, 16	" 13, 18	" 23, 12
" 4, 21	" 14, 20	" 24, 16
" 5, 16	" 15, 17	" 25, 19
" 6, 17	" 16, 16	" 26, 12
" 7, 19	" 17, 16	" 27, 26
" 8, 15	" 18, 12	" 28, 24
" 9, 16	" 19, 14	" 29, 20
" 10, 19	" 20, 14	" 30, 24

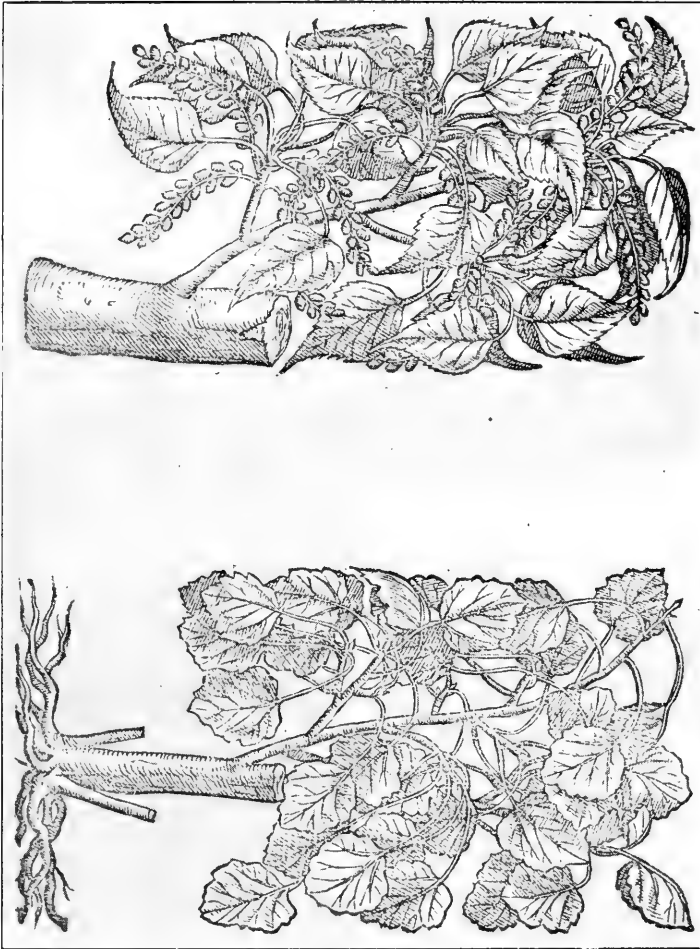
Total number of species seen in April, 36.

Total number migrants seen in April, 15.

Total number of species seen in March and April, 44.

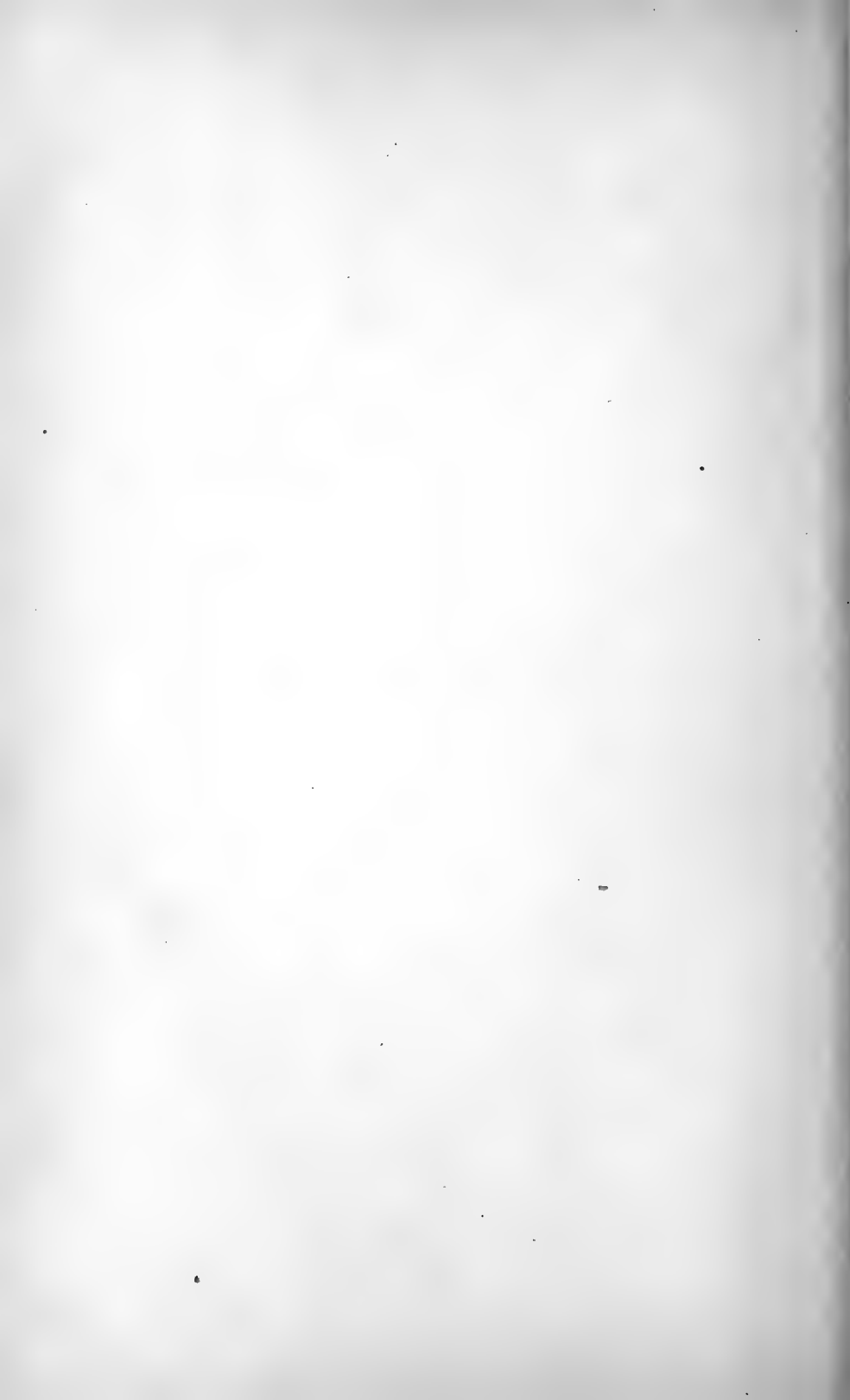






ICON. STIRPIVM TOMVS 17.  
*Populus nigra*. L. 609. T. 225. Tom. 2.  
*Populus Libyca*. L. 610. T. 225. Tom. 2.

(From Lobelius, Icones, 1581.)  
PLATE II. TIDESTROM on POPULUS, PLINIUS.



# THE AMERICAN MIDLAND NATURALIST

Devoted to Natural History, Primarily  
that of the Prairie States

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## III.—NEW PLANTS FROM NORTH DAKOTA.

BY J. LUNELL.

### *Solidago dumetorum* sp. nov.

Caules 5-10 dm. alti, dense et minutatim pubescentes vel scabri per totam superficiem, praecipue autem in parte superiore, striati, robusti, recti, valde foliosi. Folia firma, crassula, admodum tri-costata, ambobus lateribus scabra vel breviter pilosa, eoque magis in nervis strigosa, et per totam laminam inferiorem dense pubescentia, acuminata, lanceolata vel latiora, in parte dimidia marginis exteriore serrata, aspero-ciliata, media 1 dm. longa, 2 cm. lata. Capitula 4-5 mm. alta (vel magis), in paniculum amplum, pilosum conferta. Bractee involucri late lineares vel deltoideae, zona viridi media exornatae.

Stem 5-10 dm. high, closely and minutely pubescent throughout, the more so in the upper part, striate, stout, strict, very leafy. Leaves firm, thickish, strongly triple-veined, scabrous or short-pilose on both sides, with a pubescence still more prominent on the veins, and rather close and appressed on the whole of the lower surface, taper-pointed, lanceolate or broader, serrate above the middle, rough-ciliate, the middle ones 1 dm. long, 2 cm. wide. Heads 4-5 mm. high, or more, crowded in an ample, pubescent panicle. Involucral bracts broadly linear or deltoid with a green zone in the middle.

This plant belongs to the same group as *S. elongata* Nutt., which has nearly glabrous, sub-entire, obscurely 3-nerved leaves, an elongated panicle and linear-subulate involucral bracts, and *S. Pitcheri* Nutt., which has a stem glabrous up to the inflorescence, larger heads, and leaves more sharply serrate and glabrous except on the margins and on the mid-veins. The *S. Pitcheri* of this region

\* May 15, 1911.—Pages 57 to 72.

is not altogether typical. Specimens collected by me at Pingree, Stutsman County, are glabrous on the nerves of the upper sides of the leaves, otherwise typical, and plants from other localities, as Turtle Mountains, Minot, Towner, Peninsula of Lake Ibsen, etc., have the mid-veins glabrous on both sides. [*S. serotina* Ait. (?)].

The plant here described grows in the rich soil of the outskirts and the thickly wooded parts of the Turtle Mountains, wherethe type was collected by the writer in Bottineau County on July 23, 1902.

*Solidago satanica* sp. nov.

Caules 6-8 dm. alti, superne scabri et minutatim pulverulenti, infra glabrati (rami inflorescentiae cinereo-puberulenti), simplices vel in parte dimidia superiore uberrime ramosi, valde foliosi. Folia lanceolata, superne pubescentia minuta et appressa vestita vel scabra, subtus molliter et dense cinereo-pubescentia, conspicue tri-nervata, serrata vel superiora quidem integra. Capitula 3 mm. alta. Bracteae involucri lineari-lanceolatae, viridi-flavescentes.

Stems 6-8 dm. high, scabrous or minutely puberulent above, glabrate below (branches of the inflorescence cinereous-puberulent), simple or copiously branching above the middle, very leafy. Leaves lanceolate, minutely and appressedly pubescent or scabrous above, softly and densely cinereous-pubescent beneath, prominently 3-ribbed, serrate or the upper entire. Heads 3 mm. high. Involucral bracts linear-lanceolate, greenish-yellow.

A plant nearly related to this is *S. canadensis* L., which differs mainly in having its leaves narrowly lanceolate, glabrous above, and a minute pubescence on the nerves beneath, and narrowly linear involucral bracts. *S. procera* Ait. has leaves with looser pubescence and with distinct soft hairs, and its heads are larger. *S. scabriuscula* (Porter) Rydb. has shorter, broadly lanceolate leaves, rugose beneath, and the heads are larger. *S. gilvocanescens* Rydb. has broad, pale leaves, yellow-canescens on both sides.

The plant just described was found late in the season within the forest surrounding Devil's Lake, Ramsey County, and it was named because found in this romantic region. The foliage was dark green in deep shade and remarkably light green in the open woodland. The lower half or the lower two-thirds of the stems were covered with faded leaves or denuded, but this deficiency does probably not detract a great deal from the completeness of this description.

**Oligoneuron bombycinum** sp. nov.

Caules numerosi, de rhizomate crasso, perenni adscendentes, rigidi, simplices, densa, molli, alba pubescentia vestiti, valde foliosi, parte inferiore laminis petiolorum magis minusve involuti. Folia oblonga, crassa et rigida, marginibus integris, leviter vel nequaquam scabris, pubescentia mollissima, alba ambobus lateribus amicta, superiora quidem parva, sessilia, amplectantia, inferiora autem vehementer maiora et petiolis longis, alatis ornata. Folia basilaria longiores tamen petiolos habent, non alatos. Involucra 6-8 mm. alta, cymum compactum, terminalem sicut capitulum compositum formantia. Bracteae involucri oblongae, puberulentae, pallide viridi-flavescentes. Flores radiati saturate flavi.

Stems numerous, 2.5-3.0 dm. high, ascending from a thick, perennial root-stock, stiff, simple, with a thick, soft, white pubescence, very leafy, the lower part more or less enveloped in the sheaths of the leaves. Leaves oblong, thick and rigid, with entire, slightly or not at all scabrous margins, and with a soft, velvety, white pubescence on both sides, the upper small, sessile, clasping, the lower considerably larger, with long, winged petioles. The basal leaves have still longer petioles, not winged. Involucres 6-8 mm. high, in a terminal, compact eye having the appearance of a compound head. Involucral bracts oblong, puberulent, pale greenish-yellow. Rays deep yellow.

The soft, velvety pubescence of the stems and leaves is the principal character segregating this species from *O. rigidum* which is rough throughout. If *O. rigidum* grows exclusively in dry soil, *O. bombycinum* seems to prefer a moderate degree of moisture in the soil. The description is based on a specimen collected by the writer on September 9, 1910 at Butte, Benson County, where—if luck is not adverse—an occasional find recompenses the assiduous, indefatigable seeker.

**Euthamia camporum** var. **tricostata** var. nov.

Folia conspicue trinervata; insuper duo nervi minus prominentes exteriores saepe accedunt. Inflorescentia est valde glutinosa.

Leaves prominently tri-nerved; in addition, another faint external pair of nerves can often be seen. Inflorescence very glutinous.

This beautiful plant grows in wet meadows and boggy ravines and was collected by the writer at Leeds, Benson County, August 23, 1898, being seemingly the only representative of the genus *Euthamia* in central North Dakota.

*Leeds, North Dakota.*

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## THE TYPE OF THE GENUS PANICUM.

BY J. A. NIEUWLAND.

Article 45, section 6 of the rules of the Vienna Congress makes provision for the segregation of the natural genera from older more or less composite ones. It has been shown by A. A. Eaton\* that in case of the genera *Serapias* and *Epipactis* a blunder had been made so that the type of the original group was put in the segregate genus. The reasoning of Mr. Eaton is as follows: "The genus *Serapias* of Linnaeus is composite consisting of *Cephalanthera*, *Epipactis* (Adanson em. R. Br., not Böhmer) and *Serapias* as restricted by Swartz. The first two genera have been segregated, and the residue of the original genus now bears the name. It has been customary to leave the final residue of segregation the original name, but this is contrary to Article 45 of the Vienna Code provided the type or origin of the group is not contained aggregate consisting of species of *Cephalanthera* and *Epipactis* Adans., genera shown by Wettstein to be inseparable. This type is fixed by Linnaeus in Gen. Pl. Ed. 5, (1754.) as t. 245 of Tournefort which represents *S. grandiflora*. The name *Serapias* must then be restored to the *Cephalanthera-Epipactis* group."

The case of the Linnaean genus *Panicum* is quite similar. The type of the genus *Panicum* is not at present in what is called *Panicum* by the authors, but rather in the segregated *Chaetochloa* or *Ixophorus* or *Setaria* etc. (or whatever synonyme is preferred.) The segregate has not fared well from the very start since wrongly made up by Beauvais, and has passed through all the throes of synonymy and homonymy. The name *Panicum* should therefore, be given to this group that contains the undisputed type, *Panicum*

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\* Eaton, A. A. Proc. Biol. Soc. Washington, XXI, [1908] p. 63-68. also Fedde, F. Rep. Novar. Spec. [1908] VI. p 45.

*italicum* Linn. The other group is then the residue though at present containing the larger number of species, and as it has never to my knowledge received a name one should be given it.

Linnaeus, neither in the *Species Plantarum* of 1753 nor in the *Genera Plantarum* of 1754 indicated which species he considered the type of his composite group. His genera were usually so heterogeneous that an average representative plant could not have served as such, but in the *Philosophia Botanica*\* he left us his impressions as to what his followers were to do should they find it necessary to break up his so called genera into their original natural genera. We are justified then in appealing to Linnaeus at his own suggestion or direction for the method to be used and the only reasonable one for such a procedure as the segregation of a genus. By the study of the pre-Linnaean authors it is not difficult to pick out the type species, especially when we can trace the plants back to the author who first named or discovered them. Dr. E. L. Greene† has pointed out this method, in the case, for instance of the genus *Draba*, and often this way is the only one for arriving at the correct idea of the types. If then for no other reason than this, the study of pre-Linnaean works has become an indispensable requisite for taxonomists, even for such as conform blindly to the 1753 "starting point." Study of post-Linnaean authors helps only when we are sure that they conform to the reasonable method of returning to the genera held by botanists prior to 1753. If the authors afterwards made blunders without designating types then the mistakes are to be corrected by the appeal to the older writers.

The type of the genus *Panicum* and the plant to which the name *Panicum* was first applied by Pliny is indisputably the plant which Linnaeus and others before him called *Panicum italicum*. A survey of the pre-Linnaean authors leaves no doubt whatever of this fact.‡ Though Caesalpinus says that the derivation of

\* Linnaeus, C., *Philosophia Botanica* 1st ed. 1751 also 2nd ed. 1755 pp 197, 198 in both.

† Greene, E. L., *Pittonia* Vol. 4, p. 203.

‡ *Panicum Italicum*, sive panicula majore, Bauhin, C. *Pinax*, 27. *Panicum*, Dodonaeus R. *Pempt.* p. 497-498. *Panicum sativum* Cusa, *Lugd* *Panicum vulgare* Clusius C., *Hist.* *Panicum indicum* Tabernaemontanus, J. T., *Kreutterbuch.* (1625) p. 639. also Gerard's *Herbal.* *Panicum* Caesalpinus, A. *De Plantis* (1583) p. 189. *Panicum* Marcellus Vergilius. *Com.* *Ped.* Diosc. 1529. p. 239. *Panicum* Herm. Barbarus *Coroll.* in Diosc. (1530)

the name comes from the fact that the fruit is in panicles, Pliny states that a kind of poorer grade of bread (*panis*) was made from the plant, and it is the general opinion that Pliny's plant was *P. italicum*.

What seems all the more strange that Beauvais should have mistaken the type in his attempt at segregation, is that even in the editions of the Species Plantarum of Linnaeus the members of the group to which *P. italicum* belongs are described by Linnaeus before those to which the name is now given, so that this is additional reason to suppose that even Linnaeus if he could be supposed to give preference to types, hereby showed a preference by right of position at least. I can only guess that the reason, if any exists, why Beauvais should have considered the *Setaria* group as real *Panica*, to have been what their panicles were more typical in the modern sense of the word, but the explanation of the origin of the derivation just given explains this. Even the name *Setaria* could not stand as it is a homonym, Acherson having given it to a group of lichens in 1798. Scribner recognizing this, called the genus *Chaetochloa*, but it had already been given a name, *Ixophorus* by Schlectendal in 1861-62. Kuntze\* in his Revisio Plantarum Generum suggested a name *Chamaeraphis* of Robert Brown, but this simply amounts to joining the *Setaria* of Beauvais to the other genus, and there are those who hold that they are quite separate and distinct groups of plants. The new Gray's Manual of Fernald and Robinson still holds to the name *Setaria*, as also does Mr. Parrish† both appealing to the international laws of nomenclature, in spite of the fact that the name is a homonym. In view of the appeal of Mr. A. A. Eaton to Art. 45, in the case of *Epipactis* to which the case of *Panicum* and *Chaetochloa* seems to me to be a parallel, it would appear that the Vienna Code needs

\* Kuntze, O. Rev. Pl. II., p. 766.

† Parrish, S. B. Muhlenbergia. Vol. V. p. 114.

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p. 34. *Panicum* Chabraeus, D. Stirp. Sciagraph. (1677) p. 178. *Panicum* Ruellius De Nat. Stirp. (1543) p. 322. *Panicum aliud Indicum* Lobelius. M. Observ. (1576) p. 25. *Panicum* Matthioli, P. A. Com. sex. Lib. Diosc. (1559) 255, 256. also do, (1554) p. 230. also do. (1552) p. 229. *Panicum Italicum* sive paniculo majore, Tournefort. J. P. Inst. Rei. Herb. (1700.) a. Fig. 298. also Els. Bot. (1694.) p. 417. & Fig. 298. etc. etc. *Panicum* Dodonaeus, R. Frum. Leg. (1564.) p. 69. also do. Com. de Stirp. (1559) p. 11. also do. Hist. des Plantes (1557) 317, 318.

some explanatory commentary, or at least a few more specific dogmatic or arbitrary decisions; for this would be the only way out of the difficulty of contradictory rules unless they be abrogated and this is not likely for a while at least.

In any case, the only reasonable way out of the predicament is to restore the name *Panicum* to the group of plants to which it was applied as far back as nearly two thousand years ago. Even the interpretation of the Vienna Code requires this. *Setaria* was conceived in falsehood, it is itself a homonym and the attempts to correct the mistake have so far resulted in at least one other synonyme, so that there would seem to be little reason to perpetuate a blunder when we can easily correct the mistake, the Vienna Code favoring. As the matter now stands the name *Panicum* rightly belongs to the plant group that contains *Panicum italicum* Linn., which is now called *Ixophorus italicus* (Linn.) Nash., *Chaetochloa italica* (Linn.) Scrib., or *Setaria italica* (Linn.) R. & S. This procedure leaves the other genus hitherto called *Panicum* by the authors, without a name, as far as I am able to ascertain, and I propose that of *Chasea*. Following is the synonymy of the genera. I shall indicate only a few of the transferred plants under the new name.

PANICUM (Pliny) Linn., 1753.

*Setaria* Beauvais, 1812 not Achers., 1798.

*Ixophorus* Schlecht., 1861-62,

*Chaetochloa* Scribner, 1791.

*Chamaeraphis* [R. Br. 1810 (?)] O. Kuntze, 1891.

PANICUM ITALICUM Linn. 1753.

*Setaria italica* (Linn.) R. & S. 1897.

*Ixophorus italicus* (Linn.) Nash, 1895.

*Chaetochloa italica* (Linn.) Scrib., 1897.

*Chamaeraphis italica* (Linn.) Kuntze, 1891.

PANICUM VIRIDE Linn, 1762.

*Setaria viridis* (Linn.) Beauv., 1812.

*Ixophorus viridis* (Linn.) Nash, 1895.

*Chamaeraphis viridis* (Linn.) Porter, 1893.

*Chaetochloa viridis* (Linn.) Scribn., 1897.

PANICUM GLAUCUM Linn., 1753.

*Setaria glauca* (Linn.) Beauv. 1812.

*Ixophorus glaucus* (Linn.) Nash, 1895.

*Chamaeraphis glauca* (Linn.) Kuntze, 1891.

*Chaetochloa glauca* (Linn.) Scribn., 1897.

*Pseudoraphis glauca* (Linn.) Griff., 1851.

PANICUM VERTICILLATUM Linn., 1762.

*Setaria verticillata* (Linn.) Beauv., 1812.

*Ixophorus verticillatus* (Linn.) Nash, 1895.

*Chamaeraphis verticillata* (Linn.) Porter, 1893.

*Chaetochloa verticillata* (Linn.) Scribn., 1897.

PANICUM OCCIDENTALE (Nash.) Nwd.

*Chaetochloa occidentalis* Nash, 1901.

PANICUM VERSICOLOR (Bick.) Nwd.

*Chaetochloa versicolor* Bicknell, 1898.

CHASEA *nov. nom.*

*Panicum* of the authors not of Linnaeus or only in part.

CHASEA CLANDESTINA (Linn.) Nwd.

*Panicum clandestinum* Linn., 1753.

CHASEA DICHOTOMA (Linn.) Nwd.

*Panicum dichotoma* Linn., 1753.

CHASEA PUBESCENS (Lam.) Nwd.

*Panicum pubescens* Lam., 1797.

CHASEA ANGUSTIFOLIA (Ell.) Nwd.

*Panicum angustifolium* Ell., 1817.

CHASEA VIRGATA (Linn.) Nwd.

*Panicum virgatum* Linn., 1753.

CHASEA AMARA (Ell.) Nwd.

*Panicum amarum* Ell., 1817.

CHASEA VIOLACEA (Linn.) Nwd.

*Panicum violaceum* Linn., 1753.

CHASEA PROLIFERA (Lam.) Nwd.

*Panicum proliferum* Lam., 1797.

CHASEA CAPILLARIS (Linn.) Nwd.

*Panicum capillare* Linn., 1753.



CHASEA FLEXILIS (Gatt.) Nwd.

*Panicum flexile* (Gatt.) Scrib. 1893.

*Panicum capillare* var. *flexile* Gattinger, 1887.

Other plants belonging to the group are *P. patens* L.; *P. latifolium* Linn., *P. brevifolium* Linn., and many more.]

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## TERATOLOGICAL NOTES.

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### IV.—Frequent Occurrence of a Third Pseudocardinal in the Right Valve of Certain Species of *Lampsilis*.

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During the past four years, I have examined the hinge areas of a large number of *Unionida*, and have been much impressed with the fact that the dentition of these freshwater mollusks is very variable, not only within the family and within the genus, but even within the species. That considerable variation exists is to be expected, since it is generally conceded that the teeth of *Pelecypoda*, being largely moulded by the dynamics of situation, change with the influences to which their form is due, and in the course of time may become obsolete from disuse, as in *Anodonta*\*, or may simulate those of other groups. As a rule, however, the type of dentition is pretty constant for the various families and genera, so that they may be given a definite dental formula. The freshwater mussels are schizodont in their dentition, their hinge teeth, when present, consisting of a subumbonal and a lateral series, known as pseudocardinals and pseudolaterals. The ligament is external, parivincular and opisthodetic. *Unionida* are distributed in the lakes, ponds, and streams throughout the entire world, and in the Mississippian region of America we find their metropolis.

In his Synopsis, the only comprehensive recent work dealing with the great family of Naiades, Simpson† defines the dentition of the genus *Lampsilis* in the following characterization: "Hinge with one or two pseudocardinals and one lateral in the right valve, and two pseudocardinals and two laterals in the left." Other

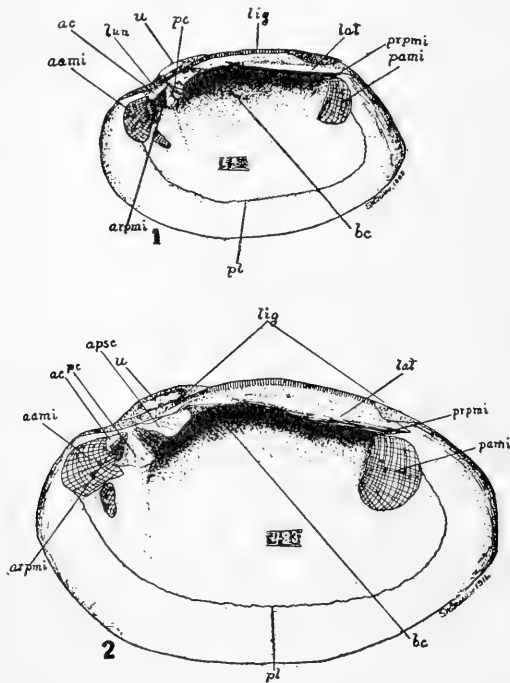
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\* Dall, W. H. in von Zittel, Karl A. Textbook of Palaeontology, Eastman's Translation I (2): 353-354. (1900).

† Simpson, Charles Torrey. Synopsis of the Naiades, or Pearly Fresh-Water Mussels. Proc. U. S. Nat. Museum XXII: 526. (1900).

writers on the genus have subsequently given practically the same definition. However, within this genus there are a number of notable departures from the typical generic dentition, as exemplified in the type, *Lampsilis ovata* (Say) Rafinesque, and in the groups of *L. (Proptera) gracilis*, *L. (P.) amphichæna*, and *L. (P.) leptodon*, we find species having the pseudocardinals, laterals, often rudimentary or almost wanting.

In the accompanying figures are shown the normal right valve of *L. ligamentina* (Fig. 1.) and a right valve of the same



species in which there is a strongly developed third pseudocardinal. (Fig. 2). Each valve in this species has normally two pseudocardinals, with two laterals in the left, and one in the right valve. The pseudocardinals on the left valve are nearly equal in size, and are solid, triangular, and marginally crenulate. In the right valve the anterior pseudocardinal is very small (see figure); the posterior is large, triangular, and crenulate. The laterals are strong and direct and are curved post-ventrally, and show on

their edges a transverse striation commonly to be observed in many Uniones.

Most of the *Unionidae* now in the Museum of the Upper Iowa University were collected in the Wapsipinicon River near Independence, Iowa. A considerable number of the specimens, especially those referable to such abundant and widely distributed species as *L. ligamentina*, *L. recta*, and *L. ventricosa*, show to a greater or less extent the development of a third tooth, just behind the normal posterior pseudocardinal (*pc* in figures). A large series of specimens shows the development of this third tooth in a number of species. It varies in size from a simple rounded caruncle on the usually smooth dental bridge, to a tooth as large or even larger than the normal posterior pseudocardinal. At Figure 2 is shown such a specimen, No. 483, U. I. U. Museum. The third tooth (*apsc* in Fig. 2), is very strongly developed. The connecting bridge, instead of being smooth, is raised into a sharp ridge, appearing a little as if it might be a rudimentary second lateral. The normal lateral tooth does not differ in any material respect from those in specimens in which the third pseudocardinal is not developed.

It is impossible at the present time to say whether this abnormality is caused by unfavorable embryonic conditions thus being truly teratologic. I am inclined to think, however, that it is merely a reversion, since it occurs so commonly among the freshwater mussels. True teratism, such as transposition of the teeth, etc., occurs quite rarely, and but little is known at the present time as to the causes of such abnormalities. Its study offers an interesting field for qualified workers.

Samuel W. Geiser,  
Fayette, Iowa.

EXPLANATIONS OF THE FIGURES.\*

Fig. 1. Normal right valve of *Lampsilis ligamentina* (Lam.)

Fig. 2. Right valve of *Lampsilis ligamentina*, showing third cardinal tooth. *aami*, anterior adductor muscle impression; *ac*, anterior pseudocardinal; *apsc*, third pseudocardinal; *arpmi*, anterior retractor pedis muscle impression; *bc*, beak cavity; *lat*, lateral hinge tooth; *lig*, ligament; *lun*, lunule; *pami*, posterior adductor muscle impression; *pc*, normal posterior pseudocardinal; *pl*, pallial line; *prpmi*, posterior retractor pedis muscle impression; *u*, umbo.

\* Figures are all  $\frac{1}{2}$  natural diameter.

## NOTES ON PRIORITY OF PLANT NAMES.

—  
J. A. NIEUWLAND.  
—

The following names of families taken mostly from the Flora of Anjou, 1827, by Desvaux must be given priority over such as are now accepted or in cases where the names are not different, they should be accredited to that author rather than to the ones who have hitherto been considered as their authors. I shall lay stress only on those ending in *aceae*, such being commonly held to. Desvaux has, however, others which by right of priority should be used, though prejudice has kept many botanists nowadays from using names not ending in *aceae*.

*Monotropaceae* Desv., 1827, p. 172, instead of Lindley, 1836.

*Rhamnaceae* Desv., 1827, p. 355, instead of Dumortier, 1851.

*Polygalaceae* Desv., 1827, p. 333, instead of Reichenbach, 1828.

*Salicariaceae* Desv., 1827, p. 320, instead of *Lythraceae*,  
Lindley, 1836.

*Saxifragaceae* Desv., 1827, p. 312, instead of Dumortier, 1829.

*Berberidaceae* Desv., 1827, p. 293, instead of Torrey and  
Gray, 1858.

*Apocynaceae* Desv., 1827, p. 188, instead of Lindley, 1836.

*Jasminaceae* Desv., 1827, p. 187 (188 in Index), instead of  
*Oleaceae* Lindley, 1836.

*Gentianaceae* Desv., 1827, p. 184, instead of Dumortier, 1829.

*Polygonaceae* Desv., 1827, p. 127, instead of Lindley, 1836.

*Daphnaceae* Desv., 1827, p. 176, instead of Reichenbach, 1828.

*Oenotheraceae* Desv., 1827, p. 318, antedates *Onagraceae*  
Dumortier, 1829. Both must yield to *Epilobiaceae* Vent,  
1799.

Among the principal names not ending in *aceae* antedating those now held are the following of Desvaux, *Violineae*, *Cistineae*, *Dioscorineae*, *Portulacineae*, *Opuntiateae*, (*Opuntiaceae* in Index).

Heister in 1755\* first published the name *Malvaceae* for the Mallow family, and that too fifteen years before Necker's publication and two years antedating Zinn.† The name *Liliaceae* Heister, 1755, antedates the publication of Zinn.†

\* Heister, L., Beschreibung eines Neuen Geschlechts Africkanischen Pflanze (*Brunsvigia*). Braunschweig, 1755., p. 16.

† See Am. Mid. Naturalist. Vol. I., p. 112.

## II.—OUR SONG BIRDS.

BY BROTHER ALPHONSUS, C. S. C.

## CATBIRD.

*Dumetella carolinensis.*

The Catbird, I think, may be placed next to the Brown-Thrasher as a songster. But it often mars its singing by introducing a cat-like call. Sometimes, however, the bird will sing without a discord. The catbird is an accomplished mimic, and often imitates other birds' notes to a nicety.

## INDIGO BIRD.

*Passerina cyanea.*

Among the sweetest of all our song birds is this beautiful little blue bird. During the hot days of July, when most other birds are seldom heard, this charming songster will sing almost continuously, at the edge of some wood. The song gradually ceases towards the middle of August.

## BROWN THRASHER.

*Toxostoma rufum.*

The Brown Thrasher is our finest song bird. On its arrival, sometimes as early as April 10, the bird begins to sing. Perched in a tree top and in full view of the observer, the Thrasher will pour forth melody that, for richness and variety, is unsurpassed by any other of our birds. The Thrasher stops singing about the first of July.

## BLUEBIRD.

*Sialia sialis.*

The first note of early spring is the sweet warble of the Bluebird. The last week of February is sure not to pass without the arrival of the first Bluebirds, whose soft call-notes are heard as the birds fly or rest at the edge of some wood. A few days later, the Bluebirds' notes fill the fresh spring air.

## BALTIMORE ORIOLE.

*Icterus galbula.*

The loud, whistling notes of the Baltimore Oriole are very conspicuous in May and June. Feeding in the tree tops, the bird will often stop to utter one or more of its rich notes. There is

considerable variety in the song of the male, and the same clear tones in the voice of the female. Most of the summer, a few notes may be heard, delivered in a less forcible manner.

RED-WINGED BLACKBIRD.

*Agelaius phoeniceus.*

The notes of this blackbird are clear and melodious, but have little variety. The bird's habitat is in swampy places, where its song may be heard a great way off. After the nesting season, the song is seldom heard, but a shrill whistle is given for a longer time.

(To be continued.)

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EDITORIAL.

THINGS NEW AND OLD.

On more than one previous occasion we have found that so called discoveries of our time had really been originally made several centuries ago. There has come to our notice now a work on "The Law of Sex-determination and Its Practical Application," by Laura A. Calhoun,\* which may again illustrate the fact. Mrs. Calhoun has had much experience in California in breeding animals and proposes a theory of conditions that determined the sex of offspring. She proposed as the principal thesis the following:

"The sex of the embryo in man and the higher animals is determined in the ovary from which the ovum in question is developed. In the normal female, the ovary of the right side yields ova which on fertilization develop as males and the ovary of the left side yields ova which are potentially female."

Commenting on this, David Starr Jordan\* states that "from this arises the practical deduction that sex can be determined at will through the service of gravitation. For the prospective mother to lie on the right side should ensure male offspring. To allow the spermatic fluid to flow to the left side means female offspring." Other theories of telegyny are proposed more or less scantily supported by facts. We have other theories with

\* "The Law of Sex-Determination and Its Practical Application", Laura A. Calhoun. The Eugenic Publishing Company, New York.

\* Science, Vol. XXXIII., No. 846, p. 429., Friday, March 17, 1911.

not a few facts to support them more or less plausibly, but we do not think this the place to discuss others. Regarding the main thesis of Mrs. Calhoun we do not, moreover, pretend to make either adverse or favorable comment, as we dare not even hope to feel competent in expressing as much as a valuable opinion.

On first reading of it, however, we were forcibly reminded of the opinions and theories and beliefs of the older scientists of the middle ages, nowadays called "dark ages," more or less appropriately and truly, if not more likely, because we are at present so hopelessly 'in the dark' concerning the great men, and their great scientific attainments. It is fair to say that whenever and wherever careful scientific observation without the aid of machines, microscopes and the like, were not indispensable, the great students of former ages even decades of centuries ago were as capable of careful investigation as we of to-day. True, their interpretation was often wrong, but they have often shown themselves our superior also, because looking only for truth and a solution of problems, they approached a subject with an unprejudiced attitude of mind. There are, for instance, not many astronomers of to-day that could have made Galileo's discoveries with his instruments and under similar restrictions. Theophrastus of Eresus several centuries before the Christian Era knew things about plants that we have been till very lately attributing to the discoverers of the seventeenth and eighteenth and nineteenth century. Many are still wont to consider that little of scientific value was done before the eighteenth century in biology, and that, the exponents of earlier ages were theorists and dreamers only.

This condition of opinion may be due partly because few of our times can or do read the Greek or Latin treatises of the older scholars. I have heard it said that there are many scientists now flourishing doctor's degrees that owing to lack of classical training not only would not compare with scholars of old, but would scarcely qualify for bachelor's degrees in any European University of the 'dark ages,' whatever be the reason why the older masters of science are unknown there can at best be very poor excuses for the fact.

In looking over a review of Mrs. Calhoun's book, I remembered an old work of the thirteenth century printed in 1662 at Amsterdam, containing a theory not much unlike the present

one. I refer to a small treatise by Albertus Magnus, the eminent professor of St. Thomas Aquinas. It is entitled *De Secretis Mulierum item de Virtutibus Herbarum, Lapidum et Animalium*, etc. Bound in the same volume is a similar treatise, *De Secretis Naturae*, by Michael Scotus. In the latter are found nearly the same discussions, though with important modifications as the quotations show. In spite of our want of appreciation of theories of the thirteenth century, a theory of the twentieth is not a jot more useful, true, or important unless based more solidly on facts. The following quotations from the aforesaid works of Albertus and Scotus may in any case prove of interest.

"Et nota secundum Avicennam, si semen cadit in latere sinistro matricis, generatur foemella, si in dextro, generatur masculus."\* "Et ideo in dextro generantur masculi, etc, etc."†

It will be noted too that this theory of sex-determination is attributed by Albertus to the Arabian philosopher, Avicenna. Whenever quotation is made due credit is always given by the ancient scientists, but gives examples of observed facts when he makes a modification in this old theory. Compare the following from Michael Scotus.

"In latere dextro dicimus quod masculus concipitur and in sinistro foemina, ut quidam volunt: nos vero dicimus quod latus non facit ex <sup>h</sup>toto, sed semen testiculi, quia de dextro, exit masculus, and de sinistro foemina, etc. etc."

Then follows a practical observation and proof for what he says.

Scotus beside this devotes two chapters to the subject of sex-determination. (Chaps. XVI., XVII.), Albertus also has a special chapter VIII. on the subject. Scotus intimates that there have been exceptions to the theory.‡

That there are some ideas on sex-determination which can hardly be viewed by us as anything but absurd maybe admitted, but in view of the striking similarity of the views expressed in these quotations with those of Mrs. Calhoun and professor Jordan, we are justified in believing that were the scientists of to-day better acquainted with the works of the distant past less time would be lost in rediscovering things old.

\* Albertus Magnus. L. C. p. 96. Compare also p. 103.

† l. c. p. 97.

‡ Scotus, M. De Secretis Naturae. pp. 266, 267.



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## ANTENNARIA IN THE MIDDLE WEST.

By EDWARD L. GREENE.

The prairie region of the Middle West I roughly estimate to be about three times the area of New York, Pennsylvania, New Jersey and the six New England States combined. Concerning the antennarias of that eastern region the botanists of all the generations preceding ours knew so little that we may call it nothing at all and not be far wrong. Only recently have eastern botanists begun really to look at the plants; and to find that they have there a dozen easily definable species where the forefathers had but one. This being true in the little field of the East, much more probably shall we find even now the knowledge of Middle Western antennarias to be scanty, seeing that this field is of such vast extent, and the critical students of systematic botany resident there are so very few.

Such knowledge of the botany of the prairies as a botanically minded school boy may have, I had acquired about a half-century ago, and in recent years I have made several rather extended vacation tours through various parts of the Middle West, always studying the antennarias on the ground, and making specimens. Several collectors in various prairie states have gathered them, and there are some scores of sheets in the herbarium of the National Museum which have been so acquired, and altogether it seems quite time that some kind of a census should be made of all that we seem to have been able to gather and to distinguish in the middle-western membership of the genus. Such a census can hardly fail to stimulate to more active investigation.

I entertain no hope of being able confidently to refer to one or another of the dozen or fifteen clear species of the Middle West all the several scores of herbarium sheets existing in my own

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\* June 10, 1911.—Pages 73 to 96.

large antennaria bundles and those of the National Museum. Not many, if indeed any of the collectors are aware of the urgent need there is of searching for and gathering the male plants—often so very scarce—as well as the female; and in consequence, we have scores of sheets of specimens showing female plants only; and the species are not few of which the characters reside not at all in the female plants, but are pronounced enough in the males. In view of these facts, not a few specimens well chosen and carefully prepared occur in the collections, even some with both sexes represented, which I do not venture either to refer to species already described, or to name and characterize as new; but I make mention of several such, adding some informal account of their peculiarities, thus inviting those in the field to further study of them. It is also with such an end in view that, in the case of common and widely dispersed species, I cite with unusual fulness the stations which the herbaria show for them.

It is hoped that the following attempt at a key to the species may be found helpful.

Leaves small, 1-2 in. long, narrow.

Leaves with some distinction of blade and petiole.....1. *A. neodioica*.

Leaves with little or no distinction of blade and petiole.

Mature leaves glabrous above.

Fertile plants tall; scale tips broad, entire;

sterile plants low.....2. *A. neglecta*.

Fertile plants not low, but the sterile taller;

scale-tips erose or fimbriate.....4. *A. erosa*.

Fertile plants tall, the sterile low; scale-

tips coarsely notched.....5. *A. longifolia*.

Mature leaves hardly, or very tardily glabrate above.

Scales of fertile involucre narrow, their tips very narrow.....3. *A. Wilsonii*.

Scales of fertile involucre broad, their tips

broad, obtuse.....6. *A. nebrascensis*.

Leaves of smallest size,  $\frac{1}{2}$ - $1\frac{1}{4}$  in. long, not more than twice as long as wide.

Leaves obovate-spatulate, glabrous above even when young.....7. *A. campestris*.

Leaves very short, round-obovate, hoary above even in age.

Plant hardly stoloniferous.....8. *A. parvula*.

Plant conspicuously slender-stoloniferous.....9. *A. Lunellii*.

Leaves large, 2-4 inches long including a distinct narrow petiole, the blades  $\frac{3}{4}$ -2 inches wide.

Scales of fertile involucre narrow, not showily scarious-tipped.

Scales few, subequal; pappus-tips in male subserrate.....10. *A. umbellata*.

Scales many, well imbricated; pappus-tips in male crenate.....11. *A. mesochora*.

Scales of fertile involucre broad, with broad showy tips.

Pappus-tips in male narrow, serrate.....12. *A. occidentalis*.

Pappus-tips in male wide, crenate.....13. *A. calophylla*.

1. *A. NEODIOCIA*, Greene, Pitt. iii. 184 (27 May, 1897). I meet with no specimens of this from anywhere to the westward or southward of southern Michigan. In Elias Nelson's distribution it occurs as collected by the late C. F. Wheeler about the Agricultural College, Ingham Co.; also Mr. Charles K. Dodge of Port Huron has sent it out from North Point, Alpena Co.; these specimens uncommonly tall, but the leaves not large. This is from well northward in the southern peninsula. The most southernly and at the same time the most westerly station I have for it is St. Joseph, on the shore of Lake Michigan. I gathered it there myself, in company with Dr. Nieuwland, 27th of May, 1909. Just beyond the suburbs of that city we found it in a piece of rather low meadow at the base of a hillock. The specimens are smaller than usual. No male plants of this are known to me from anywhere in the West.

2. *A. NEGLECTA*, Greene, Pitt. iii. 173 (19 of May, 1897). This, the first new antennaria to have been added to the flora of eastern North America since Linnaeus, has proven the forerunner of many more that have since been given recognition and publication, partly by myself, and partly by others who felt the force of my initiative and were constrained to follow it.

Under the rather extended limits which I seem obliged to concede to the species it has a wide range; for from Maryland and Virginia it occurs northward to Maine and eastern Canada, thence westward to the Mississippi River, if not a little beyond it. Exceedingly different environments are embraced within such empires of territory as are thus circumscribed as one; and *A. neglecta* wears in some parts at least of Maine, New Hampshire and Vermont, aspects that do not harmonize well with that of the plant as seen in the mild Potomac Valley. Also on the remote and very diverse region of the prairies the species wears almost

everywhere a somewhat different dress. It is often much reduced in size, and everywhere there is a peculiar whiteness to its herbage due to a greater density and whiteness of its woolly indument. Very commonly, too, it grows on elevated and even somewhat sandy or gravelly knolls, rather than in such low and even moist pasture lands as it is apt to choose in New England and southward. On the eastern edge, however, of the prairie country, the plant is so little unlike that of Pennsylvania and Maryland, that one is constrained to let it pass for the same; and the transition to the more differentiated white form of northern Illinois, southern Wisconsin and eastern Iowa is gradual; meanwhile one discovers little in the inflorescence or floral characters to mark the plant as specifically distinct. The large number of herbarium sheets before me are mostly of rather poor material; but the enumeration of them, with the special localities, may be of service to those in the field, and may incite some to better field work than has yet been done in this direction.

MICHIGAN. O. A. Farwell, Detroit, 14 May, 1898; a single pistillate plant very stout and low, only 3 inches high, cluster of 6 large heads, labelled *A. campestris* by Mr. Farwell, certainly not that, yet hardly referable to *A. neglecta*. Also "Woods in Detroit," 19 May, 1907; sheet of 7 specimens, 5 fertile all too stout and low for good *A. neglecta*, leaves too large and long. Again "Open fields, Detroit," 14 May, 1898; 4 specimens, one male, all slender, the male with inflorescence dead and dry, the females barely past flower, all this normal western *A. neglecta*, that is, not as tall, more whitened than the eastern. Lastly "Moist-sandy places near Ypsilanti," 16 May, 1901; plants all male, passing out of flower.

Charles K. Dodge. Port Huron, 18 May, 1901; quite slender normal western form, female and male.

Edw. L. Greene. Marengo, 22 May, 1902; 4 specimens female and male, all so nearly matching those collected by me in the District of Columbia in the year that I published the species, even to the racemosely arranged heads, that I can not doubt the identity of the two. Also this is the only really good sheet of this plant which I have seen from the West. The majority of collectors gather and send out such miserable stuff, that he who is long used to be perplexed by the scraps and fragments, will be apt to use his opportunity when in a new field by making

such specimens as really show what a plant is like.

ILLINOIS. Royal A. Dixon and L. Cornelia Gage, Morgan Park Ridge (Chicago), 15 May, 1907; 5 specimens, all male, rather small and young. Mrs. Agnes Chase, "Low prairie west of Harlem," Cook Co., 17 May, 1900. V. H. Chase, "Sterile prairie near Wady Petra," Stark Co., 8 May, 1900. These two sheets by the collectors Chase, from northern Illinois exhibit both male and female plants, the latter unusually stout and low, the former uncommonly tall, and are farther from the norm of the species in this particular than are any others seen.

Philip Price, Wilmette. "Sterile banks"; no date whatever, not even the year; the specimens female, and typical for the West.

Charles P. Johnson (Freeport). "Open clayey hillside, Sciota," 1 May, 1899. Specimens so stout and low, also so much whitened as to the leafy stolons, that one is loath to record them as belonging to the species. Also by Mr. Johnson, the same year "Sandy barren west of Ottawa," 10 May; three specimens, all female, are as tall as the tallest of eastern plants, the involucre in all the examples—there are seven on the sheet—as much racemose as one ever sees them, and this is almost an exceptional phase of the western plant.

F. E. McDonald (Peoria). "On gravelly dry knolls, Peoria," 9 May, 1901; sheet of 4 female and 3 male specimens, representing the southern limit of the species for the Middle West, as far as my own herbarium and that of U. S. Museum have to show; but the plants are too far from typical. The scales of the involucre are too few and their white tips too much reduced, and the pappus-bristles in the male plant are not only more evidently thickened at tip, the tips are neither serrulate nor barbellate, but appear as if quite smooth under a hand lens of low power. There is ground for a suspicion that this Peoria plant may yet claim the rank of a species.

While passing from Illinois to Wisconsin and Iowa I remark that our herbaria in Washington have nothing by which to prove the occurrence of *A. neglecta* in either Indiana or Ohio; but it must be found in the northern parts of both.

WISCONSIN. The oldest specimens of anything called *A. neglecta* which are now before me were collected by myself, at Albion, Dane Co., 12 May, 1862. The sheet contains two good

specimens, male and female. They seem hardly referable to the species. Several points of divergence are manifest. They are stout and low, and the two sexes of about the same height, the male  $2\frac{3}{4}$ , the female  $3\frac{1}{4}$  inches. Both are at the same stage of development as to flowers. The involucre is larger, and those of the female are not darkened at all as to the lower part of the scales. The pappus of the male is quite like that of Mr. McDonald's Peoria plant; yet in other particulars that and this are rather dissimilar. At Dodgeville, 20 June, 1898, I collected what is probably quite typical western *A. neglecta*, the stems slender, 9 or 10 inches high, the heads racemose, their scales dark as usual.

Gilbert Random, Oshkosh, 4 May, 1896, reports "sterile knolls" as the habitat, and the two plants, female, are for the West typical.

IOWA. Mr. C. R. Ball collected at Ames, 18 May, 1897, and at Marshalltown, 15 May, 1897, good plants male and female of the most hoary state of the species, the soil and environment not being mentioned.

R. E. Buchanan gives "Open prairie" as the habitat of specimens made by him, 10 May, at Ontario in the State, 1902. They are quite like those of Mr. Ball.

3. **A. Wilsonii.** Habitu et mensura *A. neglectae*, sed folia et breviora et latiora, tomento faciei superioris vix deciduo. Capitula majuscula, interdum distincte subracemosa, plantae femineae involucri squamis omnibus angustis, summitate angustissime scariosis, maris squamis obtusissime obovatis, summitate inaequaliter dentatis. Pappus maris apice paullulum incrassatus et obscure sub lente crenatus.

Collected "Near Cold Creek, Hamilton Co.," Indiana, 18 April, 1892, by Guy Wilson; specimens in my own herbarium and in that of U. S. Museum. In several of the male specimens the heads are loosely racemose, a thing never seen in *A. neglecta*, or in any other species whatever. The short broad leaves, from which the woolly indument is seldom wholly deciduous, and the peculiarities of the involucre in both sexes, compel the recognition of this plant as a species. It is from central Indiana, and the collector remarks that it is rare.

4. **A. erosa.** E grege *A. neglectae*, sed folia majora, submembranacea, apice obtusissima, infra medium abrupte angustata. Capitula utriusque sexus pauca, in summo, caule confertim sub-



sessilia. Squamae involucri plantae femineae latiusculae apice subtruncato eroso-lacerae, aut interdum fere pectinato-fimbriatae; maris late obovatae, interdum retusae, leviter eroso-dentatae.

Prairies of Marion Co., southern Illinois, collected only by the writer. The oldest specimens are of the year 1898, taken near Sandoval, 12 June, 1898. At this date in southern Illinois, spring is past, and nothing remains of antennarias but the fully formed and mature stolons with their foliage. I made specimens of these leafy stolons, for the foliage was clearly that of no species I had seen before. Then eleven years later, being again in the region in the beginning of May, 1909, I obtained the fine flowering specimens of both sexes, which answer to the diagnosis given above. As an ally of *A. neglecta* this one differs from all others known in this one other particular, that the male plants are distinctly taller than the female, their average height in the specimens before me being  $6\frac{1}{2}$  inches, that of the females 5 inches; also the two come into flower at the same time. The habitat of *A. erosa* is not the low and level prairie. It occupies the northward slopes slight elevations toward the woodland borders between Odin and Sandoval.

5. *A. longifolia*. Habitu praecedentis sed folia longiora, usque bipollicaria et ultra, infra medium magis attenuata, perinde quasi subpetiolata. Capitula plantae femineae in modum *A. neglectae* subracemosa. Pappi setae maris apice vix incrassatae.

Known only from western Missouri, from which region it has been distributed to herbaria by B. F. Bush and by K. Mackenzie, chiefly from within the limits of Jackson County. These collectors have usually sent it out with only the generic name on the labels, as if it had not been found identifiable with any published species; yet n. 12 of Mr. Bush, as distributed from Grain Valley, of May 7, 1899, he had labelled *A. neodioica* as to the female plant, while the male (his n. 6) from the same place and of the same date, is labelled *A. campestris*; nor is this all which the labels bear. That for the female plant informs us that it is "common in woods," that of the male says, "common on prairie." Neither of the sexes bears any likeness to either *campestris* or *neodioica*. Very fair specimens of plants of both sexes were distributed by Mr. K. Mackenzie, in 1899, from Hickman's Mills, the male from "Sandy woods," the female from "dry prairies"; so that, as we should suppose, the two sexes grow

together both in woodland and on prairie. Mr. Mackenzie did not assign any specific name to his plant as distributed, but in the Flora of Jackson County it appears under the name *A. campestris*, but, with Mr. Rydberg's description of that very different species altered as to height of stem and length and shape of leaves—and very much altered, too—so as to let this tall long-leaved plant into the book under that name.

6. **A. Nebrascensis.** Affinis *A. neglectae*, sed folia dimidio minora, superne multo magis tomentosa, indumento tardius evanido vel interdum, ad margines praecipue, permanente. Pedunculi plantae femineae 5-unciales; capitula 5 in summo pedunculo subsessilia; squamae basi fuscae, apice lacteae, obtusae, integrae.

Species known only from near Hershey, in western Nebraska where they were collected by Mr. C. D. Mell, 5 May, 1903. The specimens are excellent, though of the fertile plant only. The habitat lies quite beyond the region of low alluvial prairie, and is really on the eastern slope or verge of the arid Rocky Mountain plains; and the plant shows the influence of its environment in a foliage that is of but half the size of that of eastern *A. neglecta*, all the herbage quite hoary with the fine close tomentum which is far from being deciduous altogether from the upper face of the foliage. The basal and herbaceous part of the involucreal scales is very dark in comparison with the same in even the more properly midland and prairie phase of *A. neglecta*. The male plant though unknown, is probably no rarity; but the locality for the species is remote from all centers of botanical field work.

7. **A. CAMPESTRIS**, Rydb. Bull. Torr. Club, xxiv. 304 (July, 1907). Doctor Rydberg when publishing this fourteen years ago reported it as occurring only beyond the Mississippi, and there is before me now no specimen that brings the range of it to the hither side of that river. It is almost a thing of the elevated Rocky Mountain plains. In view of a fair sheet of six specimens in U. S. Herb., collected and distributed by the discoverer of the species there appears a troublesome discrepancy between these and the description; for that attributes to the species leaves which in age are glabrate above. This character holds good of two specimens out of the six, but of the four it is not true; for in their young and not half grown state they have not a trace of any pubescence of their own. When I say of their own I have reference to this, that all around their edges there is seen a narrow line

of white which, on close inspection, is found to belong to the lower face of the leaf which is to that degree rolled in at the margin before its full expansion. Now it can not be allowed in *Antennaria*, as we have been learning its characteristics these last fifteen years, that the same species, on the same spot—or in different localities, for that matter—shall appear partly with foliage perfectly glabrous above from the start, and partly with this hoary above with a wool that is deciduous; and this is the case in two of the well developed plants on what is a part of the type material of *A. campestris*. Out of this difficulty I am helped by two other sheets in the U. S. Herb., the numerous specimens on which are all from the Black Hills of South Dakota, the same region where Dr. Rydberg collected his specimens. One of these two bears specimens of two species, the other as many specimens all of one kind, without admixture of any even doubtful *A. campestris*.

8. *A. parvula*. Planta pumila, caule 1-3-unciali. Folia semiuncialia, saepissime ovalia, interdum suborbicularia, utrinque incano-tomentosa. Capitula pro planta magna, pauca, subsessilia. Pappi setae maris apice vix incrassatae, scabroserrulatae.

Black Hills, South Dakota, near Fort Meade, collected by Dr. W. H. Forwood in 1887; seven specimens on U. S. Her. sheet 317207, three of them fertile, the rest sterile. Also by the same collector, and mounted on sheet 317750, fine specimens of *A. parvula* and two of the plants with leaves green and glabrous above, to which it seems best to have the name *A. campestris*.

The distinctions between the two are not merely those of the permanency of the indument. This is not even tardily deciduous from the upper half face in *A. parvula*, while as already affirmed, in the other it does not at all exist at any stage of the half's development; but the leaves in *A. parvula* are so short as to appear almost orbicular now and then; and while the pappus in its male is almost filiform at tip, and mostly barbellate, that in *A. campestris*—not mentioned in the original description—is very obviously thickened as well as quite smooth, or at best faintly crenulate.

9. *A. Lunellii*. Planta pumila, caule vix biunciali, stolonibus elongatis crebre foliosis. Folia latiuscula, semiuncialia et ultra, interdum fere uncialia, spathulato-obovata, superne leviter sericeo-tomentosa, indumento vix, vel tardissime deciduo.

Capitula pauca, magna, sessilia. Pappus maris apice levissime incrassatus barbellulatus.

Collected at Leeds, North Dakota, 7 May, 1902, by Dr. J. Lunell, and by him distributed for *A. campestris*. From both that and *A. parvula* this differs very materially in a number of particulars. At its flowering time it has beautifully leafy stolons as long as the stems are high. The character of the indument is entirely different from that of either, and so also is the form of foliage.

Having here transcended my proper limits and taken up this one species belonging to the region north of the headwaters of the Mississippi, and which is more properly a part of the vast system of steppes of the Canadian Northwest, I might be expected to go further and take into this census other antennarias of North Dakota; but I shall leave the summing up of those to the resident botanist, Dr. Lunell, in hope that, with the handsome little *A. Lunellii*, added to the list, he will soon give us the enumeration of them, with what is always desirable, field notes on their habits and associations.

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Entering now upon the consideration of the group of larger species with broad and petiolate leaves we encounter difficulties. In the eastern parts of the United States where these species abound a few of them are of such marked vegetative characters as to be recognized at once in either the fertile plant or the sterile. In the greater part of the group the fertile plants are so very much alike that the species is hardly distinguishable until you have also the sterile plant, and very interesting is the fact that these male plants are very plainly different in the different species, when the females are with difficulty distinguishable by the most expert. The discouraging circumstance, however, is this, that in certain cases the sterile or male plants of a species are exceedingly rare, so that one may search a township or a county wherein a species is abundant without finding a male plant at all. Just how many species of this section of *Antennaria* there are in the Middle West will therefore not soon be ascertained; but at present we safely list, because able readily to define, a small number.

10. *Antennaria umbellata*. Planta feminea saepissime pedalis, caule tenui summitate capitulis 5-9 tenuiter pedicellatis

et sub-umbellatis coronato. Folia biuncialia, lamina late elliptica petiolo aequilonga, superne primum levissime villosa-tomentosa, dein glabra. Involucrum late-campanulatum; squamae angustae, subaequilongae, apice angustissime et vix conspicue scariosae. Planta sterilis fertili dimidio minor, ejus capitula 3-5 subsessilia; pappi setis apice manifestim dilatatis subserratis.

This fine species was discovered by the writer, in company with Dr. Nieuwland, in the vicinity of Benton Harbor, Michigan, 27 May, 1909, the special habitat being the crown of an open hill jutting forth from a piece of woodland, the exposure being northward. The fertile and sterile plants were growing together; but from the fertile alone the species is easily distinguishable from all others of this broad-leaved group. Its heads are slenderly pedicellate, and form usually a loose subumbellate corymb. The scales of its involucre are very narrow and not manifestly imbricated, being of nearly equal length, in this differing from, I think, every other antennaria known, and the scarios tips of the scales, being narrow and little elongated are nearly as inconspicuous as those of *A. mesochora*. The plant will be found in other localities of southern Michigan and northern Indiana when once the exploration of the region for antennaria shall be carried forward beyond what are hitherto its first beginnings.

II. *A. MESOCHORA*, Greene, Pitt. v., 111 (28 Aug. 1903). A full statement of the characteristics of this species may be found at the place cited, and need not here be repeated. I do not yet see reason for altering it in any particular. It pictures the plant as I found it in the middle of May, in Southern Michigan, nine years ago, and as others may find it still, no doubt. I first saw the plant while passing patches of it on a railway train near the station of Marengo. With what was my thorough familiarity with the large-leaved species of the East, I could see that this was none of them. For one of the tall species it was remarkable that it should grow in small but rather compact tufts or clumps. The male plants were common, so that I saw many of them. This is not true of any large Eastern species. Nor were the males at all like those of any known Eastern species. Finally, this was a prairie plant. This is an environmental, an ecological consideration, and a forceful one in all reason, though the untravelled neither heed nor even realize its meaning.

My first specimen of *A. mesochora* were made on hills overlooking Lake Goguwac near Battle Creek, 19 May. Three days later I stopped for a day at Marengo, not far from the other locality, and gathered for my herbarium some of the same plants I had seen before from the passing train. Long before then experience had taught me how to make serviceable specimens in antennaria. If others, even those resident in the West had taken pains to make anything like fair specimens we should now have been able to give some account of the further range of the species beyond the limits the one county of Calhoun where the type specimens are found. As things are we have not very much to definitely add in relation to its distribution.

MICHIGAN. Two years before my discovery of *A. mesochora* it had been collected for E. Nelson's distribution by the late Prof. C. F. Wheeler at the Agricultural College near Lansing. Four sheets of this plant are before me, aggregating 10 specimens, 8 of them fertile. The two sterile ones are feeble and poor. Perhaps they were not sought with any attention. The two show well the marks of the pappus in the sterile plant. The fertile plants also, all but two or three, are indifferent. The one really good one is a fertile specimen on U. S. Herb. sheet 390134. On the same sheet is a second specimen, at a much earlier stage, belonging to some other species. In all the rest of these specimens the scales of the fertile involucre are rather too broadly and conspicuously white-tipped.

More remote from my original stations, but on the same parallel, in the extreme western part of Michigan and within sight of the shipping of Lake Michigan at Benton Harbor, I collected again in 1909 a perfect type of this species in the two sexes, this on May 27. The plant was common at that point; and it was later in the day, and in a different spot, that I detected *A. umbellata* described above.

Mr. Charles K. Dodge, for the Nelson distribution collected some large fertile plants at Algonac on the eastern edge of the State which I wish I could refer to the present species, and the more because *A. mesochora* is manifest on the other side of the St. Claire River in Ontario; but the involucre in these Algonac plants are wrong for the species. Their scales are too little imbricated, their tips too broad and conspicuous, and they show a tinge of flesh-color. It is to be hoped that the well known zeal

of Mr. Dodge will impel him to investigate this plant, and find if possible the male of it.

Mr. O. H. Farwell sent me from Detroit in 1879 a fertile plant to which I could assign no name. I can not now with any confidence refer it to *A. mesochora*, the tips of its bracts are too broad and conspicuous. Good specimens taken at the right time, and of both sexes, are in requisition from about Detroit.

ONTARIO. Professor John Macoun in 1901 sent me good fertile specimens of this species from extreme western Ontario; one from "Pastures at Leamington, Lake Erie," and one from "Point Edward, Lake Huron." From as far to the eastward as Saint Catherines some one whose name does not appear gathered antennarias for the *A. Nelson* distribution, some of them fair, most of them poor, many sheets of which were issued under the name of my *A. ambigens*, though none represent it. The best sheet before me of this St. Catherines material, U. S. Herb. n. 390130, I should like to refer to *A. mesochora* on account of its involucreal scales being as narrow as in that, and almost as slightly white-tipped; but the plant is rank. Its heads are much too large and are loosely corymbed. Moreover the scales themselves are almost as little imbricated as in the small plants published above as *A. umbellata*. The sheet next to this in U. S. Herb., n. 390131, from the same place, has two small male plants. They are insignificantly small by the side of the female plants of the other sheet. The heads are but four and are sessile. The pappus in these male flowers is that of *A. mesochora*. Should these two sheets of the distribution be proven to be mates, i. e. to represent one species, then there would be no doubt about the necessity of receiving it as a new one. But as I said before, this anonymous gathering from St. Catherines', all of it sent out under the wrong name, is altogether a sad mixture of things utterly dissimilar.

INDIANA and ILLINOIS. I should, I think, be sure of finding *A. mesochora* in northern Indiana, especially eastward, and near the Michigan boundary, but most of those sections are little or not at all explored botanically, and I have no record to make, from the goodly number of herbarium sheets at hand, of this species for Indiana. As one follows the southern shore of Lake Michigan around, across the northwestern corner of Indiana and into northeastern Illinois, both soil and climate change notably;

the environment is no longer that of the prairies of south-central Michigan, but something very different. We have antennaria material—some of it excellent—from those districts suburban to Chicago in both states, but no *A. mesochora*; or at least none that is at all genuine.

WISCONSIN. Passing northward along the lake shore, the low and almost swampy-prairie region on which Chicago and its suburbs have been builded are left behind, and one traverses there in southern Wisconsin, just opposite southern Michigan, again a region of elevated and rolling prairie. Except as being to the windward of Lake Michigan, and therefore notably colder in winter than southern Michigan, the environment is the same in the two, and here in Wisconsin we might expect *A. mesochora*. Unluckily I have access to little evidence in this case. Botany is long since moribund in Wisconsin and some other neighboring states; and good specimens of Wisconsin plants if found in herbaria, are mostly such as were gathered by earlier generations. In 1898 I made near Dodgeville and as late as 20 June—which is too late—specimens of a large antennaria “gone to seed”; but the involucre, not yet withered, are those of *A. mesochora*, and the stature of the plant, also its foliage and general aspect are those of that species. No male plant was seen.

12. *A. OCCIDENTALIS*, Greene, Pitt, iii. 322 (21 May, 1898). Readily distinguished from *A. mesochora* by a stouter habit, a more herbaceous texture, a less imbricated involucre the scales of which have rather wide and conspicuous white tips, and the pappus of the male showing but little flattened and distinctly serrate bristle tips. This does by no means express all which the botanist, with botanist's trained and experienced eye sees by which we know this plant of the southerly prairie region as something other than its northern congener. Apparently the sterile or male plant of *A. occidentalis* is as rare as that of *A. mesochora* is common; yet the oldest specimen of *A. occidentalis* that I have seen, as well as the only one I knew of when first describing the species is a sterile one collected by myself as long ago as 1867. That I gathered only the male plant at the time may well indicate that I did not see the other. The mansion of a Chicago millionaire and its spacious grounds and gardens long since came to occupy the site where I gathered my specimen forty-four years ago. The habitat was an open low sunny hill top just outside



a woodland border, the woodland strip narrow, skirting the banks of the Sangamon River, in Piatt County a few miles southward from Monticello. The best sheet of fertile plants yet seen by me was that I might have named as the type which I had from H. A. Patterson of Oquawka as long ago as 1874. He obtained it near Oquawka in that year. I have never had any doubt that his fertile and my sterile are of one and the same species.

Being in Monticello in May, 1909, I followed the north bank of the Sangamon in the direction of my original but now obsolete station for this species, but with the result of finding along those sunny bluffs plenty of fertile plants in good condition but not a sterile one. The next best showing of sterile *A. occidentalis* known to me is from Marshall County, a part of the same physiographic region to which the County of Piatt belongs. This is a sheet (U. S. Herb. n. 645268), of two specimens gathered by Virginius S. Chase, 19 May, 1907, from "Rich woods along west fork of Senachwine Creek." I do not like "rich woods" for the habitat of my *A. occidentalis*, for, while it is not a prairie plant such as *A. mesochora* is, the environment of rich woods is not that open knolls bordering woods and where the soil is not rich but clayey rather. Mr. Chase seems not to have gathered the larger fertile plants; but as for the male pappus in these specimens, it is perfectly that of the present species, though the stems are quite slender; something that might be due to the shade in which they are by implication said to grow. The fertile individuals of this plant are needed for the settlement of the question of its precise identity. Probably we have it, and from Mr. Chase, from another station also in Central Illinois, and gathered six years later than the males just mentioned. The sheet that holds the two specimens is 434360. It is E. Nelson's distribution n. 533; is described as having grown, "On a clayey slope near Princeville, Peoria County." That agrees well with the habitat of *A. occidentalis* at the place where I obtained first. The specimens match perfectly my specimens from the hills sloping to the Sangamon; the two localities not only belong to the same geographic tract, but are not more than 75 or 80 miles apart. Indeed there is not the least doubt that Mr. Chase's fertile plants from Princeville are perfect *A. occidentalis*. But that his male plants of the earlier year belong here seems improbable; and nothing but specimens of the other sex from that rich woods station can help to the settlement of the question.

An interesting series of specimens is in U. S. Herb., taken from a "Sandy barren west of Ottawa" by Mr. Charles P. Johnson of Freeport, Ill., 10 May, 1899. The specimens fill five herbarium sheets and number fourteen, six of which are fertile, and themselves alone considered would pass for *A. occidentalis*; but the eight sterile specimens which from a part of the series are most plainly, even glaringly, of two kinds. Of normal male specimens there are but two, and six are something else; yet I have no doubt that the three phases—male, female and neutral, I shall call them—are of one species. During at least ten years past I have been aware of the existence of a certain occasional trimorphism. The occasional third form, while showing more likeness to the male than to the female, is in aspect intermediate; always taller than the male, its involucre longer, yet with scales equal in length and their tips distinctly more narrow and elongated, yet always obtuse, just as those of all male plants are obtuse; and the pappus-bristles, while never flattened, are coarser at summit and barbellate. I have seen them in Maryland, and in the District of Columbia, in perfect maturity shedding their abortive achenes, throwing them off to be scattered by the winds quite after the manner of the fertile plants. I suspect that if I had eyesight to study these occasional third forms in flower I should find them to be in some imperfect way bisexual, or hermaphrodite as to the individual flower. Nevertheless, with a mere hand lens I have been able to see that the pappus these plants give to the winds carries no achene, but only an empty shell. The fact of this trimorphism of course increases the difficulty which this genus presents to the student. If it should happen that the phase which I call neutral should in some places present itself along with the female colony to the total exclusion of the normal male, it might be taken by the inadvertent for the real male, and lead to the propounding of false species.

KANSAS. In the original account of *A. occidentalis* it was noted that it seemed to occur westward to Kansas. Nothing more is known of the plants at the time I wrote. The specimen I had from Kansas at that time is again before me. It is a fair pistillate plant, from "Woods, Pottawatomie Co.," by A. S. Hitchcock and may well be this species, as far as one sex alone can enable one to determine.

MICHIGAN. Among antennarias gathered in Ingham County by the late Professor Wheeler for Elias Nelson there is one sheet in U. S. Herb. (n. 494963) which Mr. Nelson called *A. occidentalis*, and I can not gainsay the identification; but the three plants on the sheet are all fertile. Also they are small and slender for this species; but by their involucre they are far removed from *A. mesochora*. The discovery of the sterile plant might easily, I suspect, prove the existence there of a species not now definable.

INDIANA. Dr. W. S. Moffatt of Chicago seems to have obtained fine fertile specimens of the present species from the "Border of a thicket" somewhere in Lake County, 29 May, 1879. They are on sheet 327217 U. S. Herb.

Collected by myself near Knox, in May 1909 is a species about which I am much in doubt. The pappus of the male is that of the present species. The involucre of the female is not, nor is it any more nearly that of *A. mesochora*. In stature the plants are somewhat smaller than in either and there is less disparity between the males and females as to size. In two stations I found the plants on gravelly knolls along the railway, the land never having been under cultivation. This part of Indiana was originally not prairie land but timbered, at least mainly. I insist on making mention of these ecological considerations because they are always significant to the mind of every travelled and experienced systematic botanist; this notwithstanding the fact that the mere dry-herbarist, the closet botanist, always makes light of them, but for reasons too manifest to require mention.

Farther northward still in Indiana, namely at South Bend, I met with a large woodland antennaria which, as seen at first in the fertile plant only, I should have referred without much hesitancy, to *A. mesochora* but for the fact of its woodland shade habitat. The Studebaker Woods, as they are called, are rather low and moist in the main, and although this antennaria grows on elevated ground in the shade of upland oaks, yet do these elevated shades fall short of being dry woods. Had the first been a young growth, and had *A. mesochora* been found in the open country around South Bend, I should have been ready to say to myself that these alseophilous plants were a survival from the time when these elevations were treeless and open to the sun and wind. But the forest is a hundred years old if not a thousand, nor did I find a trace of any large-leaved antennaria in all the

open country round about. Repeated searches in the Studebaker woods were rewarded by the discovery of a number of individuals that were sterile. I think I gathered the few I found. To my dismay I now find that they are not the males of either *A. mesochora* or *occidentalis*, not even right males at all. Their elongated involucre and undilated pappus-bristles declare them to be of that third phase, the neutral or the false-hermaphrodite one, of which mention is made above. If the real male plant shall come to light, either from the woods named, or, along with the female, from elsewhere, then may we hope to ascertain what the species is.

It is evident that not all the large-leaved plants of the prairie region can be distributed between the two species last named; but with the scanty materials at hand representing too imperfectly one or two species, perhaps yet to be made out, nothing more can be done.

A. CALOPHYLLA, Greene, Pitt. iii., 347. (27 Sept. 1898). Readily known at whatever stage of growth by the great dimensions of its foliage, the largest leaves more than two inches wide and not much longer, of thin texture, and permanently flocculent above. Known only from the limestone districts of southern Illinois and adjacent Missouri; but it should be looked for in similar parts of extreme southern Indiana, which still remains a region botanically unexplored.

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#### IV.—NEW PLANTS FROM NORTH DAKOTA.

By J. LUNELL.

During my botanical excursions in this state I have for many years paid a special attention to the multi-variable behaviour of the group of plants, known as *Laciniaria scariosa*, and made efforts to penetrate the secrets governing its remarkable changes. I have also had a splendid occasion to widen the scope of my observations by studying the fine material of Mr. C. C. Deam, secretary of the Indiana State Board of Forestry, who kindly placed it at my disposal, thereby enabling me to confirm my

views by observation of the similarity of manifestations under another latitude. I found that the North Dakota plants have some characters in common that distinguish them from their southern relatives, and therefore I will in the first place attempt to outline those general characters as they present themselves within this state as follows:

Stems, especially their upper part, pubescent with white shaggy hairs, 1-5 dm. high, single or several, erect or ascending from a large, somewhat woody tuber and bearing numerous or comparatively few leaves. Radical leaves long, lanceolate, protractedly tapering into very long petioles. The lower stem leaves are lance-oblong, tapering into petioles of very variable length. Upwardly the leaves becoming narrower and shorter and at last bract-like. The leaves are arranged on the stem in two series, and they are usually pubescent, sometimes glabrate, but never perfectly glabrous. Heads sessile to long-peduncled, of variable size, 1 to 12 in a short raceme, but occasionally 30 or more in a more or less dense spike or thyrus. Bracts in 4-7 series, green with purple, scarious, erose margins, the outer orbicular, the middle rows broadly spatulate, the inner oblong.

The Rocky Mountain forms as described by Prof. Aven Nelson (*Liatris ligulistylis*) are single-stemmed with glabrous leaves, else they appear in general characters to be near relatives of our plants. The North Dakota plant—as learned from Mr. Deam's material—differs considerably more from its southern relatives, principally in its shorter racemes and shorter involucrel bracts and in its smaller size, the southern plants having many-headed spikes, often several dm. long, and the involucrel bracts longer, sometimes pointed, more loosely imbricated, often so as to make them appear sub-squarrose. They are extremely beautiful and striking (one of them looking rather strange with its drooping heads).

When considering the *scariosa* group in its variety of forms, one would feel tempted to compare it with the genus *Hieracium* of the Old World, but the differential characters of the latter seem to be easier to systematize. The following suggestion of a key for the North Dakota group will be practically useful, though the multitude of intermediate forms forbids the application of the proposed names as indicating species and causes a great deal of hesitation even in using them as variety names:

## CLAVIS ANALYTICA VARIETATUM.

- A. Series foliorum inferior infimam tantum partem caulis prope tuber occupans.....1. var. *BASILARIS*.
- A. Series foliorum inferior tertiam usque ad dimidiam partem caulis quae infra inflorescentiam ad tuber pertinet occupans.
- (a) Folia series inferioris folia eiusdem series in caule altiora vel folia series superioris infima supereminentia.....2. var. *SUPEREMINENS*.
- (a) Folia series inferioris ad folia series superioris abruptissime gradientia, nullum autem folium quidquam in caule altius folium supereminens.....3. var. *PRAECEPS*.
- (a) Folia series inferioris ad folia series superioris abruptissime non gradientia.
- (b) Folia series inferioris ampla, longipetiolata, valde remota.....4. var. *PRAESTANS*.
- (b) Folia series inferioris amplitudinem modicam neque petiolos tam longos praebentia, magis minusve remota.
- (c) Folia pubescentia.....5. var. *MULTIPLEX*.
- (c) Folia glabrata.....6. var. *PERUSTA*.
- (b) Folia series inferioris amplitudinem modicam, petiolos breves, angustos praebentia, nec non appropinquata.....7. var. *ANGUSTATA*.
- (b) Folia series inferioris brevia, lata, breviter et late petiolata, appropinquata.....8. var. *OPIMA*.

## KEY OF VARIETIES.

- A. The lower series of leaves occupying only the lowest part of the stem, close to the tuber.....1. var. *basilaris*.
- A. The lower series of leaves occupying one-third to one-half of that part of the stem reaching from beneath the inflorescence to the tuber.
- (a) The leaves of the lower series overtopping the leaves of the same series born higher up on the stem, or the lowest leaves of the upper series.....2. var. *supereminens*.
- (a) The leaves of the lower series passing very abruptly into the leaves of the upper series, but no leaf reaching above any leaf born higher up on the stem.....3. var. *praeceps*.

- (a) The leaves of the lower series not passing very abruptly into the leaves of the upper series.
- (b) The leaves of the lower series large, long-petioled and very distant.....4. var. *praestans*.
- (b) The leaves of the lower series middle-sized, with shorter petioles, more or less distant.
- (c) Leaves pubescent.....5. var. *multiplex*.
- (c) Leaves glabrate.....6. var. *perusta*.
- (b) The leaves of the lower series are middle-sized, with short, narrow petioles, and rather approximate.....7. var. *angustata*.
- (b) The leaves of the lower series short and broad, with short and broad petioles, approximate.....8. var. *opima*.

The var. *basilaris* has short and broad leaves, is a small plant of no usual occurrence, and grows in dry, elevated soil.

The var. *supereminens* is a middle-sized plant with a very peculiar aspect, on account of the remarkable and sudden change between the lower leaves and those situated higher up on the stem. It is one of the forms that will be met occasionally.

The var. *praeceps* is an undersized or middle-sized plant, often with a pubescent, dense foliage along the whole stem, prefers a dry soil.

The var. *praestans* is a bright-green plant that generally becomes very luxuriant and beautiful. It is the largest of all of our varieties, and is quite common in valleys and ravines and in rich prairie soil with sufficient moisture.

The var. *multiplex* has broadly to narrowly lanceolate lower leaves with rather narrow petioles, is usually somewhat more than middle sized, not stout, more variable than the other forms, and is the most common of all of them.

The var. *perusta* is rather stoutish, with thickish leaves, and was found on sunny spots where the prairie and the woodland meet.

The var. *angustata* is rather stout, has leaves with shorter petioles than var. *multiplex*, but narrower and longer than the following variety. Occasional.

The var. *opima* is remarkably stout, with a profusion of short and broad leaves, on short and broad petioles, and the specimens I have seen show a large number of heads on stout, long peduncles,

born on a long, dense thyrus. I have found it growing sparingly in meadows along running water.

Mr. E. S. Steele of the Smithsonian Institution named a few years ago one specimen from this state as a new species, and sent me his original description of it, in order to enable me to discover more material of it. All my attempts in this direction have been futile, and probably will be, as the plow constantly overturns the prairie and exterminates the wild flowers. By this time hardly any prairie is left intact here. I hope that Mr. Steele will publish this species some time.

The specimens from my herbarium used as types for the above descriptions show the characters markedly which are ascribed to the special varieties. Other specimens will sometimes show more or less conspicuous deviations from the rules. And it is an occasional occurrence that when two stems arise from the same tuber, either one shows an inclination toward different varieties or even "mixed" characters. This deterred me altogether from the idea of making different species out of my material. I met too many specimens that only partly allowed themselves to be forced into a "system" thus adding a second name to *Laciniaria scariosa*, and refused unconditionally to accept another species name.

Leeds, North Dakota.

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#### ADDITIONAL NOTE ON CYPRIPEDIUM ACAULE.

By E. S. REYNOLDS.

I was much interested when I happened upon Dr. Edward L. Greene's accounts of the ecology of the stemless Lady's Slipper which appeared in the early numbers of the *Midland Naturalist*.\* I am again reminded of his accounts by the finding of this same plant in another location which was only slightly referred to in one of the "additional" notes. Dr. Greene quotes from Mr. Skeels as follows, "It is also found, but not as plentifully, at Mill Creek in the same county, on the summits of sandy ridges, under pine and hardwood trees." To me the typical situation for the plants has always been under pine trees in a somewhat open wood. A few days ago while on a trip into the Cumberland Mountain

\* Vol. I. p. 61, 125.



regions I found just outside the little town of Cumberland Gap, Tennessee, a hillside covered with a second growth of *Pinus virginiana* Mill., and on this hillside many fine specimens of the orchid under discussion. One of my students who had accompanied me on the excursion had never seen the plant before and was as much delighted with the find as I was on a similar occasion in Rhode Island a number of years ago when I was just beginning to hunt wild plants. In the latter state and in adjacent parts of Massachusetts I have often found this Lady's Slipper but nearly always in pine woods. I remember only once finding it in any other location and that was in a rather open sphagnum bog. I had been so accustomed to finding this plant in the pine woods that I remarked to my companion just before finding the orchid that "in that location you will find a different orchid from any you have seen yet." The plants in this Cumberland Gap region were among the largest I have ever seen, the "slipper" being nearly three inches long. As regards the two flowered form I may also be able to give a little information. Once or twice I have seen a plant bearing two scapes of about the same length, and the flowers about the same size. One of these I found in Rhode Island or in the region of Attleboro, Massachusetts.

*University of Tennessee.*

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### III.—OUR SONG BIRDS.

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#### BROTHER ALPHONSUS, C. S. C.

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##### ORCHARD ORIOLE.

*Icterus spurius.*

Though not so gifted a singer as the Baltimore, this oriole has exceedingly sweet notes. This quality may be recognized better when the bird sings only one or two notes. The full song is rather rapid, and is hard to follow. As its name indicates, the Orchard Oriole is oftenest heard in fruit trees.

##### WOOD PEWEE.

*Myiochanes virens.*

This is our only flycatcher whose song is musical. Arriving late in May, the Pewee's silvery notes may be heard throughout

the summer. As its name indicates, the bird is usually found in woods. No other bird's notes seems to harmonize so well with a quiet grove in summer.

COWBIRD.

*Molothrus ater.*

The few notes of the Cowbird are exceedingly sweet. When on the wing, the bird often gives a loud, clear whistle. In spring, when at rest, a gurgling note is heard. The gregarious habit of this species adds to the effect of the song, for several birds may utter their notes in succession.

YELLOW WARBLER.

*Dendroica aestiva*

Not a noted singer, but a hearty one, would probably be a correct description of this warbler's musical powers. As if to atone for a lack of sweetness and variety, the bird sings its simple song all summer long. You will find it in marshy places in company with the Maryland Yellowthroat.

CHICADEE.

*Penthestes atricapillus.*

The common note of this species is not notably musical. It resembles the name of the bird. Besides this note, it has a louder whistle, which is heard occasionally. The Chickadee's song is not so agreeable as that of its cousin, the Tufted Titmouse. The latter species is very rarely heard here.

FIELD SPARROW.

*Spizella pusilla.*

This modest little bird is a constant singer from spring until autumn. Not so gifted as the Vesper or Song Sparrows, still its notes are very cheery. As simple as its thrill is, the bird manages to vary it a little. This is done by pausing, by raising or lowering the voice, or by singing slowly or rapidly.

(To be continued.)

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NOTE.

The number of THE AMERICAN MIDLAND NATURALIST that should appear in July has been printed earlier than usual to avoid issuing it during the vacation period.

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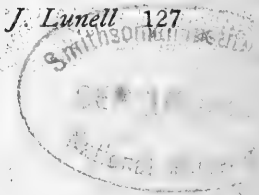
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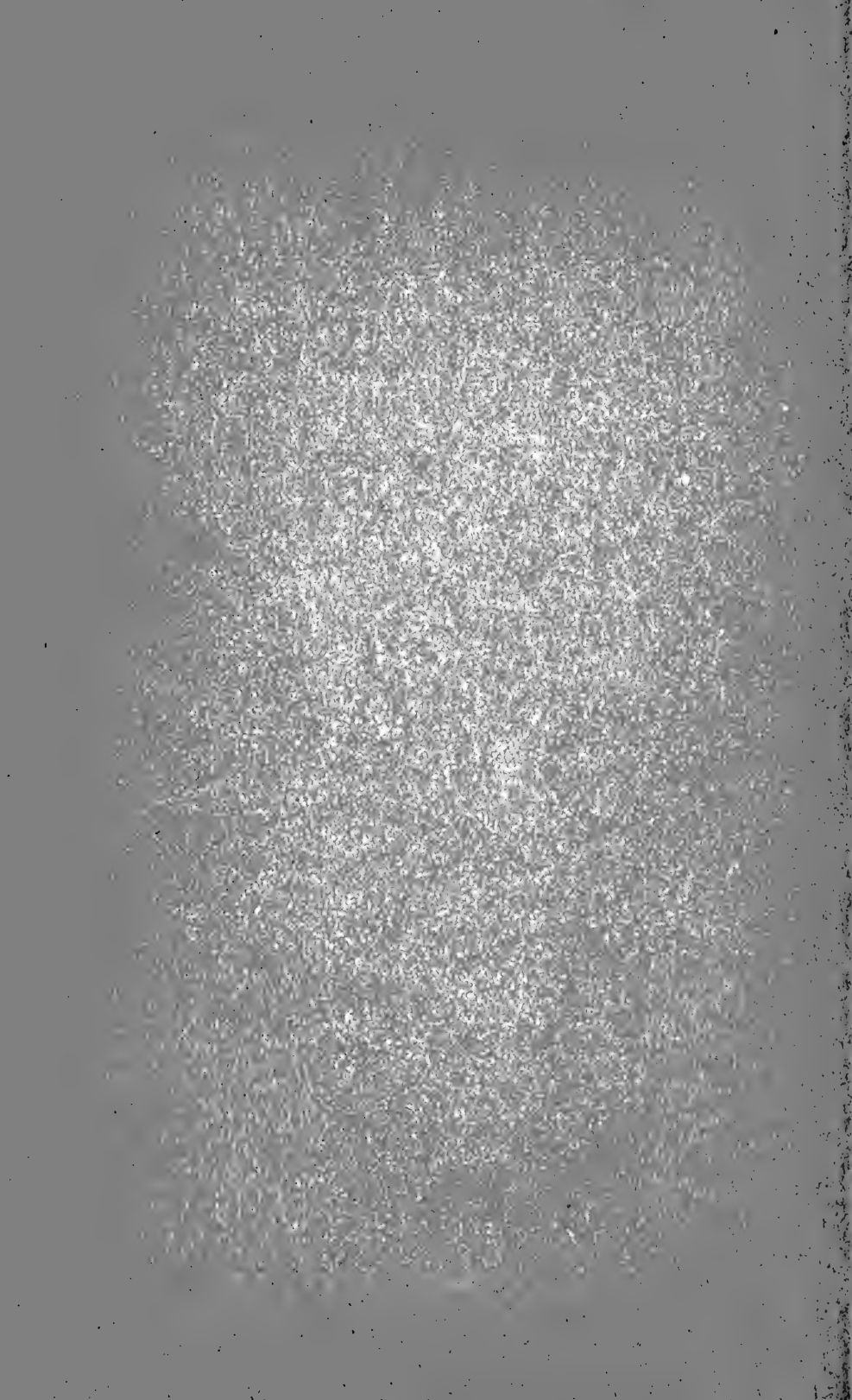
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## SOME LINNÆAN TRIVIAL NAMES.

By J. A. NIEUWLAND.

About Linnæus and botanical nomenclature several notions prevail here in the beginning of the twentieth century which botanists of a hundred years since had scarcely heard, and which would have been promptly objected to and dismissed as bad if they had been offered for acceptance. One such notion is that Linnæus invented and established a system of what is now commonly called binomial nomenclature; a scheme by which each plant species should be known by a single generic name of one word and a specific name of one word, so that there should be but two words to a name.

That Linnæus made no such law or that if he did, he neither said so nor carried it into effect, is sufficiently shown by the following list of names which consist not of two words, but of three, all these occurring in that work, the *Species Plantarum*, in which we are told that he put this binomial scheme into practice. Supposing this claim to be well founded, it is curious that our botanical forefathers of a hundred or even a hundred and fifty years ago and more, living as they did some of them contemporaneously with him, others active within the first quarter of a century after him, knew nothing of such a claim, should have felt themselves so often called upon to alter Linnæan species names either by exclusion of one of the words of the 97 ternary names, or using their freedom in suppressing such names altogether, supplanting them by others of one word totally new.

Or supposing that such botanists of a hundred years since and more, approved, as a suggestion, the short and handy trivial names, it is certain that scores of them treated Linnæan nomenclature as they did that of others, like a thing subject to amendment and improvement, and so there were a hundred and forty years or so

\*September 15, 1911, pages 97 to 128.

next following 1753 during which such Linnæan trivial names as *Alisma Plantago aquatica* was displaced by the name *Alisma Plantago*. His *Salvia africana coerulea* cut down, by some to *Salvia Africana*, by others to *Salvia coerulea*. *Scandix Pecten Veneris* appeared as *Scandix Pecten*, or else *Scandix*, the generic name being suppressed and *Pecten* adopted as generic, the binomial as we call it, became *Pecten Veneris*. Our subjoined list of 97 names shows how far this correcting and even suppressing of Linnæan ternary names was carried, though it does not much more than begin to show the number of reputable, and even most distinguished botanists, that have had part in this work, either as creating the new and truly binary names, or else as adopting such improvements when made.

One practice some of these forefathers indulged in which was wrong, as being in violation of one of the very fundamentals of all science; if they substituted for the ternary name *Veronica Anagallis aquatica* the binary *Veronica Anagallis*, they credited the new name to Linnæus. It was a false credit, and falsehood is the deadliest enemy of science, never anywhere or in any form to be tolerated. The practice of Linnæus shows that he might easily have made also besides *Veronica Anagallis aquatica* a *Veronica Anagallis* himself, but the author who suppressed the former and created the latter, should be credited with *Veronica Anagallis*, and the name *Veronica Anagallis aquatica* L. ought to appear only as a synonym. This needs no argument. The simple fact that truthfulness demands it is enough.

There are Linnæan names of the several-worded kind that do not admit of such substitution as will leave one of the words in place. It would have been impossible for any of our forefathers to have divided, and thrown away one half of such a trivial name as *Noli me tangere*; though no one observing the sheer lack in many twentieth century botanists, of common sense as to nomenclature, would be surprised to see *Impatiens Noli tangere* cut down to *Impatiens Noli* or *Impatiens tangere*, either of which, no matter how absurd, would pass muster with the creators and defenders of the codes. A less intellectual epoch than this would have seen the need of rejecting completely the phrase *noli me tangere* as impossible, and of creating a name new in every syllable, as, for example, *Impatiens penduliflora*.

In the latter part of the nineteenth century, when Linnæus had

been dead a hundred years, almost all his three-worded "specific names" had disappeared from nomenclature. Very few could be found in manuals of botany or anywhere else for that matter. There was *Alisma Plantago*, *Veronica Anagallis*, *Asplenium Ruta-muraria*, *Panicum Crus-galli*, and the like, and all credited to Linnæus, and falsely; for to connect two of Linnæan names by a hyphen is to convert the words into one. It is to make for him a binary name where he had a ternary one. Linnæus could not have perpetrated such a falsification of history as to have written *Alisma Plantago-aquatica*. That expression would have been in his view worse than needless. The plant had been known for centuries as *Plantago aquatica* simply, and it was that old name precisely which he wished to preserve. He would not have written in his synonymy *Plantago-aquatica* Camerarius, because neither Camerarius nor any one else could have been found to present the name in the form of a compound word.

Now in recent years when it has been found that ternary names are very frequent in Linnæus, botanists play on their own minds the trick, and thereby deceive themselves, and falsify to the unwary, who take their word for it, that *Alisma Plantago-aquatica* is a Linnæan name, which it is not. The hyphen is a harmless looking mark, almost meaningless, yet is not quite so. Its office is to make two words over into one, and by the strength of its littleness people convert nearly a hundred ternary names into binaries, and then credit them to Linnæus. We make for Linnæus some ninety-seven new names that he never thought of, give them to him, and then argue from these of our own making that Linnæus laid down a law making names strictly binary, and carried it into effect. We enact for him a law of which he knew nothing and then pretend that he both made and kept it. That is the reasoning of us hyphenators. Linnæus did indeed sometimes connect two terms of a name by a hyphen. The first name in our list is so made; but even the hyphenated name as made by him, to his contemporaries and to later authors was as objectionable as the unhyphenated, and they suppressed that kind and made new ones in place of them just as unhesitatingly as they did the others; and for the purpose of showing that we insert some such in our list.

There is abroad in the atmosphere of these early twentieth century days a spirit of the absolute immutability of specific names. All the younger members of the botanical fraternity have

had no doubt that this was always true ; the belief being that from the time of Linnæus forward a specific name once published remains unalterable, even under the transfer of the species to another genus. The study of these Linnæan ternaries has revealed a very different condition of things. It is ascertained that not only did Linnæus himself hold them easily subject to alteration and improvement, but that many of the best botanists during many decades after him were of the same mind, and that old names were suppressed and new ones substituted for them with much freedom. This slavery to the idea of stability, which binds the whole rank and file of most working botanists of to-day, did not hold our forefathers ; and even down to and within the twentieth century there are defenders of the principle that names that are bad ought to be suppressed, and new ones that are good put in the place of them. On this point our list tells at least a part of that story very effectually.

1. *Acer Pseudo-Platanus* :

*Acer quinquelobum* Gilib., 1781.

*Acer procerum* Salisb., 1796.

*Acer Pseudoplatanus* Stokes, 1812, S. F. Gray, 1821, C. B. Presl, 1826.

*Acer majus* S. F. Gray, 1821.

*Acer platinifolium* St. Lager, 1880.

*Acer Pseudo-Platanus* Hook. & Jacks., 1893.

2. *Adiantum Capillus Veneris* :

*Adiantum coriandrifolium* Lam., 1778, Lestib., 1804.

*Adiantum fontanum* Salisb., 1796.

*Adiantum cuneifolium* Stokes, 1812.

*Adiantum capillaceum* Dulac, 1867.

*Adiantum capillare* St. Lager, 1880.

*Adiantum Capillus-Veneris* Britton, 1896.

*Adiantum capillus-veneris* Underw., 1900.

3. *Aesculus Hippo Castanum* :

*Hippocastanum vulgare* Duhamel, 1755, Moench, 1794, Gaertner, 1802.

*Aesculus hippocastanum* P. Miller, 1768, Scopoli, 1772, Hook. & Jacks., 1893.

*Aesculus procera* Salisb., 1796.

*Hippocastanum Aesculus* Cav., 1801.

*Aesculus hippocastanum* Lestib., 1804.

*Aesculus septenata* Stokes, 1812.

*Aesculus castanea* St. Lager, 1880.



4. *Agrostemma Coeli rosa* :

- Lychnis coelirosa* Lestib., 1805.  
*Lychnis coeli-rosa* DC., 1815.  
*Eudianthe oculata* A. Brown, 1849.  
*Lychnis coelestis* St. Lager, 1880.  
*Agrostemma Coeli-rosea* Hook. & Jacks., 1893.  
*Lychnis Coeli-rosa* Hook. & Jacks., 1894.

5. *Agrostemma Flos Jovis* :

- Lychnis umbellifera* Lam., 1778.  
*Agrostemma flojovis* Moench, 1802.  
*Lychnis incana* St. Lager, 1880.  
*Lychnis Flos-Jovis* Hook. & Jacks., 1894.  
*Agrostemma Flos-Jovis* Hook. & Jacks., 1893.

6. *Agrostis spica venti* :

- Apera Spicaventi* Berknh., 1795, Hook. & Jacks., 1893.  
*Agrostis purpurea* Gaudin, 1811.  
*Apera effusa* S. F. Gray, 1821.  
*Agrostis Spica-venti* Beauv., 1812, Hook & Jacks., 1893.  
*Agrostis ventosa* Dulac, 1867, St. Lager, 1880.

7. *Alisma Plantago aquatica* :

- Alisma Plantago* P. Miller, 1768, Scopoli, 1772, Vitman, 1789,  
 Moench, 1794, Sibthorp, 1794, Berkenhout, 1795, Murray, 1797,  
 Jolyclerc, 1805, Eaton & Wright, 1840, Hook. & Jacks., 1893.  
*Alisma paniculatum* Stokes, 1812.  
*Alisma majus* S. F. Gray, 1821.  
*Alisma verticillatum* Dulac, 1867.  
*Alisma plantagineum* St. Lager, 1880.  
*Echinodorus vulgaris* Bubani, 1901.  
*Alisma Plantago-aquatica* Hook. & Jacks., 1893.

8. *Allium Chamae Moly* :

- Allium Chamaemoly* Hill, 1774, Jolyclerc, 1805, Steudel, 1821,  
 1840, Hook. & Jacks., 1893.  
*Saturnia cernua* Marrati, 1822,  
*Allium Columnae* Bubani, 1901.

9. *Amaryllis Bella donna* :

- Amaryllis Belladonna* Linn., 1763, Hook. & Jacks., 1893.  
*Amaryllis Bella Donna* Hill, 1774.  
*Amaryllis rosea* Lam., 1783.  
*Callicore rosea* Link, 1829,  
*Belladonna purpurascens* Sweet, 1830.  
*Coburgia Belladonna* Hook. & Jacks., 1893.

10. *Amomum Grana Paradisi* :  
*Amomum elatum* Salisb., 1794.  
*Torymenes officinalis* Salisb., 1812.  
*Amomum Granum-paradisi* Hook. & Jacks., 1893.  
*Amomum Granum-Paradisi* Hook. & Jacks., 1893.
11. *Anthyllis Barba jovis* :  
*Vulneraria argentea* Lam., 1783.  
*Barba jovis argyrophylla* Moench, 1794.  
*Anthyllis argentea* Salisb., 1796.  
*Vulneraria Barba-Jovis* C. B. Presl, 1826, Link, 1830, Hook. & Jacks., 1895.  
*Anthyllis Barba-Jovis* Hook. & Jacks., 1893.  
*Barba-Jovis argyrophylla* Hook. & Jacks., 1893.
12. *Apocynum foliis androsaemi* :  
*Apocynum androsaemifolium* Linn., 1763, Crantz, 1766, Moench, 1794, Hook. & Jacks., 1893, referring to Linn., Sp. Pl. p. 213.  
*Apocynum androsaemi folium* P. Miller, 1768.  
*Apocynum muscipulum* Moench, 1794.  
*Apocynum androsaemi-folium* Lestib., 1804.
13. *Arbutus Uva ursi* :  
*Arbutus uva ursi* Crantz, 1766, Steudel, 1841.  
*Uva ursi procumbens* Moench, 1794.  
*Arbutus Uva Ursi Berkenhout*, 1795.  
*Arbutus procumbens* Salisb., 1796.  
*Arbutus buxifolia* Stokes, 1812, S. F. Gray, 1821.  
*Arctostaphylos officinalis* Wimm., 1832, 1840.  
*Arbutus officinalis* Boiss., 1867.  
*Arbutus Uva-ursi* Hook. & Jacks., 1893.  
*Arctostaphylos Uva-ursi* Hook. & Jacks., 1893.  
*Uva-Ursi buxifolia* Hook. & Jacks., 1895.
14. *Ascyrum Crux andreae* :  
*Ascyrum Crux-andreae* Desf., 1829, Hook. & Jacks., 1893.  
*Ascyrum cruciatum* St. Lager, 1880.  
*Hypericum crux andreae* Crantz, 1766.  
*Hypericum crux Andreae* Lestib., 1804.
15. *Asplenium Adiantum nigrum* :  
*Asplenium Adiant-nigrum* Scopoli., 1772.  
*Asplenium nigrum* Lam., 1778, Bernh., 1802, Lestib., 1804, Stokes, 1812, Dulac, 1867, St. Lager, 1880.  
*Phyllitis lancifolia* Moench, 1802.  
*Asplenium Adiantum-nigrum* Berknh., 1795.  
*Trichomanes nigrum* Bubani, 1901.

16. *Asplenium Ruta muraria* :  
*Asplenium ruta muraria officinarum* Crantz, 1766.  
*Asplenium murorum* Lam., 1778.  
*Asplenium murale* Stokes, 1812, Salisb., 1796, St. Lager, 1880.  
*Asplenium murarium* Dulac, 1867.  
*Asplenium ruta-muraria* Underw., 1900.
17. *Asplenium Trichomanes dentatum* :  
*Asplenium dentatum* Murray, 1797, Lestib., 1804, Steudel, 1824,  
 Underw., 1900.  
*Asplenium Trichomanes-dentatum* Maxon, 1901.
18. *Asplenium Trichomanes ramosum* :  
*Asplenium lanceolatum* Hudson, 1778.  
*Trichomanes lanceolatum* Bubani, 1901.
19. *Aster Novae Angliae* :  
*Aster altissimus* Moench, 1794.  
*Aster Novae-Angliae* Hook. & Jacks., 1893.
20. *Aster Novi Belgii* :  
*Aster uniflorus* Moench, 1794.  
*Aster Novi-Belgii* Hook. & Jacks., 1893.
21. *Atropa Bella donna* :  
*Atropa Belladonna* Linn., 1762, Berknh., 1795, Stokes, 1812,  
 Dulac, 1867, Hook. & Jacks., 1893.  
*Belladonna trichotoma* Scopoli, 1772, Moench, 1794.  
*Belladonna baccifera* Lam., 1778.  
*Atropa lethalis* Salisb., 1796.
22. *Bignonia Unguis cati* :  
*Bignonia unguis Jolyclerc*, 1805, Desf., 1829.  
*Bignonia unguis cati* Linn., 1763, Lestib., 1804.  
*Doxantha Unguis* Miers, 1863.  
*Doxantha unguiculata* Miers, 1863.  
*Bignonia unguiculata* St. Lager, 1880.  
*Bignonia Unguis* Hook. & Jacks., 1893.  
*Bignonia Unguis-cati* Hook. & Jacks., 1893.
23. *Byssus Flos aquae* :  
*Byssus flos aquae* Crantz, 1766.  
*Nostoc aquae* Steudel, 1821.  
*Anabaena flos-aquae* Wolle, 1867.  
*Anabaena Flos-aquae* G. S. West, 1904.
24. *Cactus Ficus indica* :  
*Opuntia Ficus Indica* P. Miller, 1768, Hill, 1769.  
*Cactus Ficus* Stokes, 1812.  
*Opuntia ficus indica* Steudel, 1821.

- Opuntia ficindica* St. Lager, 1880.  
*Opuntia Ficus-indica* Hook. & Jacks., 1894.  
*Cactus Ficus-indica* Hook. & Jacks., 1893.
25. *Campanula Speculum Veneris* :
- Campanula Speculum* P. Miller, 1768, Hill, 1769 and 1775,  
 Moench, 1794, Hook. & Jacks., 1893.  
*Campanula speculum* Lam., 1778.  
*Specularia arvensis* Durand, 1782, S. F. Gray, 1821, Bubani, 1900.  
*Campanula pulchella* Salisb., 1796.  
*Prismatocarpus Speculum* L'Herit., 1788, Dulac, 1867.  
*Specularia vulgaris* St. Lager, 1880.  
*Specularia Speculum* Hook. & Jacks., 1895.  
*Legousia Speculum* Hook. & Jacks., 1894.
26. *Carex pseudo cyperus* :
- Trasus chlorostachyos* S. F. Gray, 1821.  
*Carex Pseudocyperus* S. F. Gray, 1821, Steudel, 1821.  
*Carex Pseudo-cyperus* S. F. Gray, 1821, Hook. & Jacks., 1893.  
*Carex longibracteata* Dulac, 1867.
27. *Chenopodium Bonus Henricus* :
- Atriplex bonus Henricus* Crantz, 1766, Steudel, 1821.  
*Chenopodium sagittatum* Lam., 1778  
*Chenopodium bonus henricus* Moench, 1794.  
*Chenopodium esculentum* Salisb., 1796.  
*Chenopodium spinacifolium* Stokes, 1812, S. F. Gray, 1821.  
*Chenopodium triangulare* Dulac, 1867.  
*Chenopodium ruderales* St. Lager, 1880.  
*Chenopodium Bonus-Henricus* Hook. & Jacks., 1893.  
*Blitum perenne* Bubani, 1897.
28. *Chrysocoma Coma aurea* :
- Chrysocoma Coma Aurea* Hill, 1775.  
*Chrysocoma aurea* Salisb., 1796.  
*Chrysocoma coma aurea* Moench, 1802, Steudel, 1821.  
*Crinita linearifolia* Moench, 1802, Steudel, 1821.  
*Chrysocoma comaurea* Lestib., 1804.  
*Chrysocoma Coma-aurea* Hook. & Jacks., 1893.
29. *Coix Lacryma Jobi* :
- Coix Lacryma* Linn., 1758-9, Steudel, 1821.  
*Coix arundinacea* Lam., 1789.  
*Coix lachryma* Moench, 1794.  
*Lithagrostis lachryma jobi* Moench, 1794.  
*Coix pendula* Salisb., 1796.  
*Coix ovata* Stokes, 1812.  
*Coix Lacryma-Jobi* Hook. & Jacks., 1893.  
*Lithagrostis lacryma-Jobi* Hook. & Jacks., 1894.

30. *Convolvulus Pes caprae* :  
*Convolvulus Pes Caprae* Hill, 1772.  
*Convolvulus capripes* Stokes, 1812.  
*Ipomoea aegopoda* St. Lager, 1880.  
*Ipomoea Pes-caprae* Hook. & Jacks., 1893.  
*Ipomoea biloba* Hook. & Jacks., 1893.
31. *Cotyledon umbilicus Veneris* :  
*Cotyledon Umbilicus* Hill, 1775, Steudel, 1821 and 1840, Hook. & Jacks., 1893.  
*Cotyledon umbilicata* Lam., 1778.  
*Cotyledon umbilicus* Lam., 1778, Lestib., 1804.  
*Cotyledon rupestris* Salisb., 1797.  
*Umbilicus pendulinus* Lam. & DC., 1805 and 1815, S. F. Gray, 1821, Dulac, 1867.  
*Cotyledon umbilicifolia* Stokes, 1812.  
*Cotylyphyllum Umbilicus* Hook. & Jacks., 1893.  
*Umbilicus Veneris Bubani*, 1900.
32. *Crataegus Crus galli* :  
*Crataegus crus galli* Moench, 1794.  
*Mespilus cuneifolia* Moench, 1794.  
*Crataegus calcarigera* Salisb., 1796.  
*Crataegus Crus-galli* Hook. & Jacks., 1893.
33. *Daphne Tarton raira* :  
*Thymelaea tarton-raira* Allioni, 1775.  
*Daphne candicans* Lam., 1778.  
*Thymelaea Tarton-raira* Allioni, 1785.  
*Daphne tarton-raira* Lam., 1788.  
*Daphne tartonraira* Jolyclerc, 1805.  
*Daphne Tartonraira* Stokes, 1812, Mussche, 1817, Steudel, 1821 and 1841, Hook. & Jacks., 1893.  
*Passerine Tarton-raira* Steudel, 1821.  
*Passerine Tartonraira* Steudel, 1821 and 1841.  
*Passerine Tartonraira* Hook. & Jacks., 1893.  
*Thymelaea Tartonraira* Steudel, 1841, Hook. & Jacks., 1895.  
*Daphne Tarton-raira* Lam., 1862-3.
34. *Elymus Caput medusae* :  
*Elymus caput Medusae* Steudel, 1840.  
*Elymus Caput-Medusae* Forbes, 1833, Hook. & Jacks., 1893.
35. *Epidendrum Flos aëris* :  
*Epidendrum Flos Aëris* Hill, 1774.  
*Aërides Arachnites* Sw., 1799.  
*Arachnanthe moscifera* Blume.  
*Epidendrum aërosanthum* St. Lager, 1880.  
*Epidendrum Flos-aëris* Hook. & Jacks., 1893.

36. *Erica pallido-purpurea* :  
*Erica purpurascens* Linn., 1762.
37. *Erica viride-purpurea* :  
*Erica pelviformis* Salisb., 1796.  
*Erica viridipurpurea* Hook. & Jacks., 1893.
38. *Erythronium Dens canis* :  
*Erythronium Dens Canis* Hill, 1774.  
*Erythronium maculosum* Lam., 1778.  
*Erythronium vernale* Salisb., 1796.  
*Erythronium dens canis* Moench, 1802.  
*Erythronium caninum* Dulac, 1867.  
*Erythronium bulbosum* St. Lager, 1880.  
*Erythronium Dens-canis* Hook. & Jacks., 1893.
39. *Euphorbia Caput medusae* :  
*Medusea major* Haw., 1812.  
*Euphorbia Caput-Medusae* Hook. & Jacks., 1893.
40. *Ferula Assa foetida* :  
*Ferula Assafoetida* Stokes, 1812.  
*Ferula Asa-foetida* Sprengel, 1813.  
*Ferula foetida* St. Lager, 1880.  
*Ferula Assa-foetida* Hook. & Jacks., 1893.
41. *Hedysarum Caput galli* :  
*Onobrychis Caput Gallinaceum* Frankenan, 1766.  
*Hedysarum caput galli* Jolyclerc, 1805.  
*Hedysarum Caput-galli* Hook. & Jacks., 1893.
42. *Hemerocallis Lilio Asphodelus* :  
*Hemerocallis flava* Linn., 1762, etc., etc.  
*Hemerocallis lutea* Gaert., 1802.  
*Hemerocallis Lilioasphodelus* Steudel, 1841, Hook. & Jacks., 1893.
43. *Hibiscus Rosa sinensis* :  
*Hibiscus Sinensis* P. Miller, 1768.  
*Hibiscus Rosa Sinensis*, Hill, 1772.  
*Hibiscus festalis* Salisb., 1796.  
*Hibiscus rosiflorus* Stokes, 1812.  
*Hibiscus Rosa-sinensis* Hook. & Jacks., 1893.
44. *Hyacinthus non scriptus* :  
*Hyacinthus pratensis* Lam., 1778.  
*Hyacinthus Non Scriptus* Hill, 1785, Berk., 1795.  
*Scilla festalis* Salisb., 1796.  
*Scilla nutans* Stokes, 1812.  
*Endymion nutans* Dum., 1821.

*Hyacinthus Non-scriptus* Kew Ind.

*Scilla nonscripta* Hook. & Jacks., 1895.

45. *Hydrocharis Morsus ranae* :

*Hydrocharis vulgaris* Hill, 1756.

*Hydrocharis Morsus Hanae* Hill, 1775, Berkenhout, 1795.

*Hydrocharis asarifolia* S. F. Gray, 1820.

*Hydrocharis cordifolia* St. Lager, 1880.

*Hydrocharis batrachyodegma* St. Lager, 1880.

*Hydrocharis Morsus-ranae* Hook. & Jacks., 1893.

46. *Hypnum Crista castrensis* :

*Hypnum castrense* Stokes, 1812.

*Hypnum cristatum* St. Lager, 1880.

47. *Impatiens Noli tangere* :

*Impatiens noli me tangere* Crantz, 1766, Hill, 1772, 1775, 1786,  
Buchoz, 1800.

*Impatiens Noli-tangere* Berknh., 1795, Hook. & Jacks., 1893.

*Balsamina Noli-tangere* Lestib., 1804.

*Impatiens Nolitangere* Stokes, 1812.

*Impatiens Noli-me tangere* Desf., 1829.

*Impatiens lutea* Lam., 1778, Dulac, 1867.

*Impatiens penduliflora* St. Lager, 1880.

*Impatiens Noli-me-tangere* Hook. & Jacks., 1893.

48. *Inula Oculus Christi* :

*Inula sericea* St. Lager, 1880.

*Inula Oculus-Christi* Hook. & Jacks., 1893.

*Inula lanuginosa* St. Lager, 1886.

49. *Ipomoea bona Nox* (2d ed.) :

*Calonyction speciosum* Chois., 1834.

*Calonyction Bona-nox* Hook. & Jacks., 1893.

*Ipomoea Bona-nox* Hook. & Jacks., 1893.

50. *Ipomoea Pes tigridis* :

*Ipomoea Pes-tygridis* Hill, 1772, 1775.

*Convolvuloides palmata* Moench, 1794.

*Convolvulus bryoniaefolius* Salisb., 1796.

*Ipomoea tigrina* Persoon, 1805.

*Ipomoea tigripes* Stokes, 1812.

*Ipomoea pes-tigridis* Hook. & Jacks., 1893.

51. *Lonicera Peri Clymenum* :

*Lonicera Periclymenum* Linn., 1762, Stokes, 1812, Hook. &  
Jacks., 1894.

*Caprifolium sylvaticum* Lam., 1778.

*Euchylia verticillata* Dulac, 1867.

52. *Lychnis Flos cuculi* :

- Lychnis Floscuculi* P. Miller, 1768.  
*Lychnis Flos Cuculi* Hill, 1773, Berknh., 1795.  
*Lychnis laciniata* Lam., 1778, Salisb., 1796.  
*Lychnis flos cuculi* Moench, 1794.  
*Lychnis laciniflora* Stokes, 1812, Dulac, 1867.  
*Lychnis plumaria* S. F. Gray, 1821.  
*Floscuculi pratense* Opiz, 1852.  
*Coccyanthe pratensis* Schur., 1866.  
*Lychnis coccugosantha* St. Lager, 1886.  
*Lycnis Flos-cuculi* Hook. & Jacks., 1894.

53. *Lysimachia Linum Stellatum* :

- Lysimachia Linum stellatum* Hill, 1772, Gaertner (1788), 1801.  
*Lysimachia Linum* Hill, 1775.  
*Lysimachia linifolia* Salisb., 1796.  
*Asterolinum stellatum* Hoffmg. & Link, 1809.  
*Asterolinum Linum-stellatum* Duby in DC., 1844, Kew Ind.  
*Lysimachia Linum-stellatum* Duby in DC., 1844, Hook. & Jacks., 1894.  
*Asterolinum lysimachioideum* St. Lager, 1880.  
*Lysimachia stellata* St. Lager, 1880.

54. *Marrubium Pseudo dictamnus* :

- Beringeria pseudodictamnus* Necker, 1790.  
*Ballota pseudodictamnus* Benth., 1832, Hook. & Jacks., 1894.  
*Ballote dictamnifolia* St. Lager, 1880.  
*Marrubium Pseudo-dictamnus* Hook. & Jacks., 1894.

55. *Mespilus Chamae Mespilus* :

- Mespilus chamae mespilus* Crantz, 1766.  
*Mespilus Chamaemespilus* P. Miller, 1768, Hook. & Jacks., 1894.  
*Crataegus humilis* Lam., 1778.  
*Lazarolus Chamaemespilus* Borck.  
*Pyrus Chamaemespilus* Hook. & Jacks., 1895.

56. *Mimosa Unguis cati* :

- Mimosa unguiscati* Lestib., 1804.  
*Inga felina* Stokes, 1812.  
*Pithecolobium Unguis-cati* Benth., 1844, Hook. & Jacks., 1894.  
*Inga Unguis-cati* Hook. & Jacks., 1893.  
*Pithecolobium Unguis-cati* Hook. & Jacks., 1894.

57. *Mussaenda fructu frondoso* :

- Mussaenda frondosa* Linn., 1762, Murray, 1797, Sprengel, 1825,  
 Hook. & Jacks., 1894.  
*Mussaenda villosa* Stokes, 1825.



58. *Narcissus Pseudo Narcissus*:  
*Narcissus festalis* Salisb., 1796.  
*Narcissus serratus* Haw., 1803.  
*Narcissus Pseudonarcissus* Stokes, 1812.  
*Stephanophorum grandiflorum* Dulac, 1867.  
*Narcissus grandiflorus* St. Lager, 1880.  
*Narcissus Pseudo-Narcissus* Hook. & Jacks., 1894.
59. *Nyctanthes arbor tristis* :  
*Nyctanthes tristis* Salisb., 1796.  
*Nyctanthes Arbor-tristis* Hook. & Jacks., 1894.
60. *Ophrys Nidus avis* :  
*Ophrys nidus avis* Lam., 1778, 1793.  
*Ophrys Nidus Avis* Berknh., 1795.  
*Neottia squamosa* Dulac, 1867.  
*Neottia orobanchioides* St. Lager, 1880.  
*Neottia Nidus-avis* Hook. & Jacks., 1894.  
*Ophrys Nidus-avis* Hook. & Jacks., 1894.
61. *Oxalis Pes caprae* :  
*Oxalis Pes Caprae* Hill, 1775.  
*Oxalis caprina* Thunb., 1781.  
*Oxalis Pes-caprae* Hook. & Jacks., 1894.
62. *Panicum crus galli* (?):  
*Panicum Crusgalli* Berknh., 1795.  
*Panicum grossum* Salisb., 1796.  
*Panicum Crus-galli* S. F. Gray, 1821, Hook. & Jacks., 1894.  
*Echinochloa Crus-galli* S. F. Gray, 1821.  
*Panicum alectromerum* Dulac, 1867.  
*Panicum crus-galli* Dulac, 1867.  
*Panicum alectrocnemum* St. Lager, 1880.
63. *Panicum crus corvi*, 2d ed. 1762, Syst. Pl. ed. x, 1758-9 :  
*Panicum corvipes* Stokes, 1812.  
*Panicum Crus-corvi* Hook. & Jacks., 1894.
64. *Pedicularis Sceptrum Carolinum* :  
*Pedicularis sceptrum Carolinum* Crantz., 1766.  
*Pedicularis Sceptrum* Schrank, 1789.  
*Pedicularis sceptrum carolinum* Steudel, 1841.  
*Pedicularis macrostachya* St. Lager, 1880.  
*Pedicularis Sceptrum-Carolinum* Hook. & Jacks., 1894.
65. *Phlomis Herba venti* :  
*Phlomis herba venti* Crantz, 1766, Lam., 1778, Lestib., 1804.  
*Phlomis Herba Venti* P. Miller, 1768, Hill, 1773.  
*Phlomis ventosa* St. Lager, 1880.  
*Phlomis Herba-venti* Hook. & Jacks., 1894.

66. *Phlomis nepetae* folia 2d ed.:  
*Phlomis nepetaefolia* Linn., 1753.  
*Phlomis nepetifolia* Murray, 1779, Moench, 1794.  
*Leonurus globosus* Moench, 1794.
67. *Polypodium Filix foemina* :  
*Polypodium filix femina* Lam., 1778.  
*Aspidium filix foemina* Steudel, 1821.  
*Athyrium Filix-femina* Presl, 1836.  
*Athyrium fimbriatum* Dulac, 1867.  
*Asplenium fimbriatum* St. Lager, 1880.  
*Asplenium Filix-foemina* Britton, 1896.  
*Polypodium Filix-foemina* Britton, 1896.  
*Asplenium filix-foemina* Underw., 1900.
68. *Polypodium Filix fragile* :  
*Polypodium album* Lam., 1778.  
*Polypodium fragile* Linn., 1762, Hudson, 1778, With., 1791,  
 Lightfoot, 1792, Britton, 1896, etc., etc.  
*Cyathea fragilis* Smith, 1805, Stokes, 1812.  
*Cyste fragilis* Dulac, 1867.  
*Cystopteris fragilis* Dulac, 1867, Britton, 1896.  
*Filix fragilis* Underw., 1900.  
*Cystopteris polymorpha* Bubani, 1901.
69. *Polypodium Filix mas*:  
*Polypodium filix mas* Lam., 1778.  
*Nephrodium crenatum* Stokes, 1812.  
*Lastraea filix mas* Presl, 1836.  
*Lastraea officinalis* Presl, 1836, Bubani, 1901.  
*Polystichum obtusum* Dulac, 1867.  
*Dryopteris Filix-mas* Britton, 1896.  
*Polypodium Filix-mas* Britton, 1896.  
*Aspidium Filix-mas* Britton, 1896.  
*Dryopteris filix-mas* Underw., 1900.
70. *Prunus Lauro Cerasus* :  
*Prunus Lauro-Cerasus* Linn., 1762-3, Linn., 1764.  
*Prunus lauro cerasus* Crantz., 1766.  
*Padus Laurocerasus* P. Miller, 1768.  
*Prunus grandifolia* Salisb., 1796.  
*Prunus Lauro-cerasus* Stokes, 1812, Hook. & Jacks., 1894.
71. *Rhamnus Spina Christi* :  
*Ziziphus Africana* P. Miller, 1768.  
*Ziziphus africana* Stokes, 1812.  
*Ziziphon spinosum* St. Lager, 1880.  
*Rhamnus Spina-Christi* Hook. & Jacks., 1895.  
*Ziziphus Spina-Christi* Hook. & Jacks., 1895.

72. *Rhinanthus Crista galli* :

- Rhinanthus Cristagalli* Hill, 1773-5.  
*Rhinanthus glaber* Lam., 1778, S. F. Gray, 1821.  
*Alectorolophus glaber* All., 1785, Moench, 1794, Dum., 1821,  
 1827.  
*Rhinanthus minor* Ehr., 1791.  
*Rhinanthus inflatus* Salisb., 1796.  
*Rhinanthus Crista-galli* Persoon, 1807, Hook. & Jacks., 1895.  
*Rhinanthus cristatus* Stokes, 1812.  
*Rhinanthus vulgaris* Gueldenst., ex Ledeb., 1846.

73. *Ribes Uva crispa* :

- Grossularia Uva Crispa* P. Miller, 1768.  
*Ribes Uva Scopoli*, 1772.  
*Ribes spinosum* Lam., 1778.  
*Ribes Uva-crispa* Berknh., 1795, Hook. & Jacks., 1895, Britton,  
 1896.  
*Ribes glabra* Stokes, 1812.  
*Grossularia vulgaris* Spach., 1838.  
*Ribes crispum* Dulac, 1867, St. Lager, 1880.  
*Grossularia Uva-crispa* Hook. & Jacks., 1893.

74. *Robinia Pseudo Acacia* :

- Robinia Pseud-Acacia* Linn., 1763.  
*Robinia pseudacacia* Crantz, 1866, Moench, 1794.  
*Robinia Pseudoacacia* Hill, 1769.  
*Robinia pseudo-acacia* Lam., 1778, Buchoz, 1800.  
*Pseudo-acacia vulgaris* Medic, 1787, Hook. & Jacks., 1895.  
*Pseudacacia odorata* Moench, 1794.  
*Robinia fragilis* Salisb., 1796.  
*Pseudacacia vulgaris* (Tour.) Greene, 1894.  
*Robinia Pseudacacia* Stokes, 1812, Hook. & Jacks., 1895.

75. *Salvia africana lutea* :

- Salvia aurea* Linn., 1762, Hill, 1773, Salisb., 1796, Hook. &  
 Jacks., 1895.  
*Salvia lutea* Hook. & Jacks., 1895.

76. *Salvia africana coerulea* :

- Salvia africana* Linn., 1763, Hill, 1773, Hook. & Jacks., 1895.  
*Salvia Africana* Hill, 1775.  
*Salvia rotundifolia* Salisb., 1796.  
*Salvia coerulea* Hook. & Jacks., 1895.

77. *Santolina Chamae Cyparissus* :

- Santolina Chamaecyparissus* Hill, 1775, Steudel, 1841, Hook.  
 & Jacks., 1895.  
*Santolina cupressiformis* Lam., 1778.  
*Santolina dentata* Moench, 1794.

- Santolina pallida* Salisb., 1796.  
*Santolina chamaecyparissus* Buchoz, 1800.  
*Santolina brevidentata* Stokes, 1812.
78. *Scandix Pecten Veneris* :
- Scandix pecten veneris* Crantz, 1766.  
*Scandix Pecten Veneris dicta* Hill, 1772.  
*Pecten Veneris* Lam., 1778, Hook. & Jacks., 1894.  
*Scandix pecten* Lam., 1778.  
*Scandix Pecten Veneris* Berknh., 1795.  
*Scandix pectinifera* Stokes, 1812.  
*Scandix Pecten* Dulac, 1867.  
*Scandix Pecten-Veneris* Dulac, 1867, Hook. & Jacks., 1895.
79. *Scilla Lilia Hyacinthus* :
- Scilla Lilio Hyacinthus* Hill, 1774.  
*Ornithogalum squamosum* Lam., 1778.  
*Scilla squamosa* Dulac, 1867.  
*Scilla Lilio-hyacinthus* Hook. & Jacks., 1895.
80. *Senecio Pseudo China* :
- Senecio pseudo-china* Crantz, 1766.  
*Gynura Pseudo-china* DC., 1837, Hook. & Jacks., 1893.  
*Gynura Pseudochina* Steudel, 1841.  
*Gynura nudicaulis* Arn., 1836.  
*Gynura Pseudo-China* Hook. & Jacks., 1893.
81. *Serratula chamae* Peuce :
- Serratula chamae* peuce Linn., 1762-3.  
*Pteronia Chamaepeuce* Spr., 1826.  
*Ptilostemon muticum* Cass., 1826.  
*Chamaepeuce mutica* DC., 1836.  
*Serratula Chamaepeuce* Hook. & Jacks., 1895.  
*Cnicus Chamaepeuce* Hook. & Jacks., 1893.
82. *Sisymbrium Nasturtium aquaticum* :
- Nasturtium aquaticum* Hill, 1755.  
*Sisymbrium vulgare* Hill, 1756.  
*Sisymbrium Nasturtium Aquaticum* Hill, 1769.  
*Sisymbrium Nasturtium* Scopoli, 1772, Stokes, 1812, Steudel, 1821, S. F. Gray, 1821.  
*Cardamine fontana* Lam., 1778.  
*Sisymbrium nasturtium* Lam., 1778.  
*Sisymbrium aquaticum* Lam., 1778.  
*Cardaminum Nasturtium* Moench, 1794.  
*Nasturtium officinale* R. Br., 1812, Hook. & Jacks., 1894.  
*Nasturtium Dodonaei* Lej. Court., 1826.  
*Sisymbrium Nasturtium-aquaticum* Steudel, 1841, Hook. & Jacks., 1895.

83. *Smilax bona nox* :  
*Smilax Bona Nox* Hill, 1775.  
*Smilax Bona nox* Willd., 1805.  
*Smilax Bona-nox* Hook. & Jacks., 1895.
84. *Smilax Pseudo China* :  
*Smilax pseudo-china* Crantz, 1760.  
*Smilax Pseudo China* Hill, 1775.  
*Smilax Pseudo-china* Stokes, 1812.  
*Smilax Pseudo-China* Britton, 1896.  
*Smilax Pseudo-china* Hook. & Jacks., 1895.
85. *Solanum Pseudo Capsicum* :  
*Pseudo capsicum undulatifolium* Moench, 1794.  
*Solanum hyemale* Salisb., 1796.  
*Solanum Pseudocapsicum* Salisb., 1796, Hook. & Jacks., 1895.  
*Solanum pseudocapsicum* Jolyclerc, 1805.  
*Pseudocapsicum undulatum* Steudel, 1841.
86. *Strychnos Nux vomica* :  
*Strychnos nux vomica* Crantz, 1766.  
*Strychnos ovalifolia* Stokes, 1812.  
*Strychnos vomicus* St. Lager, 1880.  
*Strychnos Nux-vomica* Hook. & Jacks., 1895.
87. *Thlaspi Bursa pastoris* :  
*Iberis bursa pastoris* Crantz.  
*Thlaspi Bursapastoris* Hill, 1773.  
*Thlaspi bursa pastoris* Lam., 1778.  
*Bursa pastoris* Wigg., 1780.  
*Thlaspi Bursa Thunb.*, 1784, Steudel, 1841.  
*Capsella Bursa-pastoris* Hook. & Jacks., 1893, Britton, 1896.  
*Thlaspi infestum* Salisb., 1796.  
*Thlaspi cuneatum* Stokes, 1812.  
*Thlaspi bursetta* Bergeret, ex Steudel, 1841.  
*Capsella pastoralis* Dulac, 1867.  
*Capsella triangularis* St. Lager, 1880.  
*Capsella poimenobalantion* St. Lager, 1880.
88. *Trifolium Melilotus coerulea* :  
*Trifolium coeruleum* Hill, 1775, Willd., 1800.  
*Trifolium Melilotus Coerulea* Hill, 1786.  
*Melilotus coerulea* Moench, 1794, Desf., 1829, Lam.  
*Trifoliastrum coeruleum* Moench, 1794.  
*Trigonella coerulea* Seringe in DC., 1825.  
*Trifolium Melilotus-coerulea* Hook. & Jacks., 1895.
89. *Trifolium Melilotus corniculata* :  
*Trigonella corniculata* Linn., 1758-9, 1763, Hill, 1775, 1786.  
*Trifolium Melilotus-corniculata* Hook. & Jacks., 1895.

90. *Trifolium Melilotus cretica* :  
*Trifolium Creticum* Hill, 1775.  
*Trifolium Melilotus Cretica* Hill, 1786, Ser., in DC., 1825.  
*Melissitus dentata* Moench, 1794.  
*Pocockia cretica* Ser., DC., 1825.  
*Melilotus cretica* Desf., 1829, Steudel, 1841.  
*Trigonella cretica* Bois., 1867.  
*Trifolium Melilotus-cretica* Hook. & Jacks., 1895.
91. *Trifolium Melilotus indica* :  
*Trifolium indicum* Hill, 1775.  
*Melilotus indica* All., 1785.  
*Trifolium Melilotus Indica* Hill, 1786.  
*Melilotus levis* Moench, 1794.  
*Melilotus parviflora* Desf., 1798-1800.  
*Trifolium indicum* Loisel., 1818, Thunberg, 1807-13.  
*Trifolium Melilotus* Hook. & Jacks., 1895.  
*Trifolium Melilotus-indica* Hook. & Jacks., 1894.
92. *Trifolium Melilotus italica* :  
*Trifolium Italicum* Hill, 1775.  
*Melilotus Italica* Lam., 1778, Desf., 1829.  
*Melilotus rugosa* Moench, 1794.  
*Trifolium Melilotus Italica* Hill, 1786.  
*Trifolium Melilotus-italica* Hook. & Jacks., 1895.
93. *Trifolium Melilotus officinalis* :  
*Trifolium Melilotus officinarum* Crantz, 1766.  
*Trifolium officinale* Scopoli, 1772, Stokes, 1812.  
*Trifolium Officinales* Hill, 1775.  
*Melilotus officinalis* Lam., 1778, Moench, 1794, S. F. Gray, 1821, Desf., 1829.  
*Trifolium Melilotus Officinalis* Hill, 1786.  
*Melilotus citrina* Duval., ex Steudel, 1821.  
*Brachylobus officinalis* Dulac, 1867.  
*Trifolium Melilotus-officinalis* Hook. & Jacks., 1895.  
*Trifolium Melilotus-officinarum* Hook. & Jacks., 1895.
94. *Trifolium Melilotus ornithopodioides* :  
*Trifolium ornithopodioides* Hill, 1775.  
*Lotus ornithopodioides* Hill, 1775.  
*Trigonella purpurascens* Lam., 1778.  
*Trifolium Melilotus Ornithopodioides* Hill, 1786.  
*Melilotus ornithopodioides* Desr., 1797.  
*Falcatula Falso-Trifolium* Steudel, 1821.  
*Trigonella ornithopodioides* S. F. Gray, 1821, Desf., 1829.  
*Falcatula falsotrifolium* Steudel, 1841, Hook. & Jacks., 1893.  
*Trifolium Melilotus-ornithopodioides* Hook. & Jacks., 1895.

95. *Trigonella Foenum graecum* :  
*Foenum Graecum sativum* Buchoz, 1770.  
*Trigonella Foenugraecum* Hill, 1775 and 1786, Stokes, 1812.  
*Foenum graecum officinale* Moench, 1794.  
*Trigonella Foenum-graecum* Sibth., 1818, Kew Ind.  
*Buceras foenum graecum* All., 1785.  
*Trigonella gladiata* Steudel, 1841.  
*Trigonella graeca* St. Lager, 1880.  
*Foenum-graecum sativum* Hook. & Jacks., 1893.  
*Buceras Foenum-graecum* Hook. & Jacks., 1893.  
*Foenum-Graecum officinale* Hook. & Jacks., 1893.  
*Xyphostylis erectus* Gasparr., ex Bubani, 1900.
96. *Vaccinium Vitis idaea* :  
*Vaccinium punctatum* Lam., 1778.  
*Vaccinium vitis idaea* Lam., 1778.  
*Vitis idaea punctata* Moench, 1794.  
*Vaccinium nemorosum* Salisb., 1796.  
*Vaccinium punctifolium* Stokes, 1812.  
*Vitis-Idaea punctifolia* S. F. Gray, 1821.  
*Vaccinia rubra* S. F. Gray, 1821.  
*Vaccinium rubrum* Dulac, 1867, St. Lager, 1880.  
*Vitis-Idaea punctata* Hook. & Jacks., 1895.  
*Vaccinium Vitis-Idaea* Hook. & Jacks., 1895.  
*Vitis-Idaea Vitis-Idaea* Britton, 1901.  
*Myrtillus exigua* Bubani, 1906.
97. *Vella Pseudo Cytisus* :  
*Vella Pseudo-Cytisus* Hill, 1773, Steudel, 1821.  
*Vella integrifolia* Salisb., 1796.  
*Vella Pseudocytisus* Steudel, 1841, Hook. & Jacks., 1895.
98. *Verbesina Pseudo Acmella* :  
*Spilanthes Pseudo Acmella* Steudel, 1821.  
*Pyrethrum Acmella* Steudel, 1821.  
*Verbesina Pseudo-Acmella* Steudel, 1821, Hook. & Jacks., 1895.  
*Spilanthes Acmella* Steudel, 1841, Hook. & Jacks., 1895.  
*Verbesina pseudoacmella* Steudel, 1841.  
*Spilanthes pseudoacmella* Steudel, 1841.  
*Spilanthes Pseudoacmella* Steudel, 1841.
99. *Veronica Anagallis aquatica* :  
*Veronica Anagallis Scopoli*, 1772, Hill, 1773, Moench, 1794,  
 Berknh., 1795, Sprengel, 1825, Steudel, 1821 and 1841, Dulac,  
 1867, Hook. & Jacks., 1895.  
*Veronica anagallis* Lam., 1778.  
*Veronica palustris* Salisb., 1796.  
*Veronica aquatica* Buchoz, 1770, S. F. Gray, 1821.

*Cardia amplexicaulis* Dulac, 1867.  
*Veronica acutifolia* Gilib., 1792, ex Bubani.  
*Veronica Anagallis-aquatica* Hook. & Jacks., 1895.

100. *Vitex Agnus castus* :

*Vitex verticillata* Lam., 1778.  
*Vitex agnus castus* Lam., 1778, Steudel, 1821.  
*Vitex agnus* Stokes, 1812, St. Lager, 1880.  
*Vitex Agnus* Hook. & Jacks., 1895.  
*Vitex Agnus-castus* Hook. & Jacks., 1895.  
*Agnus-Castus vulgaris* Hook. & Jacks., 1893.

101. *Zanthoxylum Clava herculis* :

*Zanthoxylum carolinianum* Lam., 1778.  
*Zanthoxylum clava herculis* Moench, 1794.  
*Zanthoxylum Clava Herculis* Willd., 1805, Steudel, 1821 and 1841.  
*Zanthoxylum claviger* Stokes, 1812.  
*Zanthoxylum clavatum* St. Lager, 1880.  
*Zanthoxylum Clava-Herculis* Hook. & Jacks., 1895.

There is presented above a list of almost one hundred names of plants precisely as Linnæus published them in 1753, hardly five of which are to be found unaltered in recent books of botany whether European or American; and this in the face of universal pretension that, beginning with the year named no specific term of any name is to be altered, even by the man who proposed it. On our side of the Atlantic one faction does indeed carry the professed principle of immutability to the extent of writing *Catalpa Catalpa*, *Hepatica Hepatica*, and a score of other such; but even in such instances when it comes to writing *Vitis idaea Vitis idaea*, Linnæus is doubly amended; for they make the four words over into *Vitis-Idaea Vitis-Idaea*, pretending that he had *Vitis-Idaea*, which he had not, though they can not bring themselves to write *Melilotus Melilotus officinalis*, or *Filix Filix fragilis*.

If the rule that "specific" names shall not be changed in transferring a plant to another genus has any meaning whatever, then such Linnæan names as *Trifolium Melilotus officinalis*, *Trifolium Melilotus indica*, *Trifolium Melilotus italica*, etc., ought to appear in our botanical literature as *Melilotus Melilotus officinalis*, *Melilotus Melilotus indica*, *Melilotus Melilotus italica*, etc. For the same reason *Polypodium Filix fragilis* ought to be present as *Cystopteris Filix fragilis* or *Filix Filix fragilis*. We look for these in vain,



however; nor will they be found even hyphenated. A whole word has been arbitrarily suppressed, and we read only *Cystopteris fragilis* or *Filix fragilis*, *Melilotus officinalis*, *Melilotus italica*, *Melilotus indica*, etc. The authors of our manuals, however, protest that they have labored to bring them in agreement with the codes, and they insist apparently seriously that they have adopted the earliest "specific" names instead of that specific name which was first combined with the correct generic name.

As we have already intimated there is hardly the appearance even of consistency exhibited in such neglect. To illustrate the point we may take the example of two species of ferns both taken from one Linnæan genus. The Linnæan *Asplenium Ruta muraria* becomes in our books the hyphenated *Asplenium Ruta-muraria*, whereas *Asplenium Adiantum nigrum* appears simply as *Asplenium nigrum*, a whole word left out as in case of *Cystopteris fragilis*. It would seem not an easy matter on the part of our modern nomenclators to decide whether the dropping of a whole word from the text is much a different thing after all from the mere insertion of a hyphen. They are evidently not minded simply to end the forging process with hyphens only. That the instance occurs in one genus too is worthy of note! Again, in the same genus the Linnæan *Asplenium Trichomanes ramosum* has either been dropped entirely or *A. viride* Hudson put in its place.

The conclusions forced on us by the comparison of the Linnæan names of the *Species Plantarum* with the versions of them as appearing in the manuals and recent literature of botany, is that no matter how strongly the modern nomenclators protest in word and writing to their following their codes and keeping intact the text of his works, they are actually changing his names as much if not more than the writers quoted in the accompanying list, while all the time pretending not to do so. It may be said of the older writers at least that they seemed more honest or candid about their alterations. They did not pretend to serve divided masters, for there had not as yet been any congresses or codes save the codes of reason.

It is worthy of note that some of the followers of Linnæus imitated him in making ternary names. Bieberstein as late as 1819\* had them, and even made new ones such as *Trifolium Melilotus parviflorum*, *Trifolium Melilotus tauricum*, *Trifolium*

\* Bieberstein *Flora Taurica Caucasica*, Vol. III, p. 506-7 (1819).

*Melilotus hamosum*, etc. Brotero and Schousboe also made similar new ones under the genus *Trifolium*.

We have looked in vain for the following names which, by the rule of priority of the codes, ought to be the correct ones as transferred to the genera now recognized. There is here no question of hyphens, or of running together of the two last words of the Linnæan ternary. A whole word has been changed in form, or altogether left out, and this has been done by authors of recent date, despite the fact that the laws of priority of their code require the names in the following form :

Asplenium Adiantum nigrum.  
 Asplenium Trichomanes dentatum.  
 Asplenium Trichomanes ramosum.  
 Hemerocallis Lilio Asphodelus.  
 Mussaenda fructu frondoso.  
 Cystopteris Filix fragilis, or Filix Filix fragilis.  
 Salvia africana coerulea.  
 Salvia africana lutea.  
 Trigonella Melilotus caerulea.  
 Trigonella Melilotus corniculata.  
 Trigonella Melilotus cretica.  
 Melilotus Melilotus indica.  
 Melilotus Melilotus italica.  
 Melilotus Melilotus officinalis.  
 Trigonella Melilotus ornithopodioides.  
 Melilotus Melilotus polonica.

Several such names from which part of the Linnæan trivial was omitted by older writers, have since been adopted, though with the inserted hyphens.

Alisma Plantago aquatica.  
 Legousia Speculum Veneris.  
 Cotyledon Umbilicus Veneris.  
 Scandix Pecten Veneris.  
 Radicula Nasturtium aquaticum.  
 Veronica Anagallis aquatica.

An unusually interesting case of the falsification of a Linnæan trivial name is that of *Apocynum foliis androsaemi* Linn., 1753. Any one on first seeing the name in this form would hardly think it

possible that such appears in the first edition of the *Species Plantarum* of Linnæus. One would hardly look for it except in the works of his predecessors, or of his contemporaries unfavorable to his methods. That writers of to-day who pretend to make the *Species Plantarum* of 1753 the beginning of priority, should have taken up for it the name *Apocynum androsaemifolium* and attribute it in this latter form to Linnæus, is certainly a case of testing the credulity of the botanical public. When, moreover, we actually see it in botanical works quoted as *Apocynum androsaemifolium* L., Sp. Pl., p. 213, 1753, then we must conclude that the manual maker had either not seen the original, or was trying to misrepresent facts. Such inaccuracy of quotation ought not to come from those who in matters nomenclatorial "strain at a gnat" on questions of priority to such an extent as to admit duplicate binaries, because the law of priority would strictly speaking be otherwise broken.

The name *Apocynum foliis androsaemi* shows as well as any that Linnæus considered that any two-worded generic name or short phrase or term might serve as a trivial name no matter what its form. There are quite as many three-worded names in the second edition of the *Species Plantarum* of 1762-1763, as there are in the first. If the name *Apocynum androsaemifolium* is to be accepted, it ought at least not to be referred to the first edition of the *Species Plantarum*, but to the second, where it is found corrected. The first publication of the plant, however, being made in 1753, and in the very work from which, according to the codes, it is all important to begin all nomenclature, it is an interesting problem for the followers of these same codes, which alternative is to be taken up, an impossible name with priority to support it, or the only feasible name of the second edition not enjoying this prerogative!

Somewhat different from the foregoing is the case of the plant now called *Hemerocallis flava*. The Linnæan *Hemerocallis Lilio Asphodelus* had in the first edition of the *Species Plantarum* the two varieties, *flava* and *fulva*, the former designated as the type. In the second edition the ternary name does not appear, and the two plants are recognized as separate species under the names *Hemerocallis flava* and *Hemerocallis fulva*. Linnæus, therefore, changed the name of the former, a liberty which the codes do not permit even him to take, as it constitutes a breach of priority. Though *Hemerocallis Lilio Asphodelus* is the oldest name for one of the plants, we look in vain for it in any modern work of botany.

Following the lead of Linnæus, earlier and later botanists have suppressed the name which for the reason of priority ought to be used according to the codes.

In much the same condition do we find the names *Salvia africana coerulea* and *Salvia africana lutea*, one of the words being dropped in each case. Linnæus himself changed both names completely, calling the *Salvia africana coerulea* of the first edition, *Salvia africana*, and the other became *Salvia aurea* in the second edition.

It can not fail to surprise many of the younger botanists of the present that those two or three generations next succeeding Linnæus held the opinion that no name that was unsuitable was to be made permanent; that changes and improvement were to be made in the specific terms of binary names, when scientific truth and accuracy, or the call for brevity demanded; and that they were to be changed, amended, or entirely displaced, as freely as any other kind of error. Linnæus himself, as we have said, gave his own example to the same effect, when in the second edition of his *Species Plantarum* the earlier *Apocynum foliis androsaemi* was retired by him in favor of *Apocynum androsaemifolium*. The principal changes of his are the following:

FIRST EDITION.	SECOND EDITION.
Amaryllis Bella donna,	A. Belladonna.
Apocynum foliis androsaemi,	A. androsaemifolium.
Atropa Belladonna,	A. Belladonna.
Hemerocallis Lilio Asphodelus,	H. flava.
Lonicera Peri Clymenum,	L. Periclymenum.
Mussaenda fructu frondoso,	M. frondosa.
Panicum Crus galli (?),	P. Crusgalli.
Prunus Lauro Cerasus,	P. Lauro-Cerasus.
Robinia Pseudo Acacia,	R. Pseud-Acacia.
Salvia africana caerulea,	S. africana.
Salvia africana lutea,	S. aurea.
Solanum Pseudo Capsicum,	S. Pseudocapsicum.
Trifolium Melilotus corniculata,	Trigonella corniculata.

A rather striking case of the use of hyphens in order to make an otherwise impossible combination acceptable to the codes and manual makers, is that of the Linnæan *Arbutus Uva ursi* and *Vaccinium Vitis idaea*. Moench restored these plants to the older pre-Linnæan genera, *Uva ursi* and *Vitis idaea*, both two-worded generic

names, such as were not objected to before Linnæus. When combining these binary generic terms with their rightful "specific" names transferred from the *Species Plantarum* as quoted above, we have *Uva ursi Uva ursi* and *Vitis idaea Vitis idaea*. Four-worded names can not, of course, be tolerated if three-worded ones are objectionable, but if the hyphen can make a binary out of a ternary, then two hyphens can as readily make a binary out of a quaternary name. Both Tournefort and the older writers who used *Uva ursi*\* as a genus name, as well as Moench who restored it and *Vitis idaea* after 1753, might have used a hyphen here had they chosen so to do, just as Linnæus might have done for the trivial name, but neither Moench, Linnæus, nor any one before these had so used the name. To attribute to both Linnæus and Moench the genus or the combination of generic and trivial names, for which neither is responsible, and which without the stealthily inserted hyphens could not be allowed to stand as valid even under the laxest codes, is hardly to be considered as truthful or exact.

A practice resorted to in changing Linnæan names of the first edition consists in running the last two words of the ternary name together. This method is so easy and withal so convenient, as it eliminates even the use of the hyphen, that we wonder it had not been oftener resorted to. There is in a sense less of tampering with an original in this case, as nothing is actually added and almost nothing taken away. The deceit involved, presuming the two words to be attributed to the first edition of the *Species Plantarum*, is all the greater the more subtile the manner in which the two words are actually made into one. The hyphen at least seems a compromise, for it makes only a compound word. The process here outlined presumes to make one word of two absolutely. Besides the names so corrected by Linnæus himself and given in the preceding list, we have the following wrongfully attributed to him, and not found even in the second edition of the *Species Plantarum* :

Aesculus Hippocastanum.	Ballota Pseudodictamnus.
Ferula Assafoetida.	Robinia Pseudacacia.
Pyrus Chamaemespilus.	

We may say in conclusion that apart from any comments, the simple list of Linnæan names from the *Species Plantarum*, together with the various attempts of Linnæus himself and his contemporaries, and followers to change these, shows that our present idea of the immutability of names originated in very recent times. It was

\* *Uva ursi* written as two words was used also by P. Miller in 1754.

an illustrious line of great botanists that gave the names of Hill, Lamarck, Moench, Gaertner, Allioni, Salisbury, Philip Miller, Scopoli, Persoon, Crantz, Stokes, and S. F. Gray, all of which between 1755 and 1830 were as diligent to improve specific names, as they were to make better descriptions and better classifications of plants.

Moreover our references in general to the changes that modern nomenclators make in accepting without question these corrections, and refusing to accept the names as published in 1753 by Linnæus, show that the highly flaunted priority of our own day is, regarding this list at least, as much a dead letter as it ever was. If the law of priority is to continue indisputable the list and the self-evident conclusions to be deduced therefrom will bear more than superficial consideration. The plain facts are, that Linnæan names have been changed, are still accepted in their changed form, are still being changed by contemporaneous nomenclators in spite of our much boasted adherence to the opposing dictates of the codes and their principles of priority, that this law of priority itself is in many respects still unfulfilled by those that profess strictest and most scrupulous regard for it. There are those among the rising generation of botanists that are beginning to ask why principles are not being observed practically in spite of their theoretical appropriateness and the sanction of codes, and we feel, in view of the facts above discussed, that such demands are anything but unreasonable, and remain waiting for explanation.

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#### V.—NEW PLANTS FROM NORTH DAKOTA.

By J. LUNELL.

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##### *Gaillardia aristata foliacea* var. nov.

Caules simplices, unicapitulati, scapiformes vel foliis in parte inferiore accumulatis. Bracteae involucri in 3 series dispositae longitudinis inaequalis, intima quidem usque 2 cm. longa, hirsutissima, media usque 3.5 cm. longa, extrema usque 5 cm. longa, quarum utraque minus hirsuta, magis foliacea quam series intima est. Flores radiati breves et pauci, flavi, valde pilosi.

Stems simple, monocephalous, scapiform or with the leaves clustered on their lower part. Involucral bracts in 3 rows of unequal length, the inner series all to 2 cm. long, very hirsute, the

second all to 3.5 cm. long, and the outer all to 5 cm. long, both of these less hirsute and more foliaceous than the innermost series. Rays short and few, yellow, very pilose.

This variety grows on dry plains, gravelly hills, etc., and can be found occasionally. The specimen just described was collected by the writer at Butte, Benson County, on August 27, 1909, at which late date the type of the species is usually altogether past flowering. Other specimens were found as early as July 20, the type even at this date being seen in an advanced fruiting stage.

***Fragaria ovalis quinata* var. nov.**

Sub foliolis tribus solitis minora duo opposita petiolum exornant.

Besides the usual 3 leaflets there exist further down on the petiole 2 smaller, opposite leaflets.

Among the species occasionally at Leeds, Benson County. Collected by the writer on June 11, 1902.

***Fragaria platypetala quadrifolia* var. nov.**

Folium in foliola quatuor verticillate divisum.

Leaf divided in a whorl of 4 leaflets.

Occasional with the type near St. John, in the Turtle Mountains of Rolette County, where it was collected by the writer on July 7, 1910.

***Allionia decumbens assurgens* var. nov.**

Caules 2-4 dm. alti, adscendentes vel erecti.

Stems 2-4 dm. high, ascending or erect.

Collected by the writer on July 2, 1911, in gravelly soil on the margin of the woodland at Pleasant Lake, Benson County.

***Sporobolus cryptandrus vaginatus* var. nov.**

Paniculus contractus et vagina superiore fere omnino inclusus.

Panicle contracted and almost wholly enclosed by the upper sheath.

Collected by the writer on July 28, 1911, on bare, gravelly hillsides at Pleasant Lake, Benson County.

***Actaea arguta alabastrina* var. nov.**

Baccis albis.

Berries white. The plant grows freely mixed with the type, in the same kind of soil and with the same habitat, the berries are spherical or subspherical and, when full-grown, 8-10 mm. in diameter, and the only visible difference is their color, being brilliantly cherry-red in the type, and just as brilliantly snow-white or

alabaster-white in the variety. The ripening of the two is contemporaneous.

*A. eburnea* Rydb. has also white berries, but they are ellipsoid, 9-12 mm. long and 6 mm. wide. *A. neglecta* Gillman too has white (ellipsoid?) berries and has been placed by Prof. Robinson as a forma under *A. rubra* (Ait.) Willd. with *A. eburnea* as its synonym.

***Tradescantia ramifera* sp. nov.**

Plantae praeter sepala et pedunculos glabrae, pallide virides, solitariae vel in fasciculis parvis crescentes. Caules basi erecti vel assurgentes, solitarii, geniculati, iterum iterumque ordinatimque ramos de omnibus axillis foliorum caulis et postea ramorum emitentes, 2-4 dm. alti. Folia linearia, involuta, recurvata, 7-9 vel interdum 10 mm. lata, basi vaginas glabras, parallelinerves, 1-4 cm. longas, circum caulem formantia. Bractee involucri 1 vel plerumque 2, involutae, lanceolato-lineares, parte inferiore saltem quae 10-12 mm. lata est foliis latiore, recurvatae, glaberrimae. Umbellae terminales, sessiles, valde floriferae. Pedunculi 1-2 cm. longi, pilis apice glanduliferis dense vestiti. Sepala oblonga, viridia, membranoso-marginata, 7-10 mm. longa, pilis apice glanduliferis dense vestita. Petala saturate coerulea, 10-12 mm. longa, vel sepalis fere dimidio longiora. Filamenta basi mediocriter pilosa.

Plants glabrous except sepals and pedicels, pale green, solitary or growing in small tufts. Stems erect or ascending at the base, solitary, geniculate, repeatedly and successively branching from all the axils of the leaves on the stem and later on the branches, 2-4 dm. high. Leaves linear, involutely folded, recurved, 7-9 or sometimes 10 mm. wide, the bases forming glabrous, parallel-nerved sheaths, 1-4 cm. long, around the stem. Involucral bracts 1 or usually 2, involutely folded, lanceolate-linear, at least their lower part which is 10-12 mm. wide broader than the leaves, recurved, perfectly glabrous. Umbels terminal, sessile, many-flowered. Pedicels 1-2 cm. long, thickly pilose with gland-tipped hairs, as are also the oblong, green, scarious-margined sepals, which are 7-10 mm. long. Petals deep blue, 10-12 mm. long, or nearly  $\frac{1}{2}$  as long as the sepals. Filamenta tolerably pilose at base.

Belonging to that group of the genus having pedicels and sepals pilose with gland-tipped hairs, this species differs from *T. bracteata* Small which has deep green foliage, with bracts 2-2.8 cm. broad at



the base, ciliate and often villous, and flowers 2.5–3 cm. in diameter, and from *T. occidentalis* Britton which has bright green foliage, is taller, erect and simple-stemmed, with even the lower part of the bracts narrower than the leaves, and with petals about 14 mm. long.

Collected by the writer on July 13, 1899, on bare, gravelly, sterile, open ground of that stretch of rolling prairie named Sand Hills in McHenry County, also lately in the same kind of soil at Pleasant Lake, Benson County.

***Senecio suavis* sp. nov.**

Tota planta glabra, foliis crassis, firmis. Radix perennis, robusta, aut simplex conicaque, aut ramos nonnullos emittens, quorum singuli in caudice terminantur e quo caulis unus usque ad nonnullos oritur. Caulis 1–3 dm. altus. Folia caulina 3–5, linearilanceolata, 1–4 cm. longa, margine integro, vel undulato, vel serrato, vel pectinato, petiolis 0.5–2 cm. longis. Folia basilaria complura, late linearia—lanceolata, 3–4 cm. longa, 0.5–1 cm. lata, marginibus integris, vel crenatis, vel serratis, vel pectinatis, apice saepissime tridentato, petiolis 3–8 cm. longis. Caules capitula bina usque ad quaterna, 1 cm. longa, 0.5 cm. lata gerunt. Bractee involucri circiter 17. Flores radiati circiter 6. Pappus albus. Achenia 2.5 mm. longa, obscure pulla, 4-costata, singulis costis pilis albis adpressis vestitis.

The whole plant glabrous with thick leaves of firm texture. Root perennial, stout, either simple and conical, or sending out several branches upwards, each ending in a crown from which one to several stems arise. Stem 1–3 dm. high. Stem leaves 3–5, linear-lanceolate, entire, wavy-margined, serrate or pectinate, 1–4 cm. long, with 0.5–2 cm. long petioles. Basal leaves very numerous, broadly linear to lanceolate, 3–4 cm. long, 0.5–1 cm. wide, with entire, or crenate, or serrate, or pectinate margin and oftenest tridentate apex, petioles 3–8 cm. long. Heads 2–4 on each stem, 1 cm. long, 0.5 cm. wide. Involucral bracts about 17. Rays about 6. Pappus white. Achenes 2.5 mm. long, dull brown, 4-ribbed with a row of white appressed hairs covering each rib.

Belonging to the same group as *S. mutabilis* Greene, *S. tridenticulatus* Rydb. and *S. oblanceolatus* Rydb., all of the Rocky Mountain flora, this species, and excluding other prominent characters, it differs from the first named by being perfectly glabrous and by its narrow basal leaves, and from the others by its extremely variable leaf margins and larger size.

Our species grows in bare, gravelly soil on open prairie hills, and was collected on July 2, 1911, by the writer at Pleasant Lake, Benson County. The name of the original station suggested the species name.

***Antennaria chelonica* sp. nov.**

Planta caespites latos integens. Caules maris 4-10 cm. alti, feminae graciles, 1-3 dm. alti. Stolones elongati, procumbentes, bracteati, apice foliosi, flabelliformes. Folia basilaria firma, cuneato-spatulata, indumento laminae superioris laete deciduo. Capitula 2-5 (plerumque 4), maris conferte condensata, feminae corymbosa et longipedicellata. Pedunculi ferme 1-2 cm. longi et ultra (interdum usque 13 cm.). Involucra 9-10 cm. alta. Squamae maris latae, albae, apice eroso-denticulato, vel propemodum integro, feminae lineares vel anguste spatulatae, albidae, subintegrae. Pappus maris sensim et paullulum apicem versus incrassatus, sub lente barbellulatus.

Plant broadly matted, with male plants 4-10 cm. high, and female slender, 1-3 dm. high. Stolons elongated, procumbent, bracteate, leafy at the top, flagelliform. Basal leaves firm, cuneate-spatulate, the indument disappearing at maturity on the upper side. Heads 2-5 (usually 4). Male plants with heads in dense, capitate clusters, female heads being corymbose and long-pedicelled. Pedicels usually 1-2 cm. long or more, sometimes being very long: one of my type plants has 4 heads and pedicels respectively 4.5, 5.5, 6.0 and 13.0 cm. long, arranged on the stem so as to make the inflorescence corymbose. Involucres large, 9-10 mm. high. Bracts of male heads with broad, white, erose-denticulate or almost entire tips; those of the female plants linear or narrowly spatulate, whitish, subentire. The male pappus gradually and slightly thickened towards the apex, under a hand lens barbellulate.

This species differs from *A. neglecta* Greene and allies in its large involucres, its corymbose inflorescence and its long (sometimes remarkably long) pedicels.

The plant grows in green woodland lanes where trees on both sides offer an ample shade. This natural condition being by no means common, it causes the plant to be quite rare. The type specimens were collected by the writer in the middle of June, 1910, and 1911, in the Turtle Mountains of Rolette County, in the vicinity of St. John. The species name is derived from *Chelone*, the Greek name for turtle.

## ADDENDA.

**Laciniaria scariosa scalaris** var. nov.

This variety will be numbered 9 in the *Key of varieties*. Insert on page 92 at the end of *Clavis Analytica Varietatum*.

A. Folia series inferioris ad folia series superioris  
sensim et obscure gradientia . . . . . 9. var. SCALARIS.

And on page 93 at the end of *Key of varieties*.

A. The leaves of the lower series passing imperceptibly  
and indistinctly into the leaves of the upper series . . . . . 9. var. *scalaris*.

The var. *scalaris* has short lower leaves, the lowest next to the tuber about 2.5 cm. long, the others about equal (on one stem 6.5 cm. long, on another 5.5 cm.), occupying one-fourth of the stem, broadly lanceolate—lanceolate.

The other leaves are narrowly lanceolate and very gradually reduced. On the whole stem there is (excepting the lowest leaf) never more than 0.5 cm. difference in length between two neighboring leaves, the uppermost of which is 0.5 cm. long. This variety seems to be rare, and was found in moderately moist and rich soil on the open prairie.

**Helianthus apricus camporum** comb. nov.

to replace *H. nitidus camporum* described in the Am. Midl. Nat. I, p. 237 (1910).

Its leaves being *scabrous* beneath, its *scabrous* stems and its *habitat* are characters peculiar to *H. apricus* and cause me, *ceteris paribus*, to place it preferentially with this species, though the outline of its leaf is that of *H. nitidus*.

Leeds, North Dakota.

## I.—NEW PLANTS FROM MINNESOTA.

By J. LUNELL.

**Astragalus Chandonnetii** sp. nov.

Planta pallide viridis, caulibus robustis de rhizomate ligneo adscendentibus, geniculata, pilis albis adpressis vestita, 3 dm. alta. Foliola 11–19, oblonga vel angustiora, 10–25 mm. longa, 3–7 mm. lata, breviter petiolulata, pilis albis, densis, strigosis oblecta. Flores adscendentes, capitulum magnum, densum, cylindricum, 3–4 cm. altum, 2 cm. latum formantes. Calyx indumento dense albo-strigoso sine pilis atris sparsis gaudet. Dentes calyci longitudine aequales, marginibus viridibus, sere albidis, albo-strigosis. Bractee floris angustae, tubo calycis longitudine fere aequales. Corolla circiter 1.5 cm. longa, alba vel albida.

Pale green with stout stems ascending from a woody rootstock, geniculate, with white, appressed hairs, 3 dm. high. Leaflets 11-19, oblong or narrower, 10-25 mm. long, 3-7 mm. wide, short-petiolulate, with white, dense, strigose hairs. Flowers ascending, in a large, dense cylindrical head, 3-4 cm. high and 2 cm. broad. Calyx densely white-strigose without scattered black hairs, with green, later whitish, white-strigose margined teeth as long as the tube. Floral bracts narrow, nearly as long as the calyx tube. Corolla about 1.5 cm. long, white or whitish. Pods not seen.

This beautiful plant differs from *A. nitidus* Dougl. by its large heads and leaflets and its longer calyx teeth, and from this and *A. sulphurescens* Rydb., a native of Colorado, by its white-strigose calyx without the admixture of more or less scattered black hairs, and by its large, white or whitish corolla. In addition, these two allies are as a rule glabrate, or else have only a scanty pubescence.

The handsomely prepared type specimen was collected in dry soil at McHugh near Detroit, Minn., on June 16, 1911, by Rev. Father Z. L. Chandonnet, who works ardently and enthusiastically in the botanical field whenever season and sacerdotal duties permit. It was simply a matter of course that this species should be named in his honor.

***Meibomia grandiflora Chandonnetii* var. nov.**

Folia circum basem pedunculi haud, sed in parte quadam inferiore caulis accumulata. Insuper folium solum basem pedunculi ornat, saepeque folium alterum semel vel interdum bis subtus additur. Saepe demum folium solum semel (vel bis) infra parten foliorum accumulata pateferi solet.

Leaves not clustered at the base of the peduncle, but further down on the stem. In addition to these there is one single leaf at the base of the peduncle, and often one or sometimes two single leaves beneath this. Lastly, there are often one or two single leaves on the stem below the clustered part. One plant had only single leaves and no cluster at all.

This variety, also named for Rev. Father Z. L. Chandonnet, was collected by him at Beaulieu, Mahnomen County, Minn., on July 27, 1911, and at other times. In submitting it to me he furnished valuable data regarding the plant. It is the frequent form there. I have also a specimen rightly belonging here and collected by Mr. Chas. C. Deam in Wells County, Indiana, with a single leaf 0-5 dm. above the clustered leaves, being his number 2325.

Leeds, North Dakota.

# THE AMERICAN MIDLAND NATURALIST

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that of the Prairie States

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## BOX-ELDERS, REAL AND SO-CALLED.

BY J. A. NIEUWLAND.

The first author who applied a generic name to the group of pinnately compound leaved maple-like trees, called Box-Elders, was John Ray in 1688.† He used the name *Negundo* for this distinctively American tree, called by Linnaeus *Acer Negundo*, the only species known until the beginning of the nineteenth century, when in 1818, Nuttall described more or less completely our middle western species, under the name *Negundo fraxinifolium*. Ray in giving the name seems to have been well aware that it had been used also by Garcia ab Horto and Acosta.‡ Other authors besides these who used the name *Negundo* before Ray's time, and after his time for that matter also, reserved the name for a plant from the East Indies and Malabar, now called *Vitex Negundo* Linn., 1753. There must have been some botanists during or before the time of Ray who misapplied the name to the common Box-elders, or Ray himself because of his insufficient knowledge of both this and Acosta's plant, judged or guessed the two to be the same. He describes the plant as follows:

"*Arbor exotica, foliis Fraxini instar, et serratis, Negundo perperam credita.*"§

From what follows there can be little doubt as to the identity of Ray's description with that of our common Box-elder.

"*Folia quatenus observavimus in planta juniore, duabus pinnarum conjugationibus constant, folio [partiali] impari extremam costam quibus pinnæ adnexæ sunt terminante. Pinnæ singulæ*

† Raii, J. *Historia Plantarum*, p. 1798, (1688).

‡ Garcia ab Horto, *Arom. et Simpl. ex Car. Clusio*, 1593, (1st edition). 1567. Chapter III. DE NEGUNDO.

§ Raii, J. *Historia Plantarum*, p. 1798, (1688).

\* November, 1911, pages 129 to 152.

*Fraxinearum magnitudine aut ampliores, in acutos mucrones exeunt, dentibusque, marginibus et etiam mucronibus inordinatis obiter incisae sunt, summa praesertim parte. Folium impar quod dicimus, extremam costam terminans ab angusto principio sensim dilatatur ultro mediam partem. E. Virginia (ni fallor) delata fuit. An arbor haec Garciae et Acostae Negundo sit nescimus; folia ab eorum descriptionibus abundunt."*

No other parts of the plant beside leaves and stem seem to have been observed by Ray, and owing to his want of knowledge of both this plant and that of Garcia and Acosta, he appeared unwilling to create a new name under the circumstances.

Plukenet\* had a more thorough knowledge of the plant, and in his *Phytographia* he gives three figures, one of a pinnate leaf with fine leaflets, a fertile flower branch, and also the fruit. His description and name show that he considered the tree as not generically distinct from the maples.

*Acer maximum foliis trifidis et quinquefidis, Virginianum. Negundo perperam dicta arbor, Virginiana. Hort. Beaum., Ray. Hist.*

*Hortus Beaumontianus*,† probably written by Francis Kiggelaer, quotes the plant as introduced into Holland at least as early as 1690, and cites it as: "*Negundo perperam dicta, arbor Virginiana.*" Boerhaave‡ also considered it as a maple and he simply repeats the references of Ray, Kiggelaer and Plukenet.

In the *Hortus Cliffortianus*, Linnaeus§ has the plant in the genus *Acer*, and calls it "*Acer foliis compositis.*" In the *Species Plantarum*|| of 1753, he added to this the words "*floribus racemosis,*" and retains the trivial name *Negundo*, calling it *Acer Negundo*.

From these references it may be deduced that no valid name deserving to designate the genus was given to the Box-elders as a group before the year 1753. The term *Negundo* was applied by Ray in a mistaken sense, and was a homonym, having previously been used for *Vitex Negundo* on the basis of absolute priority.

\* Plukenet, L. *Phytographia*, Tab., 123, Figs. 4, 5. (1692).

† [Kiggelaer, F.] *Horti Beaumontiani Catalogus Plantarum exoticarum*, Hagae, (1690).

‡ Boerhaave, H. *Index alter Plantarum*, pt. 2, p. 234. (1727).

§ Linnaeus, C., *Hortus Cliffortianus*, p. 144, (1737).

|| Linnaeus, C., *Species Plantarum*, p. 1056, (1753).



The earliest clearest designation of the plant as distinct from *Acer* which I have found was made in the third edition of Ludwig's *Definitiones Plantarum* by Boehmer,\* though he omits important characters of the genus, and he refers the genus to Ray under the name *Negundo*. The description is as follows:

"1265. NEGUNDO Raj. Hist., 1798.

*Ex gemma foliorum fila longa propendent, quorum extremo adhaeret calix tri-quadri-vel quinquefidus minimus: stamina quatuor, ad sex.*

*Flos pistillus incertus in distincta planta collocatus videtur.*

*Inter ACERIS species Boerh. II., 234, et Linn. Spec. Tom. II., 1052, recensent, cum quo habitu quodam modo convenit."*

This is the first place when the dioecious character of the trees was pointed out, a rather important mark in the classification of the plants.

Realizing that the name *Negundo* had been preoccupied by another plant, Adanson†, who recognized the generic standing of the Box-elder, gave them the un-Latin name, *Rulac* or *Rulak*, and on the basis of absolute priority this is the earliest valid name, other objections notwithstanding. That the name is not Latin in origin need hardly stand in the way, for even in the best classical Latin of the Golden Age do we find uninflected words approved of by the masters of the language! It will be said that such words were introduced earlier and only accepted as used by the authors. There are, however, not a few other names now accepted into our botanical nomenclature that could hardly bear the strict scrutiny of the exacting name tinker, and they are accepted and new ones such are still being perpetrated. Rafinesque among others objected to the word *Negundo* as well as *Rulac*, and changed the name to *Negundium*.‡ At all events, the other name *Negundo* is withal as un-Latin as *Rulac*, and no preferences need be accorded one or the other for grammatical reasons only. Botanists therefore, who hold that no names are valid if published before 1753, should accept *Negundo* as the oldest published generic designation of the Box-elders. Those who believe that the above-mentioned

\* Ludwig, C. G. *Definitiones Plantarum*, 3rd ed., by G. R. Boehmer, p. 508. (1760).

† Adanson, M. *Familles des Plantes*, Vol. II. p. 383. (1763).

‡ Rafinesque, C. S., *Medical Repository*, Vol. V., 2nd Hexade, p. 352, also Devaux *Journal de Botanique*, vol. II., p. 170. (1808).

date is not the beginning of scientific botany or nomenclature will reject *Negundo* as a homonym, as it was first applied to the plant called *Vitex Negundo*, and can not be applied to any other.

The Box-elders are exclusively North American in their range or origin, and until quite recently three or four species had been recognized. *Rulac Negundo* (Linn) A. S. Hitchcock, the type of the genus, *Rulac mexicana* (DC). from Mexico and Guatemala, *Rulac californica* (A. Gray), from California, and finally *Rulac texana* (Pax) Small, of the South by some botanists. Dr. N. L. Britton\* in 1908 published two species from the west and especially Rocky Mountain Region. The two species were published under *Acer*, as *Acer interior*, and *Acer Kingi*. A number of botanists have accepted Nuttall's† species, *Negundo fraxinifolium* as a distinct plant from the eastern Atlantic coast tree. His name is however, untenable as Rafinesque published in 1808, a *Negundium fraxinifolium*, a species which like many of that author, is not sufficiently distinct from the type to deserve recognition, and is undoubtedly some form of the type. Nuttall's plant is beyond doubt our middle western tree as his description plainly indicates. He does not refer to the eastern plant at all, though he must have known of it. Dr. Britton evidently included Nuttall's *Negundo fraxinifolium* in his *Acer interior*. The type of the latter is from the far west, a pubescent plant hitherto taken for *Rulac texana* (Pax) Small, and mistakenly so.

Concerning the identity of the plant called by authors *Rulac texana* and especially most plants labelled so in herbaria, much confusion has arisen. The real *Rulac texana*, or *Acer Negundo* var *texanum*‡ Pax, later called by Pax himself *Acer californicum* var *texanum*,§ is based on a certain pubescent form of our southern states the type or cotype sheet of which is in the United States National Herbarium, No. 18099, and is Lindheimer's No. 360 from Texas. The first publication of the plant as *Acer Negundo* var *texanum* Pax, 1885, included several broad leaved plants, Dandridge's from Tennessee and Rugel's from Florida, also in the U. S. National Herbarium which are only forms whose terminal leaflet is wider than long. All these have been examined by me

\* Britton, N. L. North American Trees, 1908, pp. 655, 656.

† Nuttall, I. Genera of N. Amer. Plants, p. 253. 1818.

‡ Pax in Engler's Botanisches Jahrbuch III., (1885), p. 327.

§ Pax in Engler's Bot. Jahrb. XI., (1889), p. 75.

in the U. S. National Herbarium, and, I think, can hardly be considered as even nearly related to Lindheimer's plant. Recognizing this Pax later segregated these first mentioned plants under the name *Acer Negundo* var *latifolium* Pax, 1889, l. c., and transferred Lindheimer's plant as a variety of *Acer californicum*, as *Acer californicum* var *texanum* Pax, 1889. The plant is really more closely related to the Californian tree than to the eastern tree of the Atlantic States and mostly east of the Alleghany Mountains. Even Lindheimer's type appears, however, hardly to deserve specific rank, and is in fact only a less densely pubescent *Rulac californicum*. It seems that when the Rocky Mountain plant began to become numerous in herbaria, this really unnamed and totally different species from any of the forgoing in some manner became confused with the Texan form or variety, and received the name *Rulac texana*.\* Dr. Britton recognizing its difference and the confusion named it *Acer interior*, as I have already noted. In 1902 Pax† still recognized the varieties mentioned and in the same sense as last emended in 1889, but specimens of Britton's plant as well as Nuttall's are scattered throughout the numerous subvarieties and forms, of his monograph. Wesmael‡ like Pax had published many varieties and subspecies. Considering the great variability of the form of foliage of the plants, one not knowing that a single tree may have several kinds, shapes, not only at various ages, but at one and the same time, would readily be led to multiply, as has actually been done, the varieties and subspecies until we have a perfect maze of names. It is hardly safe to multiply such without an ecological study of the whole plants in their native haunts. I have found several of these so-called varieties on the same individual plant! Our midland Box-elder, the one Nuttall first described, has been found to have the terminal leaflet broader than long on seedlings and two year old plants early in the season, whereas the later leaves are the same as on the larger trees. I think I can be sure of this as I have examined the antecedants of the plants in question in our locality. I have also found that one of the principal characters on which Dr. Britton's *Acer interior* is based, i. e., attenuation of the base of the fruit, varies at least in those plants of the species growing in

\* See Small, J. K. Flora of the S. E. United States, 1903.

† Pax, in Engler & Prantl's Pflanzenreich. 1902.

‡ Wesmael, A. Bull. Soc. Roy. Bot. Belg. 1890, XXIX. pp. 42, 43.

the midland, so that various graduations are found from that of his type to that of the plant of the Atlantic States. As Dr. Britton states, however, of the western type "the features which while individually insignificant are collectively sufficient to warrant its recognition as a species," one may also say the same of the Midland Box-elder first described by Nuttall. The leaves are thick and firm and very veiny, drying greenish whereas those of *R. Negundo* dry brownish and are extremely thin and membranous, the first bodies are perfectly glabrous in Nuttall's plant, minutely pubescent in the eastern type. The middle western plant has larger fruits usually in shape like those of *R. interior*; the leaves differ in being composed commonly of more than three leaflets even in fruiting branches. The sterile and growing shoots have usually 5 to 7 leaflets and very often 7 to 11. Leaves with eleven leaflets are bipinnate a character that did not escape Nuttall nearly a hundred years ago. The lower leaflets at the base and the terminal have again become compounded into pinnately trifoliolate members. Such leaves of 9 to 10 or 11 leaflets may be found on nearly any tree in our locality. The most obvious character of the midland plant is that of the pale bluish glaucous twigs, The bloom often persisting several seasons on old stems. As the plant was recognized by Nuttall, but under a name previously taken, I propose in his honor to call the plant, **Rulac Nuttallii**.

Bourgeau in 1859 published in a list the name *Negundo Fraxinus* for a plant from Saskatchewan. A plant or cotype of this is in the U. S. National herbarium, No. 292221. It is not very satisfactorily labelled, and the publication is not accompanied by any diagnosis; hence is a *nomen nudum*. The specimen supposed to be that of Bourgeau mentioned above is, however, undoubtedly the same plant as *R. interior* of Britton.

Some of these questions of synonymy and explanation for rejection of names referred to, might perhaps have been desired when Dr. Britton published *Acer interior*. As his work is, however; more or less popular in treatment, we can readily see why discussions of homonyms and synonyms and *nomina nuda* with other complicated matters of nomenclature, had better been entirely omitted by him. There are those, however, who are not quite able to see why Nuttall's name should have been omitted for either

\* Bourgeau, Jour Linn. Soc. IV., (1859), 9.

the Midland plant or, as Britton has it, the aggregate of Midland and Rocky Mountains plant which he called *Acer interior*,\* not mentioning synonyms, and thus leaving readers to suppose that it is in every sense an entirely new plant, never previously referred to.

The plant I shall call *Rulac Nuttallii* could hardly have had the same type as Britton's plant, as it is not likely that Nuttall as early as 1818 had penetrated as far as the mountains. We know, however, that in 1810 he made a journey west along the Ohio river almost solely to look up a new genus of plants typified by *Collinsia verna* published in 1817, and it may have been that he met with our midland *Rulac* on this trip west of the Alleghany mountains. At all events his description, incomplete as it certainly is, can only point to our midland Box-elder. He gives as the habitat of the tree: "Northwestward on the banks of the Missouri to the mountains?" I append here the synonymy of the Box-elders as fully as I have been able to ascertain it, or as is deemed necessary for the understanding of the various limitations of species already referred to.

RULAC Adanson, 1763†.

*Negundo* John Ray, 1688‡ per errorem.

*Negundo* Ludwig-Boehmer, 1760§ haud *Negundo* Garciae et Acostae, 1567 et 1593, || vel veterum. Est enim *Vitex Negundo* Linn., 1753.

*Negundium* Rafinesque, 1808.¶

*Acer* Linnaei pro parte.\*\*

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\* The specific name *interior* would seem to have been ill chosen. The obvious meaning of the Latin word is "internal," "inside of." It would be difficult to imagine what a plant could be inside of and an internal or interior maple is an unthinkable thing. It was probably meant for *mesochorum* or midland, the Greek term being the only available one, as the Latin synonym *mediterraneum* would obviously refer to a European habitat.

† Adanson, M. Familles des Plantes, Vol. II., (1763), p. 283.

‡ Raii, J. Historia Plantarum, (1688), p. 1798.

§ Ludwig-Boehmer, Definitiones Plantarum, (1760), p. 508.

|| Garciae ab Horto et Acostae, Arom. et Simplic. ex Car. Clusio, 1593. Cap. III. De *Negundo*.

¶ Rafinesque, C. S. Med. Rep. Vol. V, 2nd Hexade (1808). p. 352, also Desvaux, Jour. de Bot., Vol. II. (1809). p. 170.

\*\* Linnaei, C. Species Plantarum, (1737), p. 1056. Linnaei, C. Genera Plantarum (1737), p. 112, et (1754), p. 474.

Dioecious trees with opposite pinnately compound leaves, leaflets serrate and usually irregularly, to biserrate, and variously cleft. flowers precocious, apetalous: staminate in drooping umbels, pistillate in racemes or imperfect panicles: calyx small; disk none: stamens 4-6, long filamentary: fruit a samara like that of *Acer*: samara wings separately and tardily dehiscent.

1. RULAC NEGUNDO (Linn.) A. S. Hitchcock, 1894.\*  
*Negundo aceroides* Moench, 1794.†  
*Negundo virginianum* Medik. 1800,‡ to include *Negundo trifoliatum* Raf.,§ and *Negundo lobatum* Raf.,||  
*Negundium fraxinifolium* Raf., 1808.¶  
*Negundo fraxinifolium* D. C., 1824.\*\*  
*Negundo fraxineum* Steudel, 1841,†† nomen tantum.  
*Negundo Negundo* (Linn.) Karsten, 1880-83.‡‡

Small or middle-sized dioecious tree, with *green glabrous twigs* and pinnately compound leaves: *leaflets 3-7 usually 3-5 on flowering branches, and 5-7 on sterile and growing shoots: leaflets thin membranous glabrous at maturity with a few scattered hairs especially on the veins beneath; leaves drying to an olive brown: terminal leaflet and the two basal often 3-lobed or cleft, (the latter never both completely divided into three leaflets) all variously roughly and irregularly serrate or dentate, middle leaflets rounded or subcordate, the others so when lobed, otherwise cuneate or narrowed at the base; secondary veins not prominent, rather inconspicuous; petioles green, glabrous.* Flowering racemes 2, opposite, near the end of the twigs of the preceding year's growth on short side branches 1-2.5 cm. long, *peduncles 3-5 cm. long with 1-2 opposite small simple or ternate leaves, usually entire: fruiting racemes about 2 on a twig; samaras attenuate at the base, wings usually widely divergent forming an obtuse or right angle on the outer margins: seed body minutely pubescent.*

\* Hitchcock, A. S. Spring Flora of Manhattan, (1894), 6.

† Moench, C. Meth. Pl. (1794), p. 334.

‡ Medikus. Pfl. Anat. (1800), p. 439.

§ l. c.

|| l. c.

¶ l. c.

\*\* DeCandolle, A. P. Prodrômus, Vol. I., (1824), p. 546.

†† Steudel, E. T. Nomenclator Botanicus. Vol. II., (1841), p. 188.

‡‡ Karsten. Deutschl. Fl. (1880-1883). p. 596.

This tree is a native of the Eastern United States along the coast from Maine or farther south as far south as Florida. It extends inland as far as Kentucky and Tennessee. Quite typical specimens I have seen and collected around Washington, Philadelphia, in the Shenandoah valley, Virginia, and in West Virginia and Maryland. It grows wild along the Potomac River. It is scarcely found in typical appearance in Indiana, though some plants growing here have been observed in cultivation.

The variety of Pax, *Acer* or *Rulac Negundo latifolia* is based on several\* plants segregated from the variety *texana* or *Acer Negundo* var *texanum* Pax. It has broadly elliptical leaflets, the terminal leaflet wider than long, as its principal character. I have specimens of typical *Rulac Negundo* that exhibit such broad leaflets on younger shoots of the same plant. I have found such broad leaflets also in seedlings, or the early spring trifoliolate leaves of young plants of *Rulac Nuttallii*.

This character seems then hardly a distinctive one, and is found in young or first leaves of the season and often on young two year old trees especially, these leaves developed early from the bud.

The variety *latifolium* is based principally on Tennessee and Kentucky specimens, Dandridge's, Hooker's and Rugel's, both in the U. S. National Herbarium, where I have examined them.

2. **Rulac Nuttallii** Nwd., nomen novum.

*Negundo* or *Acer fraxinifolium* Nuttall, 1818,\* not  
*Negundium fraxinifolium* Raf., 1808.†

Small or middle sized tree, with *white* or *bluish glaucous* twigs whose bark is usually somewhat thicker than in the preceding; leaves pinnately or *incompletely bipinnately* compound; *leaflets usually smaller* than those of the preceding, 3-11, usually 3-7 on *fruiting branches* and 5-11 on *sterile shoots*, *leaflets rather thick and veiny*, dark-green above and paler beneath, glabrous on both sides except on the veins of the lower surface, with rather densely pubescent tufts in the angles of the principal veins; leaflets variously and irregularly toothed and cleft especially the terminal and basal lateral which are often again trifoliolate; secondary veins prominent and *mesophyl pale beneath*; *flowering and fruiting racemes usually 4 on a twig, opposite in pairs*, with numerous samaras,

\* l. c.

† l. c.

and at the ends of the twigs of preceding years growth; racemes on short side branches 1 cm or less in length, with or without reduced simple or ternate leaves; peduncles 2-2.5 cm. long: samaras densely clustered, in appearance usually smaller: *samara wings joined usually at an acute angle at the base, and not at all, or not much attenuated; fruit body glabrous.*

From *Rulac interior* it is easily distinguished by its glaucous white twigs, those of the latter being minutely and retrorsely or spreading tomentulose. The leaves of *R. interior* are almost invariably trifoliolate and the three leaflets give the whole leaves a characteristic regular appearance wanting in the eastern and middle western plants.

This seems to be the native midland Box-elder and extends from the western slopes of the Appalachian Mountain system to the foot-hills of the Rocky Mountains and north of the Ohio River and Missouri. The tree seems to be more hardy than the eastern one, and has been found more often in cultivation.

Specimens in the United States Herbarium show it to be found in the Eastern states, New York, California, Mexico, and cultivated in European gardens and parks. The eastern species seems almost totally absent from the Middle West.

Rather typical plants are present in my herbarium as numbers 675, 2165, 2174, 2175, 2168, 2169, from Notre Dame and vicinity. Mr. Deam's collection from various parts of the State of Indiana contain some good examples. Some have rather attenuated fruit bases. The specimens in the U. S. National Herbarium as also in the New York Botanical Garden Herbarium are too numerous to give individual mention and reference, though I have a record of all to date. One specimen in Mr. Deam's collection from Missouri has extremely narrowly angled fruit bases, and large wings that overlap each other.

*Rulac Nuttallii* is readily distinguished by its thick irregularly dentate leaves, and glaucous twigs and petioles. The wings of *R. interior* are minutely tomentulose and the leaves though variously dentate are trifoliolate and the whole leaf has a very symmetrical appearance, taking the leaflets together. This is lacking in the irregularly leaved midland specimens, one-half of the terminal leaflet is hardly as symmetrical as the other, nor do the basal ones help in the symmetry of outline of the whole. The leaves of *R. Nuttallii* have oftener 5-11 leaflets than any



other species. Seven leaflets are as rare in the eastern part as five are in the Rocky Mountain plant, but even 7-11 leaflets are far from rare in the midland Box-elder. *R. Negundo* has pubescent fruit bodies, those of *R. Nuttalli* are perfectly glabrous at maturity. The fruit is usually not or but little attenuate at the base. Leaves of the eastern plant dry to an olive brown, the veiny thick leaves of the midland plant dry greenish, the mesophyl on the lower surface of *R. Nuttalli* is pale glaucous and even secondary network of veins very prominent. I have never seen in the other species a near approach to the bipinnate leaf of our midland plant. Entire branches often are found that have never fewer than eight to eleven leaflets to the leaves.

3. RULAC INTERIOR (Britton).

*Acer interior* Britton, 1908.\*

*Rulac texana* Small, 1903†, Secundum descriptionem, vel saltem in parte.

*Negundo Fraxinus* Bourg., 1859‡ probabiliter, sed nomen nudum.

There seems to be no need of repeating Dr. Britton's characters. The tree is together with *Rulac Nuttalli* one of the commonest of specimens in our herbaria, and together with it more numerously represented than all the others taken together.

4. RULAC KINGII (Britton)

*Acer Kingi* Britton, 1908.§

5. RULAC CALIFORNICA (Torrey & Gray).

*Acer californicum* (Torrey and Gray) Dietrich.||

*Negundo californicum* Torrey and Gray. 1838, 1840.¶

Inclusive of *Rulac californica* var *texana* Pax *Rulac texana* (Pax) Small. This plant is only a less densely pubescent form of *R. californica* and can hardly be considered as a variety, since even *R. californica* varies more in other ways.

Native of California along the coast of the Pacific Ocean, especially in the southern part of the State extending into Mexico.

\* Britton, N. L. North American Trees, (1908), p. 655.

† l. c.

‡ l. c. l. c.

§ l. c. p. 656.

|| Dietrich, D. Syn. II., 1283.

¶ Torrey & Gray, Fl. N. Am. I., (1838-1840), p. 250.

## 6. RULAC MEXICANA (DC.)

*Negundo mexicanum* DC., 1824\**Acer mexicanum*. (D. C.) Pax, 1886, not *Acer mexicanum*

A. Gray, 1861.

This species differs rather notably from all the foregoing by its regularly sharply serrulate oval or ovate leaflets. These are always trifoliolate and densely silky tomentose beneath.

It is native of Southern Mexico, and specimens found in Guatemala are typical in every way except the larger size of the leaflets.

It seems that the Asiatic group of pinnately trifoliolate maple-like trees have been confounded with the real American Box-elders. They are, however, only like them superficially and in appearance. They differ as a matter of fact as much from the members of the genus *Rulac* as they do from *Acer* itself. The leaves are always pinnately trifoliolate but they are andromonoecious and the disk is not obsolete as that of *Rulac*. The number of stamens differs; there are differences in the inflorescence, which is terminal, and the flowers are complete. The group is at least as deserving, if not more so, of generic rank than *Rulac* itself, and I propose for it the name **Crula**.

**Crula** nov. gen.

*Arbores andro-monoicae cum foliis pinnatis trifoliolatis: discus bene evolutus et crassus extrastaminalis; gemmae perulae interiores elongatae: stamina 8 saepissime elongata medio disco inserta vel cum disco extra staminibus; petala evoluta, sepala libera; foliola minime lobata; inflorescentia in ramulis terminalibus foliosis insita; styli usque ad basim distincti, prope ad alas bene divaricati: flores praecoces, fertiles spicati, vel racemosi, vel corymbosi vel pauci umbellati.*

*Per Asiam Orientalem dispersa; Chinam, Coream, Japoniam et Mandschuriam.*

The plants differ from *Rulac* in being andromonoecious and the flowers in terminal clusters. The leaves are always pinnately

\* DC. Prodr. 1. c.

trifoliolate, never deeply lobed, usually thin serrate or entire. The stamens are 8-10, and the flowers complete with a thick prominent extrastaminal disk. The stamens in *Rulac* are 4-6, the flowers apetalous and always declinous, in different plants. The name is an anagram of *Rulac*. The following are known species, all oriental Asiatic. The genus may be considered somewhat closely related to *Rulac* and in the natural system would come between *Acer* and *Rulac* as the latter stands between the new genus and *Dipteronia* Oliv., 1896.

1. CRULA CISSIFOLIA (Sieb. & Zucc.) Nwd.  
*Acer cissifolium* (Sieb. & Zucc.) C. Kock, 1864.  
*Negundo cissifolium* Sieb. & Zucc., 1846.

The plant is represented in the U. S. National Herbarium by No. 18106, collected by Tschonoski in Japan. It is a fertile flowering and fruiting specimen; some samaras having three wings. Also No. 136663 from Nikko (Mitsude-Kaide), May 9, 1879, collected by Matsumura. It has only stamen bearing flowers. No. 210532 from Nanokawa, Tosa, July 18, 1892, has mature fruit. No. 640126 was collected from the Agricultural Department Grounds, Washington, D. C. where it is cultivated. The branch is sterile.

2. CRULA SUTCHUENSIS (Franch) Nwd.  
*Acer sutchuense* Franchi, 1894.
3. CRULA TRIFLORA (Komarow) Nwd.  
*Acer triflorum* Komarow, 1901.
4. CRULA MANDSCHURICA (Maxim.) Nwd.  
*Acer mandschuricum* Maxim., 1868.

U. S. Nat. Herb. Specimen No. 18107 from Northeastern Manchuria, 1860, fruit in umbels. N. Y. Bot. Gard. Herb. has a specimen, Wilson's No. 1883.

5. CRULA NIKOENSIS (Maxim.) Nwd.  
*Acer nikoense* Maxim., 1868.

U. S. Nat. Herb. Specimen No. 18084. Kitch's collected by C. S. Sargent, Oct. 17, 1892, at Nikko, Japan, has mature fruit. No. 18083 is a sterile specimen of the same. Tschonoski's specimen No. 18030, U. S. Nat. Herb. has flowers and mature fruit, developed and undeveloped leaves. No. 18031 of the same with mature

fruit and leaves and perfect flowers, collected at Nagasaki, Japan, in 1863, and tentatively labelled "Negundo?"

Also No. 596579 collected by E. H. Wilson for Veitch & Sons in Western Hupeh, C. China. The flowers have ten stamens and are in corymbs. Wilson's No. 639 in the N. Y. Bot. Garden Herb., which I have not determined for want of time, also seems to belong to this group.

6. CRULA GRISEA (Franch) Nwd.

*Acer nikoense* var *griseum* Franch, 1894.

*Acer griseum* (Franch) Pax, 1902.

7. CRULA HENRYI (Pax) Nwd.

*Acer Henryi* Pax, 1896.

Represented in the U. S. Nat. Herb. by No. 801241, collected by A. Henry (No. 5644) in Szech'uan, Central China, 1885-88. This is evidently one of the co-type specimens, and has young and immature fruit. Henry's No. 5644 B, another cotype from the province of Hupeh has mature fruit. Also No. 596485 from Pat'ung, W. China collected by E. H. Wilson has mature fruit and fertile flowers just out of bloom. In the New York Botanical Garden, the plant is represented by Wilson's No. 548.

DEPARTMENT OF BOTANY,  
University of Notre Dame

## VI.—NEW PLANTS FROM NORTH DAKOTA.

BY J. LUNELL.

### *Amarella Gurliae* sp. nov.

Planta annua. Caulis simplex vel de basi ramosus, teres vel angulatus, colore purpureo, 1-2 dm. altus; internodi vel longiores vel breviores vel aequales foliis. Folia marginibus scabris non vestita, basilaria spatulata, caulina lanceolato-lineararia, in caule inferiore late lanceolata et paulo falcata. Flores in axillis foliorum aut solitarii aut per ramos breves folio non longiores conspersi, ramo singulo 2 usque 5 flores gerente, quorum proximi pedicellos 5-10 mm. longos, remoti pedicellos 2 vel 3 mm. longos habent. Tubus calycis 2 mm. longus, lobi ejus 4 vel 5, inaequales, 3-4

mm. longi, lineares, longiores quidem tubo corollae compares. Corolla 6-8 mm. longa, tubulata, 4-5 lobata, colore lilacino (vel lobi lilacini, tubus autem roseus), lobi 3x2 mm. diametris, corona paucis vel nullis setis vestita. Segmenta corollae ovata, obtusa, soli late aperta. Siliqua teres, sessilis, matura lobos calycis nonnihil excedens.

Annual. Stem simple or branched from the base, terete or angular, purple-colored, 1—2 dm. high, the branches curved centrally, the internodes being either longer or shorter or of equal length with the leaves. Leaves not scabrous-margined. Basal leaves spatulate, stem leaves lanceolate-linear. Lower stem leaves broadly lanceolate, with the median axis bent or a trifle falcate. Flowers in the axils of the leaves, either solitary or on short branches not exceeding the length of the leaf, each branch bearing 2 to 5 flowers, the central ones on pedicels 5—10 mm. long, the peripheral on pedicels 2 to 3 mm. long. Calyx tube 2 mm. long, its lobes 4 or 5, unequal, 3—4 mm. long, linear, the longer equaling the corolla tube. Corolla 6—8 mm. long, tubular, 4—5 merous, lilac colored, or the lobes lilac, the tube rose colored, the lobes 3x2 mm. in diameter, the crown with a few or no setae, Segments of the corolla ovate, obtuse, opening widely to the sunlight. Capsule terete, sessile, when ripe somewhat surpassing the calyx lobes.

In order not to mistake this species for *Amarella acuta* (Michx.), it has to be remembered, that the latter has minutely scabrous leaf margins, flowers 10—16 mm. long, calyx almost 5-parted and its lobes lanceolate, and the corolla blue with acute, lanceolate lobes.

This species is only to be found near springs and is so attractive to horses, that it is difficult, where they can reach them, to collect plants with entire stems. Horses do not touch the other *gentiancae* growing in the same pasture as this. It was discovered by Miss Gurli Lunell on August 28, 1911, at Butte, Benson County, and was named in her honor.

***Amarella theiantha* sp. nov.**

Planta annua. Caulis fere simplex vel modice vel effuse de basi ramosus, teres vel angulatus vel leviter quoque aequae cum ramis alatus, flavus, strictus, 1—4.5 dm. altus, internodi in plantis maioribus circiter 4.5 cm. longi. Folia basilaria ovalia vel spatu-

lata, plerumque mortua vel languescientia, caulina media vel oblonga vel lanceolata, basi lata et apicem versus sensim angustata, internodis multo breviora, summa mensura reducta, forma autem aequalia. Flores in axillis foliorum aut solitarii aut in ramis brevibus 2-4, pauci quidem in plantis subsimplicibus, sed in plantis luxuriosis propter ramos earum fastigiatos nimios valde numerosi. Pedicelli 0.5-2 cm. longi. Lobi calycis 4 sive 5, longitudine admodum inaequales vel ferme aequales, quorum 2 latiores et 2 vel 3 angustiores et tubo corollae aut aequales aut multo breviores sunt. Corolla 10-12 mm. longa, 4-5-lobata, extremitates versus attenuata, colore candide sulfureo, lobis semper clausis, acutis, 2.5x2 mm. diametris, basi fimbriarum setacearum nulla corona vestitis, nisi forte setae binae unum vel plures lobos adornant.

Annual. Stem nearly simple or moderately to profusely branched from the base, terete or angular or even lightly winged as well as the branches, straw-colored, strict, 1-4.5 dm. high, with internodes in larger plants about 4.5 cm. long. Basal leaves oval or spatulate, mostly faded or fading. Middle stem leaves oblong or lanceolate with a broad base and narrowing gradually towards the apex, very much shorter than the internodes, the uppermost reduced in size, but equal in outline. Flowers in the axils of the leaves, either solitary or 2-4 on short branches, being few in subsimple plants, but very numerous in well developed plants on account of their superabundance of fastigate branches. Pedicels 0.5-2 cm. long. Calyx lobes 4 to 5, very unequal or nearly equal in length, 2 of them broader and 2 or 3 narrower, either equalling the corolla tube or very much shorter. Corolla 10-12 mm. long, 4-5-merous, tapering toward the ends, of a bright sulphur-yellow color, its lobes acute, 2.5x2 mm. in diameter, always closed, with no crown of setaceous fimbriae at its base, only exceptionally with a pair of setae to one or more lobes.

Related to this species are *A. scopulorum* Greene and *A. plebeia* (Cham.) Greene which are 1-3 dm. high, with internodes in larger plants 2.5-7.5 cm. long, shorter sepals, blue flowers and deeply fringed appendages; and *A. strictiflora* (Rydb.) Greene with leaves equalling or surpassing the internodes, with a dense and spike-like inflorescence, and with numerous, crowded, almost sessile flowers.

This is a plant inhabiting damp prairie ground. The type was collected by the writer on August 2nd, 1902, three miles

south of Leeds, Benson County. The color of the flowers is very seldom subject to variations.

***Solidago inornata* sp. nov.**

Caulis gracilis, de rhizomate 1 dm. longo, gracillimo, horizontali oriundus, 5 dm. altus, glaber usque inflorescentiam, dein magis minusve scaber vel pubescens, perinde ac rami floriferi. Folia firma et rigida, in caule admodum remota, lanceolata vel oblanceolata, ambobus extremitatibus angustata, integra vel remote serrulata, manifeste vel obscure tri-costata, marginibus, et præcique extremitatibus earum proximis, scabro-ciliata, superiora sessilia, 1-8 cm. longa, inferiora petiolis alatis longipetiolata, cum petiolo 8-9 cm. longa. Inflorescentia ramis paucis, divaricatis, valde recurvatis secunda, pyramidata, remisse et exigue florifera, tam lata quam alta. Bracteae involucri oblongae, obtusae. Capitula 4-5 mm. alta.

Stem slender, from a very slender horizontal rhizoma, 1 dm. long, .5 dm. high, glabrous up to the inflorescence, whence it is more or less scabrous or pubescent, as well as the flowering branches. Leaves firm and rigid, rather distant on the stem, lanceolate or oblanceolate, narrowed at both ends, entire or distantly serrulate, plainly or indistinctly triple-veined, scabro-ciliate on the margins, especially on their proximal ends, the upper sessile, 1-8 cm. long, the lower long-petioled with winged petioles, 8-9 cm. long (including the petiole). Inflorescence secund with few, divaricate, very recurved branches, pyramidal, loosely and scantily flowered, as broad as high. Involucral bracts oblong, obtuse. Heads 4-5 mm. high.

The allies of this species are *S. glaberrima* Martens, *S. missouriensis* Nutt. and *S. concinna* A. Nels. All of these have an inflorescence of dense crowded racemes approximated into a broad and short panicle, which has glabrous branches.

This modest-looking, lovely golden-rod was collected in the open woodland bordering the prairie at Pleasant Lake, Benson County, on August 14, 1911, by the writer. It has also been found by Rev. Father Z. L. Chandonnet in dry, sandy soil at Richdale, Ottertail County, Minn., an excellent specimen of which bears the date of July 15, 1911. At least in North Dakota it appears to be a rare plant.

***Solidago glaberrima montana* (A. Gray), comb. nov.**

to replace *S. missouriensis montana* A. Gray, vide Synoptical Flora of North America, Vol. I., part II., page 155, (1888):

***Solidago perornata* sp. nov.**

Caulis 7-10 dm. altus, gracilis, minutatim pubescens, parte infima denudata excepta, striatus, valde foliosus. Folia tenuia, membranacea, tricostrata, breviter pilosa et superne scabriuscula, subtus dense et adpresse puberulenta (et hoc eo magis in venis), lanceolata vel latiora, acuminata, sessila vel infima alato-petiolata, supra caulem medium maxima, dentibus inaequalibus acute serrata. Inflorescentia racemos unilateralis, divaricatos, recurvatos, gracillimos formans. Capitula 4 mm. alta.

Stem 7-10 dm. high, slender, minutely pubescent, except the lowest, denuded part, striate, very leafy. Leaves thin, membranous, triple-nerved, short-pilose and roughish on the upper side, closely and adpressedly puberulent on the lower surface, the more so on the veins, lanceolate or broader, taper-pointed, sessile or the lower wing petioled, largest above the middle of the stem, sharply serrate with unequal teeth. Inflorescence in 1-sided, spreading, recurved, very slender racemes. Heads 4 mm. high.

This species differs from *S. dumetorum* Lunell, which has thicker and more scabrous leaves and an inflorescence with fastigate, short branches and closely glomerate heads; from *S. elongata* Nutt., which has nearly glabrous, sub-entire, obscurely 3-nerved leaves and an elongated panicle; from *S. Pitcheri* Nutt., which has a stem glabrous up to the inflorescence, larger heads, and leaves more sharply serrate and glabrous except on the margins and on the midveins; and from *S. satanica* Lunell, which has its upper leaves sessile or short-petioled and densely cinereous-pubescent beneath and a very contracted, many-flowered pyramidal inflorescence with smaller crowded flowers, and it is exclusively a wood-land plant.

The type was collected by me on the 18th of August, 1907, on an open sunny hillside not far from the foot-hills of the Turtle Mountains, Rolette County, near Dunsieith.

***Aster lautus* sp. nov.**

Caulis 7-18 dm. altus, lineis pubescentiae longitudinalibus de foliis decurrentibus, praeterea glaber, parte inferiore una cum



foliis languescens glabrescente, ramis late divaricatis et horizontalibus quoque et retroflexis paniculate ramosus. Rami etiam in lineis longitudinalibus pubescentes, inferiores quidem vel medii longitudinem 3 dm. saepe obtinentes. Folia lanceolata usque lineari-lanceolata, serrulata vel integra, 0.5-1.5 dm. longa, 5-17 mm. lata, acuminata, in basin sessilem, 4-5 mm. latam attenuata, marginibus ciliatis exceptis glabra. Capitula 20-28 mm. diametro, numerosa. Involucra conica, 5 mm. alta et 5 mm. lata. Bracteae in 4 series dispositae, laxae vel apicibus paene squarrosis praeditae, lineares, acutae, apicibus autem longe attenuatis absentibus, cilio-marginatae, externae virides, latiores internis quae plerumque apices oblanceolatos, virides habent. Flores radiati 1-1.2 cm. longi, circiter 45, violacei vel purpureo-albi. Pappus sordide albus.

Stem 7-18 dm. high, with longitudinal lines of pubescence decurrent from the leaves, else glabrous, the lower part becoming glabrate as the leaves are fading, paniculately branched with divaricate and even horizontal and retroflexed branches, these also pubescent in longitudinal lines, and the lower and middle ones often reaching 3 dm. in length. Leaves lanceolate to linear-lanceolate, serrulate or entire, 0.5-1.5 dm. long, 5-17 mm. wide, acuminate, narrowed into a sessile, 4-5 mm. wide base, glabrous except on the ciliate margins. Heads numerous, 20-28 mm. broad. Involucre conical, 5 mm. high and 5 mm. broad. Bracts in 4 series, loose or almost squarrose-tipped, linear, acute, but without long-attenuate tips, ciliate-margined, outer bracts altogether green, broader than the inner ones which usually have oblanceolate, green tips. Rays 1-1.2 cm. long, about 45, violet or purplish-white. Pappus dull white.

Species apt to be confounded with this are *A. longifolius* Lam., which has a more contracted inflorescence on erect or ascending branches, the pubescence on the branches scattered, its bracts glabrous, erect, almost equal, imbricated in only 1 or 2 series, and its pappus pale; *A. salicifolius* Lam., which has a contracted inflorescence on erect or ascending branches, leaves thickish and shorter, 0.5-1 dm. long, 0.5-1.5 cm. wide, "broad-linear or linear-oblong bracts with conspicuous elliptic or subrhombic green tips" (Gray's Manual VII., page 803), and pappus white; and *A. laetevirens* Greene, which has broader leaves, fewer heads, bracts with white midrib, and outer bracts broader than the inner.

This elegant species is not unusual in yards or in moderately damp, rich prairie soil, and was collected by the writer on August 27, 1911, at Leeds, Benson County.

**Aster durus** sp. nov.

Caulis de rhizomate longo, gracili, horizontali oriens, erectus, gracilis, purpurascens, subsimplex, vel ramis erectis vel adscendentibus, in plantis redundantibus, permaturis interdum late divaricatis vestitus, lineis pubescentiae longitudinalibus de foliis decurrentibus, praeterea glaber, 3-5 dm. altus. Folia anguste usque lineari-lanceolata, 5-10 cm. longa, 5-10 mm. lata, ambobus extremitatibus angustata, sessilia, minutatim serrulata vel integra, marginibus ciliatis, praeterea glabra. Inflorescentia paniculata, contracta. Involucrum 6-8 mm. altum, 8-10 mm. latum, bracteis eius in 4 series dispositis, lanceolatis, acutis, cilio- et scarioso-marginatis, praeterea viridibus. Flores radiati 25-35, 5-8 mm. longi, pallide violaceo-purpurei vel albi. Pappus sordide albidus.

Stem from a very long, slender, horizontal rootstock, erect, slender, purplish, subsimple or with erect or ascending, in large, old plants sometimes widely divaricate branches, with longitudinal lines of pubescence decurrent from the leaves, else glabrous, 3-5 dm. high. Leaves narrowly to linear-lanceolate, 5-10 cm. long, 5-10 mm. wide, narrowed to both ends, sessile, minutely serrulate or entire, with ciliate margins, else glabrous. Inflorescence paniculate, contracted. Involucre 6-8 mm. high, 8-10 mm. broad, its bracts in 4 rows, lanceolate, acute, ciliate and scarious-margined, else green. Rays 25-35, 5-8 mm. long, pale violet-purple to white. Pappus grayish white.

Species easily confounded with this are *A. lautus* Lunell, which is best recognized by its widely spreading inflorescence; *A. salicifolius* Lam., which has thickish, broader leaves and the disk of the head 1 cm. high and 1 cm. broad, and white pappus; *A. longifolius* Lam., which has the bracts of the involucre glabrous, subequal, only the outermost sometimes shorter, and pale pappus; and *A. laetevirens* Greene, which has rather few heads, broader leaves, involucral bracts with white mid-rib, and outer bracts broader than the inner.

This species has a predilection for the margins of sloughs. The type specimen was collected by the writer on September 6, 1910, in high grass around a slough, not far from Leeds, Benson

County. The plant is a representative of advanced autumn, often defying the night frosts until early October, and surpassed in durability only by *Brachyactis angustus*.

Leeds, North Dakota.

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## OUR WINTER BIRDS.

BY BROTHER ALPHONSUS, C. S. C.

A flock of Evening Grosbeaks, ten in number, appeared at Notre Dame, Ind., on November 30 and remained three days. This is the first record of this species in this locality of which the writer has any knowledge. They came each day in the early part of the afternoon to a certain box-elder to feed on the seeds of the tree. Like all northern birds, they showed no fear of any one—even of a number of boys who made considerable noise playing near the tree where the birds were feeding. On January 19, six more of this species were seen feeding in the same kind of tree and uttering a low note.

An interesting sight during the first days of December was the presence at Notre Dame of a single Hell Diver on a lake nearly frozen over. The bird remained until the night before the last part of the lake froze. This species of waterfowl is probably the earliest to arrive in spring and the latest to depart in autumn.

Mr. John Worden, on a visit to the Roseworn farm near Niles, Mich., saw on Dec. 26, two Cardinal Grosbeaks. The farmer told him that the birds had been seen there throughout the month. The writer has never seen this species in this locality during winter.

### DECEMBER.

Birds seen every day except on the dates after their names:

Blue Jay, 4, 7, 8, 9, 10, 16, 17, Crow, 1, 2, 3, 4, 8, 10, 12, 15,  
20, 24, 27, 28. 20, 24, 27, 28.

White-breasted Nuthatch, 2, 8, 9, 10, 16, 17, 20, 21, 22, 24, 27, 28, 30

Birds seen on the dates after their names:

Evening Grosbeak, 1, 2. Hell Diver, 4, 5, 6, 7, 8.

Tree Sparrow, 8. Snowbird, 14, 17, 18.

Screech Owl, 26. Snowflake, 27.

Downy Woodpecker, 28.



T. J. Fitzpatrick of Graceland College. It is by far the most scholarly and withal the most valuable biography of this greatest of early American naturalists that has yet appeared. Born in 1783, died in 1840, the life of Rafinesque stretched over not sixty years of time, while his work in America extended over but a quarter of a century. And yet perhaps no other naturalist by the labors of so limited a period of time, had contributed so largely to the development of American science. The reviewer's interest in Rafinesque began through the study of the freshwater mollusks of America, a subject to which Rafinesque made substantial contributions.\*

The book before us is divided into four parts: CONSTANTINE SAMUEL RAFINESQUE—A SKETCH, pages 11-62; A BIBLIOGRAPHY OF C. S. RAFINESQUE, pages 65-219; a BIBLIOTHECA RAFINESQUIANA, pages 223-239; and a list of PORTRAITS OF RAFINESQUE, pages 240-241. The biographical part of the volume presents in a lucid and intensely interesting style the principal events in the life of the great naturalist. Frequent quotations and references, sometimes extended, from Rafinesque's *Life of Travels* and from the works of his contemporaries and successors add greatly to the value of the work. In summing up the scientific attainments of the man, the fact is not lost sight of that in his well defined conceptions of the evolution of species and genera of plants by the variation of previously existing species (published in 1836) he antedated Darwin. "He had some idea of the germ theory of disease. He was a pioneer teacher of modern languages and a pioneer object teacher. He was an earnest advocate of the natural classification in natural sciences while all his contemporaries held to the old Linnaean system. He was also the inventor of the coupon system."

In his interpretation of Rafinesque's character, Professor Fitzpatrick is no less happy. There is shown the intense devotion of the man to the sacred cause of Science, ever-present hope which bore him through calamities such as have brought many a worthy man to an untimely death. Rafinesque, surrounded by a country then unknown botanically and zoologically, furiously collected,

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\* His genera of mollusks as well as of other animals are being largely recognized upon anatomical grounds. See Ortmann, A. E., Mem. Carnegie Mus., IV: 335 et seq. (1911).

studied and published. The work which in him has been criticised, when considered in the light of the knowledge of his times seems brilliantly done. Even upon the tumuli of the ancient Mound-builders he made important contributions. He made, alone and unaided, brilliant progress in deciphering the inscriptions of Central American Monuments. His energy and enthusiasm apparently knew no bounds. His bibliography includes 939 published titles, and numerous extant manuscripts, to say nothing of the great number of unpublished manuscripts which at his death were dispersed and forever lost to Science.

From a typographical point of view the book is above criticism. Thirty-three plates, all but one of them facsimiles of the titlepages of various papers by Rafinesque, embellish the text.

But it is in the keen insight into the life of the naturalist manifested by Professor Fitzpatrick that the book is made indispensable to the student of American science. Justice and absolute truth seem to have been the motto of the work, as the last few paragraphs of the appreciation will indicate:

"Being without a university training, Rafinesque lacked the precision of the schoolmen, a deficiency which he partly overcame through almost boundless energy and enthusiasm. Sympathetic guidance from appreciative fellows would have prevented many mistakes. Envy, malice, distrust and rivalry prevented aid. Individuals fall short of their mission who allow such unworthy motives to control them. It seems undoubted that Rafinesque would have reached the foremost ranks had he even received generous sympathy. As it is, he reached, almost unaided, a position where his fame will grow brighter with the passing of time and he will be appreciatively recalled when the words of his calumniators shall have been forgotten. Such is the fate of mankind; some are famous for their day and generation, others long after. This Rafinesque believed and consoled himself with the thought that time renders justice to all at last.

"After a life filled with few triumphs and far too many disappointments the end found the toiler in moderate circumstances. Alone and unfriended he passed beyond the value of life into a realm where faith pictures another world of flowers, of sweetly singing birds, and of loved ones found again; a naturalist's dream, a desired haven for the tempest-ried soul."

[S. W. G.]

# THE AMERICAN MIDLAND NATURALIST

Devoted to Natural History, Primarily  
that of the Prairie States

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## NEW PLANTS FROM NORTH DAKOTA.—VII.

By J. LUNELL.

### *Rosa subnuda* sp. nov.

Caudices 3–8 dm. alti, circiter 1 cm. diametro, lucide et surde cinerei, inermes vel spinis numerosis, inequalibus, prorsus tenuibus, ferme rectis partim vestiti; rami splendide obscure fusi, inermes vel spinis tenuibus forsitan armati, valde foliosi. Stipulae integrae, conspicue non dilatatae neque spinulosae, nonnumquam glanduloso-marginatae, subtus molliter pubescentes, superne glabratae. Rachis folii minute villosa vel tomentulosa, neque glanduloso-pilosa, saepe spinulosa. Foliola 5–9, ovalia vel obovata, obtusa, basi cuneata, modice serrata, 1.5–3 cm. longa, petiolulata, subtus molliter pubescentia, superne glabrata. Flores pallide rubicundi, 3–5 cm. lati, corymbosi. Receptaculum glabrum. Sepala interiora integra, exteriora lobata, lanceolata, singulis vel binis apicibus longis, linearibus, glabratis ornata, interne eoque magis marginaliter albido-lanata, tergo partis inferioris glanduloso-hispido. Fructus globularis, 1–1.5 cm. diametro. Partes plantae variae omnes valde confertae.

Stems 3–8 dm. high, about 1 cm. in diameter, light and dull ashy gray, unarmed or partly covered with numerous, unequal, rather weak, nearly straight prickles; the branches brightly dark mahogany colored, unarmed or with occasional weak prickles, very leafy. Stipules entire, not conspicuously dilated, not prickly, occasionally glandular-margined, soft-pubescent beneath, glabrate above. Leaf-rachis finely villous or tomentulose, without glandular hairs, often prickly. Leaflets 5–9, oval or obovate, obtuse, with cuneate base, not deeply serrate, 1.5–3 cm. long, petiolulate,

\* January 15, 1912.—Pages 153 to 168.

softly pubescent beneath, glabrate above. Flowers pale pink, 3-5 cm. wide, corymbose. Receptacle smooth. Sepals lanceolate with 1 or 2 long, linear, glabrate tips, the inner ones entire, the outer lobed, white-woolly within and still more on the margins, the back of the lower part glandular-hispid. Fruit globular, 1-1.5 cm. in diameter. All the different parts of the plant very crowded.

This species avoids the open prairie where *R. heliophila* reigns, selecting more protected quarters, as thickets, ravines, etc. The type was collected in a deep ravine at Butte, Benson County, in flower June 25, 1911, and in fruit August 28, 1911. The flowering season is confined to the latter three weeks of June for this and the other species here described, while it lasts for *R. heliophila* from May to September.

*Rosa gratiosa* sp. nov.

Caudices et rami paene inermes vel spinis tenuibus rectis longitudinis inaequalis vestiti, obscure fuscii. Stipulae amplae, marginibus undulatis, apicibus glanduloso-serrulatis, superne glabratae, subtus pubescentes vel glabratae. Rachis folii tomentulosa, setis et spinulis fortuito praedita. Foliola 5-9, ovalia vel obovata vel nonnulla fere orbicularia, plerumque basi cuneata, apicibus obtusis vel retusis, ampla, saepe 5 cm. longa et 3.5 cm. lata, petiolulata, serrata, ambobus lateribus glabrata, pubescentia nervorum et marginum minuta subtus vestita. Flores splendide et saturate rubicundi, 2.5-4 cm. lati, corymbosi vel solitarii. Receptaculum glabrum. Sepala apicibus longis glabratis integra, lanceolata, interne et marginaliter albido-lanata, tergo partis inferioris setis longis tenuiter sparsis magnopere glanduloso-hispido. Fructus globularis vel pyriformis, glaber, 1-1.5 cm. diametro.

Stems and branches nearly unarmed or covered with weak, straight prickles of unequal length, dark brown. Stipules ample, wavy-margined, glandular-serrulate at the apices, glabrate above, pubescent or glabrate beneath. Leaf-rachis tomentulose, with occasional setae and prickles. Leaflets 5-9, oval or obovate or some nearly circular, usually cuneate at base, with obtuse or notched apices, large, often 5 cm. long and 3.5 cm. wide, petiolulate, serrate, glabrate on both sides, with a minute pubescence on the nerves and margins beneath. Flowers of a brilliant deep pink, 2.5-4 cm. wide, corymbose or solitary. Receptacle smooth.

Sepals entire, with long, glabrate tips, lanceolate, white-woolly within and on the margins, the back of the lower part strongly glandular-hispid with long, scantily scattered setae. Fruit globular or pear-shaped, glabrous, 1-1.5 cm. in diameter.

This species inhabits the woodland of the Turtle Mountains and the thickly timbered banks of Souris River. The specimens selected as type were collected by the writer near St. John, Rolette County, on July 7, 1910, in flower, and on July 29, 1910, in fruit, both specimens from the same individual plant.

Both of the species just described belong to the *R. blanda* group, but their highest developed leaves have 9 leaflets, while *R. blanda* has never more than 7, and the latter has naked and entire stipules and larger flowers (sometimes 7 cm. broad). *R. subnuda* is a smaller plant with shorter woody and herbaceous branches, with stipules entire and soft-pubescent beneath, with the leaves and leaflets smaller and much more crowded and the latter softly pubescent beneath, the flowers of a lighter pink, all corymbose, and the outer sepals lobed, while *R. gratiosa* is taller, with larger branches, the stipules serrulate at the apex, leaflets larger, glabrate beneath, flowers a deep pink, corymbose or solitary, and the outer sepals entire. In general appearance this species comes nearer to *R. blanda* than *R. subnuda*.

#### *Rosa terrens* sp. nov.

Usque altitudinem 15 dm. crescens, caudicibus et ramis splendide obscuro-fuscis, spinas plerumque rectas longitudinis inaequalis uberrime gerens, quae praecipue in ramis sterilibus amplissimae et aspectu formidolosae fiunt. Stipulae late et glanduloso-serrulate alatae, glabrae vel glabratae. Rachis folii tomentulosa, spinis forsam armata. Foliola saturate viridia, obovata vel ovalia, obtusa, basi cuneata, usque paulum infra medium serrata, 2-3 cm. longa, petiolulata, subtus molliter pubescentia, superne glabrata, 7-11 (gemina infima minora, ubi margines superiores alarum stipulae rachi adiunguntur affixa, petiolulis eorum rachi parallele interdum currentibus; quorum foliolorum alterum saepe deest). Flores mihi ignoti, corymbosi. Sepala lanceolata, integra vel lobata, interne et marginaliter albidolana, tergo glanduloso-hispido. Fructus globularis, 1 cm. diametro.

Growing to a height of 15 dm., with stems and branches of a brilliant dark mahogany color, copiously armed with mostly straight

prickles of different size which especially on the sterile branches become very large and of a formidable appearance. Stipules with broad, glandular-serrulate wings, glabrous or glabrate. Leaf-rachis tomentulose with occasional prickles. Leaflets dark green, obovate or oval, obtuse, with a cuneate base, serrate to somewhat below the middle, 2-3 cm. long, petiolulate, softly pubescent beneath, glabrate above, 7-11 (the last pair smaller, attached where the upper margins of the wings of the stipule join the rachis, their petiolules sometimes running parallel to the rachis, one of these leaflets often wanting). Flowers not seen, corymbose. Sepals lanceolate, entire or lobed, white-woolly within and on the margins, glandular-hispid on the back. Fruit globular, 1-cm. in diameter.

Collected by the writer on a bare gravelly desert-like plain at Pleasant Lake, Benson County, on August 14, 1911.

*Rosa deserta* sp. nov.

Circiter 5 dm. alta, spinis mediocriter fortibus, sparsis, ferme rectis neque longitudine admodum variabilibus armata, caudices obscure cani, rami obscure fusci. Stipulae comparate amplissimae, integrae vel glanduloso-serrulatae, glabrae. Rachis folii glabra, spinulis forsan armata, propemodum capillaris. Foliola 7 (foliolis 1 vel 2 minoribus saepe additis et inter alas stipulae affixis), conspicue petiolulata, late vel anguste obovata, basi cuneata vel rotundata et apice obtusa, basi excepta serrata, 5-12 mm. longa, ambobus lateribus glabra. Pedunculi 0.5-1 cm. longi. Flores mihi ignoti, perparvi autem, ut conjici potest, corymbosi vel solitarii. Receptaculum glabrum. Sepala lanceolata, integra vel lobata, interne et marginaliter albido-lanata, tergo glanduloso-hispido et parallelo-venoso. Fructus ruber, globularis vel pyriformis, 6-10 mm. diametro.

About 5 dm. high, armed with moderately strong, scattered, nearly straight prickles, not very variable in size, the main stems a dull gray, the branches a dull brown. Stipules proportionately very ample, entire or glandular-serrulate, glabrous. Leaf-rachis glabrous with occasional prickles, almost capillary. Leaflets 7 (often with a single or a pair of smaller additional leaflets attached between the wings of the stipules), markedly petiolulate, broadly to narrowly obovate, with cuneate or rounded base and obtuse apex, serrate except at the base, 5-12 mm. long, glabrous on both

sides. Peduncles 0.5–1 cm. long. Flowers not seen, but presumably very small, corymbose or solitary. Receptacle smooth. Sepals lanceolate, entire or lobed, white-woolly within and on the margins, glandular-pubescent and parallel-veined on the back. Fruit red, globular or pyriform, 6–10 mm. in diameter.

Collected by the writer on a bare gravelly desert-like plain at Pleasant Lake, Benson County, on July 2 and August 14, 1911.

*Rosa heliophila foliosissima* var. nov.

Foliola minuta, sessilia, subsessilia vel petiolulata, 1–8. singula vel gemina, in rachi inter foliola solita dispersa.

Scattered on the rachis between the usual pairs of leaflets are 1–8 small leaflets, single or in pairs, sessile, subsessile or petiolulate.

Found by the writer in wet soil at Butte, Benson County, on August 28, 1911.

*Steironema pumilum longipedicellatum* var. nov.

Pedicelli 3–5 cm. longi, gracillimi, varie curvati (typici tantum 2–3 cm. longi).

While the pedicels of the type are 2–3 cm. long only, they are 3–5 cm. long in this variety, very slender, and curved variously.

Collected by the writer in high grass on low land along a couléé at Leeds, Benson County, on August 5, 1909.

*Rudbeckia flava perbracteata* var. nov.

Bracteae involucri amplae, 2.5–3 cm. longae (speciei 1.5–2 cm. longae), flores radiatos late transcendentis. Caulis ramosus, usque apicem foliosus, foliis amplitudine aequalibus.

Involucral bracts large, 2.5–3 cm. long (in the species 1.5–2 cm. long), far surpassing the rays. Stem branched, leafy to the top, with leaves of equal size.

Collected by the writer in rich soil at Butte, Benson County, on August 28, 1911.

*Thalictrum thyrsoideum silvanum* var. nov.

Caules de singulis vel binis fascibus radicum numerosarum, fibrosarum, carnosarum aequae vel perpendiculariter currentes saepe 1–3 dm. priusquam e solo emergunt, solitarii vel nonnulli, in plantis robustis de axillis ramosi, secus simplices. Folia am-

plissima, 2-4 (plerumque 3), inferiora petiolis 4-10 cm. longis, summum petiolo brevi, saepe 0.5 cm. solum longo ornatum vel etiam sessile. Foliola luxuriosa tertianos quoque lobos gerentes, specie minus glauca vel superne omnino viridia, in plantis juvenibus non florescentibus saepe amplissima. Achenia oblique oblongo-elliptica, matura 6-7 mm. longa. Mares floribus copiosioribus et inflorescentia quam feminarum ampliore abundant.

Stems from one to two tufts of numerous fibrous, fleshy roots running horizontally or vertically often 1-3 dm. before emerging from the ground, as in the species, solitary or several, branching from the axils in robust plants, else simple. Leaves very ample, 2-4 (mostly 3), the lower with petioles 4-10 cm. long, the uppermost leaf with very short, often only 0.5 cm. long petiole, or even sessile. Leaflets, when well developed, bearing even tertiary lobes, less glaucous than the species or the upper surface perfectly green, often of a remarkable size in young, non-flowering plants. Achenes obliquely oblong-elliptic, when well developed 6-7 mm. long, and if extremely well matured becoming quite plump and approximating the ovoid outline. The staminate plants with considerably more flowers and ampler inflorescence than the pistillate.

This magnificent variety is an inhabitant of the woodland, growing both in deep shade and in open woods, always exclusively in rich humus. It seldom fails to appear where these conditions prevail. It has been collected by the writer on the peninsula of Lake Ibsen and at Pleasant Lake, around Devil's Lake and in the Turtle Mountains, and I have exchange material in my herbarium proving that it has been found also in the southern parts of the state.

*Lacinaria scariosa subcorymbosa* var. nov.

Planta amplitudine media, circa 2.5 dm. alta; inflorescentia brevis, circiter 6 cm. longa, paucicapitata (typicarum capitulis 6), subcorymbosa.

This is a middle-sized plant, about 2.5 dm. high, with a short inflorescence, about 6 cm. long, and few heads (in the type plants 6), subcorymbosely arranged.

This variety, belonging to group I, is easily distinguished from var. *corymbulosa* Sheldon, which has a many-headed, protracted inflorescence on a tall stem, and from my var. *subcymosa*, which has petioled leaves of the upper series.

Collected by the writer in dry soil at Leeds, Benson County, on August 25, 1907. An "artificial" form of this variety is produced whenever the growth is arrested at the top of the plant.

Leeds, North Dakota.

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## NEW PLANTS FROM MINNESOTA—II.

By J. LUNELL.

### *Tradescantia ramifera* Chandonnetii var. nov.

Caulis solitarii vel duo, gracillimi, internodiis valde remotis (saepe 1.5 dm.). Bractae plerumque 3. Semina formam mitrae habent, 2.5–3 mm. longa, 1.5–2 mm. lata, formae typicae haud dissimilia.

Stems solitary or two, very slender, distance between the internodes very long (often 1.5 dm.). Bracts mostly 3. The seeds have the outline of a mitre, are 2.5–3 mm. long, and 1.5–2 mm. broad, and do not differ from those of the type.

This variety, also resembling the type in the tendency towards repeated branching, was collected by Rev. Father Z. L. Chandonnet on the prairie of Perham, Ottertail County, Minn., on the 26th of June 1911.

### *Laciniaria scariosa* var.

Since the publication in this journal of my paper on varieties of *Laciniaria scariosa* in North Dakota I received from Rev. Father Z. L. Chandonnet of Perham, Minn., a fascinating set of Minnesota varieties belonging to this species, all the specimens having been collected by himself. The study of them caused me to recognize that they belong to a group essentially different from the group comprehending all the North Dakota varieties (except v. *opima*, which differs from its Minnesota kin only by its short and broad leaves). The new group has the following characters, and will be classified as

*Group III* Stems 6–11 dm. high. Lower series of leaves long-petioled, mostly narrowly lanceolate, upper series linear or nearly so. Heads numerous, 20–90 or more, in a simple or branched raceme, occupying 1–3 to 1–2 or sometimes even 4–5 of the whole stem.

## Clavis analytica varietatum.

- A. Folia series inferioris folia quaedam in caule altiora super-scandentia ..... I. var. *superscandens*
- A. Nullum folium inferius quidquam in caule altius folium superscandens.
- a. Folia series inferioris ampla, longi-petiolata, valde remota
- b. Caulis simplex.
- c. Flores subsessiles vel pedicellis brevibus longioribusve, adscendentibus..... 2. var. *praecellens*
- c. Flores pedicellis reclinatis... 3. var. *nictitans*
- b. Caulis ramosus, floribus ramorum sessilibus vel brevi-pedicellatis..... 4. var. *ramea*
- a. Folia series inferioris amplitudinem modicam neque petiolos tam longos praebentia, magis minusve remota..... 5. var. *porrecta*
- a. Folia series inferioris linearia vel lineari-lanceolata, amplitudinem modicam, petiolos angustos, nonnihil breves praebentia, nec non appropinquata.
- b. Caulis simplex..... 6. var. *propinqua*
- b. Caulis partibus usque 4 superioribus e 5 ramosus..... 7. var. *brachiata*
- a. Folia linearia, brevia caule toto usque inflorescentiam conferta, infima petiolis brevibus, cetera omnia sessilia.
- b. Flores brevi-pedicellati vel subsessiles..... 8. var. *Chandonnetii*
- b. Flores in pedicellis mediocribus positi.. 9. var. *obesa*

## Key of varieties.

- A. Leaves of the lower series overtopping some leaves borne higher up on the stem..... I. var. *superscandens*
- A. No lower leaf overtopping any borne higher on the stem.
- a. The leaves of the lower series large, long-petioled and very distant.
- b. Stem simple.
- c. Flowers subsessile, or on short or rather long, ascending pedicels. 2. var. *praecellens*



- c. Flowers nodding, on recurved pedicels.....3. var. *nictitans*
- b. Stem branched, with sessile or short-pedicelled flowers on the branches.... 4. var. *ramea*
- a. The leaves of the lower series middle-sized, with shorter petioles, more or less distant.. 5. var. *porrecta*
- a. The leaves of the lower series linear or linear-lanceolate, of moderate length, with narrow petioles, quite short, rather approximate.
  - b. Stems simple.....6. var. *propinqua*
  - b. Stems branched even as low down as to the lowest 1-5 of the stem....7. var. *brachiata*
- a. The leaves linear, short and crowded along the whole stem up to the inflorescence, the lowest on short petioles, all others sessile.
  - b. Flowers short-pedicelled or subsessile.....8. var. *Chandonnetii*
  - b. Flowers borne on pedicels of moderate length.....9. var. *obesa*

The var. *superscandens* is a very slender plant with very distant and long-petioled leaves of the lower series, which occupies  $\frac{1}{3}$  of the stem beneath the very narrow raceme. The corresponding North Dakota variety is var. *supereminens*. It was collected in dry sandy soil at Staples, Todd County, on August 29, 1911.

The var. *praecellens* is an unusually stout, luxuriant plant, with thick, strong stem, leaves of the lower series uncommonly large and leathery, and the involucre heads subsessile or short-peduncled and in well developed plants exuberant, often numbering 30 or more. The corresponding North Dakota variety is var. *praestans*. The type specimen was collected in dry, red sand at Perham, Ottertail County, on August 22, 1911.

The var. *nictitans* is an elegant form with its arcuate, reclinate pedicels, 1-2.5 cm. long. It was collected in dry, sandy soil at Staples, Todd County, on August 29, 1911.

The var. *ramea* has its lower branches 5 cm. long and few-flowered. One plant has a corymbose inflorescence, probably on account of defective growth of the top. The type's inflorescence

is a thyrus, narrow at the top, widened at the base. It was collected in dry, sandy soil at Staples, Todd County, on August 9, 1911.

The var. *porrecta* is usually slender and middle-sized, and somewhat variable. The corresponding North Dakota variety is var. *multiplex*. The type was collected at Staples, Todd County, on August 9, 1911. Another form from Wanbun, Mahnomen County, collected July 28, 1911, has ampler foliage.

The var. *propinqua* has the var. *angustata* of North Dakota as its nearest corresponding form. The type was collected at Staples, Todd County, on August 9, 1911, and a form with ampler leaves from Wanbun, Mahnomen County, bears the date of July 28, 1911.

The var. *brachiata* has a multitude of flower-bearing branches, 1-1.5 dm. long. The type, being available only as a single plant, has a broad, thyrroid or almost corymbose inflorescence, probably caused by arrested or deficient growth at the apex of the stem. This condition may be partly accountable for the extraordinary length of the branches. Collected in dry, sandy soil at Staples, Todd County, on August 29, 1911.

The var. *Chandonnetii* is a signally beautiful form with its profusion of narrow leaves, the radical 8 cm. and beneath the inflorescence 2.5 cm. long, and its narrow, compact inflorescence. It was collected in dry, sandy soil at Staples, Todd County, on August 29, 1911.

The var. *obesa* is a much stouter plant, with thicker stem, thicker, larger leaves, the radical 8 cm. long, the lower in the inflorescence 6 cm. long, the uppermost bract-like, 1 cm. long. Heads about 90. Inflorescence up to 6.5 dm. long, conspicuously pedicelled, the lowest ones often reaching a length of 5 cm. The corresponding North Dakota plant is var. *opima*. Collected in dry, sandy soil at Staples, Todd County, on August 29, 1911.

While in North Dakota differences in soil constituents, moisture and elevation are the essential factors in the creation of the different varieties, in Minnesota the all-important condition seems to be a dry, sandy soil, and Staples appears to be for this *scariosa*-group the ideal locality and the real paradise.

## A NEW LACINIARIA FROM FLORIDA.

By J. LUNELL.

*Laciniaria Deamiae* sp. nov.

Caules 1-4, 3-7.5 dm. alti, foliosissimi. Folia radicalia anguste lanceolata, longipetiolata, saepe longitudinem 1.5 dm. obtinentia. Folia caulina series inferioris omnino basilaria, caulem infimum supra tuber quasi verticillatim cingentia, perpauca, linearilanceolata, infra medium angustata in petiolum alatum gracilem decurrentia, non ciliata, apice acuminato, 0.5-1 dm. longa, 2-6 mm. lata. Folia series superioris parva, anguste linearia, valde numerosa, infima 3 cm. longa, sursum sensim reducta, infra inflorescentiam 1.5 cm. longa, vel per totum caulem aequalia, vel caule medio longiora quam ambobus extremitatibus. Spica angusta, densissima, 1.5-3.5 dm. longa. Capitula 8-12 mm. longa, pauciflora, congesta. Bracteae involucri oblongo-lanceolatae, dorso viridi et marginibus purpureis vel viridibus, scariosis, non ciliatis, et apicibus rectis, acutis, mucronatis. Achenia 5 mm. longa, dense pubescentia. Setae pappi minutatim barbellulatae.

Stems 1-4, 3-7.5 dm. high, very leafy. Radical leaves narrowly lanceolate, on long petioles, often reaching 1.5 dm. in length. Stem leaves of the lower series strictly basal, forming a rosette at the end of the stem immediately above the tuber, comparatively few, linear-lanceolate, not ciliate, narrowed below the middle into a slender margined petiole, acuminate at the apex, 0.5-1 dm. long, 2-6 mm. wide. The upper series has small, narrowly linear, very numerous leaves, above the rosette 3 cm. long, very gradually becoming shorter upwards, 1.5 cm. long just below the inflorescence, or having the same length throughout, or longer at the middle of the stem than toward the inflorescence and the lower end. Spike narrow, very dense, 1.5-3.5 dm. long. Heads 8-12 mm. long, few-flowered, crowded. Involucral bracts oblong-lanceolate, with green back and purple or green, scarious margins, not ciliate, and with straight, acute, mucronate tips. Achenes 5 mm. long, densely pubescent. Pappus-bristles minutely barbellulate.

This beautiful new species growing on sandy wastes in the vicinity of St. Petersburg, Florida, where it was seen in abundance near the railroad track, was collected by Mrs. Chas. C. Deam of

Bluffton, Indiana, on September 23, 1907, and it bears her number 2804. Mrs. Deam has given a special interest to Florida plants, and her explorations have resulted in a fine and varied representation from that state in her herbarium. The species was named in her honor.

Leeds, North Dakota.

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### NOTES ON LOCAL PLANTS.

By J. A. NIEUWLAND.

In the July number of *Rhodora*\* Dr. Fernald excludes both *Aster macrophyllus* Linn. and *Thuja occidentalis* from Indiana. Maps illustrating the distribution of both are given and show that these plants are not to be looked for even in Michigan within thirty miles or so north of the boundary of our state. As a matter of fact I have in the course of my botanizing trips, found *Aster macrophyllus* in several places in Indiana, notably at Chain Lakes a good ten miles south of the Michigan boundary.

There is a *Thuja-Larix* swamp directly north of Mineral Springs, Indiana, less than a mile from Lake Michigan at the edge of the dune region, and about half way between Dune Park, Indiana and Michigan City. The *Tamarack-Arbor-vitae* swamp is on the eastern boundary of a notable region in which are found not only the ordinary dune plants of our inland lakes, but some not to be found elsewhere in our region except in the stretch from there to the Indiana-Illinois boundary. Among these plants is *Opuntia humifusa* Raf. The plant is found nowhere in our region except in the locality mentioned and it is very abundant there. It is probably protected from our severe frosts by the fact that, securely hidden between the dunes, the cold north winds tempered by passing over Lake Michigan between the rifts of the hills partly cover up the plants with sand and snow, thus keeping out the severe cold that would otherwise and elsewhere in our locality destroy them.

Other plants peculiar to this region are *Schmaltzia arenaria* Greene, *Typha angustifolia* Linn., and *Hypericum kalmianum*

\* Fernald, M. L. Expedition to Newfoundland and Labrador. *Rhodora*, vol 13, No. 151, p. 142, July, 1911.

Linn. Several species have not been reported from elsewhere among these *Persicaria lonchophylla* Greene, a very remarkable amphibious Smartweed, because there is such a notable difference between the short aquatic and the very long narrow terrestrial leaves.

The Arbor-vitæ trees are not in the best of condition as it is evident that the tamaracks are getting the better of them, and, moreover, there is a drainage ditch a few hundred yards from the edge of the growth of trees.

The whole swamp mentioned above will of course soon succumb to the active attempts at rescuing land for farming purposes. Dozens of plants are now extinct in our region never to return, because their peculiar habitats are gradually disappearing. I have not found *Cypripedium candidum* since 1896, and there are now only two places where *Cypripedium acaule*, the stemless Lady's slipper is found within forty miles of South Bend north and south and some farther west. Both these localities are being drained also. I have not found *Oxycoccus*, the Cranberry in St. Joseph county. *Drosera rotundifolia*, the Sundew, too is extinct here and it is only a question of a few years until *Sarracenia purpurea*, the Pitcher Plant, will have disappeared entirely. It would seem that some effort ought to be made on the part of our local nature students to save such interesting and beautiful examples of plant life as those mentioned, and of *Cypripedium Reginae* the Showy Lady's Slipper, and *Calopogon pulchellus*, the Grass Pink. I know only a few places where even these are found in Northwestern Indiana and Southern Michigan. The disappearance of the Passenger Pigeon once so plentiful, together with the futile attempts at finding it again ought to teach the lesson that it is too late to close the cage when the bird is gone.

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#### OUR SONG BIRDS.—IV.

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By BROTHER ALPHONSUS, C. S. C.

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##### KILLDEER.

##### *Aegialitis vocifera.*

One of the earliest notes in spring, the Killdeer's call is heard until late in autumn. There are few sounds in nature more pleasing

than the repeated *kill-dee* of this plover. The bird flies high, uttering its notes as it proceeds. The Killdeer is often heard after dark.

SCARLET TANAGER.

*Piranga erythromelas.*

The robin-like notes of this very beautiful bird are heard in the tall trees of secluded woods. The notes are less musical than those of the Robin. Its call-note is one of the most pleasing of any of our birds. The Tanager sings all summer.

CARDINAL.

*Cardinalis virginianus.*

This rare and beautiful bird's loud, whistling notes may be heard in trees that border rivers and lakes. It is an early arrival, when its song begins and is heard until the end of summer. By one who has never heard the Cardinal, its whistle will likely be taken for that of a human being.

MORNING DOVE.

*Zenaidura macroura.*

Perhaps the saddest note of all our song birds, the cooing of the Dove is a common summer sound in groves, especially those of evergreen trees. In the sombre gloom of spruce or pine, the note of this species seems in perfect harmony with the bird's surroundings.

HOUSE WREN.

*Troglodytes aedon.*

This little songster of the garden is a prime favorite of all bird-lovers. Late in April his song is first heard and—as there are several broods—the singing, like the Robin's, lasts till August. Sitting on some outhouse, the wren will sing as if its throat would burst.

BOBWHITE.

*Colinus virginianus.*

This well-known game bird has a loud, clear whistle. In spring, the two notes sound quite like the bird's name; at other seasons one long note is heard. Like the Cardinal, the whistle of Bobwhite will deceive a person little acquainted with the songs of birds.

(To be continued.)

## MIGRATION OF OUR BIRDS IN THE SPRING OF 1911.

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By BROTHER ALPHONSUS, C. S. C.

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A number of species showed during three successive seasons great regularity in the dates of their arrival. The Bluebird's dates were: '09, Mar. 1; '10, Feb. 22; '11, Feb. 23. The Robin's were: '09, Mar. 2; '10, Mar. 4; '11, Feb. 25; The Killdeer's were: '09, Mar. 9; '10, Mar. 4; '11, Mar. 9. The Purple Grackle's were: '09, Mar. 7; '10, Mar. 6; '11, Mar. 9. The Meadowlark's were: '09, Mar. 5; '10, Mar. 6; '11, Mar. 9. The Song Sparrow's were: '09, Mar. 6; '10, Mar. 5; '11, Mar. 9. It will be noticed that the above species in the several seasons, from '09 to '11, arrived on dates relatively near each other. This fact would seem to indicate that those species were in their migrations governed by the same conditions in the weather. I think that the observations of all ornithologists have convinced them that the state of the weather is the determining cause of the movements of all migratory birds.

In the following list, several species showed during the same seasons considerable difference in the dates of their arrival. The Kingfisher's dates were: '09, Apr. 3; '10, Mar. 30; '11, Mar. 22, with 12 days between the earliest and latest dates. The Vesper Sparrow's were: '09, Apr. 5; '10, Mar. 26; '11, Apr. 9, with a difference of 14 days. The Flicker's were: '09, Apr. 5; '10, Mar. 24; '11, Apr. 5, difference of 12 days. The Red-headed Woodpecker's were: '09, Apr. 20; '10, Apr. 4; '11, Mar. 18, a difference of 33 days. When the time is longer than 14 days, I think the observer has failed to note the actual dates of arrival.

An interesting fact disclosed itself to the writer last winter in the absence of the Snowbird, from Jan. 29 to Mar. 18, 51 days. Did the bird migrate during this time from a large region or was it only locally absent? Of course, as my observations covered only a small extent of territory, I can not answer this question. Neither could I assign a reason for such a migration of this species.

The reader will wonder, probably, at the small number of warblers seen by the writer this spring. One of the reasons, doubtless, why he saw so few was the extremely warm weather of May, which, he thinks, caused these species to hasten their northern migration. Even during other springs, most of the warblers were seen only for a few days.

Other species not seen this spring were: Rose-breasted Grosbeak, Yellow-throated Vireo, Humming-bird, Least Flycatcher, Hairy Woodpecker, Snipe, Yellowlegs, Bittern, Sparrow Hawk.

Feb. 10,	Brown Creeper;	Feb. 23,	Bluebird;	Feb. 25,	Robin
Mar. 9,	Song Sparrow	Mar. 18,	Red-headed woodpecker		
" 9,	Meadowlark	" 18,	Snowbird		
" 9,	Purple Grackle	" 21,	Field Sparrow		
" 9,	Killdeer	" 22,	Golden-crowned Kinglet		
" 9,	Red-winged Blackbird	" 22,	Kingfisher		
" 10,	Canada Goose	" 22,	Phoebe Bird		
" 11,	Herring Gull	" 24,	Mourning Dove		
		" 30,	Chipping Sparrow		
Apr. 1,	Winter Wren	Apr. 23,	White-throated sparrow		
" 5,	Flicker	" 25,	Ruby-crowned Kinglet		
" 6,	Goldfinch	" 25,	Redstart		
" 8,	Fox Sparrow	" 26,	Barn Swallow		
" 8,	Towhee	" 26,	Myrtle Warbler		
" 9,	Purple Finch	" 26,	Sandpiper		
" 9,	Vesper Sparrow	" 27,	Maryland Yellowthroat		
" 11,	Hermit Thrush	" 27,	Yellow Warbler		
" 11,	Yellow-billed sapsucker	" 29,	House Wren		
" 16,	Brown Thrasher	" 30,	Warbling Vireo		
" 17,	Loggerhead Shrike	" 30,	Kingbird		
" 17,	Hell Diver	" 30,	Yellow Palm Warbler		
May ' 1,	Nighthawk	May ' 10,	Crested Flycatcher		
" 2,	Catbird	" 10,	Olive-backed Thrush		
" 3,	Baltimore Oriole	" 10,	Dickcissel		
" 3,	Chimney Swift	" 15,	Scarlet Tanager		
" 7,	Bobolink	" 17,	Red-eyed Vireo		
" 7,	Cardinal	" 17,	Indigo Bird		
" 7,	Purple Martin	" 20,	Yellow-billed Cuckoo		
" 8,	Orchard Oriole	" 28,	Alder Flycatcher		
" 8,	Whip-poor-will	" 31,	Cedarbird		
" 10,	Wood Pewee	June 18,	Bobwhite		

Total number of migrants seen, 61.



# THE AMERICAN MIDLAND NATURALIST

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that of the Prairie States

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## SOME NEW LACINIARIAE.

BY J. LUNELL.

### *Laciniaria Deamii* sp. nov.

Caulis 7 dm. altus, simplex, strictus, gracilis. Folia caulina series inferioris 1-1.5 dm. longa (vel longiora), dispersa, lanceolata, in petiolum quam limbum bis breviorum angustata, series superioris reducta, linearia vel lineari-lanceolata, in caule medio conferta, superne nonnihil remota. Inflorescentia racemus spicae sub-similis, 2 dm. longa, haud conferta, capitula circiter 20 pedicellis 0.5 cm. longis ornata. Involucra cylindraco-campanulata, 10 mm. alta, 5 mm. lata. Bractea externa herbacea, aliquantulum acuminata, deflexa, mediae late spatulatae vel rhombico-ovatae, obtusae, marginibus purpureis, integris, partim scariosis, internae oblongae, angustae, obtusae, marginibus purpureis, scariosis, integris vel nonnihil erosis. Totum capitulum 15 mm. altum. Setae pappi barbellulatae.

Stems 7 dm. high, simple, strict and slender. Stem leaves of the lower series 1-1.5 dm. long or longer, scattered, lanceolate, narrowed into a petiole occupying  $\frac{1}{3}$  of its length; those of the upper series reduced, linear to linear-lanceolate, crowded on the middle of the stem, somewhat distant higher up. Inflorescence a raceme 2 dm. long, spike-like, not crowded, with about 20 heads on pedicels 0.5 cm. long. Involucres cylindric-campanulate, 10 mm. high, 5 mm. wide. Outer bracts herbaceous, somewhat acuminate, spreading, the middle broadly spatulate or rhombic-ovate, obtuse, with purplish, entire, somewhat scarious margins, the inner oblong, narrow, obtuse, with purplish, scarious, entire

\* March 18, 1912.—Pages 169 to 200.

or somewhat erose margins. The whole head 15 mm. high. Pappus-bristles barbellulate.

This species differs from *L. scariosa* principally by its narrow cylindric-campanulate involucre.

Named in honor of and collected by Mr. Chas. C. Deam at the base of open dunes, south-east of Indiana Harbor, Lake County, Ind., on Sept. 23, 1906, the type bearing his number 1747.

#### *Laciniaria scariosa* var.

My paper on the different manifestations of *L. scariosa* in North Dakota was later followed by another paper on this species in Minnesota. I have still on hand the material belonging to Mr. Chas. C. Deam of Bluffton, Ind., and the editor of this journal has kindly placed the *Laciniaria* collection of the University of Notre Dame at my disposal. Thus armed I herewith make an attack on the species in general, independently of state limitations, and while the keys already published may be useful locally, the following general key, covers all the material hitherto studied by me. Perhaps here also is the proper occasion to make known that I am unwilling to give any positive statements regarding the prospects for future additions to it.

*Series I.* Caules pubescentes, 1-5 dm. alti, solitarii vel aggregati, simplices. Inflorescentia racemus brevis, capitula 1-12. Bractee obtusae, virides marginibus purpureis, scariosis, erosis, externae orbiculares, mediae late spatulatae, internae oblongae.

*Group I.* Stems pubescent, 1-5 dm. high, single or tufted, simple. Inflorescence a short raceme, heads 1 to 12. Bracts obtuse, green, with purple, scarious, erose margins, the outer orbicular, the middle broadly spatulate, the inner oblong.

To this group belong all the North Dakota varieties, described on pages 90-94 of this volume (except var. *opima*), var. *scalaris*, described on page 127 *ibid.*, and var. *subcorymbosa*, described on page 158 *ibid.*, and recognized from all the others by its different inflorescence. All of them have involucre 1-2.5 cm. wide, except var. *praestans* which belongs to the large-headed varieties, having its involucre 1.5-3 cm. wide.

*Series II.* Caules pubescentes vel glabrati, 3-16 dm. alti, solitarii vel aggregati, simplices vel ramosi. Inflorescentia capitulorum 12-90 in racemo vel spica elongata, compacta vel inter-

rupta. Bractee obtusae vel acutulae, virides vel nigrescentes, marginibus pallidis vel purpureis, scariosis, erosis, externae late ovales vel oblongae, mediae spatulatae, internae late lineares.

*Clavis analytica varietatum generalis.*

- A. Folia series inferioris folia quaedam in caule altiora superscandentia.
  - a. Folia series inferioris inflorescentiam non attingentia.
    - b. Folia series inferioris anguste lanceolata, tenuia; involucria brevipedicellata . . . 1. var. *superscandens*.
    - b. Folia series inferioris late lanceolata, ampla; involucria sessilia vel subsessilia . . . 23. var. *praesignis*.
  - a. Folia series inferioris inflorescentiam inferiorem attingentia vel superscandentia . . . 10. var. *superans*.
- A. Nullum folium inferius quidquam in caule altius folium superscandens.
  - a. Folia series inferioris ampla, longipetiolata, valde remota.
    - b. Caulis simplex.
      - c. Involucria ampla, 1.5-3 cm. lata, subsessilia, vel pedicellis brevibus longioribusve, adscendentibus.
        - d. Capitula subsessilia in spica densa, bracteis magis scariosis, brevibus, achenia 6 mm. longa . . . . . 2. var. *praecellens*.
        - d. Capitula bracteis foliosis, longioribus, pedicellis longioribus vel brevioribus, in racemo amplo, achenia 4 mm. longa . . . . . 11. var. *Nieuwlandii*.
      - e. Caulis brevis, racemus brevis, paucicapitatus . . . . . 12. forma *borealis*.
      - e. Bractee atrato-purpureae . . . . . 13. forma *versicolor*.
      - e. Tota planta protracta; longissima . . . . . 14. forma *gracillima*.
    - c. Capitula 1.5 cm. lata, reclinata
      - d. Pedicelli 0.5-1 cm. longi . . . . . 15. var. *salutans*.
      - d. Pedicelli 1-2.5 cm. longi . . . . . 3. var. *nichitans*.
  - c. Capitula 1-1.5 cm. lata, pedicellis erectis, brevibus, vel subsessilia.

- d. Folia series superioris in petiolos angustata.
- e. Inflorescentia racemus longus, spicae similior.....16. var. *petiolata*.
- e. Inflorescentia brevis, subcorymbosa.....17. var. *subcymosa*.
- d. Folia series superioris in petiolos non angustata.
- e. Inflorescentia racemus longus, spicae similior, capitulis in parte quadam rachidis subcorymbosis.....18. var. *corymbulosa* Sheldon.
- e. Inflorescentia racemus longus, spicae similior, capitulis subcorymbosis non interruptus.
- f. Series ambo foliis brevibus, oblongo-lanceolatis.....19. var. *virginiana*
- f. Folia series inferioris elongata, lanceolata, racemi longissimi, non interrupti, capitulis aequaliter remotis, brevipedicellatis.....20. var. *strictissima*
- f. Folia series inferioris valde elongata, lanceolata, valde dispersa, capitula sessilia, in spica angusta, interrupta, inaequaliter disposita..21. var. *virgata*
- b. Caulis ramosus, capitulis ramorum sessilibus vel brevipedicellatis.....4. var. *ramea*
- a. Folia series inferioris amplitudinem modicam neque petiolo tam longos praebentia, magis minusve remota.
- b. Inflorescentia racemus multicapitatus, elongatus, capitula bracteis late spatulatis vel oblongis, subsessilia.....5 var. *porrecta*
- b. Inflorescentia racemus brevis, paucicapitatus, capitula bracteis anguste spatulatis vel linearibus.....22. var. *Novae-Angliae*.
- a. Folia series inferioris amplitudinem modicam neque petiolo tam longos praebentia, lanceolata vel anguste lanceolata, nec non

- appropinquata.....24. var. *intermedia*.  
 a. Folia series inferioris linearia vel lineari-  
 lanceolata, amplitudinem modicam, petiolos  
 angustos, nonnihil breves praebentia, nec  
 non appropinquata.  
   b. Caulis simplex.....6 var. *propinqua*  
   b. Caulis partibus usque 4 superioribus e 5  
     ramosus.....7 var. *brachiata*  
 a. Folia brevia, in caule toto usque inflores-  
 centiam conferta, infima petiolis brevibus,  
 cetera omnia sessilia.  
   b. Folia angusta, capitula brevipedicellata  
     vel sessilia.....8 var. *Chandonnetii*  
   b. Folia angusta, capitula in pedicellis medi-  
     ocribus posita.....9. var. *obesa*  
   b. Folia latiora, capitula in pedicellis medi-  
     ocribus posita.....var. *opima*

*Group II.* Stems pubescent or glabrate, 3-16 dm. high, single or tufted, simple or branched. Inflorescence in an elongated, compact or interrupted spike or raceme of 12-90 heads. Bracts obtuse or acutish, green or blackish, with pale or purple, scarious, erose margins, the outer broadly oval or oblong, the middle spatulate, the inner broadly linear.

- A. Leaves of the lower series overtopping some  
 leaves borne higher up on the stem.  
   a. Leaves of the lower series not reaching  
     up to the inflorescence.  
     b. Leaves of the lower series narrowly lan-  
       ceolate, rather small; involucre with  
       short pedicels.....1. var. *superscandens*  
     b. Leaves of the lower series broadly lan-  
       ceolate, large; involucre sessile or sub-  
       sessile.....23. var. *praesignis*  
   a. Leaves of the lower series reaching or over-  
     topping the lower part of the inflorescence...10 var. *superans*  
 A. No lower leaf overtopping any borne higher  
 up on the stem.  
   a. Leaves of the lower series large, longpetioled  
     and very distant.

- b. Stems simple.
  - c. Involucres large, 1.5-3 cm. wide, subsessile or on short or rather long, ascending pedicels.
    - d. Heads subsessile in a dense spike, with more scarious, shorter bracts, achenes 6 mm. long..... 2. var. *praccellens*
    - d. Heads with foliaceous, longer bracts, on shorter or longer pedicels, in an ample raceme, achenes 4 mm. long..... 11. var. *Nieuwlandii*
    - e. Stem short, raceme short, few-headed..... 12. forma *borealis*
    - e. Bracts blackish purple..... 13. forma *versicolor*
    - e. The whole plant very slender and protracted..... 14. forma *gracillima*
  - c. Involucres 1.5 cm. wide, nodding.
    - d. Pedicels 0.5-1 cm. long..... 15. var. *salutans*
    - d. Pedicels 1-2.5 cm. long..... 3. var. *nictitans*
  - c. Involucres 1-1.5 cm. wide, on erect, short pedicels, or subsessile.
    - d. Leaves of the upper series narrowed into petioles.
      - e. Inflorescence a long, spike-like raceme..... 16. var. *petiolata*
      - e. Inflorescence short, subcorymbose..... 17. var. *subcymosa*
    - d. Leaves of the upper series not narrowed into petioles.
      - e. Inflorescence a long, spike-like raceme with its heads on some part of the rachis subcorymbose..... 18. var. *corymbulosa* Sheldon
    - e. Inflorescence a long, spike-like raceme without any subcorymbose interruption.
      - f. Both series with short, oblong-lanceolate leaves..... 19. var. *virginiana*
      - f. Leaves of the lower series elongated, lanceolate, racemes very



- long, not interrupted, with equally distant, shortpedicelled heads. . . . . 20. var. *strictissima*
- f. Leaves of the lower series very elongated, lanceolate, very scattered, heads sessile, unequally arranged in a narrow, interrupted spike. . . . . 21. var. *virgata*
- b. Stems branched with sessile or shortpedicelled heads on the branches. . . . . 4. var. *ramca*
- a. Leaves of the lower series middle-sized, with shorter petioles, more or less distant.
- b. Inflorescence a many-headed, elongated raceme with subsessile heads, having broadly spatulate or oblong bracts. . . . . 5. var. *porrecta*
- b. Inflorescence few-headed in a short raceme, heads with narrowly spatulate or linear bracts. . . . . 22. var. *Novae-Angliae*
- a. Leaves of the lower series middle-sized, with shorter petioles, lanceolate or mostly narrowly lanceolate, rather approximate. . . . . 24. var. *intermedia*
- a. Leaves of the lower series linear or linear-lanceolate, of moderate length, with narrow, quite short petioles, rather approximate.
- b. Stems simple. . . . . 6. var. *propinqua*
- b. Stems branched even as low down as to the lowest 1-5 of the stem. . . . . 7. var. *brachiata*
- a. Leaves short and crowded along the whole stem up to the inflorescence, the lowest on short petioles, all others sessile.
- b. Leaves narrow, heads on short pedicels or subsessile. . . . . 8. var. *Chandonnetii*
- b. Leaves narrow, heads on moderately long pedicels. . . . . 9. var. *obesa*
- b. Leaves broad, heads on moderately long pedicels. . . . . var. *opima*

The var. *praesignis* has its upper leaves of the upper series small, bract-like, the lower ones lanceolate, crowded on the stem and in a striking contrast to the lanceolate or broadly lanceolate large leaves of the lower series, which rise higher than the lower

ones of the upper series and sometimes overtop most of its leaves, though they do not reach the inflorescence. Its heads are quite small-sized and subsessile, often in a long, spike-like raceme. It is a handsome variety, and was collected by Mr. Chas. C. Deam in Warren County, Ind., on the top of the sandstone bluffs of Pine Creek, 2 miles above Mudlavia, Sept. 11, 1911, bearing his number 9986.

The var. *superans* is about 3 dm. high, with a lax, narrow spike of short-pedicelled or subsessile heads occupying  $\frac{1}{2}$ - $\frac{1}{3}$  of the stem. The type was collected by W. W. Calkins, on August 5, 1876, at Black River, Wis., as *Liatris spicata*, bears his number 869, and belongs to the University of Notre Dame herbarium.

The var. *Nieuwlandii*. Stem not unusually 1 m. high, simple or even branched (then with few-headed branches), with a few-headed, short-pedicelled, narrow, short inflorescence to an ample, many-headed, long-pedicelled or long-branched one, and with an ample, brilliant green foliage. This color is so striking that it enables one easily to distinguish this variety from its relatives. Involucral bracts bright green over the whole surface, or with narrow, mostly almost entire purple margins. The name is in honor of Prof. Nieuwland. One of his plants, numbered 406 and collected at Notre Dame, Ind., has an almost corymbose inflorescence. Mr. Deam has a varied, excellent selection of this plant from a number of places in Indiana, marvelously showing its different phases. I believe this variety surpasses all its kin in magnificence. I thought that the following forms perhaps would deserve separate names: 1. forma *borealis*, whose short stem and short, few-headed raceme bespeak its northern origin (no. 1680, Herbarium of the University of Notre Dame), collected by Prof. Nieuwland at Detroit, Mich.; 2. forma *versicolor* with its blackish purple bracts, collected by Mr. Chas. C. Deam in various places of Indiana, in sunny, exposed localities; and 3. forma *gracillima*, remarkably long and slender, collected by Mr. Chas. C. Deam on prairie soil in Steuben Co., Indiana.

The distinguished var. *salutans* has its type located in Mr Deam's herbarium, for which it has been acquired from Biltmore Herbarium, collected Sept. 23, 1903, near Houston, Harris Co., Texas, bearing its number 2670j, and named *L. scariosa*.

The var. *petiolata* is usually a tall, slender plant, with rather long, narrow, often falcate and often perfectly glabrous leaves

of the upper series. All Mr. Deam's specimens come from Steuben Co., Ind.

The var. *subcymosa* has also unusually long, linear and falcate leaves of the upper series. The type belongs to the herbarium of the University of Notre Dame, bearing its number 6659, and was collected in Sept. 1876 by W. W. Calkins in Cook Co., Ill.

Regarding the var. *corymbulosa* Sheldon I refer to its author's description.

The var. *virginiana* with its rather narrowly hemispherical heads is a fine representative from Greenbier Co., West Virginia, where it was collected by Mr. K. K. Mackenzie in August 1903, recognizable by his number 363 in Mr. Deam's herbarium as type specimen.

The var. *strictissima* appears to be a prairie plant of wide distribution, Mr. Deam having one specimen from Steuben Co., Ind. (with 6 mm. long achenes), University of Notre Dame (no. 5392) one sheet from W. W. Calkins collection dated Aug., 1907, Berwyn, Ill., another collected by F. E. McDonald, Peoria, Ill., Aug. 1904 (type), both the latter ones named *L. scariosa*, lastly one collected by B. F. Bush at Lee's Summit, Mo., Sept. 1906 (his number 4057).

The var. *virgata*, nearly related to the last variety, is of the Fitz-Fitzpatrick collection, and the type, grown on the prairie of Johnson Co., Iowa, is incorporated with the Chas. C. Deam herbarium.

The var. *Novae-Angliae* resembles closely the var. *multiplex* of the North Dakota group, but differs in its bracts. Bearing the serial number 5391 in the University of Notre Dame herbarium, the type was collected as *L. squarrosa* Willd. by A. H. Young in Sept., 1874, at New Haven, Conn.

The var. *intermedia*, resembles var. *angustata* and var. *propinqua* in having its leaves rather approximate. It stands near to v. *strictissima* in its very long, not interrupted raceme and equally distant, short-pedicelled heads. Its leaves, except those of the inflorescence and next to it, being petioled, is a character suggestive of var. *petiolata*. Collected by Mr. Chas. C. Deam in Porter County, Ind., on a cleared sand dune, Aug. 14, 1911, and registered under his number 9620.

The other varieties, numbered 1-9, are reported on pages 159-162 under the heading: New Plants from Minnesota II., and var. *opima* on pages 92 and 93, Vol. II. of this journal.

## NEW PLANTS FROM VARIOUS PLACES.

BY J. A. NIEUWLAND.

I have for a long time suspected that the pubescent Wafer-Ash indigenous to the dunes of Lake Michigan and called heretofore *Ptelea trifoliata* Linn., var. *mollis* Torrey and Gray,\* or by some *Ptelea mollis* Curtis,† is not the same plant as either of these types even if they are admitted as different from one another. Even if these are considered as the same plants, or if even the Texas pubescent plant is the same as that of the dune region of the great lakes, which is also questionable, then the latter ought to receive a new name as a varietal one, the term *mollis* being accepted for Curtis' plant.

There seems little doubt that our western plant is distinct from either *Ptelea mollis* Curtis or Bartlett's‡ variety *cryptoneura* of the same. Among other things *Ptelea mollis* Curtis as well as the var. *cryptoneura* Bartlett have obtuse or obtusish leaves of firmer texture, very densely downy beneath of a yellowish green color, with numerous conspicuous black dots on the upper surface. The leaves of the Great Lake Region plant are thin and comparatively little downy with rather scattered puberulence on older leaves. The pubescence on the twigs of our western plant never persists on two year old twigs, but either weathers off or not infrequently flakes or peels off with the epidermal layer.

Only very young shoots have their leaves beset with white downy silkiness on the lower surface, for the hairs soon become scattered on older ones. The fruit of *P. mollis* Curtis is pear-shaped, and the fruit-body lies well within the upper half. The fruit of our middle western plant is perfectly orbicular or broad oval, emarginate at the apex and rounded at the base, and much larger than either of the Southern plants. That the plant is not a variation due to soil or other conditions seems evident from the fact that I have found it growing with *P. trifoliata* Linn., the plants standing in the same ground not six feet apart along a stream

\* Torrey and Gray, Fl. I (1840). p. 680.

† Curtis, M. A. New and Rare Plants of the Carolinas. Am. Jr. Sc. Ser. 2, VII. (1849), p. 406.

‡ Bartlett, H. H. *Ptelea Mollis* var. *Cryptoneura*, A Wafer Ash of the Georgia Sand-Hills, Rhodora, Vol. XIII., p. 80. (1910)

just outside of Michigan City, Ind., as also at Grand Beach, Mich. with another variety to be described hereafter.

These differences point to the fact that our dune plant is as different from the type as any of the Southern plants, and even at that, the name *mollis* is preoccupied, should it ever merit specific standing and therefore I propose to name it

*Ptelea trifoliata* var. **Deamiana** Nwd. var. nov.

Haud arbor sed frutex cum foliis *P. trifoliatae* sed minoribus et facie inferiore sparsim tomentulosis maturis, immaturis quidem dense tomentulosis tomento deciduo; foliola abrupte acuta tenuiuscula; fructus idem ut in *P. trifoliata*; flores decandri suaveolentes.

Hardly a small tree, but usually a medium sized shrub with the foliage of *P. trifoliata* but leaves smaller as a rule, somewhat sparingly tomentulose when old, and white silky appressed tomentulose when young; twigs and young petioles densely tomentulose with a minute spreading deciduous tomentum: leaflets abruptly acute, thin except in straggling sterile sand plants with creeping prostrate branches sending up short erect ones with paler bark and even smaller leaves: fruit as in the type: flowers having the delicate pleasant odor of *Dianthus plumarius*.

I have named the plant in honor of Mr. Chas. C. Deam who first reported it from Indiana, or at least a specimen that may be referred here rather than to *P. trifoliata*. The plants which I select as types are more tomentulose than Mr. Deam's plant which he kindly sent me for examination. The leaves too are smaller. I refer here for the present at least, specimens with remarkably small leaves and paler densely tomentulose leaves. The plants are sterile, creeping by silvery shining, prostrate stems and sending up small branches from these. They grow in the last dunes bordering on Lake Michigan. They venture almost as near to the shore as *Chamaesyce polygonifolia*, (*Euphorbia polygonifolia* Linn.) I collected such some miles south of St. Joseph, Mich., also at Michigan City, in 1908, no. 216. of my herbarium. As type I may designate No. 4087 collected at St. Joseph, Mich., along the Père Marquette Railroad some distance from the lake. Another specimen No. 1500 collected in 1906, is equally typical; also No. 888a, gathered at Michigan City, June 19, 1911; as well as No. 924 from Grand Beach, Mich. and No. 888 found growing in close proximity to *P. trifoliata*. I have in many places observed the

plant growing abundantly in sand piles in vacant lots, within the city limits of Michigan City, Ind., and in streets on the outskirts and always in sunny exposed places where nothing else grows. It soon serves as a "wind break" when other plants gradually collect. On sand piles it never grows more than a meter high and seldom as high, and blooms and fruits profusely. The flowers unlike those of the type, I have found delicately pleasant scented, whereas those of *P. trifoliata* have a disagreeable odor, and the fruits are produced in rather smaller dense globular clusters.

*Ptelea meschora* Greene, var. **mucronata** Nwd., nov. var.

Arbor parva vel junior frutex cum caule diametro aliquando 1.2 dm: ramuli atri plus minusve contorti, glaberrimi, et breviusculi: foliola et omnes partes perglabra; foliola parva, 2-9 cm. longa et 1-4.5 cm. lata, basalia inequaliter ovalia, terminale foliolium ovale vel ovatum, cum apice abrupte acuto et cum basi cuneata; folia in facie inferiore glauca vel pallida, facie superiore viridia: fructus perpauci 2-4, orbiculati, ovales vel obovati circa 2-3 cm. longi et 1.7 cm. lati: semen 1 cm. longum et .6 cm. latum in medio fructu vel media samara dispositum; fructus aliquando inaequalis semper in apicem mucronatum alatumque extensus, aliquando leviter falcatum.

Small tree with a trunk about 1.2 dm. in diameter; branches with black bark, much twisted and gnarled, twigs short, brownish glabrous: leaflets perfectly glabrous 2-9 cm. long and 1-4.5 cm. wide, basal unequally oval, base rounded; terminal oval or ovate with an abrupt acute or short acuminate apex and a cuneate base, all pale or glaucous beneath and green above; fruits few in a cluster, 2-4, orbicular oval or obovate, 2.3 cm. long and 1.7 cm. wide, fruit-body situated in the middle or nearer the summit, which is produced into a broad winged triangular point about 3 mm. or more in length. This beak is often falcately curved as also are the wings inequilateral: fruit-body about 1 cm. long and .6 cm. wide.

This plant is readily distinguished by the peculiar fruit characters, small perfectly glabrous leaves, even smaller than *P. mesochora* Greene. The fruit clusters are very small.

Found by the writer near the edge of a wood near the dunes of Lake Michigan about 7 miles East of Michigan City, Ind., at Grand Beach, Mich. This locality has an abundance of *Ptelea*

plants. I designate as type number 870 of my herbarium. The fruit is not quite mature but evidently full grown, and further study may yet show it to be a valid species.

**Apocynum glaucum** Nwd. nov. sp.

Planta tota pallida et glauca, circa 2 dm. alta; flores cymosi in inflorescentia principali terminali et binis vel ternis aliis minoribus axillaribus: folia firma crassa et coriacea pro planta, 1-3 cm. longa, .5-2 cm. lata orbiculata vel late ovata vel ovalia, obtusa vel cum apice rotundato vel retuso-mucronulato; folia superiora perfecte ovalia 1-2 cm. longa .5-1.5 lata, binis faciebus perpallida subcoeruleo pallore; eorum margines minute revoluti; basis rotundata vel subcordata; petioli 2-3 mm. longi: flores breviter pedicellata; pedicelli 5 mm. longi: calix glauco-pallidus sicut folia, lobi ejus tubo longiores, calix totus  $\frac{1}{3}$ - $\frac{1}{2}$  corolla minor: Corolla 5-6 mm. longa, lobis oblongis vel angustatis sublinearibus convoluta et contorta in apicem angustum 1-2 mm. longum; corolla anguste campanulata, ejus lobe minime divaricati, immo oblonga suburceolata.

Whole plant whitish or pale bluish glaucous less than 2 dm. from the lowest leaf, but slightly branched: flowers in rather flat terminal cymes with 1 or 2 smaller clusters in the axils of the upper leaves: leaves firm rather thick and leathery, 1-3 cm. long, .5 to 2 cm. broad, orbicular to broadly oval, obtuse or roundish or slightly retuse at the apex with a mucronulate point at the end of the midrib: upper leaves perfectly oval, 1-2 cm. long, .5-1.5 cm. wide, pale on both sides, with a bluish glaucescence, (the blue tinge marked on the upper surface of young leaves) margins of the leaves slightly revolute, base rounded or subcordate, petiole 2-3 mm. long: flowers short-stalked, pedicels 5 mm. long: calyx also bluish glaucous, its lobes narrowly oblong almost linear, lobes much longer than the tube, the whole  $\frac{1}{3}$  to  $\frac{1}{2}$  as long as the corolla: corolla 5-6 mm. long with oblong narrow lobes strikingly convolute and twisted in the bud forming a terminal point 1-2 mm. long: corolla narrowly campanulate, limb not spreading giving the flowers suburceolate appearance.

The whitish appearance of the whole plant marks it as easily superficially distinguishable from all others. The leaves are pale on the upper as well as on their lower surface. It is probably closely allied to *A. cardiophyllum* Greene, but the upper surface

of the leaves in this are green. The flowers too are smaller in *P. glaucum*. It differs from *A. nevadense* Goodding in that the leaves of the latter are also green above. The finely twisted and pointed convolute corolla in bud is a striking character.

*A. calophyllum* Greene has much larger leaves and inflorescence. The flowers are larger and more densely crowded, and the corolla has broader lobes. The buds of *A. calophyllum* are not pointed, and the calyx not as deeply cleft. The leaves, too, are dark green on the upper surface.

The type is in the U. S. National Herbarium, No. 322,005, and No. 1875 of the Geological Survey of California collected July 15, 1863 near Walker River.

*Tovara virginiana* (Linn.) Raf., var. **Kachina** Nwd., nov. var.

Planta tota praesertim ochreae, pedunculi, et folia hispidohirsuta pilis fulvis: folia 5.5-17 cm. longa, 2-6.5 cm. lata, elliptica vel (excepto apice acuminato) perfecte ovalia; ochreae membranaceae pilis fulvis crassis cooperta, et majoribus rectis appressis ciliatae; bractee inflorescentiae hirtellae et ciliatae: Flores rosei, plus minusve conferti, inferiores 3-8 mm. distant ab aliis et florescentes superiores perpropinqua: spicae 2.4-3.9 dm. longae: pedunculus 4.5-12 cm. longus: semina lentis formae, nigra vel fusca binis stylis apice praedita.

Whole plant and especially the ochreae, peduncle and leaves particularly, and the lower surface of the latter rather densely hispid-hirsute with rough tawny appressed hairs: leaves 5.5-17 cm. long, 2-6.5 cm. broad, elliptic or (but for the acuminate apex) perfectly oval in shape. Ochreae membranous beset with long tawny rough hairs and their margin ciliate with longer straight ones. Stem, peduncle, and rachis also hirsute: flower bracts ciliate and their surface hirtellous: flowers rose colored rather closely aggregated on the rachis, the lower 3-8 mm. apart and when beginning to flower almost contiguous; spikes 2.4-3.9 dm. long: peduncle 4.5-12 cm. long: seeds lenticular in shape, black or brown with the two persistent hooked styles at the apex.

The plant differs from *T. virginiana* (Linn.) Raf. in the remarkably coarse pubescence of the whole plant, the shape of the leaves, and the closer aggregation of the flowers. Our American plant is seldom more than minutely strigose, and has ovate leaves. The flowers are smaller and the whole inflorescence much longer



in all its parts. The upper rachis of *T. virginiana* is always glabrous, and only slightly scabrous below. The whole inflorescence is at least hirtellous.

The type in the U. S. National Herbarium No. 516,653 from Kachin Hills, in Upper Burma, dated 1897, and collected by Shaik Mokim.

***Persicaria amurensis* Nwd., sp. nov.**

Planta aquatica. Caulis foliosus 2 dm. longus vel longior: folia petioli et pedunculi crassi: folia 7.2–12 cm. longa et 3.2–4.5 cm. lata, glabra, oblonga vel oblongo-elliptica, cordata vel subauriculata, cum apice rotundato mucronulato vel obtuso: venae omnes praesertim vena media protrudentes: rachis percrassa (4–5 mm. diametro): spicae duae, 3–4 cm. longae; pedunculus 5 cm. longus, atque, fructu maturato, usque ad 8 cm. attingens: bractee per-tenuae, membranaceae, et pellucidae. Partes inflorescentiae omnes post fructum maturatum citius dehiscunt! Internodi 4–5 cm. longi. Planta terrestris mihi omnino ignota.

Aquatic Phase. Plant large and stout, leafy part 2 dm. or more in length; leaves thick as are also the petioles and peduncles; leaves 7.2–12 cm. long, and 3.2–4.5 cm. wide, perfectly glabrous, oblong to oblong-elliptic, slightly broader nearer the base, which is deeply cordate to subauriculate, the auricle 1.2 cm. long. Apex round or very obtuse and in the former case slightly mucronulate. Midvein very prominently protruding on the lower surface as also the other veins which branch from it regularly parallel with one another and anastomosing into two curved veins at the margin: Rachis very thick, about 4–5 mm., all the parts completely dehiscent: spikes two, about 3–4 cm. long, peduncle 5 cm. long, lengthening to 8 cm. in fruit: bract very thin, transparent, membranous, and, with the flowers, completely dehiscent; stems somewhat swollen, rooting at the nodes: internodes 4–5 cm. long.

This plant belongs to the *amphibia* group and seems to be normally aquatic. Its remarkable aspect and even the vegetative characters make it at once distinct from all our European and American amphibious *Persicarias*. The terrestrial phase, if it has one is unknown. The type is in the U. S. National Herbarium No. 273744, labelled "Ex Herbario Horti Petropolitani," and collected by S. Korshinsky in 1891 along the Amur River in Manchuria.

Perhaps to this species may be referred a sterile specimen No. 200850, collected by Krassnow, and without any further data except, "Flora Poltavica. *Polygonum amphibium* L., Legit Krassnow." Its leaves are scabrous on the margin but otherwise glabrous, indicating subriparian habit of growth. The leaves are deeply cordate at the base and mucronulate at the obtuse apex, 15.5-17 cm. long and 4-4.4 cm. wide, narrowly oblong: petioles 3-8.5 cm. long, nodes 9 cm. long.

*P. amurensis* is readily distinguished by the remarkably large long thick leaves with deeply cordate to subauriculate base. The thick dehiscent rachis of the fruiting plant is also characteristic: the seeds are small biconvex and shining.

*Persicaria oregana* Greene, var. **ancoviana** Nwd., nov. var.

Planta aquatica. Folia glabra tenuia elliptica vel elliptico-oblonga, cordata (vel abrupte cuneata) apice obtuso vel rotundato mucronulato, 10-11.4 longa et 4-4.7 lata: folia in superiore caule 4.2-6.6 cm. longa et 1.7-3 cm. lata: petioli foliorum inferiorum 6-9 cm. longi superiorum 1.5-4.5 lati. Pedunculus 5 cm. longus, crassus 4.5 mm. in planta desiccata: spica ovalis 1.5 lata et 2 cm. longa: ochreae tenues 2.5-6 cm. longae: flores rosei, bractee florum vivide rubrae, omnes, praesertim in inferiore parte spicae, trilobatae.

Aquatic phase. Leaves perfectly glabrous elliptical or elliptic-oblong, cordate or subcordate (the earliest abruptly cuneate): apex obtuse or rounded and mucronulate, rather thin, 10-11.4 cm. long, 4-4.7 cm. wide; upper reduced leaves dark purple in color, 4.2-6.6 cm. long and 1.7-3 cm. wide: petiole 6-9 cm. long in the former and 1.5-4.5 cm. in the latter. Peduncle 5 cm. long rather thick about 4.5 mm. in dried specimen: spike ovoid 1.5 wide and 2 cm. long: stem rooting at the nodes rather thick: ochreae membranous, thin 2.5-6 cm. long: petiole somewhat winged above or abruptly passing into the subcordate leaf blade by a narrowed sinus on each side at the leaf base: flowers light pink; bracts dark purple red to crimson and all, but especially the lower triangularly 3-lobed with a clasping conduplicate base around each flower cluster.

The dark purple to crimson bracts and lighter rose colored flowers make a striking contrast so that the budding spikes are more showy than the flowering ones. Beside this the peculiarly

shaped bracts readily distinguish the plant. The plant seems normally aquatic, the terrestrial is as yet unknown.

The type is no. 420814 of the U. S. National Herbarium, Piper's no. 4357 collected in Alaska on the Ankow River, Aug. 31, Sept. 1, 1904.

Another specimen collected by M. W. Gorman (no. 1096) at Red Mountain, Alaska, July 11, 1899, may be referred here. It is no. 377159 of the U. S. National Herbarium. The flowering spike is, however immature and the plant is not as fleshy-stemmed as the other.

*Department of Botany*  
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## NEW PLANTS FROM NORTH DAKOTA.—VIII.

BY J. LUNELL.

### *Toxicodendron desertorum* sp. nov.

Caudex horizontalis, aut subterraneus aut in solo reptans neque autem scandens neque radículas aërias emittens. Rami eius aut erecti aut adscendentes, vel si de caudice inferiore oriuntur sursum versus curvati, 2–20 cm. longi, striati, lenticellati et vestigiis foliorum annorum antecedentium affixorum magis minusve tuberculati, progressu tempestivo expresso apice vel apicibus herbaceis qui 1–2 cm. longi sunt et folia racemosque emittunt et foliis autumnalibus exutis lignei et semper nudi fiunt. Interdum apex sterilis permanet et progressus tempestivus in singulo vel pluribus ramorum secundorum oritur. Folia pinnatim 3-foliolata, plerumque 1–3 de apice eodem crescentia, petiolis 3–10 cm. longis. Foliola 3–7 cm. longa, 2.5–5 cm. lata, late ovata, acuminata, crassa, nitentes, venis subtus pilosis, marginibus ciliatis, integris vel parte superiore dimidia undulatis vel sinuatim dentatis, petiolulo folioli extremitatis 8–15 mm. longo, lateralium 2'–5 mm. longis. Flores in paniculo axillari parvo brevi angusto, pedunculis brevibus. Fructus albidus, nitentes, globulares, 4–5 mm. diametro, post folia exuta manentes.

Stem horizontal, either subterranean or creeping on the ground, but not climbing or sending out aerial rootlets. Its

branches either erect or ascending, or when leaving the stem from beneath winding themselves around it in an upward direction, 2-20 cm. long, striate, lenticillate and more or less tuberculate by the marks of leaf-attachment of earlier years, the growth of the season represented by the herbaceous top or tops, which are 1-2 cm. long. These herbaceous tops send forth the leaves and racemes and become, after the autumnal shedding of the leaves, woody and permanently naked. It is also a not unusual occurrence, that the top remains sterile, and that the seasonal growth originates in one or more secondary branches. Leaves pinnately 3-foliolate, generally 1-3 from the same top, their petioles 3-10 cm. long. Leaflets 3-7 cm. long, 2.5-5 cm. wide, broadly ovate, acuminate, thick, shining, pilose on the veins of the lower side, margins ciliate, entire or on the upper half wavy or sinuately toothed, petioles of the end leaflet 8-15 mm. long and of the lateral ones 2-5 mm. long. Flowers in small, short and narrow axillary panicles on short peduncles. Fruits whitish, shining, globular, 4-5 mm. in diameter, remaining after the dropping of the leaves.

This species has a trailing ally, *T. vulgare* Mill. (*Rhus radicans* L., in part), which is often a vine climbing by aerial rootlets, has a stem often 7-10 cm. in diameter, and a depressed-globose fruit, always distinctly broader than high.

This small-leaved species prefers a bare, deeply gravelly prairie-soil, and was collected by the writer on July 13, 1899, in Sand Hills, McHenry County. Although he always has been handling plants of both species here described "fearlessly" and "with absolute impunity," more susceptible individuals are probably not altogether immune, when they come in contact with this "poison oak." Still during a medical practice of 23 years in this state he did never meet with a case of true Poison Oak dermatitis, and only a few imaginary cases.

#### ***Toxicodendron fothergilloides* sp. nov.**

Caudex horizontalis, subterraneus, ramis erectis supra solum crescentibus, quorum quisque plantae singulari similis est, 25 cm. altus, parte infima e tribus subterranea. Qui rami ubi folia priora inserta erant subtus protuberantiis magnis vestiti et apicibus summis circiter 2 cm. longis exceptis ubi partes herbaceae tempestivae confertae sunt lignei. Ex contrario progressus tempestivus interdum in ramo quodam secundo oritur. Folia pinnatim

3 foliolata, plerumque 3-4 de apice eodem crescentia, petiolis 15-30 cm. longis. Foliola 10-12 cm. longa et lata, suborbicularia vel rhombica, abrupte acuminata vel nonnumquam apice obtuse rotundato, subtruncata vel basi rotundata, valde membranacea, pallida et venis subtus pilosis, superne sparsim brevipila vel glabrata, marginibus ciliatis, parte dimidia superiore sinuato-dentatis vel crasse crenatis, interdum autem lobo fortuito parvo vestitis, praeterea integris, petiolulo folioli extremitatis 3-5 cm. longo, lateralium 0.6-1 cm. longis. Flores in paniculo axillari sparsi, 6-10 cm. longo, pedunculis 2 cm. longis et ramis inferioribus saepe perlongis. Fructus flavido-albidus, globularis, 4 vel 5 mm. diametro.

Stem horizontal and subterranean with erect branches rising above the ground, each of them having the appearance of an individual plant, about 25 cm. high, the lower third of this being beneath the surface. These branches are marked with large protuberances beneath the insertion of former leaves and woody, except their uppermost ends, about 2 cm. long, where the herbaceous parts of the season are crowded. It also not seldom happens that the seasonal growth takes place in a secondary branch to supplant the former. Leaves pinnately 3-foliolate, usually 3-4 from the tops, their petioles 15-30 cm. long. Leaflets 10-12 cm. in length and width, suborbicular or rhombic in outline, abruptly acuminate or sometimes obtusely rounded at the apex, subtruncate or rounded at the base, very thin, pale and hairy on the veins of the lower surface, sparingly short-hairy or 'glabrate on the upper side, with ciliate margins, on the upper half sinuately toothed or coarsely crenate, sometimes even with an occasional small lobe, else entire, petiololes of the end leaflet 3-5 cm. long and of the lateral ones 0.6-1 cm. long. Flowers in sparse, axillary panicles which are 6-10 cm. long, with 2 cm. long peduncles and often quite long lower branches. Fruit yellowish-white, globular, 4 or 5 mm. in diameter.

This species is best recognized from its allies by its large, suborbicular leaflets.

Growing in dense wood-land with rich humus and dense shade, it was collected by the writer at Devil's Lake, Ramsey County, on June 29, 1902, and July 1, 1905. Its leaflets resemble strikingly in size and outline the leaves of *Fothergilla maior*, hence the species name.

I do not believe that *Rhus Toxicodendron* as the common name, without further specifications including the two allies now described and a large number of their kin would be satisfactory to the majority of botanists of the present day.

*Artemisia caudata calvens* var. nov.

Planta humilis, plerumque 1.5-3 dm. alta. Caules et folia juvenilia indumento denso, cano operta, quod in caule mox evanescit, nisi sparse, praecipue circum petiolos, ubi saepe permanet; in foliis omnino vel partim stabile est. Folia brevía, 3-6 cm. longa.

Rather low, usual length 1.5-3 dm. Stems and leaves covered with a thick, gray indument when young. This disappears soon on the stem, except in spots, especially around the petioles, where it often is permanent; on the leaves it is wholly or partly persistent. Leaves short, 3-6 cm. long.

Collected by the writer in gravel at Willow City, Bottineau County, on August 26, 1889.

*Leeds, North Dakota.*

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THE TRITOGONIA TUBERCULATA MUDDLE.

BY S. W. GEISER.

During the past few years, considerable confusion has arisen in regard to the proper names to be applied to the species described by Barnes, 1823, as *Unio tuberculatus*. The result is that a number of different names have been applied. With the purpose of correcting the nomenclature of a former geographic catalogue of mine, I began some time ago the study of the synonymy of this species. As a result of my studies it seemed advisable to apply a new name *Quadrula Parkeri*<sup>1</sup> to this species.

In order to clear up the present confusion of names I have decided to take all the names that, so far as I can learn, have been applied to this species up to Nov. 1, 1911. I shall first give a list of the synonyms, and then separately discuss their availability as names for the present species.

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<sup>1</sup> The Academician I.: 15. [Oct. 30, 1911].

The names hitherto applied are:

- (1) *Unio tuberculatus* Barnes, 1823.
- (2) *Tritogonia tuberculata* (Barnes) Simpson, 1900.
- (3) *Quadrula tuberculata* (Barnes) Ortmann, 1911.
- (4) *Unio verrucosus* Say, 1834.
- (5) *Tritogonia verrucosa* (Rafinesque) Agassiz, 1852.
- (6) *Tritogonia verrucosa* (——) H. M. Smith, 1899.
- (6) *Quadrula verrucosa* (Say) Geiser, 1911 (Combinatio hypothetica).
- (7) *Unio pustulata* Swainson, 1840.  
non *Unio pustulatus* Lea, 1834.
- (8) *Unio gigas* Sowerby, 1867.
- (9) *Quadrula obesa* (Simpson) Vanatta, 1910.
- (10) *Quadrula Parkeri* Geiser, 1911.

1. UNIO TUBERCULATUS Barnes, 1823, Am. Journal Sci., VI.: 125, pl. VII., figs. 8a, 8b.

Agassiz,<sup>1</sup> 1852, transferred the species to the genus *Tritogonia* of Agassiz as *Tritogonia verrucosa* (Raf.) Agassiz. Simpson<sup>2</sup> transferred the species also to the genus *Tritogonia*, employing, however, the specific name *tuberculata* for reasons that will be shown under **ROMEN 4**.

2. TRITOGONIA TUBERCULATA (Barnes) Simpson, 1900, Proc. U. S. Nat. Mus., XXII: 608.

Researches since carried on independently by Sterki<sup>3</sup> and Ortmann<sup>4</sup> show that *Tritogonia* has no standing as a genus, but groups rather with *Quadrula apiculata*, as shown by Pilsbry<sup>5</sup> and confirmed by von Ihering<sup>6</sup> and Ortmann.<sup>7</sup> These facts have compelled Ortmann<sup>8</sup> to transfer the species to that genus.

3. QUADRULA TUBERCULATA (Barnes) Ortmann, 1911, Mem. Carnegie Mus. IV.: 340.

Simpson in his synopsis<sup>9</sup> transferred the species described

<sup>1</sup> Archiv fur Naturgeschichte, Jahrg., Bd. I.: 48. [1852.]

<sup>2</sup> Proc. U. S. Nat. Mus. XXII.: 608. [1900.]

<sup>3</sup> Nautilus XXI.: 48. [1907.]

<sup>4</sup> Mem. Carn. Mus. IV.: 329. [1911.]

<sup>5</sup> Nautilus V.: 76. [1891.]

<sup>6</sup> Ibid. XV.: 39. [1901.]

<sup>7</sup> An. Carn. Mus. V.: 193. [1909.]

<sup>8</sup> Mem. Carn. Mus. IV.: 340. [1911.]

<sup>9</sup> Proc. U. S. Nat. Mus. XXII.: 795. [1900.]

by Rafinesque<sup>1</sup> as *Obliquaria (Rotundaria) tuberculata* to the genus *Quadrula* and thus Ortmann's *comb. nov.* is preoccupied. The fact that Rafinesque's species properly belongs in the genus *Rotundaria* as urged by Ortmann<sup>2</sup> does not affect the priority of the combination as used by Simpson. In reference to this matter Dr. W. H. Dall<sup>3</sup> says, "This name [*Quadrula tuberculata* (Raf.) Simpson, 1900] having been accepted by Simpson in 1900, no subsequent different use of it is permissible." Ortmann's new combination is therefore unavailable.

4. UNIO VERRUCOSUS Say, 1834, Am. Conchology, Part VI.

In his paper<sup>4</sup> which was published with the sixth number of the Am. Conchology, Say uses the name *Unio verrucosus* and credits the species to Rafinesque. Rafinesque described, indeed, in 1820,<sup>5</sup> a species which he called *Obliquaria (Ellipsaria) verrucosa*, but neither his figure nor his description are intelligible and Say must be held responsible for the name. Hence Barnes' name has priority over the name *verrucosa*.

Agassiz, as before noted, transferred the species to the genus *Tritogonia* as *Tritogonia verrucosa* (Raf.) Agassiz.

5. TRITOGONIA VERRUCOSA (Raf.) Agassiz, 1852, Arch. fur Naturg. Jahrg. 18, Bd. I: 48.

5. a. TRITOGONIA VERRUCOSA (Raf.) H. M. Smith, 1899, Bull. U. S. Fish Com.: 291, pl. LXXXI.

Merely an error in the spelling of the generic name.

6. QUADRULA VERRUCOSA (Say<sup>6</sup>) Geiser, 1911. The Academician I: 15. (*combinatio hypothetica*).

The new combination is, however, preoccupied. Baker, 1898<sup>7</sup>, transferred the species described by Barnes<sup>8</sup> as *Unio verrucosus*

<sup>1</sup> An. Gen. Sci. Brux. V.: 308. [1820].

<sup>2</sup> Ortmann *in lit.*

<sup>3</sup> Dall *in lit.*

<sup>4</sup> Entitled, "An attempt to exhibit a Synonymy of the Western North American species of the genera *Unio* and *Alasmodonta*."

<sup>5</sup> An. Gen. Sci. Brux. V: 304 [1820].

<sup>6</sup> Erroneously credited to Rafinesque.

<sup>7</sup> Nat. Hist. Surv. Chgo. Acad. Sci. III (1): 85, pl. XXIII [1898].

<sup>8</sup> Am. Jour. Sci. VI: 123, pl. V, fig. 6 [1823].



to the genus *Quadrula*, and thus the hypothetical name is a homonym to *Quadrula verrucosa* (Barnes) Baker, 1898.

7. UNIO PUSTULATA Swainson, 1840. Treatise on Malacology p. 271, fig. 54, d.

Name preoccupied by *Unio pustulatus* Lea, 1834 = *Quadrula pustulata* (Lea) Simpson, 1900.

8. UNIO GIGAS Sowerby, 1867, Cont. Reeve's Conch. Iconica, XVI: pl. LVI., fig. 287.

Simpson<sup>1</sup> says that he thinks this is a rather high male *Tritogonia tuberculata*. Mr. Edgar A. Smith, of the British Museum, notes in a personal communication that the whereabouts of the type of the figure given in the *Conchologia* is unknown. He states further that, in his opinion, "it is the adult form of *U. Cumingii*, Lea, a Chinese form (figured op. cit. fig. 264). River Ohio, the locality given for *gigas* in the Conch. Incon. I regard a as one of the many mistakes in that work. I do not perceive any resemblance of *gigas* to *U. verrucosa* = *tuberculata*." I have been obliged to abide by Mr. Smith's decision in this matter, as the work cited is very rare and expensive, and I have been unable to gain access to it, although I have applied to all the great libraries in America. However, if it shall be shown that *U. gigas* Sowerby, 1867, was ever really applied to a specimen of *U. tuberculatus* Barnes, this specific name will be available for transference to the genus *Quadrula*. Nevertheless, it will be difficult, if not impossible, to locate the type of the icon, as it was sold, perhaps, with the collection. (E. A. Smith.)

9. QUADRULA OBESA (Simpson) Vanatta, 1910, The Nautilus XXIII: 102.

Simpson<sup>2</sup> described a variety of *Tritogonia tuberculata* as *Tritogonia tuberculata obesa*. This variety is considered valid, Wright & Walker<sup>3</sup> listing it as a valid subspecies in their Checklist. Vanatta used the "originally varietal name *obesa* Simps. instead of *Tritogonia tuberculata* Bar., as the name *tuberculata* is preoccupied in *Quadrula*."<sup>4</sup> But if we are to consider *Tritogonia*

<sup>1</sup> Proc. U. S. Nat. Mus. XXII 608, footnote 3, [1900].

<sup>2</sup> Op. locis sup. cit. ,p. 609. [1900].

<sup>3</sup> Checklist, N. A. Naiades, p. 18. [Detroit, Mich., 1902.]

<sup>4</sup> Op. Vanattæ citat. p. 102.

*tuberculata obesa* as a valid subspecies, it is highly objectionable to "transfer the name of a variety to the main species."<sup>1</sup> Dall<sup>2</sup> also states that "a valid varietal name is not a synonym" and that if valid, the subspecies *obesa* must stand.

**Quadrula Parkeri** Geiser, 1911, *The Academician* I: 15.

Synonymy discussed, new name applied, and reference made to type icon (*Upper Iowa Collegian* XXVII: 50, fig. 7, [1909]). The description was also reprinted in *Upper Iowa Collegian* XXIX(1): 3-4, [1911.]

Briefly, then to recapitulate. The species in question is not an *Unio*, and hence the original combinations can not be applied. Neither is the species to be included in the pseudogenus *Tritogonia*, for, as has been shown, this "genus" has no standing. The anatomy of this species includes it in the genus *Quadrula*. However, both *Quadrula tuberculata* and *Quadrula verrucosa* would be homonyms to previously established combinations. *Unio pustulata* Swainson, 1840, is stillborn, and even if transferred to *Quadrula* would also be preoccupied by *Quadrula pustulata* (Lea) Simpson. It is extremely doubtful if *Unio gigas* Sowerby, 1867, was ever applied to a *Tritogonia tuberculata*. Vanatta's name is objectionable since he has used valid subspecific name for the main species. It appears, then, that all the synonyms enumerated by Simpson are inapplicable, and that *Quadrula Parkeri* must stand as the correct name for this species, unless some other synonym exists which has escaped my notice.

Dr. A. E. Ortmann and Mr. Edgar A. Smith object to the invalidation of generic transferrences because an author has previously erroneously transferred a similar specific name to that genus. As shown under nomen 3, however, if we were not to insist upon a strict observance of the rules governing homonyms, endless confusion would be caused. For example, if we would permit the use of *Quadrula tuberculata* (Barnes) Ortmann, 1911, there would be a cause continually for confusion with *Quadrula tuberculata* (Raf.) Simpson, 1900. We must, therefore, treat these generic transferrences exactly as original names, in order to avoid endless confusion. The law of priority, though perhaps seemingly unjust

<sup>1</sup> Ortmann *in. lit.*.

<sup>2</sup> Dall *in. lit.*.

in many of its verdicts, must be strictly applied if we would rescue Zoology from becoming a mere chaos of names.

To the following specialists and malacologists I am indebted for aid and advice in the preparation of this paper: Dr. A. E. Ortmann; of the Carnegie Museum at Pittsburg; Dr. Josua Lindahl, Chicago; Drs. Dall and Bartsch of the U. S. National Museum; Dr. H. A. Pilsbry, of the Philadelphia Academy of Natural Sciences; Mr. Chas. W. Johnson, Curator of the Boston Society of Natural History; Dr. Edw. S. Morse, Director of the Peabody Museum; Mr. Frank C. Baker, Curator of the Chicago Academy of Sciences; and Mr. Edgar A. Smith, of the British Museum.

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#### BATHING HABITS OF OUR BIRDS.

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The writer has often thought that a very interesting article might be prepared by some careful observer on the bathing habits of our birds. These observations would be very valuable, for no writer has as yet given us any adequate information on this subject. In order to obtain the facts about the bathing habits of our birds, the observer will have to spend much time at some lake-side where birds usually go to bathe. The writer has thus far made but few observations on this subject. He gives them more to stimulate interest in, rather than to offer complete knowledge of, this phase of bird-life.

Two distinct methods are observable in the bathing habits of birds. The more common way is by wading into the water and wetting the head and body. The less common method is by flying out over the water and dipping so as to wet the entire body.

Among the species that bathe by wading are the Crow, Purple Grackle, Blue Jay, Indigo Bird, Robin, Goldfinch, Catbird, Brown Thrasher, Song Sparrow, Crowbird, Baltimore Oriole, Towhee. In winter the Crow bathes where the water is not frozen at the edge of lakes. The Purple Grackle also bathes in very cold weather. The Blue Jay looks blackish after bathing. The Robin bathes frequently in warm weather.

Species that bathe by dipping are the Warbling Vireo, King Bird, Kingfisher, Purple Martin and Barn Swallow.

The Warbling Vireo flies from a perch near the water, dips once and then flies back to the perch. This performance is repeated twice. The bird then preens its plumage. The writer witnessed this bathing process but once. Further observations may show some variation in this vireo's method of bathing.

Somewhat like the Warbling Vireo, the Kingbird may fly from a perch and dip twice or thrice, but it does not return to the perch until after the last dipping. Or the bird may be flying over the water when it will suddenly dip three times and then continue its flight. These facts were obtained from two observations. Is a similar method of bathing common to all flycatchers?

The Purple Martin bathes while flying over the water. To watch a number of them, late in the afternoon as they come from a long flight, dipping again and again and splashing the water, is one of the prettiest sights one may see in bird-life. This method of bathing is, doubtless, common to the swallow family.

The Kingfisher, whose well-known habit of striking the surface of water in obtaining small fish for food, incidentally does its bathing at the same time. Usually the bird makes but one effort to catch a fish, but occasionally two dips are taken before returning to a perch.

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## A NEW GUTIERREZIA FROM OREGON.

BY J. LUNELL.

### *Gutierrezia ionensis* sp. nov.

De summo caudice valido, 4 cm. longo, ligneo, rami numerosi graciles, sed rigidi, 1-1.5 dm. longi, vel 1-10 capitula gerentes vel steriles, axillis foliorum dimidiae partis inferioris gemmis glutinosis vestitis, exeunt, rami omnes tempestivi una cum involucris et foliis insigniter glutinosi. Folia lineari-filiformia, 2.5-4 cm. longa, 1 mm. lata vel minus, 1-nervia. Capitula solitaria ramulos fastigiatos vel inflexos terminantia, inflorescentiam apice plano paucicapitatam, 1-2.5 cm. altam, in extremitatibus summis ramorum definitam formantia. Glomeruli capitulorum 3-5 sessilium vel subsessilium absentes. Involucra turbinata, 5-6 mm. alta vel in

plantis permaturis fortasse altiora. Bracteae involucri longae, apicibus viridibus conspicuis.

The root with a stout ligneous crown, 4 cm. long, from which rises a number of slender, but stiff, branches, 1-1.5 dm. long, either bearing 1-10 heads or sterile; with glutinous buds in the leaf-axils of the lower half, all the branches of the season including involucre and leaves being remarkably glutinous. Leaves linear-filiform, 2.5-4 cm. long, 1 mm. broad or less, 1-nerved. Heads solitary at the ends of fastigiate or inflexed branchlets forming a flat-topped, few-headed inflorescence which is 1-2.5 cm. high and confined to the uppermost ends of the branches. The disposition with some other species of forming glomerules of 3-5 sessile or subsessile heads does not occur in this species. Involucre turbinate, 5 a 6 mm. high or probably higher in well matured plants (the type plant being quite young, with buds comparatively large). Involucral bracts long, with conspicuous green tips. Disk and ray flowers 3-6 of each kind.

Collected by the writer on July 16, 1903, east of Ione, Morrow County, Oregon, on arid plains among *Artemisia tridentata* and *Chrysothamnus pumilus*.

*Leeds, North Dakota.*

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## OUR SONG BIRDS.—V.

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### BROTHER ALPHONSUS, C. S. C.

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#### TOWHEE.

##### *Pipilo erythrophthalmus.*

One of the most pleasing woodland sounds is the song of the Towhee. It is the pure quality of the tones, rather than any great variety, that makes the Towhee's song so agreeable. From April to September, the notes may be heard in woods where there is some undergrowth.

#### HERMIT THRUSH.

##### *Hylocichla guttata pallasii.*

What a pity it is that this gifted singer keeps most of his matchless song for sojourners in our northern forests. Just before leaving, after a protracted stay in spring, the Hermit Thrush will give us just enough of his song to make us wish we could hear more.

## ROBIN.

*Planesticus migratorius.*

The Robin is perhaps our most familiar song bird. Its habit of nesting in town as well as country brings the bird under the observation of everybody. The song lasts throughout the nesting season—from the latter part of March until the first of August.

## SONG SPARROW.

*Melospiza cinerea melodia.*

This is our commonest song bird. From early spring until late in summer, its loud, clear notes may be heard. There is considerable variety in the song, a fact that often makes persons not well acquainted with birds take the same Song Sparrow for a different species.

## VESPER SPARROW.

*Proccetes gramineus.*

This sparrow is heard usually in fields where there are fences. Perched on a wire, the bird will sing its charming song and the breezes will bear it away to a distant wayfarer. Few bird notes are comparable with those of the Vesper Sparrow, whose habit of singing after sundown has won for it the pretty name it bears.

## OUR NON-MUSICAL BIRDS.

## WHITE-BREADED NUTHATCH.

*Sitta carolinensis.*

This species has the most elementary kind of note—the repeated utterance. The bird is, however, a good example of how a simple sound may be made pleasing by putting some expression into it. Sometimes the Nuthatch will increase the volume of its note so much as to remind the observer of the Flicker's efforts.

## CHIPPING SPARROW.

*Spizella socialis.*

This well-known species is our only sparrow without musical powers. However, its one note, which is uttered rapidly, is not unpleasant. By means of a more rounded utterance, the bird

has a way of giving a little variety to its simple attempt at voice expression.

CHIMNEY SWIFT.

*Chaetura pelagica.*

This curious species, whose days are spent speeding through space, utters a note that has the quality of speed as its most marked characteristic. In the evening, swifts often fly about buildings in great numbers, always heard as well as seen.

KINGFISHER.

*Ceryle alcyon.*

This large species of lakes and rivers has a note that has been very aptly compared with the noise made by a fisherman's reel when casting. If the noise of the reel were multiplied many times over, this description of the Kingfisher's note would be more correct.

WHIP-POOR-WILL.

*Antrostomus vociferus.*

Just after sundown the note of the Whip-poor-will is heard and continues for about an hour. Later the note is uttered intermittently throughout the night. When repeated slowly, the note is very distinct and agreeable; but like other species, the bird sometimes mars its effort by a too rapid repetition.

SPOTTED SANDPIPER.

*Actilis macularia.*

This common species of our lakes and rivers has a very high note, which can be imitated by the syllables *peet-weet*. Often only the note represented by *peet* is heard. The sandpiper usually utters its note when on the wing and when startled.

NIGHTHAWK.

*Chordeiles virginianus.*

When the beautiful evenings of June come round, a large bird of irregular flight may be seen flitting high overhead, and now and then uttering a strange note. When once seen or heard, you will know that this species is the Nighthawk.

LOON.

*Urinator imber.*

This large species, which is found on most of our inland lakes, is an ornament sufficiently important to secure better

protection for it from the vandalism of the ubiquitous hunter. Its loud, plaintive note is a characteristic sound in lake regions.

PHOEBE BIRD.

*Sayornis phoebe.*

The note of this species has suggested its name, but the similarity between name and note is not so clear as in the case of the Wood Pewee. The Phoebe's call-note is somewhat like the chirp of the English Sparrow.

KINGBIRD.

*Tyrannus carolinensis.*

The usual note of this well-known species is one of the least pleasing of bird-utterances: Unlike most birds, the Kingbird has no agreeable note at all. A feature that adds to this unpleasantness of the bird's notes is its habit of uttering them during its frequent quarrels.

CRESTED FLYCATCHER.

*Myiarchus crinitus.*

There is a suggestion of weirdness in the loud and not unpleasant note of this species. The bird's habit of keeping to unfrequented woods as well as the quality of the note give the observer this strange impression. In spring, when the flycatcher does not confine itself in woods, its oft-repeated note may be heard in any grove or orchard.

SCREECH OWL.

*Megascops asio.*

The very plaintive note of this our commonest owl may be heard in town or country—wherever there are trees. By some the bird's note is thought to be the saddest sound in nature. To

FLICKER.

*Colaptes auratus.*

The usual note of this species is a series of loud, rapid calls, all in the same pitch. Besides the ordinary note, the bird has many other curious utterances, some resembling the cries of babies or puppies. After the nesting season, when families of Flickers are found in our groves, these curious cries are common.

RED-HEADED WOODPECKER.

*Melanerpes erythrocephalus.*

The loud, harsh call of this species is a common sound in



all our woods. When several of the birds are together, and especially after the young are fledged, they make a noise that is well-nigh deafening. The note of the young while in the nest is similar to that of the Cedarbird.

## CROW.

*Corvus americanus.*

The loud caw of the Crow is one of the most expressive of any of our bird-notes. During winter, when the crows come nearer dwellings or assemble in great flocks, the observer may obtain a better idea of the number of variations the Crow can give to its caw.

## YELLOW-BILLED CUCKOO.

*Coccyzus americanus.*

The guttural note of this species is one of the strangest sounds in nature. The bird is seldom seen by any but an experienced observer, keeping usually in the tree tops. Its note is rarely heard, for the bird is more given to silence than to song.

## DICKCISSEL.

*Spiza americana.*

In the meadows, where the Bobolink sings his delicious song in the Maytime, you will be sure to hear another monotonous note. This will come from the Dickcissel. Persistently throughout the long day its unmusical effort continues.

## PURPLE GRACKLE.

*Quiscalus purpurea.*

This species has a note that grates on the nerves of visitors to the country. But like all familiar sounds in nature, the note of this very common bird is not unpleasant to the lover of outdoor life. The grackle's note is one of the first heard in spring and among the last in autumn.

## CEDARBIRD.

*Bombycilla cedrorum.*

This handsome species has the weakest voice of any bird of its size. The impression made upon the observer is that of the most elementary sound—a feeble effort to show that the bird has a voice. Cedarbirds move about in flocks and may be heard when in trees over head.

## DOWNY WOODPECKER.

*Dryobates pubescens.*

This species gives an observer the impression that it is too busy to waste its precious time in uttering any note. Usually the only time the bird will give one a chance to hear its rasping note is when flying from tree to tree.

## YELLOW-BELLIED SAPSUCKER.

*Sphyrapicus varius.*

Among the early spring notes, the loud, harsh clatter of the Sapsucker will be sure to attract the attention of any observer. This species is very bold, and sometimes in spring, very numerous, invading parks to prey upon the trees. Like certain woodpeckers, the Sapsucker often utters its note when flying from tree to tree.

## BARN SWALLOW.

*Hirundo erythrogastra.*

This twitter of the Barn Swallow is pleasing but hardly musical. As the swallows skim over the surface of lakes or the tops of trees, their note is an agreeable feature of life in the country during summer.

## MYRTLE WARBLER.

*Dendroica coronata.*

The first of the warblers to arrive in the north in spring, the Myrtle Warbler has a loud characteristic call-note, which is uttered while flying. Its other notes are heard occasionally, but while varied they are not very musical.

## SNOWBIRD.

*Junco hyemalis.*

Just before departing to a more northern clime for the summer, the Snowbird gives us an opportunity to hear its notes. There is some variety in them, but the musical quality is like that of the Chipping Sparrow's attempt at singing.

## LOGGERHEAD SHRIKE.

*Lanius ludovicianus.*

A favorite perching place for this species is a telephone wire by a country road. Here you may hear a variety of notes—some agreeable and others harsh—uttered by the Shrike. Usually, however, the bird is silent.

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that of the Prairie States

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## II.—OUR AMPHIBIOUS PERSICARIAS.

BY J. A. NIEUWLAND.

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## II.—OUR AMPHIBIOUS PERSICARIAS.

BY J. A. NIEUWLAND.

In regard to the plants known as Amphibious Persicarias, Smartweeds, or Knotweeds, and especially as to the specific delimitations of them as a group, various opinions have at one time or another been suggested, but only one or two have prevailed in our modern manuals or floras. The older Gray's manuals as also the manuals emanating from the New York Botanical Garden, such as Britton's, and Small's, recognize three species of these plants for the United States, *P. amphibium* Linn., *P. emersum* Michx., or *P. Muhlenbergii* Wats., and *P. Hartwrightii*. The new so-called Gray's Manual, seventh edition of Fernald and Robinson, relegated the last-mentioned species to the rank of a variety, as some one has told me 'because Massart had shown that *P. amphibium* changed into *P. Hartwrightii* when grown out of water.' The absurdity of such a reason I have already pointed out in another place.\*

The very proposition of change refutes itself, and the person affirming it manifests botanical superficiality, and innocency, by failing to see the meaning of *Polygonum amphibium* Linn., failing to perceive that Linnaeus knew in Europe a Persicaria which existed in two phases one a floating-leaved aquatic, the other phase quite terrestrial, that he called the two phases one species, not even designating the forms and varieties, which of course, they are not; forms, or rather phases or even different parts often of the same individual plant!

This double existence of the species has as I have pointed

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\* AM. MIDLAND NATURALIST, vol. ii, pp. 2 and 3.

out been known in Europe for centuries. Linnaeus knew of the fact, and was sure of it—possibly by his own observation—when he called the plant *amphibium*.

As to *P. Hartwrightii*, A. Gray, who recognized it as a separate species, doubtless knew of the plant in both an aquatic and a terrestrial phase, or if he did not know it in the former he certainly knew it to be different from any corresponding phases of any plants known up to his time. Had any novice or amateur written to him that *P. amphibium* changed to *P. Hartwrightii*, he would have at once perceived in it the mere guess of some blundering tyro, ignorant of the fact that more than one species is dimorphic, or even polymorphic, and incompetent to distinguish two species by their respective descriptions.

An opinion regarding the status of the amphibious *Persicariae* different from those of the New England as well as the New York botanists is that of Dr. E. L. Greene, who first took up the logical segregation of these plants. The groups into which they fell under his treatment may be designated as the *Hartwrightianae*, the *Emersae*, and the *Amphibiae*. The last I should prefer to omit and distribute its members between the other two.

Dr. Greene maintains that a number of valid species have been overlooked hitherto, or referred to the three above mentioned species. On the basis of specific distinctions usually in vogue among botanists at present for other plants as a standard, one can hardly hesitate in agreeing with him. True, the same standards for segregation can not always be applied to all plants indiscriminately, still it is inconsistent and illogical to neglect principles of differentiation in one case and apply them in another when the cases themselves are undoubtedly similar. Dr. Greene has besides devoted to this class of plants more study, particularly in the field where alone they can be scientifically known, than any other American botanist. His conclusions regarding them therefore ought at least to be considered with some regard rather than with the total indifference of botanists generally. As I have already shown he is the first of our modern phytographers to describe and insist on describing these polymorphic plants with different paragraphs for the phases which are as different as if they were actually distinct plants. Such, as he says, is the only logical or intelligent method of treating them with any hope of recognition. Of course such a system does not, or for a while

perhaps, will not meet with favor among manual makers whose patterns of description are hide-bound, and whose volumes are made to cover an impossible area of the country, and rather to reimburse financially than to give adequate information. There will undoubtedly come a time when students will reason that a little accurate knowledge is worth more than volumes of superficiality, when local floras will be more in demand than territorial ones; but for the present, what with the ignorance of the student and the prejudices or even ignorance of manual makers, descriptions under several captions of many polymorphic plants will continue to be a decided financial disadvantage, and so a more or less complete knowledge of the amphibious smartweeds will continue to be the heritage of a few. It has in fact come to such a pass that even otherwise reputable botanists' label for the herbaria anything as *P. amphibium* L. that has floating glabrous foliage. Any Persicaria that has spreading borders to its ochrea is called *P. Hartwrightii*, and any plant that has neither of the above characters is necessarily *P. emersum*! And for that matter these are about all the characters worth mentioning that the average manual considers sufficiently distinctive. This fact is accounted for, because the average student of taxonomy does not for too long a time consider that there is anything worth knowing about plants not in a manual. We can not put any reliance on names of amphibious smartweeds labelled even by renowned botanists, because the plants being collected in one phase only, are at most but fragmentary, and the manual-gleamed information that impels the labelling, is still more so. When therefore, as occasionally happens, a collector stumbles on a riparian specimen with both terrestrial and aquatic foliage on one shoot, in other words, contains all the above mentioned different and supposedly distinctive characters of the three species referred to, then arises the dilemma as to whether the plant is to be called *P. amphibium*, *P. emersum* or *P. Hartwrightii*. No matter how ignorant the student or unsophisticated in things botanical he has usually enough common sense to know that two species could not grow in the same shoot no matter how different in appearance, and usually, unless he leaves his specimens unnamed and unlabelled, comes to one of two conclusions; either the manual makers are sometimes possessed of but average ig-

norance on some things, or he decides to study plants from nature's volume rather than from one of man's making.

Beside the taxonomic views of the amphibious smartweeds referred to, that of Linnaeus himself is not to be overlooked here. It was prevalent until the beginning of the nineteenth century without even being challenged in any detail. Linnaeus recognized but one species which he called *Polygonum amphibium*. The reason I refer to his view is that as a result of field work for a number of years back, as also because of investigation of some thousands of specimens, I have come to the conclusions, that, whatever premises have been taken up by our systematists as to the idea of delimitation of species of Water Persicarias, there is no logical position between that of Dr. Greene's on the one hand and that of Linnaeus of the other extreme. In other words we may hold with the latter that there is but one species of Water Persicaria, or with the former that all the evidently different plants are distinct, but the *via media* of supposing that some are valid and others not, as held by our manualists, is positively untenable from a logical point of view. Either all must be accepted for they have absolutely the same reasons for acceptance or rejection, or none need be received. In the latter instance they will probably, if any show of consistency is used, be relegated to the status of "varieties" or "subspecies," of *P. amphibium* Linn.

In this connection I may say that in studying the plants, I have not confined myself to herbarium material which in the case of such variable plants as those in question, can be of little or no value whatever, not only in delimitation of the species, unless properly collected, but even in actually determining the identity of isolated specimens. In field study I have not confined my attention to any one specimen which on careful examination could be more or less arbitrarily considered as an average type, but have whenever possible gathered all available varying forms of a specimen to be found in a colony or locality. In this way I have at times collected as many as 50 to 100 samples of a specimen all of which I was sure were not only one species, but which I was fairly sure came from one original rootstock. This was done that no variation of form or phase might possibly escape me of the transitions from aquatic, riparian, terrestrial, to xerophytic flowering or sterile plants. I have not, moreover, considered it sufficient to study any given plant at one time; for example, the flowering or fruiting



period, but on once locating a good colony of *Persicarias* I have sought as often as possible during the various seasons to visit the place to note the seasonal variations from spring until late in fall, and have found these changes in appearance to be often quite remarkable. I have in fact, for some years past had the field study of the amphibious smartweeds as one of my principal aims in botanizing in various places in the east, middle west and even far west, and I have become more and more convinced that it presents problems that only the local field botanists will be able to solve.

Between the views of Dr. Greene who maintains that there are a considerable number of amphibious *Persicarias* and Linnaeus who at his time had but one, I have stated that no logical opinion could be maintained. Dr. Greene has segregated a number of species from what was, for the sake of concealing ignorance, called *P. amphibium* Linn. Regarding the suppression of *P. Hartwrightii* as a species in Robinson and Fernald's Manual, I may here add to what I have already maintained concerning this species, that logical consistency would demand the suppression of *P. emersum* as well. Dr. Greene has first described the aquatic phase of the latter, and I have since found excellent examples of it at Luray, Virginia in 1910, and with the aid of any of the above mentioned manuals it is absolutely impossible to determine this aquatic phase of *P. coccineum* or *P. emersum* as anything, but *P. amphibium*, in the common sense of the word, as understood by our American botanists. It is a glabrous submerged plant with slimy floating foliage, leaves subcordate or rounded, and in the aquatic, as well as some narrow leaved forms of the summer terrestrial, superficially quite indistinguishable by me from *P. mesochora* Greene. Yet the last named plant in its terrestrial spring and sterile phase could not by the merest amateur be confounded for either what is called *P. amphibia*, or, especially from any form is *P. emersa* I have ever seen; for the last never has even the slightest trace of herbaceous achrea borders so characteristic of *P. Hartwrightii*, whereas *P. mesochora* has these very markedly and always in the spring terrestrial phase.

Moreover, regarding the plant which I found at Luray in the Shenandoah River, as *P. coccinea* or *P. emersa*, I also found growing with it on the shore the various stages of riparian and terrestrial phases of the colony, all on one rootstock, the former in mud and

the latter upon the drier bank close by! Had I not found all these indubitably connected I should not have hesitated for a moment in calling the aquatic phase *P. mesochora*. This is but another instance to show how futile it is to gather or study these plants without obtaining all the phases, and being positively sure of their connection, and selecting all the variable specimens that exhibit notable differences even in one colony. Nay more, in spite of the remarkable resemblance of the aquatic phases of *P. mesochora*, and *P. coccinea* it is to be remembered that no two members of the group could be more different from one another, except perhaps typical *P. Hartwrightii* itself. Now as *P. mesochora* possesses the herbaceous spreading tips of the ochrea and narrow leaves in its sterile terrestrial and spring plants so characteristic of *P. Hartwrightii*, one can readily see that such characters though quite valid as distinctions, are to be used only when one is perfectly sure of the phases of the plants in which they are found. By virtue of the character above mentioned *P. mesochora* belongs to the *Hartwrightianae* as a group. It does not therefore belong to the same group as *P. coccinea*, nor has any very close relationship to it; for the latter never in any of its phases, terrestrial, aquatic, or even spring sterile terrestrial, has been found to have spreading herbaceous borders to the ochreae.

Not only does *P. coccinea* resemble *P. mesochora* in the aquatic so closely as to be difficult to distinguish, but I have found at times among the ordinary broad leaved blooming terrestrial phases of the former, plants in flower with the narrower leaves of *P. mesochora* as the latter grows typically in the terrestrial phase. Such plants I have collected on the Virginia shore of the Potomac River at Plummer's Island, growing as aberrant forms of *P. coccinea*, most of the plants being typical wide-leaved specimens of the latter. I must confess my inability to distinguish these aberrant forms from typical plants of flowering *P. mesochora*, as I have collected this at the lakes at Notre Dame, Ind., and described elsewhere as types of the terrestrial phase of the latter. And yet it is to be remembered that the spring plants of these two species could not possibly be confounded even in herbarium specimens. It is to be remembered, moreover, that typical *P. coccinea* or *P. emersa* in phases indubitably proved to belong to it, is practically indistinguishable from *P. amphibia* as the manuals understand the latter. It is to be remembered also that the real

*P. Hartwrightii* A. Gray. never except in some subaquatic or riparian phases actually at any season is devoid of the characteristic spreading borders of its ochreae, and when these are absent the short inflorescence and characteristic glabrous long narrow leaves make it unmistakable. If after remembering all these facts concerning the resemblance of *P. amphibia* and *P. emersa*, as also the great differences between the former and *P. Hartwrightii*, we consider that the manual makers have suppressed the specific status of the last and retained that of *P. emersa*, then indeed we are justly entitled to wonder by what standards of taxonomy such things are done! This too in face of the fact that the aquatic phase of *P. emersa* was described and well known by some who took the trouble to investigate.

The very characterization of plants as "varieties" which have over and over again been shown to grow on one plant, as is done by the manuals, leads us to infer that either the authors have a new meaning for the word, or they know not the plants which they are trying to describe. What then is it that makes *P. emersa* a valid species, and *P. Hartwrightii* only a variety? The only characters worth while mentioning are the broad leaves of the former, its longer inflorescence, crimson flowers. All the others, as well as these in fact, vary in the plants so much that I can show plants and phases of them that may be referred to any and all of the descriptions as found in the New Gray's Manual, for *P. Muhlenbergii*, *P. amphibia* or *P. amphibia* "var" (?) (!) *Hartwrightii*. (Gray) Bissel, and yet the specimens grew on one root-stock! If then the difference between *P. amphibia* and *P. Hartwrightii* is insufficient to merit, in the minds of the manual writers, a valid specific standing for the latter, how then is it that with no greater reasons for the validity of *P. emersa* as a species, the latter is retained? Reasons or show of reason if any exist I have never been able to find. It follows, then that if *P. Hartwrightii* is to be rejected then *P. emersa* must be reduced to synonymy, or made a "variety." If the two are both valid then Dr. Greene's, and Sheldon's segregates having equal or greater reason for specific standing, must also be accepted.

There can be no "half way" between accepting all, or rejecting all, where all individually have the same or equal reasons for recognition. We must, therefore logically accept either Dr. Greene's position in the matter of the status of the amphibious smartweeds,

or be forced back to the original Linnaean idea of but one species.

Whatever reasons the authors of the seventh edition of Gray's Manual had for relegating *P. Hartwrightii* to the status of variety, Dr. Cowles\* still maintains that it is the same as *Polygonum amphibium*, or only a "hairy form" of the latter. From the brief references given to the two plants, one would infer that he is insufficiently acquainted with the plants to know what they really are. In fact *P. Hartwrightii* as Dr. Greene had shown, is by no means a plant "with leaves covered with numerous and stiff long hairs." *As a terrestrial phase or "form" it is quite smooth, and never has hirsute leaves even as a "land form."* Dr. Cowles also seems to infer that the aquatic phase is the "typical" phase of the plant. If it is meant that Linnaeus published this either without reference to terrestrial or knowledge thereof, the information is beside the point. From the description and drawing of the terrestrial "*Polygonum Hartwrightii*," whatever that name means to the author, I would infer that he does not know what the real *P. Hartwrightii* Gray is, for he actually described what Dr. Greene published as *P. ammophila*. Moreover, *P. ammophila* and *P. Hartwrightii* are as different from each other as *P. amphibia* is from *P. emersa*. Moreover, one remarkable fact, among others as important and more so about the real *P. amphibia*, is that its terrestrial phase known for centuries in Europe *has not spreading borders to its ochreae!* There is in fact no plant in Europe that has these, and just because the terrestrial of Europe and the various terrestrial plants of America which in no way resemble one another happen to have aquatic phases more or less as distinct as such, there is no conclusive reason for saying that *P. Hartwrightii* has been changed into *P. amphibium*. There may be a certain amount of mental amusement in juggling names, but for all that, it is the duty of the ecologist to see that they are applied to the proper things. "*Nomina si nescis perit et cognitio rerum,*" is a very old adage. There may be little in a name, but unless we are sure what is represented by it, the knowledge of phenomena and things may become a hopeless mess. Presumably Dr. Cowles does not believe in the numerous species of Persicarias as outlined in the last few years, and if he does not accept even *P. emersum*, shown to have an aquatic phase more like the real *P. amphibium* of which it may be called a broad-

\* Cowles, H. C. Textbook of Botany. Vol. II. Ecology. pp. 574, 575.

leaved long-spiked congener, then, he is at least more logical than the writers of any of the manuals. I think, however, that there will be few taxonomists who will agree to this, so strongly has the specific standing of *P. emersa* obtained a hold. On the basis of suppressing all the amphibious persicarias but *P. amphibia*, the author ought to be consistent, suppress other specific terminations which are used in the work and have as little or less reason for recognition.

In order to show how one would fare in the study of the amphibious persicarias with the help of the manuals we may suppose for example that a student taking either the New York or the New England manuals to determine the plants already referred to, viz: the one found at Luray, Va., the other at the Notre Dame Lakes. In regard to the former with the aid of both or either Britton's or the new Gray's manual, the student would find that the former is a plant that the books call *P. amphibium* Linn., when floating in water, whereas branches on the same shoot higher up on the shore are typical *P. Muhlenbergii* Wats., or *P. emersum* Michx. When the student finds what the manuals call two separate species, on the same rootstock, to his mind comes the query: "How can one end of the plant be called one of these species and the other end an equally well recognized species?"

Let us suppose, moreover, that the same student later finds in the Middle West a plant, which in early summer or spring, when not yet blooming, has the spreading herbaceous ochrea margins of what Gray's New Manual calls *P. amphibium* Linn. var. *Hartwrightii* (A. Gray) Bissel, or which Britton's manual calls *P. Hartwrightii* A. Gray. The same student watches the plants carefully until late in summer and autumn, and finds that the spreading herbaceous margins gradually disappear so completely, that at flowering time one part of the plant growing on land near the water resembles narrow leaved forms of typical *P. emersum* according to the books, as it grows along the Potomac River for example, whereas another part of this same western plant taking to water becomes a floating glabrous slimy aquatic that finds no description in the manuals save that for *P. amphibium* Linn. These water shoots have no longer "leaves lanceolate to ovate acuminate, and peduncle hispid often glandular." on which one of these manuals puts so much stress, but now in water have "obtuse or acutish leaves" and "peduncles glabrous, spike terminal, dense ovoid or

*short cylindric*" of the *P. amphibium* description. The only obvious conclusions the student is led to are that the manual makers have either not described what might be separate species by their proper distinguishing characters, or, that they did not know the plants they attempted to describe, and that this want of knowledge came from the fact that study in herbarium of isolated separate aquatic and terrestrial phases not known to be physically connected, led to erroneous conclusions, and that separate names were applied to apparently separate plants that in reality were one. Further investigation on the part of the student reveals other facts. First of these is that there are amphibious persicarias which are easily distinguishable from others in not having in spring or at any other time, spreading borders to the ochreae whereas others always have them, and others again lose them at blooming time. Here plainly are three easily distinguishable groups provided the complete set of seasonal phases are present.

The student may notice too that some plants that have nearly the same shape of aquatic foliage never bloom except in different phases, or that their terrestrial phases growing under exactly similar conditions, often in the same place, are notably or unmistakably different. The aquatic, for instance, of one of these never grows or blossoms except in deep water, whereas the other plant is normally terrestrial in flowering phases, never blooming except out of water and on shoots with terrestrial foliage, and always clinging to the shore, and only producing a few aquatic leaves early in the season or when raising themselves from shallow water near shores.

These observations could force the student only to the following conclusions. Either the manuals because of their attempt to compromise are inconsistent, and we must go back to the Linnaean idea of one species of amphibious Persicaria, or we must accept a large number, with different standards of delimitation of the species than those found in these common manuals. Either view may be logical in itself and depends on the premises assumed as to the characters that distinguish species. The latter course is more reasonable if we weigh carefully or compare sedulously our idea of species as applied to other plants nowadays accepted by the manuals and floras. The *via media*, however, which consists of admitting one or two species besides *P. amphibia*, that is also *P. Hartwrightii* and *P. emersa*, or either of these

without the other, is hopelessly illogical on the basis of characters as they are outlined in our books. Neither of these plants have by virtue of their descriptions in all our common books any better reason for existence or acceptance, than any of the number published by Dr. Greene, and most of his have been based on more solid distinctions than those of these two plants. Admitting for example as we must, that *P. emersa* Michx. has an aquatic phase that the manuals can not distinguish from *P. amphibium* Linn., then there is nothing left of all the descriptions of all the manuals, except that the former is *usually* broader-leaved and *usually* longer spik'd *P. amphibium*. *P. Hartwrightii* is for similar reasons but a *P. amphibium* with spreading borders to the ochrea.

The ecology of the amphibious persicarias is to be taken into consideration in their classification. When we force certain plants into abnormal habitats producing peculiar individuals these changed "forms" are in no way to be considered as new species or for that matter even as "varieties." Plants, however, naturally choose their own habitats or at least adapt themselves to them. If we find *in one locality* a plant like *P. fluitans* which takes always to deep water,—and another like *P. ammophila* which though early in the season possesses leaves like those of *P. fluitans*, but, unlike it, can not be made to bloom except in the terrestrial phase when the aquatic part of the plant has almost disappeared, and which will never bloom except out of water, and if this character is found to be constant, then we are justified in saying that the plants are not the same. It may be said that they are but two "forms" that have adapted themselves to different habitats. It is to be remembered that these habitats are not only near one another but actually continuous or contiguous. Seasonal drought and freshet changes may have brought about an inherent disposition to take to one prevailing habitat or other, and this tendency may have been inherited in succeeding generations. At all events the finding of a specimen of *P. ammophila* with shoots blooming in the aquatic phase or, vice versa, of a blooming shoot of terrestrial *P. fluitans* would sufficiently establish the identity of the two species. Such have not as yet been found and I therefore prefer to regard them as separate species until their identity has been proved.

That there is a factor to be explained by ecologists beside the mere differences in the above-mentioned plants, *i. e.*, *P.*

*ammophila* and *P. fluitans*, is evident from the following. I have found the former most abundant at Millers, Ind. in pools which seem never to dry up quite completely. If there were but a matter of selective habitat to explain their identity, why would not *P. ammophila* venture out a few meters into deep water and bloom as an aquatic, rather than hug the shore and wait until the aquatic foliage is withered on account of drying up of the water, before it blooms solely as a normal terrestrial. In other words the habitat of *P. fluitans* is present where *P. ammophila* invariably grows! *P. fluitans* is reported from Dune Park, but a few miles away.

I have found it difficult in course of a number of experiments to force terrestrial phases to change to aquatic. The plants are invariably so shocked by the sudden change to water that they die. I have however succeeded in keeping *P. ammophila* in aquatic phases growing as such, without blooming of course, for many months. I have one such shoot that kept a few aquatic leaves all winter in a twenty gallon glass jar with some soil in the bottom, and that too in spite of the ravages of *Oscillatoria* that would have choked any other plant, as it actually did all the *Myriophyllum* shoots and *Utricularia*, as also in spite of water-snails that seem carefully to avoid touching the foliage of the smartweed for some reason or other.

Though some forms of *P. grandifolia* and *P. pratincola* are quite indistinguishable at times, the aquatic phases could hardly be confused. Similarly *P. rigidula* in the same phase could not be mistaken for either, by the shape of its leaves. This plant has, however, a very characteristic pubescence in the terrestrial phase. Superficial observers in studying these plants sometimes overlook the fact that two different species growing close together may have shoots one as hairy as the other, yet the *character* or *kind* of pubescence may be totally different and usually not noticeably so without a hand lens.

The fact that in some of the species of amphibious persicaria the aquatic phase is to all appearance simply vestigial, found only early in the season, and only for a short time, never to be looked for at flowering period, shows that they are normally adopting a certain phase exclusively. How long ago this process of divergence of types was begun it is impossible to say. Students of phylogenesis would say, that as these developments seem to be



taking place at the present time, this group of plants ought now to be a subject of very interesting study. Some of the species are still normally amphibious in the true sense of the word, and able to pass rather quickly from one habitat to the other. In fact some, like *P. mesochora* and *P. coccinea*, may have the characteristic terrestrial and aquatic shoots on one rootstock. Others may have the characteristic foliage of both phases even on one shoot, the upper terrestrial and lower aquatic, as in *P. ammophila* and especially *P. grandifolia*. In others as *P. pratincola* or *P. fluitans* one or other of the phases may be either completely obliterated or vestigial.

Whether the law of mutation is a notable factor, will, it seems to me, be a rather difficult problem to ascertain, for seeds of Persicarias I have found hard to germinate successfully. Some attempts made have been without avail. I have not in fact, as yet found a single indubitable seedling of any member of the group, possibly because it may be difficult to distinguish any given plant from other water persicarias, such as *P. Hydro-piper* and *P. hydro-piperoides*. Moreover, the difficulty of forcing normal terrestrial phases of plants known to be normally also aquatic, into the latter phase, offers difficulties directly proportionate to the periods of time they were allowed to grow in one habitat exclusively without access to the other. In other words shoots of *P. mesochora* for example will only bloom simultaneously in both phases at the water's edge. A plant too long kept from water and grown on dry soil exclusively, will even lose its power of blooming as a riparian plant, and take on what may be considered as a sterile xerophytic phase, the pubescence of which in this case resembles that of a plant found by me at Studebaker's woods and hereafter to be described as new. This pubescence of the xerophyte of *P. mesochora* lasts only during the early season and the plant later becomes glabrate like typical terrestrial plants of the above-mentioned species. Shoots of the new plant to be hitherto described retain such pubescence always, and even, on the contrary, become more so later in the season.

As Dr. Greene has pointed out, the amphibious smartweeds have every one, at least potentially, several separate phases, and must be studied and described in their separate phases. As long as the manuals persist in describing only in part plants, which though resembling one another in one phase, are different essentially

in others, we can hope for nothing but hopeless confusion and ignorance. The examples quoted have, I think, sufficiently shown this. The authors who will not admit the system must perforce logically go back to the Linnaean one species, *P. amphibium*, for on the basis of classification as now obtains in the manuals, *P. emersa* is as untenable as *P. Hartwrightii*. Admitting these two, we must also logically admit Dr. Greene's species.

Moreover admitting these two plants as separate species, and logically also the others, one is also as logically led to the conclusion that there is no typical *P. amphibia* in America. The terrestrial phase of this has been many times described by European authors and lately again by Massart.\* The only plants that could be mistaken for it are *P. mesochora* forms, and specimens of *P. fluitans*. The former has spreading herbaceous borders to its ochrea in the terrestrial phase, as have many others such as *P. Hartwrightii*, and *P. ammophila* which in aquatic form are somewhat like the European plant. *P. fluitans* has no known terrestrial form. *P. amphibia* of Europe never has these spreading margins in any phase whatever. *P. emersa* in its aquatic phase may be considered like *P. amphibia*, as I have pointed out, but to say that they are the same is equal to suppressing one of them. Moreover, there is no narrow-leaved terrestrial phase growing in America that sufficiently resembles that of the *P. amphibia* in Europe, that could possibly serve as a terrestrial phase to prove the existence of the real aquatic here. In other words as there is in America no terrestrial phase like that of the European *P. amphibia*, therefore, if the latter exists here it exists without a corresponding terrestrial, none being like it here, and this fact alone renders its presence here, at least highly improbable. The absence of a terrestrial presupposes the absence of the aquatic, and the aquatics we have are phases of one of the other Persicarias whose terrestrial phases differ from any European terrestrial plant.

As few if any collectors in the past, or apparently at present, gather all the different variations or phases of these plants, or make any pretence to establish the relationship or identity of aquatic and terrestrial specimens from any given locality, the determination is a difficult matter and sometimes quite impossible. Such ignorance of other plants would be considered intolerable

\* Massart, J. C. L'Accommodation Individuelle Chez *Polygonum amphibium* Bull. Jard. Bot. Vol. I Fasc. 2, 1902.

among even amateur students of nature. There can be no more apt analogy of such careless classification of plants unless it be that of the older biologists who called caterpillars and any elongated crawling things worms. There has come a time long since that the amphibious smartweeds must be distinguished on a totally different basis from heretofore, and despite the reiterated assertions of Dr. Greene, that when plants are heteromorphic they need separate diagnosis for every phase, we wonder that antediluvian systems of distinguishing these plants still maintain. That the manual makers should not have known these facts long ago, is beyond comprehension, unless as one suspects, they prefer to follow the easy path of hidebound ignorance.

I shall now add a few new descriptions of phases of the amphibious Persicarias which have been discovered since the last discussion of these plants. Several new varieties or species are added, together with a list of the various hitherto known species as I have found them represented in the herbaria to which I have had access during the last year. It is hoped that though considerable space may be taken up, it may be useful to cite the proper specific names of specimens that have been called variously *P. amphibium*, *P. Hartwrightii*, or *P. emersum* by the collectors. Foremost of these herbaria to which I have had access are the U. S. National Herbarium at Washington, where I have spent the larger part of two summer vacations mostly studying these plants. I have also all too briefly examined those in the New York Botanical Garden. Dr. C. C. Deam has kindly sent me his collection for examination, and specimens have been sent me also by Dr. J. Lunell, and Rev. Z. L. Chandonnet from Minnesota. My own collection of these plants extended over a number of years in various parts of this country, especially the immediate vicinity of Notre Dame, Ind., within seventy miles in various directions, as also at Detroit and vicinity, in Oregon, Virginia, West Virginia, Maryland and the District of Columbia and other places.

Beside the two new phases to be described no notice at any length will be made of plants already known. Only diagnoses of hitherto unknown phases will be made. I have, as far as I have been able, tried to arrange the species in the order of natural relationship. Most of the plants of the Midland prairie region are included, none from the far West, and from the East only such are mentioned as are known also from our Region.

Genus *PERSICARIA* Tragus, (1531), in Brunfels' Herb. Viv. Icones. Brunfels App. p. 18 (1531), also Tragus do. p. 161 (1531), also *Pulicaria* Brunfels, (1531), etc., etc.

*Persicaria* Tournefort, (1694). Els. Bot., p. 410, (1700) Inst. Rei. Herb., p. 509, also Linn., (1737) Gen. Pl., p. 35. *Polygonum* Linn., (1754) Gen. Pl., p. 170. in part; also Sp. Pl. p. 359 in part.

*Persicaria* Trew in Herb. Black., (1754), Tab. 118 and 119, Hill, (1756) British Herball, p. 486, Shaw, (1757) Trav. and Obs. Lev., Collect. p. 466., Morandi, (1760) Hist. Pl. Pract. p. 118., Adanson, (1763), Fam. des Pl. vol. II., p. 276.

#### Section. POTAMOCALLIS.

Perennial plants typically amphibious with rose-colored to crimson flowers, (never white).

#### Subsection I., EMERSAE.

Plants never having spreading herbaceous borders to the ochreae in any of the phases.

*PERSICARIA AMPHIBIA* (Linn.) S. F. Gray, (1821) Nat. Arr. Br. Pl. vol. II., p. 208.\*

Since the last time I made a study of the European species in the National Herbarium a larger number of specimens are now available. Though there is some variation in the plants both terrestrial and aquatic, I am more than ever persuaded that *P. amphibia* is not found in America. Whatever resemblance there may be in the aquatic phases to our well known plants either *P. canadensis* or *P. fluitans* or *P. mesochora* or even the aquatic plants that are to be referred to *P. coccinea*, there can be but one reason advanced for their identity with it, and that is at most a negative one. *P. mesochora* Greene, can at once be dismissed because in its spring terrestrial phase it has the spreading ochrea borders and wider lanceolate leaves of the terrestrial phase. *No European plant has as yet been found with these borders!* And yet *P. mesochora* seems in every way the nearest relative of our American plants to the real European *P. amphibia*, superficially observed.

*P. fluitans* Eaton and *P. canadensis* Greene have not it is true been found in their terrestrial phases. There seems much reason to suspect that they are normal aquatic without terrestrial phases, because of their deep water habit of growth. *Moreover, I have*

never either in the field or herbaria seen any terrestrial phase of an amphibious smartweed that was even a near approach in appearance to the distinctively narrow-leaved plant of Europe. I have in the field found some terrestrials with narrow leaves resembling those of *P. amphibia* and without the spreading herbaceous borders. but study of the spring and early summer terrestrials invariably showed the presence of these borders that later disappeared. I venture for this reason to predict that should the terrestrial phases of *P. fluitans* or *P. canadensis* be found some day they will have herbaceous borders to their ochreae! The reason for this suspicion, as I have just intimated, is obviously, because if the terrestrial phase actually exists, comparison with aquatic phases such as *P. ammophila* shows that terrestrials such as those of *P. asclepiadea* or *P. ammophila* itself are likely to be the forms. The latter has an aquatic phase that at times could hardly be distinguished from *P. fluitans*, but for the fact that it never blooms in the water phase.

The most notable examples of *P. amphibia* which I have studied are the following mostly from the U. S. National Herbarium.

No. 133941 U. S. Nat. Herb. Richter's gathered at Pesth, Hungary. Aquatic.

No. 257776 collected by the same is a riparian specimen.

No. 387898 by G. de Chalmot, Kampen, Holland. The leaves are subcordate and lanceolate rather than the usual oblong-elliptic leaved specimens.

No. 155279 collected by Mezambara (?) near Venice, also has subcordate leaves.

Nos. 133947 and 155398 on the same sheet, the former the terrestrial, the latter subaquatic or riparian, both from the herbarium of G. C. Joad, July-Aug. 1866. "Flora Ingrica." The terrestrial leaves subcordate 5-11.5 cm. long and 1-2 cm. wide, are scattered-strigose, some of the hairs gland-tipped, the leaves of the latter are 10-15 cm. long and 2.5-27 wide.

No. 155398, Aug. 2, 1861. Specimen by Thorion. (Place and other data illegible).

No. 45440, by S. E. Lassimone from France, Aug. 6, '92. The terrestrial plant is not typically terrestrial but somewhat intermediate. Aquatic leaves 12x3.5 cm. acute, subcordate. The terrestrial are much smaller 7x1.5 cm.

No. 133946 Ahlberg's, Aug. 1865, from Upland, Scandinavia. The plant is aquatic with a transitional terrestrial.

No. 45439. Mouillefarine, Tours. June 19, 1892. Aquatic.

No. 810258. A. Moller, June 1880, from Portugal. The leaves are very broad, 2.7-4 cm., and 9-11 cm. wide.

In the herbarium of the New York Botanical Garden we find the following:

Rydberg's. Aug. 1866. Skedbrack, Sweden. The leaves of this specimen resemble those of *P. mesochora* more than any specimen I have seen. Also Kindly's No. 26 from the herbarium of the Linnaean Society.

Carleton Curtis from Wicken Fen, Cambridge, Eng. Aug. 4, '96. The leaves are cordate at the base as also those of the preceding; both aquatic.

C. Reik's. Aug. 1875 from Aistershaim, Upper Austria. Terrestrial with strigulose appressed pubescence. The leaves are typically long and narrow.

No. 1264. July 30, 1827, collected near Vienna, has rather typical aquatic and terrestrial plants showing the charactersitic perfectly glabrous smaller leaves of the aquatic.

A specimen from Meisner's herbarium. Sept. 1828. Collected at Geneva is also a good example. In the Torrey Herbarium, Haworth's from England has leaves on the aquatic remarkably like those of *P. fluitans*, as also a typical terrestrial plant.

PERSICARIA COCCINEA (Muhl.) Greene, (1904). Leaflets I. 24 and 36.

*Polygonum coccineum* Muhl. (1809) in Willd. Enum. Hort. Berol. p. 428.

Probably (?) *Polygonum amphibium* var. *B. emersum*  
C. Richard in Michx., (1803). Flor. Bor. Am. I. 240.

*Polygonum Muhlenbergii* S. Wats. (1879). Proc. Am. Acad. XIV. p. 295.

*Polygonum emersum* (Michx.) Britton (1189). Trans. N. Y. Acad. Sc. VIII. p. 73.

*Persicaria emersa* (Michx.) Small (1903) Fl. S. E. U. S., p. 376.

Considering this species in the limited sense apart from the segregates recently made, the description of the terrestrial and

the riparian phases have been elsewhere given.\* The aquatic phase has since been rediscovered by the writer at Luray, Va., on the shores of the Shenandoah River near Shortass Mountain, Sept. 6, 1910. Rather good specimens of riparian plants were growing on the shore connected by rootstocks to the floating aquatic plants. Another good specimen of riparian phase is in Mr. C. Deams' herbarium. The lower leaves are aquatic and the plant emerged from the water later so that the flowering spike was produced on an aerial shoot. The stem is really aquatic below and terrestrial above.

**RIPARIAN PHASE.** Lower leaves subaquatic, perfectly glabrous, abruptly short acuminate, rounded, truncate, or slightly subcordate at the base, 8.5-10 dm. long, and 2.5-3.5 cm. wide; petioles 2-4 cm. long, slender; upper emerged, 15-17 cm. long and 4-5 cm. wide with short petiole 1.5-2 cm. long; margins rough as is also the midribs of the lower surface of the upper leaves, otherwise perfectly glabrous; peduncles minutely glandular pubescent 9 cm. internodes 3-9 cm. long, leaves very thin.

A good example of the riparian plant is No. 697, collected at Luray, Sept. 6, 1919, and mounted on the same sheet as the typical aquatic phase. Mr. Deam's plant already referred to, and collected at Vanemon's Woods S. of Bluffton, Wells Co., Indiana, is strictly speaking to be considered as more aquatic since it has the lower leaves almost aquatic except for their more acute apex. The upper leaves are like those of the type. The spike is, however, very long about twice that of the eastern plant. The leaves have the appearance of those of *P. laurina* Greene, but are much broader.

**AQUATIC PHASE.**† Leaves perfectly glabrous, slimy and shining, all floating rounded to subcordate at the base, simply and abruptly acute at the apex, (sometimes obtuse) elliptic-oblong or ovate-oblong, perfectly green, 7-10 cm. long, 2-4 cm. wide; petiole 3-5.5 cm. long, slender; stems swollen between, and just above the nodes, rooting in the water; internodes slightly fistulous 4-6 cm. long; spike cylindrical usually solitary 3-4 cm. long, flower small rose-colored to rose-red; bracts membranous somewhat green in the middle, acute to acuminate, glabrous, entire; peduncle shining glabrous with one or two large bracted flowers above the middle, where it becomes very slender.

\* Greene, E. L. Leaflets, vol. i, p. 35; also AM. MID. NAT., vol. ii, p. 20.

† See also Greene, E. L. Leaflets, vol. i, pp. 106, 107.

The aquatic plant was found by me along the Shenandoah River near Luray. The aquatic phase is No. 697a, as referred to above, several of the plants on the same sheet with the riparian phase No. 697 were found with it.

Following are other good examples of *P. coccinea* which I have studied in the U. S. National Herbarium.

No. 444732. Collected in Huron Tp. Erie Co. Ohio, VIII, 18, 1892.

No. 672000. Webster Co., Iowa. XIII. 1, '09.

No. 672476. M. P. Somes, Webster Co., Iowa, VIII, 13, 1909.

From the New York Botanical Garden Herbarium I select the following:

[Thomas Morong's Rockland Lake, N. Y. VIII, 26, 1891.]

This is probably an aquatic phase of *P. coccinea* rather than of any other amphibious plant. One could not be certain, however, unless the terrestrial plants growing near had also been collected. Collectors will some time perhaps realize that it is impossible in many cases to tell the difference between what is called "*P. amphibia*" and "*P. emersa*," when the above description of the "real" *P. emersa* or (*P. coccinea*) aquatic is compared to the description of "*P. amphibia*" as outlined in our manuals, and understood by most botanists today. As the manuals describe the two plants, one can readily see why we might conclude on a very conservative basis to suppress *P. emersa* altogether, with *P. Hartwrightii*, unless, as I have pointed out, another system of distinctions be adopted from that of the manuals of today.

C. W. Short, Kentucky, 1840, also in the N. Y. Bot. Garden Herbarium contains as one of the specimens what might be *P. coccinea* in its aquatic phase. If the two specimens are found one plant, it is an interesting fact to deduce, that our older collectors were more careful than in recent years to gather complete plants!

Another specimen from the Torrey Herbarium "New York near Albany." also "H. H. Eaton's, Troy." also Letterman's. Valentine, Mo. VIII, 1903. (?) G. L. Clothier's No. 458. 1896. The last specimen has four spikes of flowers! J. B. Norton's No. 458 Riley Co., Kan. VII., 22. W. Eggleston's "Western Vt." IX, 23, 1899. This plant has the aspect of the terrestrial *P. mesochora*, and thus resembles the plant I found along the Potomac, as already referred to.

From Mr. Chas. Deam I have his No. 1700 from the banks of



the St. Mary's River, South of Fort Wayne, Allen Co., IX. 16, 1906.

In my own herbarium I may note the following collected by myself.

No. 12, Notre Dame, 1907. Sterile. No. 910, Kizer, Dollar Lake, Ind., VI., 26, 1911. No. 691, Notre Dame, 1910. No. 376, X., 10, 1909.

This is *P. coccinea* var. *asprella*: No. 2242, Notre Dame, 1909. No. 8987, pond near Studebaker's Woods, South Bend, Ind., VII. 12, 1911. The plant is sterile and corresponds to Var. *asprella*.

No. 261, Notre Dame, IX., 16, '09, var. *asprella*. No. 1809, Studebaker's Woods, South Bend. IX., 16, 1911. This is the variety *asprella*. Some of the stems have the very narrow and small foliage characteristic of ordinary *P. mesochora* in its terrestrial phases. No. 742. Sagunay, Ind., near Hudson Lake. IX, 29, 1910.

No. 1618. Virginia, banks of the Potomac opposite Plummer's Island, D. C. Specimen No. 1618x from the same rootstock as 1618 is so much like the terrestrial of *P. mesochora* with its narrowed small leaves, that one could hardly tell them apart, and not knowing the origin of the plants, one would undoubtedly classify them as terrestrial phase of *P. mesochora*.

These are properly *P. coccinea* var. *asprella*. Other specimens of the variety *asprella* in its various phases are the following from Millers, Indiana and vicinity, collected at various times. The variation in numbers indicates either different dates of collection or different places.

No. 3006. Along I. H. R. R. IX. 21, 1911. A full grown blooming specimen, as is also the following from another place nearby.

No. 8988. Collected same day as the above; both terrestrial No. 2095 from another pool has narrower leaves.

PERSICARIA COCCINEA var. ASPRELLA Greene, Leaflets Vol. I., P. 36.

AQUATIC PHASE. The plant in the aquatic state resembles as to glabrous foliage perfectly that of the species. The plant never blooms in this phase, but soon emerges assurgently out of shallow water as the aerial leaves enlarge and one after another become nearly twice as long and broad. In June one may find such sterile aquatic phases with leaves 6-12 cm. long and 2-4

cm. wide: (some of the leaves are long and narrow, 3x12 cm.) obtuse or acutish at the apex rounded to cordate. As the leaves change to those of the terrestrial the upper part of the petiole is often winged with abrupt sinuses where it passes into the blade petioles often 4 cm. long.

**RIPARIAN PHASE.** The plant not only fails to bloom in the aquatic phase but the aquatic plants are never to be found at blooming time. Aquatic branches are, by elongation in growth rapidly changed into riparian ones, which are strictly speaking only aquatic branches in the condition of transition to terrestrial, or terrestrials with the lower foliage passing into aquatic when the glabrous floating leaves are still present. Such riparian leaves are characterized as having the upper part of the petiole winged and with abrupt sinuses when the wing passes into the blade.

The type of the aquatic I may designate as numbers 857a and 859a collected by myself at Millers, Indiana in pools along the old Indiana Harbor Railroad. June 1, 1911. Numbers 856ab and 859ab represent types of the riparian plants. The two numbers are the same variety collected in different pools. Numbers 856b and 859b and 859c are specimens in which the foliage characteristic of riparian and aquatic plants is absent due to the fact that the plants grew nearly out of the water. The plants are, of course, all sterile.

The petioles of the riparian plants are sometimes quite long and this often is the case when the leaf-blades are quite of the terrestrial type. I deduce from the analysis of many different kinds of *Persicarias* that the length of petiole depends more on the available amount of moisture the plant can obtain, rather than actual immersion of the leaves, whereas the pubescence of the leaves depends on the extent of actual emersion. One will often find plants growing in boggy places with a large supply of water, but actually unable to float that have typically pubescent leaf blades with the long petioles of the aquatic leaves.

*PERSICARIA PRATINCOLA* Greene, Leaflets, Vol. I., p. 36.

**AQUATIC or SUBAQUATIC PHASE.** Plant at first free-floating but later assurgent with only the first and lower leaves glabrous slimy; leaves long-petioled, long acuminate, truncate at the base 9-12 cm. long 25-4 cm. wide; margins almost parallel

or slightly wider at the middle of the leaf, which is lanceolate to oblong of a bright green but later paler, and soon withering as the terrestrial foliage replaces the few aquatic leaves: petioles to oblong of a bright green but later paler, and soon withering as the terrestrial foliage replaces the few aquatic leaves: petiole 4-5 cm. long, slender; The upper terrestrial leaves are larger, longer 13-15 c. long 4-5 cm. wide acuminate, and rounded at the base, elliptic oblong or elliptic oval. The intermediate leaves are at first rounded, then cordate at the base and then change gradually to the normal terrestrial subcordate to cuneate. The intermediate leaves with cordate base are glabrous, but not slimy aquatic being emersed, and are oval or ovate in shape. The petiole gradually becomes shorter as the leaves pass to the terrestrial.

What I may designate as type phases were collected along the St. Joseph, South Bend, and Southern Railroad in St. Joseph Co., Indiana, between Lydick, Ind. and Galien, Mich. about two miles from the state boundary. They are nos. 923a (two sheets) and 923aab, and were gathered June 15, 1911. The plants are therefore sterile, and it may be inferred that the strictly aquatic phase of *P. pratincola* is vestigial, represented by only a few leaves at the base of such stems as are found near or in shallow water. Even if the water remains the stems elongate and later produce only terrestrial foliage. The species, therefore, like *P. grandifolia* bears all the phases consecutively on one shoot, but differs in that the aquatic is the merest vestigial remains, to be looked for and found only when the plants appear early in the season, and when not yet blooming. Some strictly aquatic plants were found, but had only a few first leaves. The habitat of the plants was a small pool only a few feet wide, evidently filled with water only in spring and early summer. It appeared as if it might once have been an animal wallow, though no animals could have been near for years as it was surrounded and invaded by rather old underbrush. The pool was in a field in low ground, and surrounded by normal terrestrial plants of *P. pratincola*, also present in my herbarium as Nos. 923 c, 923d, 923 de. No. 922 is another terrestrial found not far from this place. Other specimens of *P. pratincola* I may here refer to from the U. S. National Herbarium are the following.

No. 230396, B. Fink. Fayette Co., Iowa, VIII. 1894; 324300,

J. M. Mill's No. 529, Mt. Pleasant, Iowa, VIII. 1887; 353194, J. B. Norton's No. 458, Riley Co., Kan., VII. 22; 235324, J. N. Rose and Geo. Clinton, VIII. 28, 1895. The last is labelled, "A bad weed in Illinois." The spikes are 10 cm. long. Though Dr. Greene in publishing this species gave no reference to a special plant designated as type, we might suspect that he had this specimen in mind when commenting on it as a rank weedy species of low praries in Indiana, Illinois, Iowa, and Missouri."

324365, E. Johnson's No. 622, Ames, Iowa, IX. 14, 1897; 281163, B. F. Bush's No. 397, Courtney, Jackson Co., No. VII. 15, 1896; 318289, K. Mackenzie's 313, Sheffled, Mo., VIII. 1, 1897; 308100, Glatfelter, Creve Cœuer and St. Louis, VIII. 31, 1895.

216246, W. C. Stephens. Lawrence Kansas. Aug. (Labelled as "*P. amphibium*." 430106, W. F. Wight's no. 49 Hutchins Lake Ganges Tp. Mich. Labelled "*P. pennsylvanicum* L." A very narrow leaved specimen that may be distinct. 490346, A. J. Peters. Put-in-Bay, O. VIII, 1898.\* Sterile. 444735, L. Mosely, Oxford, Erie Co., Co. IX. 2, 1895. 444733 S. H. and D. R. Camp's Jackson Co., Mich, IX, 31, 1893. 444736 L. Mosely Oxford, Erie Co., O., IX, 2, 1895. 343362 Mark White, Arkansas City, Ark., VIII, 4, 1898. 353195 ——— no. 458a Swamps, Riley Co, Kan. 353383 B. W. Everman, Lake Maxinkuckee, Ind. VIII, 15, 1899.

Herbarium U. S. Dept. Agric. Tom A. Williams (2 specimens). 1200 feet, Nebraska, VIII, 1, 1889.

Herbarium N. Y. Bot. Garden. B. F. Bush's, 4176, Sully, Mo. X, 10, 1904, also B. F. Bush's 4150. Dodson Mo. X, 10, 1904. J. B. Norton's 292, Manhattan, Kan., VII. 22, '95. L. M. Umbach, Dune Park, Ind. IX, 2, 1898. Paul J. White's, Custer Co., Okla., VII, 21, 1900. Herbarium of Mr. Chas. Deam, Duplicate of the preceeding also of L. M. Umbach's IX, 2, 1989, Dune Park, Ind.

PERISCARIA VESTITA Greene, (1904) Leaflets, Vol. I, p. 38.

B. C. Taylor's, ———, Minn., VIII, 1892. N. Y. Bot. Garden. another specimen gathered at Brookings, S. D., VII, 1894. P. A. Rydberg's 1613, Whitman, VII, 29, 1893. The lower leaf seems to be riparian or subaquatic. All from the Herbarium of the New York Botanical Garden.

\* Roman numerals indicate month collected, the others before the year show the date of the month. e. g. IX. 2, 1895 means Sept., 2, 1895.

PERISCARIA GRANDIFOLIA. Greene (1904) Leaflets, Vol. I, p. 37,49.

The following plants in the U. S. National Museum may be referred to this species.

649547. E. A. Mearns, Ft. Snelling, Minn. VII, 24, 1888. (Duplicates in New York Botanical Garden Herbarium.)  
 670719 E. Mearns Camp Douglas, (Probably *P. grandifolia*?)  
 444734 Mosely. Willows Pt. Sandusky, O. VIII, 17, 1895.  
 649546 Edgar Mearns, Fort Snelling, Minn., VII, 24, 1888.  
 E. P. Sheldon's Mira, Kanabec Co, Minn., VII, 1892.

I have since found the plant growing at the edge of a pond, South of South Bend, and west of Studebaker's woods, together with a new species to be described. The plant is represented by numbers 942x and 942y collected July, 12, 1911. Some of the leaves are typically aquatic below.

PERSICARIA RIGIDULA (Sheldon) Greene, (1904) Leaflets Vol. I. p. 24. and 39.

The plant is closely allied to *P. grandifolia*, and had the same habit of growth, rising rigidly and assurgently from aquatic branches. Hitherto it has been known as an aquatic only. Dr. J. Lunell has sent me a specimen with explicit notes, one sheet of which proves to be the strictly terrestrial phase of the plant. When growing in dry soil the plant is "always sterile," and under these circumstances has smaller, or at least differently shaped leaves with short appressed characteristic pubescence, and of course lacks the fistulous stems.

RIPARIAN PHASE. There is another very peculiar habitat in which the plant has the characteristic appearance of the sterile terrestrial as to the stem and leaves, but blooms freely. Concerning this Dr. Lunell says, "I believe this form has to be called riparian. Bottom of lowest course of ravine, boggy and thoroughly soaked, but no visible water." The specimen is over a metre high and has been broken off at that. The leaves resemble those of the terrestrial phase except that they are much larger, and the nodes are somewhat swollen. The specimen was collected Aug. 12, 1906 at Butte Benson County, N. Dak., by Dr. Lunell. Another plant sent me by him was collected by J. F. Braenkle at Kulm, N. Dak. July 20, 1910 and though smaller shows the characteristic creeping habit sending up new aerial shoots.

in this case from "shallow water and mud." This aerial plant is then quite of the appearance of a terrestrial, but is, as is evident from the description of the habitat, a dweller of wet places. It may be classified as riparian, since Mr. Braenkles' plant rose from shallow water.

**TERRESTRIAL PHASE.** Plant always sterile, assurgent from a thick green prostrate stem: leaves 7—14 cm. long, 3-4.7 wide, oval or elliptic-oval, but for the acuminate apex, scarcely ovate, sometimes elliptic-oblong, (the aquatic leaves are ovate often broadly so) short petioled hardly 1 cm.; covered with very minute fine pubescence which is canescent on young foliage; somewhat roughish on the midrib; ochreae beset with longer appressed scattered hairs; stems densely leafy; internodes not over 6 cm. long swollen near the nodes; stem commonly glabrous or pubescent like the ochreae.

As type I select no 10078 of my herbarium sent me by Dr. J. Lunell, and collected by him Sept, 8, 1911 at Butte, Benson Co., N. Dak. The plant is always evidently sterile unless growing in places where moisture is abundant. Another sterile terrestrial was sent me later by Dr. Lunell, collected in the same place Aug, 28, 1911, in damp places, but without visible water.

A typical aquatic is in Mr. Chas. Deams' herbarium, which he kindly sent me for examination. The plant was collected near Leeds, N. Dak. by Dr. Lunell, Aug. 7, 1901. No 10077 in my herbarium, also collected by him Aug. 7, 1911, is singular in having a flowering shoot accompanied on the thick fistulous aquatic, by a sterile terrestrial shoot. The latter establishes beyond a doubt connection between the aquatic and riparian, and sterile terrestrial phases! In all cases except Mr. Dean's specimens the aquatic foliage has disappeared almost entirely.

*PERSICARIA LONCHOPHYLLA* Greene, (1904) Leaflets Vol. I. p. 37.

U. S. Nat. Herb. no. 593950 O. A. Farwell's VIII, 1892, C. C. Deam's Herb. his plant from dunes 2 m, E. of Indiana Harbor, Lake Co. IX, 8, 1907.

*Persicaria tanaophylla*. Nwd., nov. sp.

**PLANTA TERRESTRIS.** 5-10 dm. vel altior e rhizomate radicante in locis subhumidis: caulis plus minusve tenuis cum internodiis longis in aliis plantis innixus sed erectus: Folia oblonga vel

anguste lanceolata, apice acuminato, et basi cuneato, obtuso vel raro subcordato, circa 5-6-plo longiora quam lata cum, marginibus ciliato-scabris subparallelis. (Adsunt quidem folia 21.5 longa et tantum 3.3 cm. lata): Petiolus 1-3 cm. longus; folia adpresso-strigulosa vel cum pilis sericeis albis plus minusve longis praesertim in facie inferiore; vena media scabra vel adpresso-hirtella, vel muriculata. Folia 8-22 cm. longa et nunquam plus quam 4.7 cm. lata, et longissima circa 3.5 cm. lata vel angustiora: folia juniora sericeo-canescientia; folia seniora vel matura et quoque ochreae, sparse adpresso-hirtella: nodi intumescens. Pedunculi 5-10 cm. longi tenuis et minute glanduloso-pubescentes et aliquando hirtelli spicae circae duae, 5-6 cm. longae lanceolatae quando florent et cum floribus seriatim florescentibus binis vel trinis series. Bractee ovatae, hirtellae, et ciliatae pilis longioribus fuscis. Flores infundibuliformes, rosei et deinde rubro-purpurei. Calix dum fructus maturat, basim attenuatam habet. Semen lenticulare et in latere altero planum, et stylis binis praeditum usque ad medium vel inferius divisum. Stamina rubra versatilia, exserta, et stylis coaetanea.

PLANTA RIPARIA VEL SUBAQUATICA cum caulibus erectis, brevibus, circa 2 dm, longis super aquas vadas natantibus, et e caule majore, longo, radicante se erigentibus. Folia elliptico-oblonga vel lanceolata, praesertim ea in caule inferiore, glabra 7-13 cm. longa (cum petiolo 1-2 cm. longo): cum basi cuneata vel in superiore caule rotundata et subcordata; cum apice acuto. Ochreae margines desunt omnino. In caule superiore ochreae strigulosae vel scabrae, et aliquando, ut in caule inferiore, glabrae, et aliquando ut in caule inferiore, glabrae et limosae, tenues, et membranaceae Spicae 3.5 cm. longae, emersae, angustae, cum floribus pro planta perparvis infundibuliformibus. Pedunculus circa 5 cm. longus, leviter pubescens in parte superiore. Bractee glabrae, fuscae, cum apice aristato vel cum aristis paucis.

*Terrestrial Phase.* Plant 5-10 dm. high from a creeping rhizome, rooting at the nodes, and usually though erect more or less supported by other plants especially shrubbery. Leaves narrowly lanceolate or even linear-oblong, acuminate at the apex, usually sharply cuneate at the base, or obtuse, (and very seldom subcordate) long and narrow generally 5 or 6 times as long as broad, the lower leaves with subparallel ciliate scabrous margins (in some cases leaves actually 21.5 cm. long and only 3.3 cm. wide.)

Petiole 1-3 cm. long. Surface of the leaves minutely strigulose with white rather long hairs, often appearing fine and silky even under the lens. Midrib minutely scabrous to appressed hirtellous, or appressed muriculate. Leaves 8-22 dm. long and never more than 4.7 cm. wide, the longer leaves rather often comparatively less wide than the upper shorter ones. Young leaves appressed silky canescent, or sometimes glabrate; sometimes the older leaves, and the ochreae always appressed hirtellous. Nodes slightly swollen: peduncles very slender minutely glandular pubescent sometimes pubescent upward, 5-10 cm. long: spikes 5-6 cm. long, lanceolate in flower, linear in fruit, the rose-red flowers blooming in consecutive series gradually spreading upward, so that the flowers appear sometimes in 2-3 circles giving the spike an attenuate appearance in the middle. About three sets of spikes in twos are produced in a season, a new branch ending in the new inflorescence appearing in turn from the axil of one of the upper leaves. The peduncle enlarges in fruit and all the parts of the spike except the tawny hirtellous bracts are soon dehiscent. Bracts triangular ovate, and ciliate with long brownish hairs. Flowers perfectly funnellform, rose-red, the calyx becoming dark purple to carmine in fruit. Calyx attenuate below the seed in fruit shining black lenticular flatter on one side. Flowers rather loosely aggregated in the spikes early in the season. Stamens with rose-red, exserted, versatile anthers, longer than the red, globular-tipped, coetaneously exserted styles which are divided to below the middle.

It would seem that the first spike of the season, as also the aquatic spikes, are quite uniformly sterile. It is not quite certain whether the plant is to be referred to the *emersa* group or to the following, but it seems quite safe to put it as next of kin to the following plant to be described, as also next to *P. mesochora*. Though I have visited its habitat in early summer I have been unable to find any trace whatever of borders to the ochrea tips. In shape of leaves it shows kinship to *P. mesochora*, or even *P. ammophila* for that matter, though the spikes differ much from those of the latter. If the plants ever even in the spring terrestrial phase have the herbaceous borders of the ochrea, they are vestigial, and soon disappear, even sooner than in the two following plants, where such structures may be found occasionally even at blooming time in sterile specimens. I have found plants with traces of borders at Millers early in the season which certainly were not



*P. ammophila*, everywhere so abundant there, but no collections of such specimens were made at the time and the identity of the plants can not be positively proved. Moreover, the locality is rich in many amphibious Persicarias, some of which resemble *P. mesochora*, or *P. lonchophylla*, or even, *P. caricetorum*.

I may designate as type of the terrestrial phase, which seems to be the normal condition of the plant, No. 1901, of my herbarium gathered at Millers, Ind., July 9, 1911. Numbers 1901a and 1901b show the long narrow leaves so characteristic of the species, as also the ever-present brownish color of the lower surface of the leaves later in the season, that distinguishes it from all other members of the *emersa* group. Other typical specimens are numbers 1903 collected in another place some distance from the first locality and on the same day. Numbers 2096 and 2099 gathered in the same place, Sept. 21, 1911, as also 3002, 3004, and 3005. Numbers 3002b, 3002c and 3004c are riparian plants with upper terrestrial foliage and the lower leaves about  $\frac{1}{3}$  as long, though of nearly the same width, and glabrate, due to previous immersion in shallow water. The most striking of these intermediate riparian phases is sheet No. 1903a which has lower aquatic leaves much shorter, and as broad aquatic ovate oblong to lanceolate, that are quite glabrous, with broad base and acute apex, whereas the upper are nearly twice as long and acuminate. The petioles gradually shorten upwards, and the specimen is as perfect a fertile transition phase as I have been able to find. It was collected July 9, 1901. No. 2465 is the nearest approach to the aquatic phase I was able to obtain late in the season. The lower foliage though scabrous margined has the long petioles of the water plant though the leaf shape is not characteristic. It is more riparian than either strictly terrestrial or aquatic. Even riparian blooming plants of the species are rarely to be found.

**SUBAQUATIC PHASE.** Plant with small floating leaves ovate to elliptic-ovate, acute, subcordate or rounded at the base and not over 9 cc. long when on sterile plants, about 2 cm. longer in the largest of upper leaves on fertile plants, and 1.5-2.6 cm. wide and ovate or ovate-oblong. Petioles 1.5-3 cm. long perfectly smooth. The plant blooms rarely in this phase and apparently the flowers do not mature seed. The smaller stems rise from a long upright one in shallow water and as they rise out of the water soon change to terrestrial or riparian. I select as type

No. 1906 collected with the terrestrial No. 1901 at Millers, Ind., in the same pool July 9, 1911. Numbers 1904 and 1905 are sterile aquatic shoots gathered nearby. They are more typically aquatic in nature of the foliage, as No. 1905 has traces of pubescence on leaves just forming that connect it without doubt with the terrestrial phases of *P. tanaophylla* as just described. I choose No. 1906 in preference to the more typically aquatic 1904 and 1905, because the latter are sterile. The choice, however, is arbitrary, for my experience shows that the aquatics are normally or at least commonly sterile.

#### Subsection II. HARTWRIGHTIANAE.

Plants having more or less spreading herbaceous borders to the ochreae usually in the terrestrial phase, sometimes only in the terrestrial spring sterile and disappearing later.

#### *Persicaria carictorum* Nwd. nov. sp.

PLANTA TERRESTRIS VERNA circiter 6 dm. alta. Forma foliorum maxime differt ab ea foliorum plantae aquaticae. Folia 9-19.5 cm. longa 2-5 dm. lata cum petiolis 1 cm. longis, densis pilis et sericeis mollibus plus minusve divaricatis induta, praesertim juvenilia; pilis in venis et petiolis praesertim divaricati. Ochreae dense sericeo-hirsutis pilis obsitae, et in infundibuliformem vel campanulatum marginem herbaceum ciliatum terminantes. Folia anguste lanceolata cum baso rotundato vel obtuso et apice longe acuminato in fine obtusiusculo. In plantis caulem inferiorem adhuc aquaticum habentibus, folia superioris partis terrestria, semper dimidio angustiora et longiora sunt!

PLANTA TERRESTRIS AUTUMNALIS unica fertilis, plus minusve erecta 3-8.5 dm. alta, assurgens e rhizomate in humidis vel aridis locis radicante. Internodi 3-7.5 cm. longi: nodi haud intumescunt. Folia inflorescentiam superantia 7.5-17 cm. longa, 2-4 cm. lata, pubescentia ut in planta terrestri sterili. Ochreae molliter sericeo-hirsutae pilis plus minusve divaricatis et omnino et semper margines divaricatos carentes. Folia juniora pilis sericeis appressis canescentia. Spicae 1-3 saepissime 2, altera prior et senior, circa 5 cm. altera junior 2 cm. longa. (Quando 3 adsunt, omnes fere aequae longae circa 2.5 cm.) Pedunculi 3-4 cm. longi, tenues, et glandulosi pilis divaricatis induti. Bractee ovato-triangulari-

formes dense hirsutae et hirsuto-ciliatae. Calix breviter campanulatus roseo colore: stamina exserta; anthera versatilia: styli longi tenues usque infra medium furcati, longe exserti, et staminibus coaetanei vel juniores. Semen pro planta perparvum, nitidum, fuscum et crasse lenticulariforme. Floret haec species in planta terrestri tantum, a Julio usque Octobrem in carictis prope ad stagna.

PLANTA AQUATICA VERNA AESTIVALIS semper, sterilis. Folia viridia ambabus faciebus, in aqua natantia, glabra, nitentia et limosa, elliptica-ovata vel elliptico-oblonga media parte latissima, cum basi obtusa, rotundata vel subcordata (in foliis superioris caulis), cum apice acuto, 5-11.5 cm. longa et 1-4 cm. lata (saepissime 3x9 cm.) Petioli tenues 1-4 cm. longi: internodi 2-4 longi ubi folia virescunt, internodi inferioris caulis multo longiores. Nihil differt planta aquatica autumnalis praeterea quod folia sunt magis venosa et purpuata. Plantae ipsae aestivales et praesertim autumnales, ambae steriles, perrarae sunt et nunquam nisi in vadis umbrosis inveniuntur.

*Terrestrial Phase.* Plant about 6 dm. high, leaves 9-19 cm. long 2-5 cm. wide, exclusive of the petiole which is 1 cm. long (sometimes 2 cm. in glabrate broader leaved riparian plants, with rather wide borders to the ochrea, and long internodes, growing in shady places.) Leaves persistently covered on both surfaces with white soft silky spreading hairs and particularly on the ochrea and petioles of older plants, often in appearance somewhat tomentose, growing foliage white with more appressed soft hairs. Older ochrea more or less densely hirsute or hirtellous with soft hairs, and tipped with salver-shaped or campanulate herbaceous ciliate borders that gradually diminish in size upwards on the stem, and are seldom present even on sterile plants at blooming time, never on flowering terrestrials. Location in shady or sunny and dry places, varies only the amount and sparseness of the pubescence not its character. Leaves generally long narrowly lanceolate, with a rounded or obtuse base and a long acuminate, but finally blunted apex. When the plant is riparian, *i. e.*, still has its lower leaves aquatic, subaquatic or but lately emersed, the pubescent upper leaves are generally at least one half longer and one half narrower than the smooth lower ones.

Specimens have been found of normal terrestrials with lower subglabrate leaves that evolved gradually by continued growth

from a normal aquatic plant earlier in the season. Internodes in this case 5-9 cm. long, the leaves are broader, subcordate, and varying from glabrous to pubescent as above described. Such plants were found in the shade of *Cephalanthus occidentalis* Linn. bordering the pond.

*Fertile Terrestrial Phase.* Plant more or less erect 3-85. dm. high assurgent from a rootsrock creeping and rooting in mud or wet places, (the plant never blooms except where a good supply of water is present in the soil even in the terrestrial plants.) Internodes 3-7.5 cm. long: nodes not noticeably swollen: foliage usually overtopping the spikes. Leaves 7.5-17 cm. long and 2-4 cm. broad: pubescence as in the spring sterile terrestrial. Ochrea soft silky hirsute with more or less spreading hairs, and always entirely devoid of herbaceous margins. Young leaves silky shining with appressed hairs. Spikes 1-3 usually 2, one older, the larger about 5, cm. the second 2 cm. long, (when 3, all about the same length). Peduncle 3-4 cm. long slender and beset with rather long spreading fine gland-tipped hairs. Bracts ovate triangular ciliate, and densely covered with straight appressed brownish somewhat rough hairs. Calyx rose-red short campanulate: stamens versatile with rose-red anthers long-exserted: styles exserted, long, slender, forked below the middle with red globular stigmas, coetaneous with the stamens. Seed small, brownish, shining, thick, biconvex. Lowest flower not separate from the rest of the spike.

*Aquatic Phase.* Plant floating in shallow water along the shores of ponds, gradually elongating into terrestrial plants as water recedes or dries up. Leaves with borderless ochrea only aquatic and smooth when and as long as water is present. Submerged parts all smooth and, when young, slimy also. Leaves shining dark green on both sides, elliptic-ovate or elliptic-oblong widest near the middle, obtuse, rounded or the upper subcordate at the base, acute or sometimes somewhat obtuse at the apex, 5-11.5 cm. long and 1-4 cm. wide, the average leaf about 3x9 cm. Petiole slender 1-4 cm. long: internodes 2-4 cm. long where the leaves persist, but lengthening out considerably when old.

The aquatic phase seems to be merely vestigial, or transitional to the blooming terrestrial. Plants on high dry land seldom flower in the terrestrial phase, and the aquatic seems to serve only the purpose of starting the growth early in the season.

Good examples of the aquatic phases are my numbers 917a, 917ab, 916a and 916ab, 917aab. Numbers 917abb and 917b are good riparian specimens, and 917c, 917cd, 917d, 917de, 916e, 916ee, 917ee show all the intermediate transitional phases from the first, which is strictly aquatic, to the last which is strictly terrestrial, having lost all trace of borders to the ochreae. No. 917d had leaves 20 cm. long and less than 5 cm. wide. Nearly all the aquatics show traces of the beginning of terrestrial foliage. All were collected June 22, 1911 around and in a small pond about a mile in circumference west of Studebaker's Woods,\* and south of South Bend, Indiana.

No. 917ee may be chosen as type of the sterile terrestrial phase. It begins already to lose the borders of the ochreae. No. 917a may be considered as a good typical spring aquatic. No. 941y represents the summer and fall aquatic as also 941x. Both were collected July 13, 1911 at the same place. No. 941bcd, gathered at the same place, on the same day, shows the characteristic fall sterile plant.

As the type of the flowering plant No. 941bcde is the best example and this is in fact the type of the species. The specimen was collected July 12, 1911 at the above mentioned locality. No. 941b is a unique example only one of which I have been able to find during several years that I have frequented the place, of a riparian blooming plant. The lower foliage is typically aquatic with three glabrous long petioled leaves; the upper foliage is typically terrestrial. No. 1806 shows the fruiting plant gathered Sept. 19, 1911, at the same place.

This plant is readily distinguished from *P. mesochora*, its nearest ally on the one side, by the fact that it never blooms in the floating aquatic phase, as also by the characteristic habit and pubescence. It is intermediate between *P. mesochora* and *P. tanaophylla*, and distinguished from the latter in the presence of borders to the ochreae as well as the pubescence and shape of foliage. The latter also blooms at least occasionally in an aquatic condition. As far as habit is concerned, the plant connects the members of the *Hartwrightianae* as a group to which it strictly belongs, by means of *P. tanaophylla* to the *Emersae* group. Any one not knowing its spring phases would unhesitatingly class *P. caricorum* as a near ally of *P. coccinea* and *P. pratincola*, or more likely near *P. vestita* which in bloom it somewhat resembles, but

for its remarkable pubescence. On the other hand the sterile spring phases with unmistakably large margins to the ochrea leaves it as a closer ally to *P. Hartwegii* in spite of the appearance and habit of the flowering plants. To sum up *P. tanaophylla* still blooms in the strictly aquatic phase and, not having margins to the ochrea, is a member of the *Emersa* group. *P. caricetorum* has only a vestigial aquatic phase in which it never blooms, and has borders to the ochrea in terrestrial plants, but only in sterile spring plants. *P. mesochora* with a different foliage from the latter blooms evidently more normally in the aquatic than the terrestrial phase, and has margins to the ochrea in spring plants only and is glabrate in the terrestrial flowering phase.

I have met in the U. S. National Herbarium but one specimen that may possibly be referred to this species, and that not with absolute certainty, as it is only a sterile plant. It is No. 148853, collected by H. N. Patterson at Oquawka, Ill. in the Mississippi bottoms. No date is given beyond "Sept.," without day or year.

*P. caricetorum* seems to thrive best along the borders of a pond where it is near water, or in muddy boggy places among sedges and *Dulichium* species. It is abundant in the shade of the southern shore growing under willows and *Cephalanthus* the shade having no apparent effect on the pubescence of the plant. Other plants of the group growing with it are *P. grandifolia* and *P. coccinea*.

PERSICARIA MESOCHORA Greene (1904) Leaflets vol. I., p. 28.

Of the specimens of this species which I have found in the U. S. National Herbarium and that of the New York Botanical Garden, the following are more or less notable.

U. S. National Herbarium: 443325, Slough, Dune Park. IX., 7, 1903. Collector's No. 2097. Terrestrial phase. 434581, R. Cratty's Emmet Co., Iowa, VII. and VIII., 1895. Aquatic. 284691, J. Macoun's Hull, Ontario, IX., 6, 1889. Riparian or subaquatic. Labelled "*P. emersum*." 593947, O. A. Farwell's 352, Belle Isle IX., 23, 1892. Aquatic. "Deep water, stems several feet long." Marked "*P. amphibium coccineum*." 343986, W. C. Kendal's N. Windham, Me. VII. 6, 1889. Aquatic. (Owing to the close resemblance of the aquatic phases of *P. mesochora* and *P. coccinea* though otherwise so very different, this specimen is more likely to be the aquatic of the latter.) 45465, F. V. Coville's

Potomac Flats, D. C., V. 11, 1890 (?). This is a sterile terrestrial labelled *P. Hartwrightii* with spreading tips to the ochrea, and more closely resembles *P. mesochora* as to vegetative characters. Owing to the incompleteness of the specimen its status may be considered as indeterminable from the material at hand. 295743, F. V. Coville's Preston, N. Y., VII, 28, 1886. Also sterile but with the foliage of *P. mesochora*. 295748, F. V. Coville's Ithaca, N. Y., VII. 27, 1885. Also sterile, but aquatic. Labelled "*P. amphibium*." U. S. Dept. of Agric. Herb., F. V. Coville's Oswego, N. Y. VI. 29, 1887. Sterile terrestrial.

New York Botanical Garden Herbarium: W. F. Wright's Allegan Co., along the Kalamazoo River, IX. 10, 1902, in 3 ft. of water. Aquatic. N. L. Britton's Buffalo, N. Y., VIII. 20, 1886. O. A. Farwell's 325a Belle Isle, Mich., IX. 23, 1892. Aquatic phase. P. A. Rydberg's, Platte near Horse Creek, VIII. 1, 1891. This most resembles the aquatic phase of specimens of which I found the terrestrials on the same rootstock at Notre Dame. Stewart H. Burnham's, Bacon Pond, Washinton Co., N. Y., IX. 20, 1900. Labelled "seems a form of *P. amphibium* L. growing where water subsided." One specimen has leaves passing into those of the aquatic but smaller. All the specimens are like those I found here at Notre Dame.

From C. C. Deam's Herbarium a specimen from Steuben Co., Ind. VIII. 13, 1903. Swamps near tamarack lake, also his number 298, Noble Co., Waldren Lake, Orange Tp., VIII. 9, 1905.

I have collected the following specimens of *P. mesochora*, all the plants being present in my herbarium. 864, Mineral Springs, Dunes of Lake Michigan, VI. 7, 1911. 906, Hick's Crossing on the Interurban Electric Line to Michigan City, V. 20, 1911. Another specimen No. 907. These plants are sterile and the ochreae borders have already disappeared. 844, St. Joseph's Lake, Notre Dame, Ind., VI. 2, 1911. Same locality as type of terrestrial already described in former paper.

*PERSICARIA MESOCHORA* var. *arenicola* Nwd., nov. var.

*Planta terrestris fertilis* differt a planta typica foliis magis strigosis pilis appressis. Internodes habet breviores hirtellos; ochreae ciliatas et spicas minores circa 2 cm. longas. Venas medias quoque habet appresse hirtellas quae in typica sunt tantum scabrae. Convenit plantae typicae forma foliorum et aspectu foliorum.

Folia in caule inferiore majora et longiora sunt. Desunt margines divaricati ochreae omnino quando floret.

*Plantae sterilis terrestris* folia ut in praecedente sed majore et dimidio longiora quam in *P. mesochora*. Internodi vero duplo longiora quam in planta typica. Adsunt margines campanulati erose-ciliati perparvi. Plantam aquaticam non inveni. Planta inter *P. mesochoram* et *P. ammophilam* intermedia.

*Terrestrial Phase.* Differs from the type in having the leaves more or less strigose with scattered appressed fine hairs. The internodes are shorter and the ochrea appressed hirtellous, with rather long hairs, the spike is smaller less than 2.5 cm. The mid-vein is appressed hirtellous and only scabrous in the type. It agrees with the type in the shape of the leaves and their general aspect. The leaves of the variety are larger below on the stem. The spreading ochrea margins are absent as in the type at flowering time.

*Sterile Spring Plant.* Leaves as in the fertile summer plant but larger and pubescence softer, leaves nearly one half again as long as in the corresponding phase of the type. The campanulate erose-ciliate borders of the ochreae are present but smaller and less conspicuous. Aquatic phase not seen.

The type of the new variety is a single sheet of a specimen gathered at Millers, Ind., Sept. 21, 1911, No. 2090. The spring sterile phase is represented by Nos. 857a and 857b found at the same place, June, 1, 1911. The plants have that marked characteristic of *P. mesochora*, viz., absence of ochrea border at the time of blooming. They have almost the pubescence of *P. ammophila*, but the latter always has the borders present when in flower.

PERSICARIA AMMOPHILA Greene, Leaflets Vol. 1, p. 47.

SPRING TERRESTRIAL PHASE. Plants rather variable in appearance ranging from very leafy glabrate specimens of moist habitat (internodes 2.5 cm.) to hirsute with nodes 5 cm. apart. Ochreae very hirsute with wide-spreading broad herbaceous ciliate types or borders often 2 cm. or more broad in sterile plants. This border is seldom wanting or withered in elongated specimens straggling over bushes and sedges, but often diminishing in size as the plant grows larger. Leaves oblong to ovate-lanceolate from glabrate with ciliate scabrous margins to strigulose and hirtellous, or hirsute, usually always with hirsute appressed ochreae, and



hirsute petioles and lower midrib. Base of the leaves obtuse or rounded: apex slightly acuminate or just acute; leaf broader usually near the middle or the margins subparallel for a considerable distance.

The plants with long internodes are found in grassy or sedge-covered places: the stocky leafy plant, in open sandy or muddy exposed places. Muddy or moist localities usually produce glabrate plants with leaves dark purple below, or with a v-shaped purple blotch above. The leaves are often 17 cm. long and the petiole not over 1 cm. The earliest leaves of terrestrials show a tendency to approach the shape, and often lack of pubescence, of aquatic phases, even when entirely removed from water. Good examples of the early summer terrestrial are Nos. 961 and 962 of my herbarium collected July 9, 1911 at Millers, Ind.

SPRING AND EARLY SUMMER AQUATIC PHASE. Leaves small always glabrous, purple beneath, yellowish-green above, 4-8 cm. long and 1-1.7 cm. wide, obtuse or acutish at the apex, always cuneate at the base, oblong to elliptic-oblong. Whole plant, especially growing foliage, slimy glabrous, ochrea margins only noticeable above on the stem, entire or erose and not ciliate unless aërial. Internodes 3.5 cm. or longer: stems, thin and wiry.

The aquatic phase of *P. ammophila* resembles that of small plants of *P. fluitans* or *P. canadensis*. Perfect resemblance does not long exist, as the plant soon emerges from the water, and the stems become thicker and aërial in character. I have found a remarkable series of specimens growing on one rootstock in a small pool at Millers, Ind., along the Indiana Harbor Railroad, June 1, 1911. The series of plants numbering eleven sheets all with several plants numbered 840a to 840k, contains all the intermediate transition forms from the strictly aquatic sterile to the normal terrestrial, all having been gathered not only from one small pool, but from one original rootstock! All the changes of the various organs of the plants as to pubescence, disappearance of parts, and appearance of others can thus be studied in their development under the changed conditions incident to the drying up of the pool. The terrestrials were found on the shore and transition forms at various distances into the deeper water of the normal aquatic. The specimens were not studied simply as dry herbarium plants, but selected after careful study of the specimens in the field. A mere glimpse over the series in order, is

sufficient to convince one more than anything else of the futility of studying, amphibious smartweeds from isolated plants or phases of such as have hitherto found their way into our herbaria.

Another almost similar series of the same phases of the same plant, I collected about eight miles southesat of South Bend, Ind., on the border of a tamarack swamp along the Turkey Creek Road, two miles west of Woodland. The plants number 915m to 915u were collected in a pasture along what was to all appearance the edge of the water before the large drainage ditch was dug that is rapidly destroying the largest tamarack swamp in St. Joseph County. Though not standing in water the lower leaves are glabrous, and resemble those of the intermediate transition phase of the preceding series up to the normal terrestrial. Doubtless later the plants become normal terrestrials, but when appearing early in the season, they have not as yet, though now high and dry, lost their tendency to grow their first foliage as subaquatic in appearance. The later growth of older plants is already distinctly terrestrial, though at first subaquatic in character, thus hinting at their previous history of submersion not many years ago. In other words the species *P. ammophila* survives because of its ability to change rapidly, even in one season, from aquatic sterile phase to the terrestrial.

Strictly normal aquatic phases, flowering with none, but floating glabrous foliage, I have not been able to find in spite of long and repeated search at various seasons of the year from the very first days of flowering until the spikes ran to seed late in fall. In one particular locality, at Millers, Ind., the plant is most abundant, and I have come to the conclusion that the plant has no strictly flowering aquatic phase, thus emphasizing beyond any doubt the utter impossibility, for the present at least, if my investigations are sufficient, of connecting *P. ammophila* Greene with such plants as *P. canadensis* Greene or *P. fluitans* Eaton, whose aquatic foliage resembles that of *P. ammophila*, but which flower only in the aquatic phase. If the specimens I found at Millers, flowered as normal aquatics we might infer that *P. ammophila* was but the terrestrial phase of *P. canadensis* or *P. fluitans*. But the first has never been known to bloom until the aquatic foliage was replaced by terrestrial at least in part, and the last two have not as yet been found with any terrestrial phase. It may even be likely from their deep water habit that they have

no terrestrial phase in that it is always a sterile one. In other words, *P. ammophila* is a normal terrestrial and *P. fluitans* and perhaps *P. canadensis* also normal aquatics. I wish to lay special stress on these facts; because at present it affords the best means of distinguishing all our various amphibious Persicarias from one another, especially when we find they have phases that closely resemble one another respectively, though always different beyond a doubt in at least one of them. The classification of these plants must therefore take account of the fact that the plants with similar phase or phases; but different in another or others, may be distinct, or as I have already intimated, we are logically forced to accept the other alternative that there is but one amphibious smartweed which is to be called *P. amphibium* Linn., and that the others are not even varieties; for all have the same reason for being either recognized or rejected. In fact what is called *P. emersa* or *P. coccinea* has less reason for recognition than most of them.

**SUMMER AND FALL AQUATIC PHASE.** Perfect aquatic leaves scarcely distinguishable from those of *P. canadensis* or *P. fluitans*, purple only in spring, or early summer. Stems wiry, internodes at times 9.5 cm. long. Leaves elliptical-oblong to perfectly elliptical, obtuse or acutish at the apex, always cuneate at the base; petioles 1-2.5 cm. long. Leaves glabrous, shining, slimy especially when young, typically without spreading margins to the ochrea which is membranous.

As already stated, to *P. ammophila* is distinguished from *P. canadensis* and *P. fluitans* in that it never blooms in the aquatic form but it soon emerges from the shallow water and becomes a riparian form, which has the upper foliage terrestrial in character. In this phase it blooms occasionally, but, about the time of flowering its chosen habitat has dried up, and the plants have all become terrestrials. It then produces one or two densely-flowered and especially densely-fruited spikes, that resemble those of *P. canadensis* in shape, with the exception that the parts are all more or less glandular pubescent or simply pubescent.

The water of the pools in which *P. ammophila* grows never dries up completely, there being usually a very deep and rather large part in the middle. The plant, however, clings to the shore where the water has dried up during part of the season, and the middle part is always left without any plants whatever. *P. fluitans*

and perhaps *P. canadensis* under similar conditions would avoid the shore, and grow only in deep water. This in itself is a character by which the collector may easily distinguish corresponding aquatic forms of each, no matter how much alike: for each species carefully selects its habitat.

I have in my herbarium forms illustrating all the transition stages from the normal aquatic to the terrestrial, also plants with all the various shapes and kinds of foliage in one specimen. I shall therefore not describe the riparian which in this case is a plant exhibiting all these transition characters on one individual shoot for it may easily be imagined by combining aquatic and terrestrial with gradations from one to the other. It is needless to say too that aquatic plants are comparatively rare in flowering time, in spite of the abundance of flowering terrestrial, because of the evident tendency not to bloom in water, and not to venture in deep water. Aquatics in fall are found only in wet seasons when the water fails to dry up at the shore, or in case of an occasional straggling shoot that has ventured just beyond the drought line.

I have selected as types of the aquatic summer phase specimens No. 965b of my herbarium of which I collected three sheets at Millers, Ind., July 9, 1911. At another visit Sept. 21, 1911 I was unable to obtain typical aquatic plants. Specimens showing various transition phases to the terrestrial, *i. e.*, riparian plants, are the following: Nos. 963a, 963b, 963c, 962b, all sub-aquatic; 963d, 963e are more terrestrial in appearance, as also are 965a, 965e. 965f is subaquatic; 965g is subterrestrial, whereas 965h and 965j illustrate the last stages of transition to the true terrestrial phase represented by 965k and 965l. All these were collected at Millers, July 9, 1911.

Of the aquatics I could not find typical plants in fall, but only one straggling depauperate specimen No. 2465 hardly typical, and of course with out any apparent tendency to flower. No. 2098 found the same day, as also No. 2097 is decidedly transitional to the terrestrial, even these being rare at so late a date. Nos. 2465 and 3001 show the typical fruiting plants with characteristic dark purple red, some even bluish-purple or partly blue color of the fruiting calyx, as also the closely-flowered, broad spikes. Flowering specimens in fall are characterized by rose-colored flowers (Nos. 2465c, 3003, 2097, 2466).

I found only two plants No. 961 blooming as early as July 9, 1911. They were growing high up on a dry sand pile or dune, about one hundred yards from any water, and twenty feet or more above the highest water line. Such a habitat I have found so unusual that it may be considered as teratological as the plants so found usually become very hirsute develop broad herbaceous ochrea borders, and large leaves. The plants became very leafy, and of the aspect of *P. asclepiadea* except for pubescence and remain sterile and very green, often with purple blotched leaves.

The following are the principal specimens of *P. ammophila* of the herbaria I have examined. No. 35 collected by myself 4 miles north of Notre Dame blooming on sand thrown up from the bottom of a ditch in the middle of a swamp at Webster's crossing. Dated VII. 8, 1909. The other specimens collected by me are all sterile and, but for their hirsute pubescence usually of the aspect of *P. asclepiadea*.

911, Oliver's, south of South Bend, Ind., on tracks of Grand Trunk R. R., VI. 27, 1911. 820, North Liberty, Ind., V. 11, 1911. 2732, Lawton, Mich., Edge of a pond near Bankson Lake. 369a, Webster's Crossing, 3 miles north of Notre Dame, X. 8, 1909. 909, Dollar Lake near Kizer, Ind., on Wabash Branch R. R., VI. 26, 1911. This specimen has subsessile leaves about 20 cm. long and the largest ochrea borders I have met in any specimen, over 2 cm. wide, erose ciliate. It grows among grasses and sedges around the pond.

857a, b, Millers, Ind., VI. 1, 1911. 919, on S. S. S. R. R. near Galien, Mich. (in Indiana). VI. 15, 1911; also 920 gathered at another place in the same railroad, and No. 918, collected nearby. 912, Chain Lake, VI. 21, 1911, and at another place about one half mile distant, No. 886; also 913. 2077, Chain Lake, IX. 26, 1911. Leaves broad elliptic 15.5 cm. by 4.5. 862, 2 miles S. of Stephenville, Mich., VI. 8, 1911. 39, Webster's Crossing, VII. 7, 1908. 88, Cultivated field southeast of Notre Dame. VI. 19, 1909.

U. S. National Herbarium. 407260, B. W. Everman's (1293) Lake Maxinkuckee, Ind., VIII. 15, 1899. 648937, Frank Gates', Chicago, VI. 31, 1905. 383069, L. M. Umbach's, Galt, Ont., VIII. 17, 1889. 607246, C. Dennis' (1209) Bass Lake, Steuben Co., Ind. 45460, B. C. Taylor, Center City, Minn., VIII., 1892. (Duplicate in Herb. N. Y. Bot. Garden.) 607246, Chas. C. Deam, (7209)'

Grass Lake, Steuben Co., Ind., VII. 22, 1906. 593952, O. A. Farwell, IX., 1901.

Herb. of Chas. C. Deam. 'His specimen from Gage Lake, Steuben Co., Ind., VIII. 12, 1903.

It may be interesting in this connection that some one (perhaps Dr. A. Gray?) at one time had intended publishing what is a good specimen of *P. ammophila* Greene. A specimen in the N. Y. Botanical Garden Herbarium, originally from the Torrey Herbarium, collected Aug. 25, 1929, at Troy, N. Y. is thus labelled as indicated below. The following annotation is appended to the sheet.

"*Polygonum hirsutissimum* (mihi) a new one! Description. Stamens 5, stigmas 2, style 2 cleft, cylindric-ovate, thick round obtuse: general bracts about 2-flowered, each flower with a bract also. Stem assurgent simple or branching very hirsute; leaves oblong linear-lanceolate very hirsute, tapering gradually to the obtuse or subacute apex, subsessile subcordate at the base scabrous ciliate, stipules hirsute, long ciliate; peduncle smooth or nearly so, 12-24 inches long. Grows in great plenty in company with *P. mite* and *amphibium* var. *terrestris* in a lot 1 mile NNE of Rens. School. August."

PERSICARIA NEBRASCENSIS Greene, Leaflets Vol. 1., p. 47.

AQUATIC OR SUBAQUATIC PHASE. Plant with a creeping root-stock which is rather thick: Ochrea of the upper leaves membranous as in the terrestrial and slightly hirsute when emerging from the water. Leaves of the same shape as the terrestrial, but perfectly glabrous throughout, obtuse, rounded or subcordate at the base, and acute at the apex, broadest little below the middle, elliptic to elliptic oblong. Internodes 1.5-4 cm. long in branches and 4-11 cm. on the rhizome. Petioles short, .5-3 cm. long; bracts triangular acute, glabrous: seed almost lenticular, black. Peduncles short 1.5-2 cm. long: spike 1.5-2 cm. long.

The lower leaves are especially glabrous, and the upper reduced, sometimes appressed scabrous on the margin. They are smaller than in *P. ammophila* and on the terrestrial less hirsute. It is more than likely that typical aquatic phases will be found to have the habit and foliage resembling that of *P. ammophila*. The lower leaves of the specimen described are normally aquatic but the plant has recently emerged from the water the upper

foliage becoming somewhat scabrous on the margins. A good example is *P. A.* Rydberg's No. (1793) Grant Co., 3 miles NW. of Whitman, Nebraska, IX. 20, 1893. There is a duplicate in the Herbarium of the New York Botanical Garden. It may not exactly coincide in degree of pubescence in aquatic habit with the specimen in the U. S. National Herbarium, and I have not had occasion to compare them. The lower part of this plant is plainly what may be considered as the aquatic phase of *P. nebrascensis* Greene. This specimen was collected the same day at the same place by the collector, as the plant which Dr. Greene made the type of the provisional species. A better or rather more aquatic plant may be looked for than the specimen of Dr. Rydberg, but its lower foliage is unmistakably aquatic, though the rest of the plant seems to have taken on subriparian habit. Dr. Greene in some way seems to have overlooked this specimen which with its foliage like that of *P. ammophila* and *P. canadensis*, and the habit of the former plainly shows it to be in every way a very close ally to it in all its phases.

Another plant in the U. S. Nat. Herb. that may be referred to here is No. 210177, *P. A.* Rydberg's (1653), VIII. 7, 1893, from the same place as 1793. In the N. Y. Botanical Garden Herb. are the following specimens of *P. nebrascensis*.

C. E. Bessey's from Ames, Iowa. The plant has its lower leaves aquatic. J. M. Bates', Valentine, Neb., IX. 1, 1891. R. I. Cratty's, Emmet Co., Iowa, XII., 1880. A good riparian phase with aquatic leaves below and transitional and terrestrial below.

*PERSICARIA HARTWRIGHTII* (A. Gray) Greene, 1904 Leaflets, Vol. I., p. 24.

*Polygonum Hartwrightii*, A. Gray, (1870) Am. Acad. VIII. p. 294, including *Persicaria abscissa* Greene, 1905, Leaflets, Vol. I., p. 108.

The following specimens of typical plants of this species may be referred to:

U. S. Nat. Herb. No. 593949, O. A. Farewell's, Keweenaw Co., VIII., 1904.

N. Y. Botanical Garden Herbarium: Torrey Herbarium. Oates, Ipswich, Mass. (Leaves about 10 cm. long elliptic oblong with spreading ochrea borders. A good example of the aquatic

phase.) T. C. Porter and N. L. Britton's. Swamp south of Lake Grinnell, Sussex Co., New Jersey, IX. 17, 1887. Dr. Pitcher's Fort Gratiot, 1829. (Plant rather too pubescent to be typical.) O. A. Farwell's (351) Keweenaw Co., VIII., 1887. Aquatic phase. O. A. Farwell's (351) Belle Isle, VIII. 12, 1893. Somewhat strigose.

[Subsection III. HYDROPHILAE]\* Provisional.

Plants as far as known without any terrestrial phase, deep water aquatics with glabrous slimy foliage. Spreading borders to the ochrea always absent.

PERSICARIA FLUITANS (Eaton) Greene, (1904) Leaflets, Vol. I., p. 26.  
*Polygonum fluitans* Eaton in Eaton and Wright, p. 368.

U. S. National Herbarium. 443275, Agnes Chase's (1906) Slough, Dune Park, Ind., IX. 11, 1902. 49140, R. E. Earle's Waukegan, Railroad Ditch. 593946, O. A. Farwell's (352) Belle Isle, IX. 23, 1892. 54741, J. Macoun's Chilliwack Valley, B. C., VIII. 20, 1901. (Duplicate in the N. Y. Bot. Garden Herb.) 257772, Lester Ward's, St. Lawrence River, VIII. 9, 1879. 309481, C. L. Ballard's, Fairlee Lake, Vermont, 1878.

New York Botanical Garden. C. B. Robin's, Picton Co., Grant's Lake, VIII. 25, 1906. E. G. Knight's, Eagle Lake, VII. 30, 1851. N. L. Britton's, Morris Pond, New Jersey, IX. 13, 1887. Jos. Schrenck, Squaw Lake, N. H., VIII, 1882. T. Morong, Little Tupper Lake, Adirondacks, N. Y., IX. 8, 1884. A. G. Grant's, Joe's Pond, W. Danville, Vt., VII. 5, 1894. Wm. Van Sickle's, Morris Pond, Sussex Co., N. Y., VIII. 9, 1894. There is in this last a tendency to form spreading borders to the ochrea!

PERSICARIA CANADENSIS Greene, (1904) Leaflets, Vol. I., p. 28.

N. Y. Bot. Garden Herb. A specimen from the herbarium of P. V. Le Roy, Peekskill, N. Y. Collected in Mass. A. Gray.

The plant as described by Dr. Greene is riparian. The foliage, however, is but slightly scabrous-strigose, and on the whole glabrous. Such a specimen is almost aquatic, and can hardly be interpreted

\* This subsection will probably disappear as the members become better known or their terrestrial phases found. It may be that the plants have no terrestrial phase, however, and in that case it will remain, unless another more obvious method of division seem feasible.



as riparian in the sense I have used the word under the description of *P. mesochora* or *P. rigidula* where for want of anything subaquatic in nature, I was forced to designate for these, a riparian plant, that is glabrous or perfectly aquatic below, and quite terrestrial above. *P. ammophila* I have not found to bloom as I have said, in any phase that did not have at least some terrestrial foliage above, though *P. nebrascensis* approached this aquatic habit more. On the basis of these facts I was forced to consider *P. canadensis* and *P. nebrascensis* and especially *P. canadensis* and *P. mesochora* as specifically distinct though their aquatic foliage to the superficial examiner appears indistinguishable in many cases.

Dr. Greene\* seems to suspect that *P. canadensis* "may possibly some day be shown to be the riparian state" of *P. fluitans*. I fear that *P. ammophila* may be yet shown to be the terrestrial phase of *P. canadensis*. There is more evidence in my specimens for this suspicion than for Dr. Greene's. As, however, of all the hundreds of specimens I have collected or examined I have found no blooming strictly aquatic form of *P. ammophila*, I must refrain from drawing the conclusion, though the foliage of sterile aquatic of the latter can not be distinguished from that of *P. canadensis* or even *P. fluitans* when perfectly aquatic in nature. Field botanists may yet find plants of *P. ammophila* in which strictly aquatic and riparian and terrestrial forms connected on one shoot. Such a discovery may lead therefore to the recognition of but one of the three, *i. e.*, *P. fluitans* Eaton, the others to be only to be considered as phases of this the oldest name of them all.

The following phases of hitherto known plants have been described by me in the preceding discussions on amphibious smartweeds. Some of these have been described in the preceding article. The types of all phases are in my herbarium except No. 7 which is in the U. S. National Herbarium at Washington.

1. *Persicaria tanaophylla* Nwd. Aquatic, subriparian and terrestrial phases.
2. *Persicaria mesochora* var. *arenicola* Nwd. Aquatic, and terrestrial phases.
3. *Persicaria mesochora* Greene. Terrestrial and riparian phases, also the early summer sterile terrestrial.

\* E. L. Greene Leaflets, Vol. I., p. 28.

The plant was hitherto known in the aquatic and subaquatic phases.

4. *Pericaria carictorum* Nwd. Aquatic and Terrestrial, also early summer sterile terrestrial.
5. *Pericaria coccinea* Muhl. Riparian phase. (Known hitherto in the terrestrial and aquatic.)
6. *Pericaria ammophila* Greene. Aquatic and riparian phases.
7. *Pericaria nebrascensis* Greene. Subaquatic or riparian phase.
8. *Pericaria pratincola* Greene. Vestigial aquatic and riparian phases.
9. *Pericaria oregana* Greene. Terrestrial phases.†
10. *Pericaria rigidula* (Sheldon) Greene. Terrestrial phase also riparian.

#### CONCLUSIONS.

1. The admission of *P. emersa* as commonly understood by botanists, to specific rank on the basis of the "specific" distinctions outlined in our manuals and floras is illogical for those that reduce *P. Hartwrightii* as unworthy of specific rank. Those who suppress one must consistently and for quite similar reasons refuse to accept the other.

2. There is no logical alternative between accepting the Linnaean view of one sole species of amphibious Smartweed on the one hand, and Dr. Greene's view of a number of valid distinct species on the other.

3. On the basis of distinctive specific characters analogously used for well recognized species considered valid in other groups, the method of Dr. Greene is the most logical of all the methods referred to.

4. All the different species of amphibious *Pericarias* have, potentially at least, two or several phases, though one or other may be vestigial or perhaps absent. e. g. *P. fluitans*, (as far as we know.)

5. Polymorphic plants in order to be easily and distinctively recognized in every phase, must be described in our manuals separately for each phase.

6. The system of distinctions as outlined in our manuals of to-day fails to distinguish even the species which they actually recognize by characters which are specifically differential. Other

distinctions must be substituted that properly separate them, if we are to avoid the total confusion that has enveloped and still envelops the knowledge of these plants on the part, not only of our amateur plant students, but most botanists.

7. Two different species of these plants may more or less resemble one another in one or other of their respective phases, and still be considered as distinct, provided they are sufficiently and specifically different in the other corresponding phase or phases; e. g. typical *P. amphibia* and *P. emersa* may look more or less alike in the aquatic, but are totally and unmistakably different in the terrestrial phases of each.

8. The plants may be said to be *normally aquatic* or *normally terrestrial* or *both*, according as they bloom and fruit regularly and respectively in the aquatic, terrestrial or both phases together.

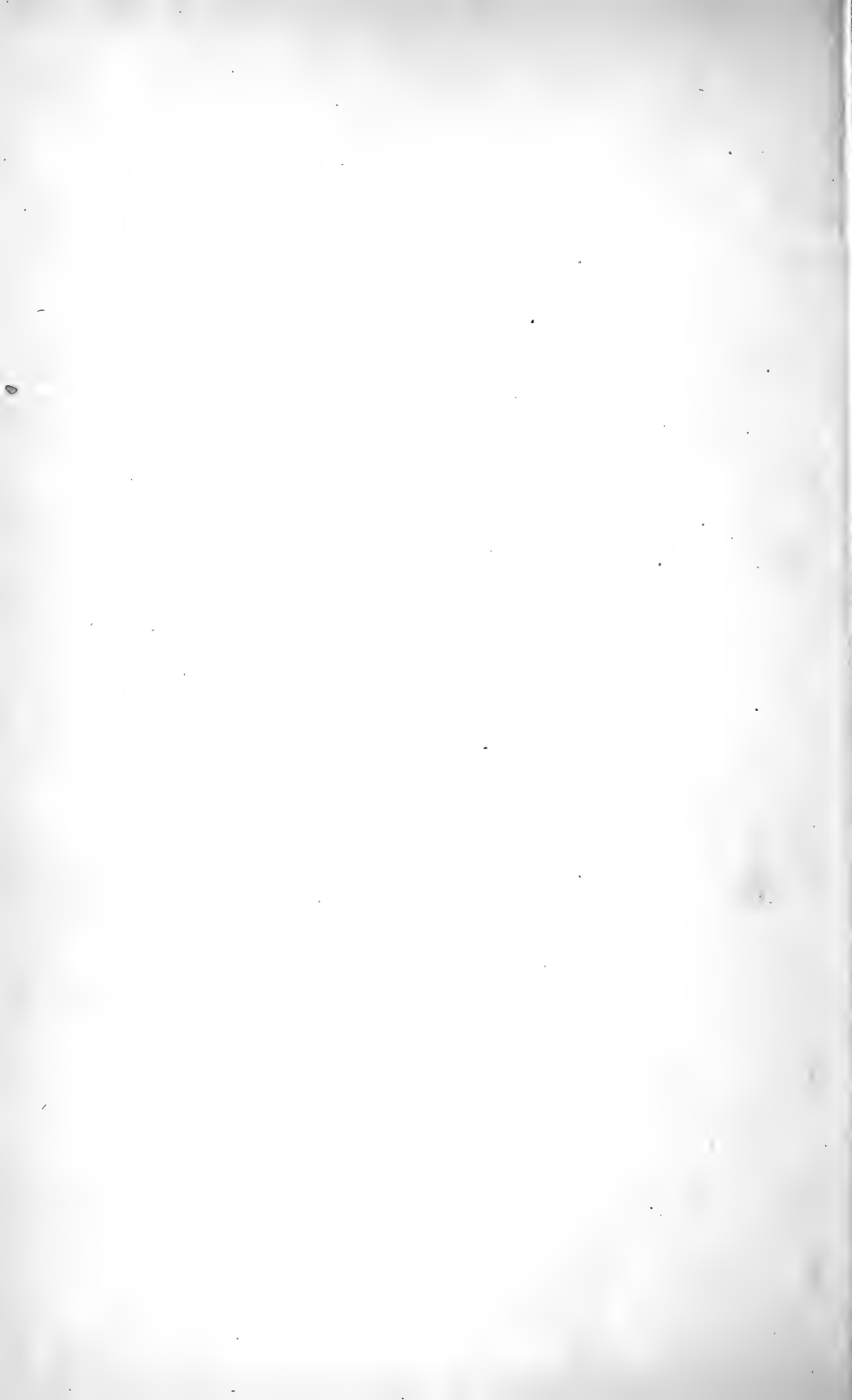
9. Specimens of these plants are to be considered as incomplete, and therefore more or less useless for purposes of identification, that are not present in their several phases. A system of making herbarium specimens, or groups of several or many sheets under one number has been suggested. The various phases are to be lettered in addition to the sheet number. Thus 840a is the aquatic typical, 840k or any last letter used, the terrestrial, and the intermediate letters to represent the transition phases in order of resemblance to one or the other.

10. Absence of any plant in America that perfectly corresponds to the terrestrial phase of the typical European *P. amphibia* points to the fact that *P. amphibia* is not to be looked for on this side of the Atlantic, and that the name therefore should disappear from American manuals of botany. The absence, in Europe, as far as I can find of the *Hartwrightianae* as a group, *i. e.*, plants with spreading herbaceous borders to the ochrea is worthy of note in emphasizing the above statement.

11. A system of classification of the plants as *Emersae*, *Hartwrightianae*, and the provisional *Hydrophilae* in the subgenus *Potamocallis* differs from previous treatment of the subject.

12. Ecological study of these plants in the field can alone solve their relationships to one another, as also their eligibility to specific rank. Seasonal variations of respective phases must be watched with care and perseverance.

*Department of Botany,*  
*University of Notre Dame.*



# THE AMERICAN MIDLAND NATURALIST

Devoted to Natural History, Primarily  
that of the Prairie States

Published by the University of Notre Dame,  
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J. A. NIEUWLAND, C. S. C., Ph. D., Sc. D., Editor

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## NOTE

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# The American Midland Naturalist

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## MODIFICATIONS IN THE VENETIAN TURPENTINE METHOD.

BY C. M. HOPFINGER.

Heretofore in working with the Venetian Turpentine method, fused calcium chloride only has been used as the drying agent in the concentration of the turpentine. There are however, other substances that have greater affinity for alcohol and alcohol vapor than calcium chloride. Definite compounds of alcohol and calcium chloride, as also of alcohol and zinc chloride are formed in which the organic substance plays the role of alcohol of crystallization, the double compounds being analogous to those formed with water when the latter takes the part of water of crystallization. Moreover, just as these later substances liquify in their own water of crystallization and absorb even more than corresponds to the definite compounds, so alcohol behaves towards the haloid salts of zinc and calcium. Zinc nitrate would serve perhaps as well as the chloride unless oxidation products were formed. Another compound absorbing alcohol in the same manner as these mentioned is barium hydroxide.\*

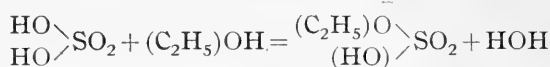
Sulphuric acid behaves in a different way, absorbing alcohol

\* Some of these alcoholates, or in some cases ethylates, are the following,  $\text{LiCl } 4\text{C}_2\text{H}_5(\text{OH})$  with wood alcohol  $\text{LiCl } 3\text{C}_2\text{H}_5(\text{OH})$ ,  $\text{Mg Cl}_2 6\text{C}_2\text{H}_5(\text{OH})$ ,  $\text{Mg } (\text{NO}_3)_2 6\text{C}_2\text{H}_5(\text{OH})$ ,  $\text{Na}_2\text{S } \text{C}_2\text{H}_5(\text{OH})$ ,  $\text{CaCl}_2 4\text{C}_2\text{H}_5(\text{OH})$ , also  $\text{CaCl}_2 3\text{C}_2\text{H}_5(\text{OH})$  when dried over  $\text{H}_2\text{SO}_4$ .  $\text{SnCl}_4 2\text{C}_2\text{H}_5(\text{OH})$  when heated gives off ether  $(\text{C}_2\text{H}_5)_2\text{O}$ , ethyl chloride,  $\text{C}_2\text{H}_5\text{Cl}$ ; a compound  $\text{C}_2\text{H}_5\text{O SnCl}_3 + \text{C}_2\text{H}_5(\text{OH})$  is formed also.  $\text{TiCl}_4$ ,  $\text{PtCl}_4$ ,  $\text{SeO}$ ,  $\text{AsCl}_3$ ,  $\text{SbCl}_5$   $\text{CuSO}_4$ , take up one molecule of  $\text{C}_2\text{H}_5(\text{OH})$  to form a compound.  $\text{KOH}$  forms the compound  $\text{KOH } 2\text{C}_2\text{H}_5(\text{OH})$ .

$\text{BaO}$  and  $\text{CaO}$  form compounds which change to the ethylates,  $(\text{C}_2\text{H}_5\text{O})_2\text{Ba}$ , etc. Wood alcohol acts somewhat similarly. I have not been able to discover whether a definite crystallizable compound of zinc chloride and alcohol has been isolated.

† July 1, 1912.—Pages 249 to 264.

with the formation of ethyl sulphuric acid, according to the equation,



Barium hydroxide seems to have but slight attraction for large quantities of alcohol and may be omitted from consideration.

Wood alcohol is also thus absorbed by all the above mentioned substances and hence "Synthol" substituted for absolute alcohol of late, because cheaper, can be as readily used in the Venetian Turpentine method with any of the above-mentioned chemicals. One of the best drying agents is zinc chloride. Although at first this does not seem likely, because the calcium chloride is far more porous, practical experiments show that this drawback is quite overcome by the greater attraction of the zinc chloride for the alcohol. When comparing the value of the zinc chloride with calcium chloride in this respect the absorption is more rapid in the case of the former. Other experiments show too, that a mixture made by fusing the zinc chloride and the calcium chloride together, worked better than the calcium chloride; but evidently not because of the increase of porousness, as this fused mixture is anything but porous.

Again, it was found that a mechanical mixture of the separately fused zinc chloride and calcium chloride also exceeds the calcium chloride as a drying agent. Sulphuric acid because of its affinity for alcohol appeared to have drying powers equal to the above-mentioned substances, but proved impracticable, because of its destructive effect upon the stain.

Results show that zinc chloride alone, or in combination (with calcium chloride), and sulphuric acid, increase the rapidity of absorption by one-half the time required when using calcium chloride. The greater the free surface of the drying agent, the more closely the vessel is stoppered, and the higher the temperature, the greater will be the available vapor tension of the alcohol, and therefore the more rapid the absorption.

The following table shows the time, as exact as could be determined, for the concentration of the turpentine, under the conditions which follow. In table No. I, Hempel's vacuum dessicator was used, without applying diminished pressure, of course, and in table No. II, large covered crystallizing dishes. Through the whole



series of experiments the remainder of the conditions were the same. Volume of Hempel's dessicator, 4200 cc; volume of crystallizing dishes, 2450 cc; amount of 10 per cent. Venetian Turpentine for each experiment, 25 cc; average free surface of the turpentine, 16sq. cm; and average temperature, 25°C. The amount of drying agent in each case was determined by the molecular weight of substance, 880 gm. calcium chloride being taken, and in case of the other agents an amount relatively proportionate.

These drying agents were not changed after each concentration, but kept for the whole series to ascertain the relative falling off in value after concentrating a number of the solutions. In the tables, the Roman numerals signify the successive turpentine preparations placed in the drying vessel, all of the same volume at start and finish, and following each other immediately in point of time. The figures in each column mark the time required for each concentration.

TABLE NO. I. (Dessicator, air-tight).

Order of Concentration	ZnCl <sub>2</sub> and CaCl <sub>2</sub> fused together	Mechanical mixture of ZnCl <sub>2</sub> and CaCl <sub>2</sub> fused separately	Fused ZnCl <sub>2</sub>	Fused CaCl <sub>2</sub>	H <sub>2</sub> SO <sub>4</sub>
I.	24 hours	32 hours	25 hours	41 hours	32 hours
II.	35 "	41 "	39 "	73 "	40 "
III.	44 "	46 "	45 "		44 "
IV.	47 "	49 "	49 "		
V.	51 "	52 "			

TABLE NO. II. (Dessicator not air-tight).

Order of Concentration	Fused ZnCl <sub>2</sub>	Fused CaCl <sub>2</sub>	H <sub>2</sub> SO <sub>4</sub>
I.	40 hours	58 hours	37 hours
II.	44 "	75 "	41 "
III.	47 "	90 "	45 "
IV.	50 "		

From the above data we can satisfactorily conclude that for all practical work in the Venetian Turpentine method, either zinc chloride, or a mixture of zinc chloride and calcium chloride fused together, or a mechanical mixture of these two separately fused is better by far than calcium chloride. These three reagents have about the same drying powers, nearly equaling each other

after sixth or seventh time used, although differing a little more at the beginning. Ten concentrations, according to conditions already given, seem to be the limit of practicability, since at this stage the reagents have liquified to such an extent, that the time for concentration exceeds the time required to fuse the drying substances again and begin a new series of concentrations.

In the case of sulphuric acid the mere concentration is satisfactory, but at the end of the process, the stain has been almost wholly destroyed. Perhaps for the acid stains this difficulty would be removed, yet on the whole it would hardly be desirable since other agents of equal drying power can be substituted.

Upon examination of the material when the experiment is completed, no evidences of plasmolysis can be detected, and this action might be suspected because of the short time required in the process. Throughout this experiment, *Cladophora* and *Oedogonium* were used with equal success. In estimating the time required by this shortened process, it was found that a specimen can be brought up ready for use in practically two days.

In preparing material by the Venetian Turpentine method, much time and trouble can be saved, if after killing with chromoacetic acid and washing well, the specimen is brought up in the alcohols, in 10, 20, 35, 50, 70, 85 and 95 per cent. successively, instead of using the glycerine process, incurring the risk of traces of glycerine in the material, preventing proper staining. The time is hereby also lessened, as a few minutes is sufficiently long for the specimen to remain in each of the graded alcohols, when filamentary algae and the like are used.

If at this stage the specimen is placed in the 10 per cent. Venetian Turpentine, without previously being stained, as has been heretofore considered necessary, and then a given amount of the concentrated alcoholic solution of the Magdala Red added to the turpentine, and the whole placed in the drying vessel, the material will in the end be perfectly stained, the process of staining going on while the turpentine is concentrating. In performing these experiments Magdala Red alone was the stain used, and ten drops was found to be the minimum amount required in each experiment.

In trying to double stain, using Magdala Red and Aniline Blue, by pouring the concentrated alcoholic solutions of the stains together, then introducing the specimen, I succeeded a few

times out of many trials, showing that generally the successful double staining by the above method is accidental, yet anticipating practical success, should we find the exact proportion according to which the stains should be mixed, even going so far as to insure success by the shortened process, recommended by the above experiments, in the case of the Magdala Red.

As to the reagents, an apparent objection to the use of fused zinc chloride instead of calcium chloride may be that the former on being fused again after absorption of alcohol seems to allow this to come off with great difficulty, so that the mass chars to a blackish substance, because of separation of carbon. After second fusion the zinc chloride does not seem to reabsorb alcohol as well as before, possibly because basic zinc chlorides are formed and some of the chlorine goes off as ethyl chloride ( $C_2H_5Cl$ ). Addition of hydrochloric acid to decompose these basic compounds supposed to be found does not improve matters much.

The fused mixture of zinc chloride and calcium chloride in equal parts does not behave in this way; no charring whatever is noticed no matter how high the temperature is raised in fusion. Since moreover, the mixture is also more active we may conclude that it is the best dealcoholizer of them all. Whichever of these salts or mixtures of them is used, the fusion after the first absorption of alcohol may be made in either an iron or a porcelain vessel. Zinc chloride and mixtures of it show a tendency to absorb iron from the vessel during fusion, this iron appearing to be held in the colloidal form. This however does not deteriorate the absorptive power, though the fused mass appears to be steel gray in color. Care should be exercised to prevent the escaping alcohol vapors from catching fire in fusion, as charcoal is deposited, giving the preparation an unsightly appearance.

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## ERIGERON IN NORTH DAKOTA.

BY J. LUNELL.

---

In the year 1818 Nuttall published in Vol. II. of "The Genera of North American Plants" on p. 147 and 148 two new *Erigeron* species, *E. asper* and *E. glabellus*. During the last 25 years there has been considerable confusion as to what plants

Nuttall actually meant when introducing these species names, and Asa Gray in his Synoptical Flora suppressed *E. asper*. Dr. P. A. Rydberg in his Flora of Colorado retained *E. glabellus* (as to the name), but the manuals suppressed it and accepted *E. asper*, as they did not believe in the existence of two separate, independent species. The plains of Missouri in North Dakota furnished the types for these two Nuttallian species. In taking up the subject of them as they present themselves to me in their home country, I acknowledge in the first place my debt to Dr. Edward I. Greene for his valuable advice and suggestions and his willingness on his own initiative to place precious material at my disposal.

1. *Erigeron asper* Nutt.

Nuttall ranges *E. asper* (l. c.) under "§1. Stem simple," and this is his original description:

"3. *\*asperum*. Hirsutely scabrous; stem about 2-flowered, slender; leaves lanceolate-acute and entire; flower hemispherical, white. HAB. On the plains of the Missouri. Flowering in August. Stem solitary, scarcely 12 inches high, covered with short and very hispid hairs in common with the leaves. Leaves narrow; radical ones spatulate-lanceolate. Peduncles 2 or 3, subterminal, the lateral one longest". . . "Rays numerous, white. Pappus double, interior simply pilose, of about 20 rays, much longer than the smooth seed, slightly rufescent."

Dr. J. F. Brenckle of Kulm, La Moure County, of this state, has kindly withdrawn from his herbarium and lent me some daisy material representing no doubt the real plant of Nuttall. Two plants collected by him on June 20, 1903, part of his sheet numbered 38, from low prairie at Kulm, and four small plants out of five from another sheet collected by O. A. Stevens at Valley City, on June 8, 1910, the last ones defined by the collector as *E. caespitosus* Nutt., have the "hirsutely scabrous" indument and also the "white rays" as outlined in Nuttall's description. The stems have from 1 to 4 flowers. Nuttall's plant was collected in August, and though I have no doubt that some belated individuals would linger into that month, the real flowering period for this species and its allies is June and the first part of July. The Valley City plant belongs to the Red River of the North basin (Sheyenne River), but the Kulm plant is from <sup>E</sup><sub>a</sub> <sup>F</sup><sub>c</sub> territory

watered by the James River, a tributary to the Missouri.

A hundred miles further northward there is an ally of this daisy, modified as follows:

2. *Erigeron multicolor* sp. nov.

Caules 1-3, simplices, floribus 1-5 ornati, graciles, 5-30 cm. alti, una cum foliis tenuiter vel modice pilis mollibus repandis appressis vestiti. Folia radicalia spatulato-lanceolata, in petiolos longos alatos sensim attenuata, integra vel dentata. Folia caulina angusta, lanceolato-acuta, integra, inferiora saepe 10 cm. longa vel longiora, usque similitudinem bractearum sensim reducta, vel folia caulina omnia ad bracteas accedentia. Flores semisphaerei, diametro inter extremitates radiatorum peripherales 2-2.5 cm., bracteis exterioribus obscuris hispidis, radiis numerosis albis vel rubicundis vel lavandulaceis.

Stems 1-3, simple, 1-5-flowered, slender, 5-30 cm. high, in common with the leaves scantily or moderately covered with soft hairs, turned upwards and appressed. Radical leaves spatulate-lanceolate, gradually tapering to long, winged petioles, entire or dentate. Stem leaves narrow, lanceolate-acute, entire, the lower often 10 cm. long or more, gradually reduced in size until bract-like, or all the stem leaves resembling bracts. Flowers hemispherical, 2-2.5 cm. in diameter between the distant ends of the rays, with dark, hispid outer bracts and numerous white to pink or lavender colored rays, often of as many different shades as the plant has flowers.

Common in moderately damp pasture land and in similar localities where the grass is scanty. I have one typical sheet of fully developed plants collected as early as June 8, 1901, and my second type sheet is dated June 24, 1906, both from Leeds, Benson County.

I have several specimens collected within a narrow radius of Leeds showing a wide difference in indument, size of plants, and size and color of flowers. Whatever possibilities these offer as new matter, they have to be corroborated by a close study of additional specimens to be collected during the coming season.

The next species to be taken into consideration is

3. *Erigeron glabellus* Nutt.

The following is the author's own description (Genera l. c.):

"6. \**glabellum*. Perennial; leaves linear-lanceolate, entire,

smooth and acute; radical long petiolate, spathulate-lanceolate and nerved; upper part of the stem and hemispherical calix pubescent; stem 3 to 5-flowered, peduncles axillar and terminal. HAB. On the plains of the Missouri, (around Fort Mandan, abundant). Flowering in August. Stem 12 to 13 inches high, simple, smooth below; lower leaves of the stem much attenuated below, 3 or 4 lines wide, smooth; peduncles about 2 inches long, pubescent; flower the size of a daisy, pale blue; rays very numerous. Seeds smooth; pappus double, exterior whitish, interior short, simply pilose and rufescent."

This is decidedly a plant of late summer, commencing to flower in the last part of July, when *E. asper* is fading, and it lasts until it is killed by the early frosts. Stems solitary or several, ascending, smooth below, sparingly pubescent midways, and more densely so in the upper part, usually with short, spreading, or even retrorse hairs, and 1 to 5-flowered. Some radical leaves are acute, others obtuse, and all have a pair of lateral nerves running parallel to the margin for the major part of its length. The leaf margins are smooth or sparingly and irregularly ciliate. The author's "size of a daisy" must be 2-3 cm. in diameter between the peripheral ends of the rays. The color of the rays is the same for all flowers of the same plant, but varies for different plants, and besides the pale blue ordinary shade an admixture of lilac seems to be just as prevalent. This species is extremely pretty, especially when its flowers are well developed, and no daisy within this state can successfully rival it.

I am just looking at a beautiful specimen of Dr. Greene's which he collected early in its season (July 22) in the summer of 1890, at Carberry, Manitoba, as stated in Leaflets II. (1912) p. 207. It is perhaps somewhat taller and more luxuriant than my North Dakotan plants would be at such an early date, and its rays have adopted a rather different natural shade, but nobody can or would attempt to question its genuineness.

4. *Erigeron pumilus* Nutt.

This is a plant preferring the gravelly plains and the high, gravelly hills, and comes from the region whence Nuttall had it (Genera II: (1818), p. 147).

5. *Erigeron obscurus* sp. nov.

Caules 1-4, erecti et rigidi, 2-4 dm. alti, inferne fusci, usque

apicem paene simplices, deinde corymboso-ramosi, pilis albis densis diffusis vel adscendentibus infra vestiti qui inflorescentiam versus molliores et appressi fiunt. Folia obscure viridia, pubescencia densa, molli, appressa vestita, basilaria et in caule dimidio inferiore spatulata vel oblonga vel lanceolata, petiolis perlongis, strigosis, integra vel remote serrata; folia caulina superiora linearilanceolata, amplitudine sensim reducta, summa saepe bracteis tantum similia. Flores 0.5-1 cm. diametro, radiis albis 2-4 mm. longis, 0.5 mm. latis, bractearum series exterior pilis diffusis vel appressis hispidulosior. Inflorescentia corymboso-cymosa, angustior et congesta.

Stems 1-4, erect and stiff, 2-4 dm. high, very leafy, dark brown in the lower part, simple almost to the top, then corymbosely branched, densely covered with white, spreading or ascending hairs below, which toward the inflorescence become more soft and appressed, almost velvety to the touch. Leaves of a dull, dark green, with a dense, soft, appressed pubescence, at the base and on the lower half of the stem spatulate or oblong or lanceolate with strigose petioles of their half or whole length, entire or sparingly serrate; upper cauline leaves linear-lanceolate, gradually reduced in size, the uppermost often mere bracts. Flowers 0.5-1 cm. across, with white rays 2-4 mm. long, 0.5 mm. wide, and the outer series of bracts rather hispidulous with spreading or appressed hairs. Inflorescence corymbosely cymose, rather narrow and congested.

This daisy was found by the writer on July 17, 1910, in a natural meadow along a coulée in the vicinity of Leeds, Benson County. As it is a near relative of *E. strigosus* Muhl., it was at first suspected of being identical with this species and introduced with grass seed. But at close inspection its different indument on stems and involucre bracts, its dull green color, its crowded foliage and inflorescence and its small rays (4-7 mm. long in *E. strigosus*) were found to be minute indument on the stem, the light green, distant leaves, the glabrate involucre bracts, the patulous inflorescence and the taller plants of this weed, so far undiscovered in this vicinity. I believe that this daisy of ours is a native western plant.

#### 6. *Erigeron philadelphicus* L.

Common in wet soil. A very rank, large and lax form grows

in rich, well drained soil in the Turtle Mountains. Sp. Pl. 863 (1753).

7. *Erigeron racemosus* Nutt.

Occasional along water courses. Trans. Am. Phil. Soc. 7: 312 (1841).

*Leeds, North Dakota.*

### A QUESTION OF NOMENCLATURE.

BY J. A. NIEUWLAND.

After having called attention to the fact of the priority of Schmidel's name *Thelypteris*\* over Adanson's *Dryopteris* or Schwartz's *Aspidium*, on the basis of 1753 as the "starting point" of nomenclature, several objections by well known botanists were made to me supposedly founded on certain codes or opinions. Followers presumably of the Vienna Code claimed that Schmidel's generic name like Adanson's was not made accompanied by the simultaneous publication of a *binary specific name*, or without any direct reference to such in another work and designating in the latter case the referred binary as type of the new genus. As far as I can find on consulting botanists it would seem that the followers of the so-called American Code will accept the validity of the genus on the latter of the two alternatives, or even when it is perfectly clear that a given plant is meant whether reference to any binary is made or not.

For the followers of the American Code, a system typified by Britton's Manuals and other works emanating from the New York Botanical Garden, there can be no possible objection to *Thelypteris*; for Schmidel made an indubitable and unmistakable reference in synonymy to the first edition of Linnaeus' Species Plantarum, as also the same in the tenth edition of the Systema Naturae, actually quoting the Linnaean "specific name."†

The makers of the Vienna Code, however, have arbitrarily decided that since even the Linnaean generic diagnoses were

\* Am. Midland Naturalist, Vol. I., p. 224, etc.

† "Acrostichum fronde pinnata, pinnis pinnatifidis integerrimis Linn. Spec. p. 107. N. 21. Syst. Nat. Ed. X. p. 1320. n. 21."



not given in the *Species Plantarum*, these are to be considered, as exception to the rule, to be published in conjunction with and in reference to the *Genera Plantarum* of 1754, where alone generic diagnoses are found. Of course this arbitrary arrangement was evolved to make the code rule worth while, and at the same time have some show of consistency, not to say reason, for throwing out many valid generic publications of Adanson and other authors. No thinking person will question the right of code makers to make arbitrary rules, even though they emphatically declare that they do not, because in the very nature of things, when reason and absolute historical priority, which alone deserve consideration, are put aside, we really could not have such a diversion as a code without empirical rulings and arbitrary decisions. If reason be rejected as a guide in nomenclature, then we can have no guide at all unless an arbitrary date or an arbitrary author or set of arbitrary agreements be put up as fetiches to decide validity of biological names.

Granting for the sake of argument, and admitting even that Linnaeus' own trivial binary terminations in the *Species Plantarum* of 1753 are made valid because published in reference to the generic diagnoses in another work, (*Gen. Pl.* 1754) then we still have another great difficulty, if we are expected to live up to the rule that trivial binaries must accompany generic publications. There are several generic names of the *Genera Plantarum* of 1754 which are monotypic according to the 1753 edition of the *Species Plantarum*, and in fact were not, as the rule requires, accompanied even in the latter work by a binary trivial name. If therefore it be made necessary for the validity of publication of a genus name, that it be made in connection with a reference to a binary trivial then we are forced to the conclusion that the Linnaean genera *Erythronium*, *Mussaenda Hydrocharis*, and *Hemerocallis* were not published in 1753 or 1754, and not for a long time after in one or other case at that. These generic names were not published in reference to a binary, because we will look in vain for such in the *Species Plantarum*. In fact the names under the genus captions are *Erythronium Dens canis*, *Mussaenda fructu frondoso*, *Hydrocharis Morsus ranae*, and *Hemerocallis Lilio Asphodelus*, and these names reprinted as found in the *Species Plantarum* can not by any juggling of hyphens be forged into real binaries without the perpetration of the most disgraceful thing a scientist can

be guilty of—a lie. An objection may at first sight appear in case of the last, *Hemerocallis*, where a second name *H. Liliastrum* occurs, and which has been since segregated into another genus. We admit the force of the objection only in case that the name *Hemerocallis* arbitrarily and contrary to all reasonable precedent, be reserved for the segregated genus of which *H. Liliastrum* Linn. now forms a component. This would mean more and more unreasonable changes making confusion worse confounded; for *H. Lilio Asphodelus* is the undisputed type of the Linnaean genus. Not one perhaps of all the staunchest followers of the supposed principle of the Vienna Code has ever even for a moment thought of questioning the validity of the Linnaean genera *Erythronium*, *Mussaenda* and *Hydrocharis*, for they are attributed to him in all books that have them. Yet the very rules fabricated require that we reject these

It follows then that it is a very difficult matter for code makers to elaborate rules which are expected to make Linnaeus fall in line with their arbitrary decisions. It sometimes seems a pity that he never could have foreseen that 1753 was to be the beginning of botanical nomenclature. With codes as with arguments if one starts wrong one must pile up more and more inconsistencies to try to make an unreasonable proposition seem plausible. If this were a fable we would point the obvious moral that it is pleasant to make arbitrary rules only when we do not expect to have them kept.

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#### OUR WINTER BIRDS.

---

The chief event in the bird world this winter was the presence of the Robin in each month and notably in January and February. The birds seen here were doubtless those having the most northern range, the severity of the weather having driven them south to places where they could find water. The individuals observed in this locality were usually seen near the edge of a lake where the water did not freeze. That the Robins could endure very cold weather, when the temperature was many degrees below zero, shows that it is not the severity of a climate that caused the birds to migrate, but the scarcity of food and water. This is the only

winter during which the writer has found the Robin. The largest number observed on any day was six.

The weather continued cold until March 14, when the temperature rose to 41°, and the Killdeer and Robin arrived from the south. The appearance of the Redpoll on March 5 was the first time this species was observed by the writer. The absence of the Nuthatch since Feb. 24 shows that this species has its period of migration.

## DECEMBER.

Birds not seen on any day:

Goldfinch	Chickadee
Hell Diver	Evening Grosbeak
Snowflake	

Birds seen on the dates after their names:

Downy Woodpecker, 1, 3, 25, 27	Brown Creeper, 4, 10, 11, 13, 15, 18, 22
Snowbird, 1, 11, 12, 13, 25, 28.	Screech Owl, 14, 18
Tree Sparrow, 1, 25	Song Sparrow, 2
Robin, 11	Cardinal, 11

Birds seen every day except the dates after their names:

Crow, 4, 5, 6, 14, 15, 17, 20, 23, 26, 27, 28, 30, 31	White-breasted Nuthatch, 1, 2, 5, 6, 11, 12, 14, 16, 20, 23, 26, 27, 30, 31
Blue Jay, 3, 6, 7, 8, 14, 20, 24, 26, 30	

Total number of species seen in December, 11.

## JANUARY.

Birds not seen on any day:

Brown Creeper	Goldfinch
Chickadee	Screech Owl

Birds seen on the dates after their names:

Downy Woodpecker, 18, 19, 20, 22.	White-breasted Nuthatch, 5, 6, 7, 9 to 13, 15, 17 to 20, 24, 25, 30.
Snowflake, 16.	Tree Sparrow, 31
Blue Jay, 1, 2, 15, 21, 22, 23, 24, 26, 30, 31.	Crow, 2, 11, 18, 21, 22, 23, 24, 26, 27, 30, 31
Robin, 17 to 24, 27, 28, 30	
Snowbird, 18, 22, 29	

Total number of species seen in January, 8.

## FEBRUARY.

Birds not seen on any day:

Snowbird	Snowflake
Screech Owl	Chickadee
Goldfinch	

Birds seen on the dates after their names:

Crow, 3, 6, 7, 12 to 18, 22 to 25, 27, 28	Brown Creeper, 13
White-breasted Nuthatch, 2, 11, 14, 24	Downy Woodpecker, 6, 16, 20
Blue Jay, 2, 5, 6, 9, 11, 14 to 17, 24, 25, 27, 28, 29	Tree Sparrow, 15 to 18, 20, 23, 24, 27, 28
	Sparrow Hawk, 14

Total number of species seen in February, 8.

## MARCH.

Birds not seen on any day:

White-breasted Nuthatch,	Brown Creeper
--------------------------	---------------

Birds seen on the dates after their names:

Crow, 1 to 4, 7 to 10, 12	Hairy Woodpecker, 2
Blue Jay, 2, 4, 8, 9, 11, 12, 13	Snowflake, 2, 3
Robin, 3	Redpoll, 5
Downy Woodpecker, 7	Tree Sparrow, 1

Total number of species seen up to March 14, 8.

Total number of species seen during the winter, 15.

## MIGRATION OF OUR BIRDS IN THE AUTUMN OF 1911.

It will be seen by making a comparison between the autumn migration in 1909 and that of 1911 that the dates are very close in the case of some species, while in others there is seen to be a difference of three weeks or a month. Is the great disparity in some dates due to an actual difference or is it because the writer has failed to observe the correct dates in such instances? With a few species the writer is willing to admit that he may have missed the right dates by many days, but when the number of species showing such disparity in their time of migrating is not few, he believes there was a considerable difference in the time of leaving in the two seasons.

As to what was the cause of such a wide gap in the dates, the

writer is unable to explain. He thinks it was not due to milder weather in one year, for while there was a later date for many species in 1909, with others, the date was earlier than in 1911.

The following species were not observed after August 14: Red-winged Blackbird, Yellow Warbler, Orchard Oriole, Red-eyed Vireo, Yellow-throated Vireo, Maryland Yellowthroat, Dicksissel, Bobolink, Scarlet Tanager, Barn Swallow, Nighthawk, Shrike, and Fox Sparrow.

## AUGUST

- 22 Alder Flycatcher
- 22 Least Flycatcher
- 22 Black and White Warbler
- 23 Purple Martin
- 27 Yellow-bellied Flycatcher
- 30 Hermit Thrush arrived
- 31 Myrtle Warbler arrived

## SEPTEMBER

- 1 Crested Flycatcher
- 1 Red-headed Woodpecker
- 3 Baltimore Oriole
- 3 Kingbird
- 4 Catbird
- 5 Sapsucker
- 6 Vesper Sparrow
- 10 Cedarbird
- 10 Wood Pewee
- 16 Yellow-billed Cuckoo
- 17 Brown Creeper arrived
- 17 Snowbird arrived
- 18 Cowbird
- 20 Brown Thrasher
- 20 Yellowlegs
- 21 House Wren
- 22 Golden-crowned Kinglet  
arrived.
- 24 Redstart
- 24 Pine Warbler
- 27 Warbling Vireo
- 27 Indigo Bird
- 27 Hummingbird

- 27 White-throated Sparrow  
arrived
- 29 Black-throated Green Warbler  
arrived

## OCTOBER

- 3 Spotted Sandpiper
- 7 Chimney Swift
- 9 Chickadee
- 12 Chipping Sparrow
- 14 Killdeer
- 14 Winter Wren arrived
- 15 Mourning Dove
- 16 Flicker
- 17 Phoebe
- 18 White-throated Sparrow
- 20 Purple Grackle
- 21 Hermit Thrush
- 23 Meadowlark
- 25 Kingfisher
- 28 Hell Diver
- 29 Myrtle Warbler
- 29 Field Sparrow

## NOVEMBER

- 1 Bluebird
- 1 Canada Goose
- 4 Winter Wren
- 8 Cardinal
- 8 Towhee
- 15 Song Sparrow
- 15 Tree Sparrow arrived
- 18 Golden-crowned Kinglet

21 Robin	27 Loon
24 Goldfinch	31 Brown Creeper
Total number of migrants seen, 55.	

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### SILÈNE CONICA IN MICHIGAN.

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BY J. A. NIEUWLAND.

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As far as I have been able to find only two places in the region covered by Gray's and Britton's manuals have reported the presence of the European plant adventive to America. I have found the plant so well established near Stephenville, Mich., (Berrien Co.), as to be likely to become a more or less noxious weed. It was growing abundantly in rather sandy well cultivated strawberry patches and along fences, about one and one half miles northwest of the village, about one mile from Lake Michigan itself and about five and one half or six miles south of St. Joseph, Michigan. As the plant at first sight seemed new to me I had gathered considerable material at the time. The specimens collected are No. 2713 of the University herbarium. Judging from the close aggregation of the plants, and the apparent health of the specimens, it would seem to be well adapted to the soil, and may become a weed that the farmer will have to reckon with if unchecked.

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### SYNONYMY ALTERATIONS.

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*Laciniaria scariosa media* to replace *L. scariosa intermedia* (*Liatris intermedia* Lindl. Bot. Reg. t. 948).

*Laciniaria scariosa Nieuwlandii septentrionalis* to replace *L. scariosa Nieuwlandii borealis* (*Liatris borealis* Nutt. in Paxt. Mag. v.t. 27). And *Laciniaria scariosa borealis* (Nutt.), l. c., to replace *L. scariosa virginiana*.

*Leeds, North Dakota.*

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Pages 29-35 incl. with Plate I. of Vol. II., Am. Mid. Naturalist were published as a preliminary separate Jan. 31, 1911.

## QUADRULA PARKERI, GEISER, A SYNONYM.

In my last published study\* of the synonymy of *Tritogonia tuberculata*, I inadvertently overlooked Ortmann's nom. nov. *Quadrula Tritogonia*, 1909 (*Nautilus* XXII.: 101; *An. Carn. Mus.* V.; 193), which has nearly three years' priority over my name. Upon the premise, then, that the pronounced sexual dimorphism of *Tritogonia* does not entitle it to generic rank, and that on the basis of its gravid characters it is properly a *Quadrula*. *Quadrula Tritogonia* Ortmann, 1909 is the only name that can be applied in accord with the provisions of the International Code and all the common-sense principles of nomenclature.

S. W. GEISER,

*Upper Iowa University.*

## SOME LOCAL ALBINO PLANTS.

BY J. A. NIEUWLAND.

While botanizing near Mineral Springs, Porter Co., Ind., May 30, 1912, I found several specimens of albino Hairy Phlox, (*Phlox pilosa* Linn.). Such plants are not unusual, but may be worthy of note. They were found along a road leading to the dunes of Lake Michigan in black marsh soil, together with numbers of normal plants. The flowers were perfectly white without the least trace of color in the corolla, nor the usual darker tinge of purple on the parts of the inflorescence or stems. The perfectly green color of the stem was so notable that one of the unblooming plants was taken and, when transplanted proved to be a pure white-flowered specimen in bloom. I have frequently, and especially in the dune region met with pale-flowered plants in sandy sun-exposed places, but none were entirely snow white. In every other respect the albino resembled the purple flowered normal plants. A pressed specimen was secured for the University Herbarium (No. 10093) and several plants were brought home and planted in the University grounds. All but one died, possibly

\* *American Midland Naturalist* II. 188-193 [1912].

because of injury to stems, and change to drier soil. One of the plants already referred to is at present in full bloom with a very large cluster of pure white rather smaller flowers.

On another trip June 15, 1911, from Lydick, Ind (St. Joseph Co.) to Galien, Mich. (Berrien Co.,) along the St. Joseph South Bend and Southern Railroad, I came upon a unique group of albinos of various shades of *Tradescantia reflexa* Raf. The plants were growing on the very edge of the Valparaiso glacial lobe, along the railroad about four miles from Galien. There were about one hundred plants altogether of which very few had the typical blue petals of the normal plants. Most of them, about one-half, were pale blue, and about one-fourth of the total number were perfectly show white without the slightest trace of any other color except the yellow veins of the petals. The patch of plants extended over an area not exceeding 30 or 40 square meters. Though only roughly estimated in number there seemed here some apparent relation of Mendel's Law respecting the variants. A specimen was taken for the University Herbarium, (No. 2684) but none were transplanted.

In the low ground before coming to the glacial gravel deposit was found at the same time a striking specimen of albino of *Iris versicolor* Linn. not far from other normal Blue Flags. It was pure snow white with the exception of the delicate yellow veins on the perianth. There was no trace of the usual purple at the base of the stem. Its flower was rather smaller than usual, the peduncle longer and more slender and the leaves narrower than those of the blue flowered plants. Part of the plant was collected with flower for the herbarium (No. 2681). The fact of finding albinos of two species so close together as also the presence of a large number of one of these might suggest some factor in the soil as causing the phenomenon. On another occasion I have found a white flowered plant of *Tradescantia virginica* Linn. at Brookland, D. C., as also a perfectly white flowered specimen of *Prunella vulgaris* Linn. at the same place.



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## NOTES ON OUR LOCAL PLANTS.

BY J. A. NIEUWLAND.

The purpose of these notes is principally to serve as a record of the vascular plants that grow spontaneously or without cultivation in the extreme parts of Northwestern Indiana and Southwestern Michigan. With the exception of Lake and Laporte counties in the former, very few reports have been made in this region of our indigenous and introduced plants, and so in perhaps most instances these records are made for the first time. Though one may have a fairly correct idea of the plants that are to be expected to grow here, as given in our larger floras of the whole country or major parts thereof, so many changes have taken place in our local flora within the last decade or two, and are even now taking place that we can never be sure which plants have become extinct, or have always been locally absent, by reference to such works as Gray's or Britton's Manuals. In other cases plants even positively excluded from our area have been found, and some hardly to be expected are as a matter of fact quite abundant. In any case the only reliable list of plants is that prepared as the result of long and extensive trips throughout a more or less limited area. Even then unless the botanizing is done year after year regularly in the same places, certain plants that seem to appear and disappear periodically are likely to be overlooked, as I have had ample occasion to experience. This list, if so it may be called, is the result of more or less irregular investigation begun about 1896. In a number of instances records of plants present in the University herbarium antedate that year. I refer to a collection of plants made by Dr. Francis Powers who was instructor in botany at the University, and now is pro-

\* October 12, 1912. Pages 267 to 306.

fessor of Anatomy. Probably the principal reason why no record of plants was made sooner of our locality is that the large collection of our local plants made by the Rev. J. Carriere, together with a large herbarium of European plants and other exchanges, and practically the whole biological museum of the University was destroyed by fire in 1879. About this time he became professor of botany at the College of St. Laurent near Montreal, Canada, and not very many specimens of local flora were added to the herbarium since his departure until rather recently.

We have preferred the title prefixed rather than the stereotyped "List" or "Flora" of S. W. Michigan and N. W. Indiana, because notes and observations as we have decided to include, would seem foreign to a mere list. In the matter of nomenclature, too, there may be what some will consider unwarranted peculiarities. Nomenclature under the systems of present expediency is largely a matter of opinion of a person, or aggregate of individuals many or perhaps most of which in the congresses which formulated these systems were expected to contribute a maximum of assent and vote, and a minimum of reason. In fact the votes that decided 1753 as the beginning of our botanical nomenclature were in some instances given and accepted from botanists in conclave so inadequate of scientific decision that some then had never even seen the inside of the *Linnaean Species Plantarum* of 1753! Being a matter largely of opinion no system of expediency that we have yet met with is even self-professedly or practically logical. No code more or less widely adopted with reservations by countries and sections and factions, merits even the encomium of honestly attempting to be consistent, no matter how many have given their support, and our systems of today are for the most part agreements more or less illogically formulated and assented to by a clique or clan for temporary expediency.

No code of nomenclature can be logical that presumes to begin with an artificial "starting point," because it presumes dogmatically to rule when science began. Any code that accepts impossible or stupid names because they enjoy priority alone does not, on the other hand, deserve the approbation of the scientist, nor certainly will win the approval of coming ages when we shall be judged logically on our real merits. Indisputably proved absolute historical priority alone as a principle deserves the consent of a reasoning mind. This is now admitted by our best botanists,

but few have the courage or some perhaps not the knowledge to dare follow this principle to its logical conclusion. The strongest objection to historical priority in plant names comes from the type of superficially educated botanists of our day, unacquainted with the Greek and Latin classics, unable without assistance in many cases to make up for their newly discovered genera or species names often that are either grammatical or correct. The difficulties standing in the way of the right system are none other than prejudice and ignorance, or better the prejudice of the ignorant, for none but the truly shallow have prejudices. These really do not deserve much consideration from the scientist whose end is the truth, the whole truth, and nothing but the truth, and is unhampered by motives of expediency in the face of eternal principles of reason.

If then in spite of the fact that due to newness of the field and vast erudition required to work it over satisfactorily, we are liable in trying to follow the principle of historical priority in the accompanying notes, to make many a mistake perhaps, we ask the indulgence of the reader in matters so difficult. In any case we shall have the consciousness at the start that we begin from a logical point of view, and we have therefore the hope that such mistakes will be entirely errors of interpretation. Regarding priority, we may not succeed in all cases to obtain the older or correct name, but we feel that we are placing no obstacle deliberately in our own way towards obtaining such, by application of a contradictory principle. Of blunders there will be not a few, but we shall do less injustice to the pre-Linnaean authors by giving the majority of them at least the credit denied them by our modern methods.

There will be those that will ridicule the idea of applying to our plants names used by Vergil, Theophrastus, Pliny, Dioscorides, Brunfels, Valerius Cordus, Dodonaeus, Camerarius etc., In most instances the names we use at present under our "expediency" codes are theirs anyway, and we might as well give them the credit due them, by writing *e. g. Adiantum* Theophr. instead of *Adiantum* Linn.; *Salix* Vergil, for *Salix* Linn. That a comparatively small number of the few hundreds of plants known before Linnaeus need have their names changed because that author had prejudices just as code makers today have prejudices, need not worry us needlessly, for more changes are made

in names every time a code goes out of fashion, than would be made by a reversion to historical priority. The criticism, if any there be, against our method as such, will we are sure, come only from the superficial opinions of such as either are unacquainted with the pre-Linnaean masters, or are unable to understand their works even if they tried to read them in the original classical languages. For the opinions of such we need care very little, and for their consolation we may ask them to refrain from unreasonable criticism, because we are entitled to our point of view in matters of opinions as well as they are entitled to another opinion.

Regarding the problem of decision as to the relative merits of the ancient Greek and Latin names, we must remember that the question was largely settled by subsequent authors even before Linnaeus. Our nomenclature of biology is Latin not Greek, and only the latter when first latinized. The very fact that hardly an author ever used any but latinized Greek names or derived Greek names for plants and animals, makes the above statement almost self-evident. The publication of the old Greek and Latin names was always held on a par and when absolute synonyms existed in both languages, the Latin name was invariably accepted, and up until the time of Linnaeus the Greek names were so carefully relegated to synonymy that it was considered a grave error to apply them to any newly discovered plant, even though their very fact of synonymy was so well known that it put them in a position that they could never have been mistaken even if newly used. No one ever presumed to use the name *Drys* for any new plant; for the older botanists knew it to be but the Greek name for *Quercus*, which every one always gave precedence. There seems to have been an apparent exception in case of *Pteris* which may have been given precedence to the Latin name. Both were used and often vaguely and indiscriminately.

No one but Linnaeus would ever have dared, unless by mistake, to use *Ptelea* for any new plant unless he thought it was an elm. Yet Linnaeus not caring for the confusion he might cause knew full well it was not an *Ulmus* and, because perhaps the name never could be used at all in nomenclature, he thought himself free to use it for a new American genus. We must give him credit at least for not foreseeing that at some time, our superficial Greek and Latin students of today meeting the

word referred to in Homer, Hesiod, Theophrastus, Theocrites, or Dioscorides might suppose that our American plant of that name grew in the Orient! As a rule, however, even Linnaeus left the Grecian synonyms of accepted Latin names severely alone, though he sometimes took a well sounding doubtfully interpreted name, and applied it to a new-world plant. Even in that case there was for example no reason whatever to take the old Greek name *Dodocatheon* and give it to a plant that already had a perfectly valid name, *Meadia*.

It is reasonable therefore to accept all the ancient plant names given before the era of printing on the same relative basis of priority as was held by the pre-Linnaean botanists generally. By accepting historical priority as our guide in nomenclature credit is given to whom it is due. No arbitrary or unreasonable principles need be applied, but only the principles of reason. This is not really a code; for a code implies some agreement, and seems to imply the arbitrary. Never until our own times has there been so much confusion of nomenclature, and never too have we been so much and frequently afflicted with new fashions of codes. There never really was any need whatever of any of them, and most botanists have begun to see that we would have made more progress had some refrained from stirring up a hornet's nest every time a new code is to be "proposed or emended?"

We hope that as a record of the plants in our locality these pages will appeal even to those who are prejudiced against historical priority, or are entirely indifferent to nomenclatorial problems. The names accepted as valid on the basis of 1753 as a "starting point" of biological science, will be given in capital letters so that the synonymy may be noted at a glance.

In regard to names of families or orders, we shall try as much as possible to accept priority as we have for genera and species. The old argument may be brought up here that families and orders have changed so much that many older family names, even pre-Linnaean ones, can not be considered in the same sense as now outlined. The family *Rosaceae* Boerhaave, may not include the same genera as now. If we reject it for this reason we may reject for a similar reason applied to genera, nearly all of Linnaeus' names. If any one now failed to attribute the name *Rosa* or *Lilium* to Linnaeus because segregates have since been made

from them, one should be rightly indignant. So applying the same principle to family names we have less difficulty in recognizing the type genus of a family for the name of the latter is usually built up from the former as type genus. In case of such families antedating 1753, as *Liliaceae*, *Rosaceae*, *Orchideae*, *Pomaceae*, (or *Pomiferae*) *Cichoraceae*, *Cucurbitaceae*, or even *Ferulaceae*, etc., there is very little difficulty for the merest tyro to guess rightly what the type genus must be. No matter how much the family may have been segregated from, we may be sure we are correct in reserving the name that contains the genera, *Rosa*, *Lilium*, *Orchis*, *Malus*, *Cichorium*, *Cucurbita*, *Ferula*, etc. are to be referred to them even though they be left as monogenotypic families.

When we consider on scanning any work, such as Bubani's *Flora Pyrenea*, Sprengel's *Genera Plantarum*, S. F. Gray's *Natural Arrangement of British Plants*, which have as their basic principle the historical priority of plant names, how many of the older classical ones still remain in our nomenclature, and that most of them were approved by Linnaeus himself, we will see that the changes to be made to bring botany under the system of historical priority are comparatively very few. They would be fewer in fact in the long run than those made necessary now by the vacillating of modified codes. There will constantly be found newer names older than such we have since 1753 as a starting point. Every new manual has many new ones, the new Gray's Manual not excepted, though the authors pretend to have brought it in perfect accord to the rulings of the Vienna Code. Thus it seems that even this last of them all has not succeeded in preventing changes. The next will do no more to stop the confusion, but will add a little more perhaps by reason of one or other arbitrary ruling it may make. Codes are not what we need to clear up our difficulties. The safest and sanest system will, as thinking botanists of today admit, only come when we apply the method of reason alone, absolute historical priority.

Regarding citations of synonymy the original works have in nearly all cases been looked up. Even when the actual page is not quoted as happens in some cases, the citations were in most cases looked up in original works. It was at first thought that it would be better to quote only the author and the year of publication of any given name, thus making the list much shorter, As, however, some of the works do not ordinarily appear in the



synonymy of modern names, it was thought better to include such quotations as correctly as possible, and so it was found necessary to go over the whole nomenclatorial part of the list a second time at no inconsiderable inconvenience and loss of time.

References to other works more or less embracing in a general way our locality were made. Principal among these works are the following: Coulter, S., Cat. Flowering Plants of Ind., (1899); Higley, W. K. and Raddin, C. S., Flora of Cook Co., Ill. and Part of Lake Co. Ind., (1891); Smith, E. F. and Wheeler, C. F., Flora of Mich., (1881); Wilson, G. W., New and Little Known Members of Indiana Flora, Prov. Ind. Acad. Sc., (1905); Deam, C. C. Report of State Board of Forestry, (1911). Mr. Chas. Deam has also kindly sent me lists of plants collected in his botanizing trips over the region. Use has also been made of plants deposited in the U. S. National Herbarium and principally the collection given by Mr. Evermann, from the country about Lake Maxinkuckee.

It is impossible to give a nomenclatorial list of works consulted as it would run into the hundreds, even thousands, of volumes. A sufficient synonymy quotation in reference under each name will, however, supply this want. Whatever nomenclatorial difficulties may be suggested to us will later be discussed in footnotes under the particular plant names that demand explanation of an applied principle not yet explained.

## Subkingdom PTERIDOPHYTA.

### Order I. DORSIFERAE. Rivinus, (1690-1699).

Also Heucher, (1711?) ex Linn. Classes Plant, (1738). Rupins, Fl. Jen. (1718), (1726) and (1745).

*Filices* Linn., l. c. p. 438, (1738); also Phil. Bot. P. 36, (1751) exclus. of *Lycopodiaceae* and *Selaginellaceae*, A. Haller, Enum. Hort. Agri., p. xii and 1 (1753), and Stirp., Ind. Helvet (1742). *Epiphyllaspermae* Haller, Fl. Helv. p. 130. (1742.) *Tergiferae* J. Faber, in Hernandez, Rév. Med. p. 757, (1651 (?)) or of Caesalpinus acc. to the same (?) *Filices* R. Brown. FILICALES Britton, Manual p. 1. (1901). *Epiphyllaspermae* J. Ray Hist. I. 132, (1686) ex Haller. (1768) and do. (1769). Nomenclator. p. 154. (only in part.)

Family 1. OPHIOGLOSSACEAE Presl, Pterid. 6. (1836).

*BOTRYCHIUM* Swartz, Schrad. Bot. 2:8. (1808).

**Botrychium virginianum** (Linn.) Swartz, do. 2: 111. (1800). Very common in low and rich woods throughout our region. Nos. 517, 9342 Rum Village, S. of South Bend, (St. Joseph Co.), 9135. Ryan's Woods N. Notre Dame, also 2488 Notre Dame. Also at Hudson Lake (Laporte Co.) Mishawaka, Granger (St. Joseph), Smith, Ind. (Laporte), Belleview, (Elkhart), Munich, Mich. also St. Joseph and Benton Harbor, (Berrien Co.), San José Park, Lawton, Mich (Cass Co.) etc.

**Botrychium ternatum** (Thunb.) Swartz, do.

*Osmunda ternata* Thunb. Fl. Jap. 329, (1784).

Reported from Lake Co. in State Catalogue, also at South Haven, Mich. I have been unable to find it anywhere.

**Botrychium ternatum** var. **intermedium** Watson, Millers, Ind. [Babcock].

**Botrychium ternatum** var. **obliquum** Muhl.

*Botrychium obliquum* (Muhl.) Willd., Sp. Pl. 5, 53 (1810) Millers, Ind. [Hill]. Laporte Co. [Deam].

**Botrychium ternatum** var. **dissectum** (Spreng). Laporte Co. [Deam].

*Botrychium dissectum* Spreng. Anleit. 3 p. 172. (1804). Laporte Co. [Deam].

Family 2. **OSMUNDACEAE** R. Brown, Prod. Fl.

Nov. Holl. 1: 161. (1810) and (1821) p. 810.

**OSMUNDA** Lobelius, (1571) also do Obs. p. 474. (1576).

*Osmunda* Tourn. El. Bot. (1694) p. 436, also Inst. Rei Herb. (1700) p. 547. *Osmunda* Linn. Gen. Pl. p. 322 (1737), Hort. Cliff. p. 472. (1737). **OSMUNDA** Linn., Sp. Pl. p. 1063, (1753). Gen. Pl. 484, (1754.)

**Osmunda regalis** Linn. Sp. Pl. p. 1065. (1753).

(*Osmunda regalis* Plumier Filic, p. 35, (1703) [?])

Notre Dame, Ind. no. 895, Webster's Crossing N. of Notre Dame, 9155. Granger, Ind. Also at North Liberty, Mishawaka, etc., (St. Joseph County.) Millers (Lake Co.) Tamarack, (Porter Co.) Near Michigan City (Laporte Co). St. Joseph, Benton Harbor, Grand Beach, Niles and Bertrand, Mich. (Berrien Co.) Lawton (Cass Co.) etc., etc.

The plant sometimes has its sporangia completely infested

by a purple mold which destroys the fructification. (No. 2790.)  
Stephensville, Mich., (Berrien Co.)

*Osmunda cinnamomea* Linn. Sp. Pl. p. 1066 (1753).

Found together with the preceding throughout our region  
in every county of both states above mentioned. No. 9319. Notre  
Dame, Ind.

*Osmunda claytoniana* Linn. Sp. Pl. p. 1066, (1753).

*Osmunda interrupta* Michx, Fl. Bor. Am. 2: 273, (1803).

Not quite as common as the two preceding, but found in  
all the counties of the area. Notably at Mineral Springs, Ind.,  
(Porter, Co.) Near Woodland, Ind., North Liberty, Lakeville  
and north of Notre Dame, (St. Joseph Co.)

Family 3. **POLYPODIACEAE** R. Brown, Prodr. Fl.  
Nov. Holl. 1: 145 (1810).

*ANGIOPTERIS* Mitchell Diss. p. 29. (1748) and (1769), also  
Adanson, Fam. des Plantes 2, 21, (1763).

*ONOCLEA* Linn., Sp. Pl. p. 1062, (1753); Gen. Pl. p. 484. (1754)

*Angiopteris sensibilis* (Linn.)

*Onoclea sensibilis* Linn., Sp. Pl. do.

I have found this plant throughout the region embraced by  
this list. Specific mention of localities would be useless.

*STRUTHIOPTERIS* Cordus. De Plantis, II. b. (1561).  
Op. Posth. also *Struthiopteris* Willd. Ges. Nat. Fr. Berl. 3, 160  
1809) not *Struthiopteris* Haller Fl. Helv. 132 (1768) and same  
(1742) in part; nor Scopoli Fl. Car. (1760) and (1772) 2nd ed.  
nor Weis Pl. Crypt. Fl. Gw. 286. (1770) nor Ludwig-Boehmer  
Def. Gen. Pl. as Subgenus (1760) p. 479 = *Lomaria Spicant*. Nor  
*Struthiopteris* Bernh., Schrad. Jr. (1800), 126 (1801) = *Osmunda*.

*MATTEUCIA* Todaro, Syn. Pl. Acot. Vasc. Sic. 30, (1866).  
*Onoclea* Linn., (1753) in part. *Strutiofera* Muntig. *Pterinodes*  
Siegesb. Prim Fl. Pt. 19, (1736). *Filicestrum* Amm. Stirp. Ruth.  
175 (1739) also Haller (1 45).

*Onoclea* Linn., (1753) in part.

*Struthiopteris Cordi*. Thalius Sylva Hercyna p. 119-121  
(1586).

*MATTEUCIA STRUTHIOPTERIS* (Linn.,) Todaro, l. c. *Onoclea*.  
*Struthiopteris Germanica* Willd. l. c.

*Struthiopteris Cordi* var.  $\gamma$ , Haller, St. Helv. p. 149 (1742).

*Onoclea Struthiopteris* (Linn.) Hoffm., Deutsch. Fl. 2: 11, (1795)

*Osmunda Struthiopteris* Linn. Sp. Pl. p. 1066. (1753).

Near Woodland, Ind. (St. Joseph Co.). In a Tamarack bog.

*CYSTOPTERIS* Bernh. Schrad., Neues Jr. Bot. I. pt 2: 26 (1806).

*Filix* Adanson\*, Familles. des Plantes 2: 20, (1763).

*Cystopteris fragilis* (Linn. 1762) Bernh. Schrad. Neues Jr. Bot. 1: pt. 2, 27. (1806). *Cyclopteris fragilis* S. F. Gray. Nat. Arr. Br. Pl. 2: 9 (1821).

*Polypodium Filix fragile*† Linn. Sp. Pl. p. 1091, (1753).

*Polypodium fragile* Linn., Sp. Pl. 2nd ed. p. 1553 (1763), also 3rd ed.

*Filix fragilis* Underwood, (1900). *Cystopteris Filix fragilis*. See Am. Mid. Nat. Vol. 2, No. I. (1911).

This plant is our common Brittle Fern and I have found it in all the counties of both states in our region. No. 407 Notre Dame, also 3398 (St. Joseph Co.) No. 9341 Smith, Ind. (Laporte Co.).

*DENNSTAEDTIA* Bernh. Schrad. Jr. (1800) 124 (1801).

*Dicksonia L'Herit. Sert. Angl.*, 30 (1788).

*Dennstaedtia punctilobula* (Michx.) Moore, Ind., XCVII (1857).

*Dicksonia punctilobula* (Michx.) A. Gray, Man. p. 628 (1848).

*Nephrodium punctilobulum* Michx. Fl. Bor. Am. 2: 268 (1803).

Though I have never found this plant within the limits of the region, the fact of its having been reported from Steuben Co. makes it possible that it may yet be found.

\*The name *Filix*, or translated literally "fern", was applied so generally by pre-Linnean botanists to many genera promiscuously that its use for any one is highly objectionable. It is not beyond doubt that Fuchs' use of *Filix* as a name was meant as a generic designation or simply a "kind of fern." Adanson's use therefore would be a synonym for the name used by Fuchs, and Fuchs' designation is doubtful. Hence the inappropriate name *Filix* had better be entirely rejected. See note under *Aspidium*.

†The use of the trivial name, *Filix fragilis* without the hyphen would be the correct use after *Cystopteris* or *Filix* as *Cystopteris Filix fragilis* or *Filix Filix fragilis*, for those who claim to follow the rules of the codes, but there does not seem to be much consistency of authors in this matter, For further discussion of the subject see AM. MID. NAT. vol. II. pp. 97-122.

*POLYSTICHUM* Roth. Röm. Mag. 2: 106 (1799); also Bernh. Schrad. Jr. (1799).

*Polystichum Achrostichoides* (Mich.) Schott., Gen. Fil. ad. t. 9, (1834).

*THELYPTERIS ACHROSTICHOIDES* (Michx.) Nwd. *Dryopteris achrostichoides* (Michx.), Kuntze, Rev. Gen. Pl. 812, (1891). *Aspidium achrostichoides* Sw. Syn. Fil. 44. (1806).

Very common in every county in the region. No. 9023 (St. Joseph Co.) near Galien, Ind. 9332 N. of Notre Dame, 2737 Pine, on Wabash R. R. (St. Joseph.) Found also at Stephenville, Grand Beach, Benton Harbor and St. Joseph, (Berrien Co.) Mich. Millers, Ind., (Lake Co.) [Higley & Raddin]. (Porter and Laporte Co.), [Deam].

*LASTRAEA* Presl. Tent. Pterid. p. 73 (1836), Babing. Man. Br. Bot. p. 409 (1851) etc.

*Aspidium* Swartz, Schrad. Jr. Bot. 2: 4, (1800).\* *Thelypteris* Ruppis, Haller Fl. Jen. p. 266, (1726), also Schmidel Ic. Pl. p. 45, (1762), Schott, not *Thelypteris* V. Cordus, and other pre-Linnaean authors.† *Dryopteris* Adanson, Fam. des Plants 2: 20, (1763), not *Dryopteris* Pliny, Dioscorides, Theophrastus, Gesner, Amman, Parkinson, etc.‡

***Lastraea Clintoneana* X *spinulosa*.** (Laporte Co.) Deam.

\* The name *Aspidium* of Dioscorides is found as one of the synonyms of *Alyssum* Diosc. l. 3, c. 95, and later as a synonym for *Atractylis*—*Cnicus sylvestris*.

† *Dryopteris* of Dioscorides, Pliny and Theophrastus is *Asplenium Adiantum nigrum* Linn. The use of the name for the genus in question is therefore objectionable as used by Adanson and must be relegated to synonymy on the basis of historical priority. See Fée, A. de Théocrite. p. 89. Smith, J. E., Fl. Graec. Prod. 2: 277.

‡ *Thelypteris* of the Valerius Cordus and the other pre-Linnaean is *Pteris aquilina* Linn. and assuming this plant to be the type of the genus *Pteris*, similar reasons to those of the preceding note invalidate the name. Likewise *Fixix* is to be rejected as a name both for this and any other genus of ferns as it is but a latin form of the Greek *Pteris* and was so used by Vergil and others. See Fée, A. Fl. de Verg. p. 56. According to Bauhin *Thelypteris* of Theophrastus, Pliny and Dioscorides refers to *Athyrium*. *Fixix fœmina* (Linn.) Roth or *Asplenium Fixix fœmina* (Linn.) Bernh. Regarding the name *Leuchitis* as a name for the genus there seems to be considerable doubt. See J. E. Smith Fl. Graec 2: 273, though Tournefort seems to have adopted the name, Inst. Rei Herb., 538. (1700).

**Lastraea intermedia** (Muhl.).*Lastraea spinulosa* var. *intermedia* (Presl.).

THELYPTERIS SPINULOSA var. INTERMEDIA (Retz). *Dryopteris spinulosa* var. *intermedia* (Muhl.) Underw. Nat. Ferns. ed. 4, 116, (1893.) *Aspidium intermedium* Muhl. Willd. Sp. P.1 5: 262 (1810). *Aspidium spinulosum* var. *intermedium* D. C. Eaton, Gray's Man. p. 665, (1893). *Dryopteris intermedia* A. Gray. Man. 630, (1848).

No. 9320 Notre Dame, No. 10095 Mineral Springs (Porter Co.) Ind. Found also at Grand Beach, Mich (Berrien Co.) Stephenville. Porter Co. [Deam].

**Lastraea cristata** (Linn). Presl. Tent. 77 (1836).*Aspidium cristatum* (Linn.) Sw. Schrad. Jr. (1800), 37 (1801).*Dryopteris cristata* (Linn.) A. Gray, Man. ed. 1. 631, (1848).

*Thelypteris cristata* (Linn.) Nwd. Porter Co. [Deam]. Also Lake Co. by the Author (No. 9754).

**Lastraea Thelypteris** (Linn.) Bory, Dict. 9, 233, (1826).*Aspidium Thelypteris* (Linn.), Sw. Schrad. Jr. (1800) 40, (1801).

*Dryopteris Theiypteris* (Linn.), A. Gray Man. Ed. 1, 630, (1848). Found commonly. Chain Lakes. (St. Joseph Co.). Porter Co. [Deam]. Clarke, Ind. (Lake Co.). [Umbach]. Found by the author at Dune Park, Ind., (Lake Co.); also Chain Lakes, (St. Joseph Co.)\*

**ANCHISTEA** Presl., Epim. Bot. 71, (1849).*Woodwardia* J. E. Smith Mem. Acad. Tor. 5: 411, (1793).**Anchistea virginica** (Linn) Presl. l. c.*Woodwardia virginica* (Linn.) J. E. Smith l. c. p. 412.*Blechnum virginicum* Linn. Mant. 2: 307 (1771).

Tamarack swamps. Very abundant everywhere. No. 9648 Sagunay also Smith, Ind. (Laporte Co.) also W. of Woodland (St. Joseph Co.) Lakeville, Ind. Mineral Springs. Road near dunes of lake (Porter Co.) This in some of the bogs is the most

\* These are the only species of *Lastraea* I have been able to record nor have I found others. Such plants as the following should be found as they are reported from nearby localities.

*L. spinulosa*, *L. Dryopteris* from near Chicago.

*L. Goldieana* found in Steuben Co., (Deam) and ain central Michigan (Hicks). *L. hexagonoptera* Ann Arbor, Mich. (Clarke). *L. marginalis*, Sa gattuck, Mich., (Umbach). *L. noveboracensis*, Steuben Co. (Deam), and possibly *L. Bootii* is to be located.

abundant fern we have. At Sagunay the plants are so common as to encroach even upon the *Cassandra calyculata*. Millers, Ind. [Higley & Raddin].

Reported also from Lake Co. I have found it in all the counties except Elkhart where it is probably also found in places I have not seen..

*TRICHOMANES* Dioscorides.

Tour. El. Bot. 430, (1694). Inst. R. H. 539. (1700). Bubani Fl. Pyr. 4: 424. (1901).

*ASPLENium\** Tour. Inst. Rei Herb. 544, (1700) El. Bot., (1694) p. 434. Dodonaeus Pempt. p. 465, (1583) etc. also Linn. Gen. Pl. p. 322, (1737), do. p. 485, (1754). Sp. Pl. p. 1078, (1753). *Asplenium Matthioli* (1554). Comment Dios. p. 414, also do. (1552) p. 547, and (1560) etc. *Cetrach*† Caesalpinus, De Plantis. p. 575., also Euricius Cordus.

*Trichomanes ebeneum* (Ait).

*Asplenium ebeneum* Ait. Hort. Kew. 3: 462, (1789).

*Asplenium platyneuron* (Linn.) Oakes D. C. Eaton, Ferns N. Am. 1: 24, (1879).

No. 9308 NW. of Notre Dame also 9413. Not infrequent. Found also in both counties in Michigan and Elkhart and Porter in Indiana. Millers, Ind. [Bastin]. Berry Lake, Ind. [Higley & Raddin].

*Trichomanes acrostichoides* (Swartz).

*Asplenium acrostichoides* Swartz do. p. 54. *Asplenium thelypteroides* Michx. Fl. Bor. Am. 2: 265, (1803). *Diplazium thelypteroides* Presl. Pterid. 114, (1836). Laporte Co. [Deam].

Found in Steuben Co. and may be found in our area. I have not as yet found it. Berry Lake, Ind. [Higley & Raddin].

*ADIANTUM* Hypocrates Eid. XIII. v. 40. etc. Theophrastus Hist. Pl. VII, 13. Nicander. Ther. V. 846. Dioscorides, Pliny, etc., etc., and nearly all pre-Linnaean writers.

*Adiantum* Tour. Els. Bot. p. 433, (1694). Inst. Rei. Herb. p. 543, (1700). *ADIANTUM* Linn., Syst. Nat. 1st ed. (1735).;

\*The *Asplenium* of Dioscorides, Pliny and some other pre-Linnaean authors has been taken out of this genus. See Bubani l. c.

† The genus *Ceterach* is now considered as a valid separate genus distinct from *Asplenium* Linn. by some authors.

Gen. Pl. p. 322, (1737); Hort. Cliff. p. 473, (1737); also p. 485 (1754) Sp. Pl. p. 1094 (1753.)

**Adiantum americanum** Cornuti Plant. Canad. 7 t. 6. (1635) also Ray Hist, 148 (1686).

ADIANTUM PEDATUM Linn., Sp. Pl. p. 1095, (1753).

Common and observed in every county. No. 2714½ Chain Lakes (St. Joseph.) 2714 Stephenville, Mich. (Berrien Co.) Studebaker's Woods, South Bend, Indiana. Munich, Mich. La-porte Co. [Deam].

*PTERIS* Theocritus. Eid III. 14 etc. and Dioscorides IV. 187.

*Filix* Vergil Georg. II, 189. Pliny XX, 55? Tour. Els. Bot. 429, 4694. Inst. Rei Herb. p. 536, (1700). *Filix*, Haller, Fuchs, Matthioli, Dodonaeus Lobelius, Tabernaemontanus, J. Ray, Blackwell, etc. *Thelypteris* Theophrastus IX, 20 also Dioscorides, and Valerius Cordus, (1560). *Avia* Columella, VI. 14. *PTERIS*. Linn., Syst. Nat., (1735); Gen. Pl. p. 322, (1737). Hort. Cliff 973 (1737), and g. 484, (1754) Sp. Pl. p. 1073, (1753). *Pteridium* Scopoli, Fl. Car. p. 169 (1760), not *Pteridium* Cordus l. c. = *Lastraea* or *Trichomanes* sp.

*Pteris aquilina* Linn., Sp. Pl. p. 1075, (1753).

*Pteris nymphaea* Dioscorides l. c. (?) *Filix nymphaea* Pliny l. c. *Pteridium aquilinum* (Linn.) Kuhn. *Pterium majus* Siegesb. Fl. Pet. p. 91.

Found in many places in all the counties. No. 2754. Notre Dame. 2754 ½ Chain Lakes (St. Joseph Co.) No. 496 Notre Dame. Lake Co. [Deam].

*POLYPODIUM* Theophrastus Hist. pl. 1, 9, c. 13 & 22. Dioscorides, etc. and all pre-Linnaean writers.

*Polypodium* Tour. Els. Bot. p. 437, (1694) Inst. Hist. Rei Herb. p. 540, (1700). *Polypodium* Linn., Syst. Nat, (1735) Gen. Pl. p. 322, (1737). Hort. Cliff. 474, (1737) and p. 485, (1754). Sp. Pl. p. 1082, (1753).

**Polypodium vulgare** C. Bauhin Pinax. p. 359. (1622), also Tour. Els. Bot. (1694), and Hist Rei Herb. (1700) Linn. Sp. Pl. 1082 (1753) St. Joseph, Grand Beach, Michigan (Berrien Co.) Pine, Ind., (St. Joseph Co.) Mineral Springs and Tamarack (Porter Co.)



Family 4. **SALVINIACEAE** Reichenbach. Consp. 30. (1828.)*AZOLLA* Lamarck, Encycl I: 243, (1783.)**Azolla caroliniana** Willd. Sp. Pl. 5: 541. (1810).

Very abundant in fall in back waters of St. Joseph River, especially in an oxbow loop near St. Mary's Academy, Notre Dame, Ind. No. 10116.

Family 5. **EQUISETACEAE** Michx. Fl. Bor. Am. 2: 281 (1803)*EQUISETUM* Pliny. 1. 26, C. B.

*Hippuris* Dioscorides, of the Greek authors\*, also of some other pre-Linnaean authors, Brunfels, Tragus, Amatus Lusitanus, Dodonaeus, etc. *Equisetum* Tour. Els. Bot. p. 424, (1694) also Inst. Rei Herb. p. 532, (1700). Linn. Syst. Nat, (1735); Gen Pl. p. 322, (1737); Hort. Cliff. p. 471, (1737); Sp. Pl. p. 1061, (1753).

**Equisetum arvense** (C. Bauhin), Linn., Sp. Pl. p. 1061. (1753).

Common everywhere and observed in every county. The plant is so abundant and crowded in places in St. Joseph County as to cover large patches preventing growth of other plants. No. 10117 Notre Dame, Ind.

**Equisetum fluviatile** Linn., Sp. Pl. 1062 (1753).*Equisetum limosum* Linn. do.

Common in Tamarack swamps. No. 2777. two miles W. of Woodland (St. Joseph Co.) No. 10118 Hick's Crossing near Hudson Lake, (Laporte Co.) Also in Porter Co. Near Mineral Springs and Tamarack. Near Stephenville (Berrien Co.) also at Chain Lake and (St. Joseph Co.) Lakeville near Pine, Ind. etc. etc. Reported from Lake Co. [Hill] also [Umbach].

**Equisetum hiemale** Linn. Sp. Pl. p. 1062 (1753). No. 10119 Notre Dame. Found throughout the region by me. Whiting, Ind. [Higley & Raddin].

**Equisetum laevigatum** A. Br. Engelm. A. m Jr. Sc. 46: 87, (1844) No. 2807 East Chicago, Ill. (Lake Co.). N. L. T. Nelson, also Lake Co. [Hill]. Millers, [Higley & Raddin].

\**Hippuris* was used by Dioscorides, 4: 47, for *E. limosum* Linn. More-over the *Hippuris* Dioscorides 4: 46 is *Ephedra fragilis*.

The word *Hippuris* was used by some of the Greeks for the plants called now *Equisetum arvense*. The use of the former name for a genus of phanerogams as used by Linnaeus is objectionable.

*Equiestum variegatum* Schleich. Cat. Pl. Herv. 27. (1807.)  
Lake Co. [Hill.]

Family 6. **LYCOPODIACEAE** Michx. Fl. Bur. Am. 2: 281.  
(1803.)

*LYCOPODIUM* Dodonaeus, Pempt. 470 (1583).

*LYCOPODIUM* Linn., Gen. Pl. p. 323, (1737); Hort. Cliff. 476, (1737), p. 486, (1754); Sp. Pl. p. 1100, (1753).

*Lycopodium lucidulum* Michx. Chesterton, Ind. [Hill]. Pine & Millers, [Higley & Raddin]. Porter Co. [Deam].

*Lycopodium complanatum* Linn. Sp. Pl. 1104. (1753.)

Near St. Mary's Academy, Notre Dame; collected in 1897. Plant has now disappeared entirely from this locality. (Lake Co.) State Catalogue. Millers, Berry Lake [Higley & Raddin].

*Lycopodium inundatum* Linn. Sp. Pl. 1102. (1753.)

Reported from Lake Co. (Hill.) Millers, Pine, Tolleston, Berry Lake, (Lake Co.). [Higley & Raddin], I have not found it.

*Lycopodium obscurum* Linn. Sp. Pl. p. 1102. (1753).

*Lycopodium dendroideum* Michx. Fl. Bor. Am. 2: 282

Reported from Lake Co. I have found sterile plants sparingly near Notre Dame, Webster's Crossing, under oak trees. no. 440. Once common, it is gradually disappearing. Also Pine & Millers, [Higley & Raddin].

Family 7. **SELAGINELLACEAE** Underwood, Nat. Ferns,  
103 (1881).

*SELAGINELLA* Beauv. Prod. Aeth. p. 101. (1805).

*Selaginella rupestris* (Linn.) Spring. Martius Fl. Bras. 1: pt. 2. 118 (1840.)

Lake (Hill) N. of Notre Dame, Ind. no. 9547. Pine, Ind. [Higley & Raddin]. Rare.

*Selaginella apous* (Linn.) Spring do. p. 119.

*Lycopodium apodum* Linn., Sp. Pl. 1105, (1753).

Common in all the counties. No. 9548 Notre Dame, Ind. Lake Co. [Deam]. Pine & Clarke, Ind. [Higley & Raddin]. Colehour Ind. [Hill].

## Subkingdom SPERMATOPHYTA.

### Class I. GYMNOSPERMAE.

#### Order CONIFERAE.

**Bellonius, (1533). Rivinus (1690-1699).**

Linn. Phil. Bot. 30, (1751); also Haller Fl. Helv. (1752) & (1753)

Family 8 **ABIETIDEAE** S. F. Gray, Nat. Arr. 2. 223, (1821).

*Pinaceae* Lindley Nat. Syst. Ed. 2, 313, (1836).

*PINUS* Vergil. Ecl. VII, 56, and Georg. I, 141.\* Pliny.

*Pinus* Tour. Els. Bot. p. 457, (1694). Inst. Rei Herb. p. 585, (1700). *PINUS* Linn., (in part) Syst. Nat. (1735); Gen. Pl. p. 293, (1737); Hort. Cliff. p. 450, (1737); Gen. P. p. 434, (1754); Sp. Pl. p. 1000, (1753).

*Pinus divaricata* (Ait.) Sudw. Bull. Club. Iub. 20: 44, (1893)

*Pinus Banksiana* Lamb., *Pinus*, 1: 7 pl. 3, (1803). *Pinus sylvestris* var *divaricata* Ait. Hort. Kew, 3: 366, (1789).

No. 10101 Mineral Springs (Porter Co.) Nos. 9454, 9455, 6043, 2791, Notre Dame, Ind. Common in the dunes at Millers, Ind. (Lake Co.) Michigan City (Laporte Co.) The plants at Notre Dame have been planted along the roadsides are mentioned only because they frequently spread by seeds spontaneously but are seldom allowed to attain any size unless growing along hedges. No plants have been noted by me as spontaneous east of the dune region of Lake Michigan. Porter and Lake Co. [Deam].

*Pinus Strobis* Linn. Sp. Pl. p. 1001, (1753).

*STROBUS WEYMOUTHIANA* Opiz, Lotos 4: 94 (1854).

*Strobis Strobis* (Linn.) Small FL. SE. U. S., p. 29 (1903), Genus *Strobis* Pliny?

No. 10021. Tamarack Bog, Sagunay, Ind. (Laporte Co.) Now common along Lake Michigan in Lake, Porter, Laporte and Berrien Counties. Laporte Co. [Deam]; Porter & Berry Lake, [Higley & Raddin]. Not abundant in the latter. The largest grove of natural White Pine I have seen near Michigan City. All the trees are of no great size. The most eastern report of the plant as growing outside of cultivation, or certainly not planted

\**Pinus* of Vergil was *Pinus Pinea* Linn. (*Pinus horiensis* Vergil.) Πιτυς of Theocritus. Πεύχη ημερος Theophrastus, and Κωνος.

by man is at Sagunay just outside of the boundary of St. Joseph Co. Though the tree has been extensively cultivated throughout the region I have found it wild nowhere except as noted above. I have been told that white pine is still to be found in a swamp several miles north of Hudson Lake.

*LARIX* Pliny, l. 16, c. 39, Vitruvius, Galen, St. Isidore, also Dodonaeus, Pempt. 168, (1582). Bauhin, Pinax 493, (1623) etc.

*Pinus* Linn. l. c. in part. *LARIX* Duhamel *Traité des Arbres et Arbustes* p: 331, (1775), also Adanson *Fam. Pl.* 2: 480, (1763) etc.

*Larix americana* Mich. *Fl. Bor. Am.* 2: 203, (1803).

No. 9566. Chain Lakes and Lydick (St. Joseph Co.) Ind. Also Sagunay and Tamarack, Ind. (Laporte Co.) Mineral Springs (Porter Co.) San José Park near Lawton, Mich., and near Paw Paw (Cass Co.) near Kalamazoo (Kalamazoo Co.). Common in Lake Co. Indiana (Dune Park.) Galien Mich (Berrien Co.) also at Lost Lake in the Kankakee Swamps, N. Liberty Ind. Lakeville, Woodland, Ind. (Along Turkey Creek Road). Pine, Ind. (St. Joseph Co.) Porter Co. [Deam]. Millers, Ind. [Higley & Raddin]. The longest tamarack swamp I have found is along the Turkey Creek Road 2 miles west of Woodland. It is rapidly being drained and the larger trees as in all the bogs are being cut for posts as they resist decay quite well. In a few years there will be no more of these trees in this locality where they were formerly so abundant. Even the small Larch bogs in the dunes of Lake Michigan or near them are rapidly being drained for cultivation, and so will disappear a remarkable flora with them comprising such interesting plants as *Drosera*, *Sarracenia*, *Cyrtopodium acaule*, *candidum*, and *Reginae*. *Oxycoccus macrocarpus*, *Cornus canadensis*, etc.

*THUYA* Homer, Theophrastus, also Pliny, l. 13, C. Bauhin *Pin.* 1623 etc.

*Thuja* Tour. *Els. Bot.* p. 459, (1694), also *Inst. Rei Herb.* p. 586, (1700). *Thuja* Linn., *Syst. Nat.* (1735); *Gen. Pl.* p. 378, (1737), do. 435, (1754). *THUYA* Hort. Cliff. p. 449, (1737), also *Sp. Pl.* 1002, (1735).

*Thuja Theophrasti* C. Bauhin, *Pin.* (1623) also Tour, l. c. *Els. Bot.* (1694) and p. 587 *Inst. R. H.* (1700).

*THUYA OCCIDENTALIS* Linn. *Sp. Pl.* p. 1002. (1753).

The only locality I know for this plant is in the dunes of N. Mineral Springs (Porter Co.) The trees are growing in a tamarack bog and are rapidly disappearing as are also the tamaracks themselves. Nos. 938, and 10102. Pine, Ind. [Hill]. Berry Lake, Ind. [Higley & Raddin]. Lake Co. [Deam].

Family 9. **CYPRESSIDEAE** S. F. Gray. Nat. Arr. (1820).

*JUNIPERUS* Vergil Ecl. VII, 53 & Ecl X.\* 76 also Pliny?

*Arkeuthos* Theophrastus Hist. Pl. III. 4, also Diosc. I, 104. Theocritus Eid. I. V. 133 and Eid V. V. 97†. *Juniperus* Tour. Els. Bot. p. 461, (1694). Inst. Rei Herb. p. 558, (1700). *JUNIPERUS* Linn. Syst. Nat., (1735); Gen. Pl. p. 311, (1737); do 461, (1754). Hort. Cliff. p. 464. (1737).

*Juniperus vulgaris* Tragus, Hist. 1074 also Clusius (1601).

*JUNIPERUS COMMUNIS* Linn. Sp. Pl. 1040. (1753).

(St. Joseph Co.) along the St. Joseph River, and escaped near Graveyard (Cedar Grove Cemetery.); also at St. Joseph, Mich. (Berrien Co.) along the bluffs near the Lake. No. 3339 St. Joseph, Mich. Also nos. 9104 and 2717, Stephensville. Pine, Ind. [Higley & Raddin]. Cultivated or perhaps escaped?

*Juniperus depressa* Raf. Med. Fl. 12 (1830) (1817? incitation).

*Juniperus vulgaris* var. *depressa* (Pursh).

*Juniperus prostrata* l. c. (?)

*Juniperus communis* var. *depressa* Pursh, F., Fl. Am. Sept. (1816) p. 646. *Juniperus communis* var. *canadensis* Loud. Willd. Sp. Pl. 4: 854 (1806).

*Juniperus communis* var. *alpina* Gaud. Fl. Helvet. *Juniperus alpina* S. F. Gray. Nat. Arr. p. 226, (1821), 6: 301, (1830). *Juniperus sibirica* Burgsd. Anleit. n. 272, (1787). *Juniperus communis* var. *montana* Ait. Hist. Kew, p. 414. (1789) acc to Willd. l. c. *Juniperus communis* var.  $\gamma$ . Linn. Sp. Pl. 1040, (1753). *Juniperus communis* var.  $\gamma$ . *J. alpina* Smith Brit. Fl. 3: 1086, (1805). *Juniperus alpina* S. F. Gray Nat. Arr. p. 226, (1821).

*Juniperus alpina* Clusius, Hist. Pl. Rar. p. 38 (1601)! J. Bauhin Hist. p. 1650, also Ray, J. Syn. 444, (1724), etc., etc., acc. to some authors but the mid and plant really different.

\*See Fée. Fl. Verg. p. 73, also Fl. Theocr. p. 14.

†See Fée. Fl. Theocr. p. 14.

St. Joseph Co. along the high sandy banks N. of Notre Dame Found also in similar habitat across the boundary in Berrien Co., Michigan. The patches are several meters in diameter and the branches closely prostrate, the smaller rising a few decimeters. Not abundant. Given in State Report also from Lake Co. and Porter Co. also Laporte [Deam].

*Juniperus virginiana* Linn., Sp. Pl. 1039. (1753).

Very abundant mixed with oak and hickory in woods. in sandy soil north of Notre Dame, Ind. especially in close proximity to the river or lake. Does not grow to any size in our region. St. Joseph and Berrien Counties. also Cass Co. Mich.; Laporte Co. Nos. 485 and 3342. St. Joseph, Mich. Millers and Whiting. [Higley and Raddin]. The tree commonly found in the East, Virginia, Maryland, etc., is a cultivated variety of *J. virginiana* brought over from Europe. It is found also in our region occasionally.

Family 10. **TAXIDEAE**. S. F. Gray Nat. Arr. 2: 226. (1820)

*Taxaceae* Lindley Nat. Syst. Ed. 2. 316, (1836).

*TAXUS* Vergil. Ecl IX. 30. Georg II., 113 & II. 257, Georg III. 448, & IV., 47. Also Dioscorides and Pliny.

*Milos* Théophrastus III. 4. *Taxus* Tour. Els. Bot. p. 462, (1694); Inst. Rei Herb. p. 589, (1700). *TAXUS* Linn. Syst. Nat. (1735) also Gen. Pl. p. 312, (1737), do. p. 462, (1754). Hort. Cliff. 464, (1737); Sp. Pl. p. 1040, (1753).

*Taxus minor* (Michx) Britton Mem. Torr. Club. 5: 19. (1893).

*Taxus baccata* var. *minor* Michx. Fl. Bor. Am. 2: 245, (1803).  
*Taxus canadensis* Willd. Sp. Pl. 4: 856, (1806).

Found south of Stephenville (Berrien Co.) Mich., no. 2716. The plant was found also at St. Joseph, Mich. Always in rather shady woods very close to the Lake. Although I have travelled extensively over the dune region from Millers, Ind. to New Buffalo, Mich., I have never found the plant anywhere within the limits of the sand hills of Indiana, nor have I found quite the same kind of habitat as the plant favors higher north, that is rather moist sandy woods on high bluffs very near the lake.

(To be continued,)

## NEW PLANTS FROM NORTH DAKOTA.—IX.

BY J. LUNELL.

**Rosa dulcissima** sp. nov.

Caudex spinis rectis, tenuibus, fragilibus, infra stipulas maioribus armatus. Stipulae per marginem totam vel ferme totam glanduloso-serratae, superne glabratae, subtus pubescentes. Rachis folii tomentulosa, saepe spinulosa. Foliola 5-9, in surculis usque 11, late ovata vel obovata, basi cuneata, apice obtuso vel acuto, simpliciter vel duplo serrata, 3-6 cm. longa, 2-4 cm. lata, conspicue petiolulata superne glabrata, subtus glauca et indumento magis minusve evanescente vestita. Flores 4-6 cm. lati, corymbosi. Receptaculum atratum, interdum setosum. Sepala paralleli-nervia, vehementer glanduloso-hispida, interne et marginaliter albido-lanata, apicibus longis glabratis, exteriora pinnis mediano-nervatis glabratis insigniter pinnatifida. Fructus globosus vel pomiformis, 12-15 mm. latus.

Stem armed with straight, narrow, weak prickles which are largest beneath the stipules. Stipules glandular-serrate for their whole length or nearly so, glabrate above, pubescent beneath. Leaf-rachis tomentulose, often with prickles. Leaflets 5-9, in young shoots sometimes 11, broad ovate or obovate, with cuneate base and obtuse or acute apex, simply or doubly serrate, 3-6 cm. long, 2-4 cm. wide, prominently petiolulate, glabrate on the upper side, glaucous with a more or less evanescent indument beneath. Flowers 4-6 cm. wide, corymbose. Receptacle dark, with occasional setae. Sepals parallel-nerved, strongly glandular-hispid, white-woolly within and on the margins, the outer notably pinnatifid with glabrate, median-nerved pinnae and long, glabrate tips. Fruit globose or apple-shaped, 12-15 mm. broad.

The features specifically distinguishing this rose from my *R. gratiosa* are its almost constantly corymbose flowers and its strongly pinnatifid outer sepals. The latter has flowers either corymbose or solitary, and sepals essentially and constantly entire, only exceptionally bearing a minute lobe, with often fusiform hews.

Collected on or just inside of the external margin of the woodland surrounding Pleasant Lake, Benson County, on July 4 and September 2, 1912, by the writer.

*Bilderdykia Convolvulus* var **pumilio** var. nov.

Caulis erecti, neque tortuosi neque procumbentes, 6-15 cm. alti. Flores solitarii vel pauci.

Stems erect, not twining, not procumbent, 6-15 cm. high. Flowers solitary or few.

Collected in ripe fruit and with the leaves displaying a splendid autumnal erythrophyll, by the writer at Leeds, Benson County, on August 5, 1912, in fields.

*Antennaria aureola* sp. nov.

Caules 10-20 cm. alti, in vastis, stratis coloniis generati, laxe vel appresse lanati. Stolones 2-6 cm. longi, foliosi. Folia caulina magis minusve acutula, 1.5-2.5 cm. longa, superiora quidem anguste lanceolata, inferiora latius lanceolata vel etiam spatulata. Folia stolonica 2-3 cm. longa, 5-8 mm. lata, cuneato-obovata, apice brevi et obtuso ornata, ambobus lateribus appresse et obstinate sericeo-tomentosa. Capitula 1-10, cylindrica, involucria feminarum 8-10 mm. alta, pedunculis 5-15 mm. longis. Bractee florum femineorum nitore aureo in 4 series imbricatae, omnes apicibus longis acutis albis angustae, serie externa excepta cuius bractee apicibus obtusis breviores et latiores sunt et maculam basilarem fuscam habent. Plantae stamineae ignotae.

Stems 10-20 cm. high, growing in large, matted colonies, loosely or appressedly woolly. Stolons 2-6 cm. long, leafy. Stem leaves more or less acutish, 1.5-2.5 cm. long, the upper narrowly lanceolate, the lower more broadly lanceolate or even spatulate. Stolon leaves 2-3 cm. long, 5-8 mm. wide, cuneate-obovate, with a short, blunt tip, densely and persistently silky-tomentose on both sides during the season, but after hibernation becoming green through partial loss of tomentum. Heads 1-10, cylindrical, pistillate involucries 8-10 mm. high, peduncles 5-15 mm. long. Inflorescence corymbose. Bracts of the pistillate flowers of a golden lustre, imbricated in 4 rows, all narrow with long, acute, white tips, except those of the outer row which are shorter and broader, with obtuse tips and a brown spot at the base. Staminate plants unknown.

Among the allies *A. aprica* Greene is a low plant, usually less than 10 cm. high, with pistillate involucries 6-8 mm. high, with sessile or subsessile heads and with generally obtuse pistillate bracts; *A. oxyphylla* Greene and *A. obovata* E. Nels. are much



taller plants, 20–30 cm. high, the former having leaves less than 2 cm. long and 5–8 mm. wide, not triple-nerved, and pistillate involucre 7–8 mm. high, the latter having stolons 5–8 cm. long, basal leaves large, 3 cm. long and 13 mm. wide, triple-nerved, and 3–7 heads, 1 cm. high, on pedicels 5–20 mm. long; and *A. Holmi* Greene has thin, obtuse, rosulate leaves with a peculiar, fine, glistening indument.

***Crepis dakotana* sp. nov.**

Perennis. Caulis scaposus vel foliis 1 vel 2 anguste linearibus, bracteis haud dissimilibus subscaposus, glaber vel in parte superiore puberulentus, pedunculis sparsim glanduloso-hispidis 2–6 dm. altus. Folia rosulata, oblanceolata vel elliptica vel oblonga vel oblongo-spatulata, acuta vel obtusa, integra, repanda, inaequaliter dentata vel runcinata, una cum petiolo alato qui saepe laminae aequalis est vel longior 5–25 cm. longa, 1–4 cm. lata, omnino glabra. Capitula pauca, in caule eodem 2–5, longipedunculata, magnopere florifera. Involucre 10–12 mm. alta, glanduloso-hispida, atra. Bractee externae breves, paucae (circiter 8), serierum 1 vel 2, lanceolatae. Bractee internae longae, circiter 15, series unius, lineares. Achenia de basi apicem versus angustata, 4 mm. longa, striata, obscure fusca vel subatra. Pappus albus, mollis, achenio aequalis vel plerumque longior.

Perennial. Stem scapose or subscapose (then with 1 or 2 narrowly linear, bract-like leaves), glabrous or puberulent in its upper part with sparingly glandular-hispid peduncles, 2–6 dm. high. Leaves rosulate, oblanceolate or elliptic or oblong or oblong-spatulate, acute or obtuse, entire, repand, irregularly dentate or runcinate, 5–25 cm. long, including the winged petiole which is often as long or longer than the leaf blade, 1–4 cm. wide, entirely glabrous. Heads few, 2–5 on the same stem, long-peduncled, many flowered. Involucre 10–12 mm. high, glandular-hispid, dark. Outer bracts short, few (about 8), in 1 or 2 rows, lanceolate. Inner bracts long, about 15, in 1 row, linear. Achenes gradually tapering from base to apex, 4 mm. long, striate, dark brown or almost black. Pappus white, soft, as long as the achene or usually longer.

This species differs from *C. perplexa* Rydb. and *C. runcinata* T. & G. which have more or less pubescent or hirsute involucre and leaves sessile or with short, winged petioles; from *C. riparia* A. Nels. which has obovate, hairy leaves, glandular-hispid

involucres and peduncles with longer hairs, achenes 6 mm. long, light brown, and pappus shorter than the achene; and from *C. denticulata* Rydb. by its small size, small obovate leaves and smaller solitary involucres, 1 cm. high or less.

The plant grows in wet soil and is represented in my herbarium from many different localities, but shows invariably a remarkable regularity in characters, with exception of two occasional forms. One of them, found at Pleasant Lake, with large leaves and long petioles, has involucres with scanty and almost glandless hairs; the other, from the shore of Lake Ibsen, has long, glandless hairs, on the petioles and midribs of the leaves. As type has been selected a specimen consisting of plants collected by the writer at Butte, Benson County, on June 27 and July 16, 1912.

*Leeds, North Dakota.*

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## WESTERN MEADOW RUES.—I.

BY EDWARD L. GREENE.

The species of *Thalictrum* in the Middle West do not appear ever to have been made the subject on any critical study by any one anywhere hitherto. In that whole great field, the utmost that has been done has been the collecting of fragments for the herbaria, and sending them forth labelled, some *T. dioicum*, some *T. polygamum*, and some *T. purpurascens*, but it is almost a rarity to find any one of those names correctly applied; or, if one must make an exception to that statement in the case of the name *T. dioicum*—a group easily recognized—the two other names, according to the showing which all our herbaria make, are much more often incorrectly assigned than correctly.

When I speak of herbarium fragments as being about all that we at the East have for light and guidance on the subject of the meadow rues of the prairie regions, I am not saying that the specimens are small. The fact is that many of them are so large as to fill an herbarium sheet of standard size; but if a plant is six feet high, or even four, and only the mere top of it, with its flowers or fruits taken, that specimen, though it measure ten inches across and fifteen inches lengthwise, is still but a fragment, and wholly inadequate to the determination of the species, for

such a specimen never shows the foliage of the plant, and in all genera which, like this one, are of so high and complicated organization as to be compound-leaved, the leaves themselves are of the greatest importance to the systematist, as offering in untold thousands of instances the very best of specific characters. Now most of our tall meadow rues everywhere have their leaves so large that a single one taken from toward the base of the stem will fill an herbarium sheet as completely as its panicle of flowers will fill another; but nothing is so rare among our thousands of herbarium sheets as a good leaf of a large thalictrum. So we have to deal with fragments; and the treatment of these plants in botanical manuals is also, and in consequence, always a failure. Not that incompleteness of herbarium material is the sole cause of failure. The foliage when present has been strangely neglected. In untold instances in which a large genus displays in its extent great diversity as to outline, texture, color, venation and indument of its leaves, these are recognized as furnishing characters, often the very best, for species; but in thalictrum, now as of old, men strain their eyes in search for some small marks of flower and fruit on which to establish species, and seem blind to the most pronounced differences among them in respect to leaves; this of course is partly due, though not wholly so, to the deficiency of specimens in this particular.

Whoever gathers herbarium material of these large meadow rues should not stop short of five full sheets from each clump or colony. There should be (1) a panicle of the staminate plant in flower, (2) the same of the pistillate at that stage, (3) a later gathering of a fruiting panicle in its full maturity (4) a perfect full-sized leaf from a pistillate plant, then (5) the same from a staminate one. In not a few species there is almost an extreme difference in outline between the leaflets of the pistillate plant and the staminate. This announcement, which I believe is here for the first made, they who are determined that plant recognition and description shall be short and easy will pass in silence, and try to discredit it in whispers. It is at least the presentation of a new difficulty in the systematization of the species. Nevertheless, the difference is only one of outline, when it exists at all. The color, texture, venation and pubescence are the same in both sexes of the same species; so that this difficulty is not at all insuperable where the specimens are made in full, as above directed.

The few new species, of which descriptions follow are mostly of that group of which the Virginian and Carolinian *T. purpurascens* is typical. Even in the Eastern States and adjacent Canada several clear species have been from time to time confused with that; and finally—and needlessly—that old name has been made to give place to a newer one in the newest manual. As for the several climatic regions lying between the northern Alleghenies and the middle Rocky Mountains, nothing seems to me more improbable than that true *T. purpurascens* should occur in any of them. The differences of environment are far too great.

***Thalictrum Nortoni* nov. sp.**

Caulis 4-5 dm. altus, striatus, glaber. Foliola firma, superne glabra, glaucescentia, haud conspicue venosa, inferne pallida, ibisque venis tenuibus lutescentibus et lateraliter sparsim hirtellis percursa, ambitu subquadrato-obovata, basi subcordata, supra medium 3-5-lobata, lobis incisus acutis, terminalia 3 cm. longa, lateralia minora. Panicula plantae foemineae subcongesta. Achenia oblique fusiformia, subsessilia, costis continuis, valde elevatis acutis et leviter sinuosis notata, pericarpio toto sub lente minutissime asperato.

Type specimens of this far western member of the *T. purpurascens* group are in the herbarium of the New Mexico College of Agriculture and were collected in Riley Co., Kansas, in 1896, by Mr. J. B. Norton. They consist of three sections of one pistillate plant in fruit, but with basal leaves cut off and probably thrown away. What are probably the flowers of the same species, by the same collector and from the same place, are in the herbarium of the Wyoming University. The specimens are a fragment of a staminate plant, and one of a pistillate, both in good flowering state. The stamens are pendulous, the filaments being capillary, and hardly clavate under the anthers.

***Thalictrum albens* nov. sp.**

Planta metralis, caule tenui glabro, laeviusculo et pulchre purpureo-rubente, foliis paucis remotis sessilibus albescentibus instructo, vertice paniculam fertilem parvam subaphyllam gerente. Foliola submembranacea, utrinque valde glauca, supra sparsim setulosa, subtus magis crebre albo-hirtella, ambitu subquadrata vel quadrato-obovata, basi plerumque obtusa, apice 3-5-lobata

lobis breviculis acutis, terminalia 2-3 cm. longa, lateralia 2 cm. longa, interdum oblongo-ovalia et integerrima. Carpella breviter fusiformia, sessilia, obtuse costata, glaucescentia et minutim hirtella.

Very elegant slender red-stemmed almost white leaved plant from Valhalla, North Dakota, collected 8 Aug., 1902, by L. R. Waldron; type specimen in Herb. Univ. Wyoming. It is the only member of the group of *T. purpurascens* I have seen with glaucescent as well as pubescent carpels.

***Thalictrum Sandbergii* nov. sp.**

Caulis metralis, validulus, anguloso-striatus, sparse et minutim setulosus folia ad 5 ampliuscula firmaque gerens et vertice paniculam fertile pro planta parvam. Foliola supra glaucovirentia et sub lente sparsissime minutim et adpresse setulosa, subtus glauca et venis elevatis atque pube albo notata, terminalia 2-3 cm. longa late obovata, leviter et obtuse 3-lobata, lateralia minora, oblique ovalia. saepe integra, interdum 1-3-dentata. Carpella immatura ovalia, sessilia, pilis brevibus albis crebre hirsutula.

Remarkable species of the white-stemmed group, known to me in only a single but very good plant on U. S. Herb. sheet 340, collected at Itaska Lake, Minn., July, 1891, by J. A. Sandberg; his No. 1193, labelled "*T. polygamum*." The species would be another of those confused elements of the guessed-at "*T. dasy-carpum*" of recent writers. The strictly staminate plant of *T. Sandbergii* would be an interesting thing to see, if such exist. The type specimen is mainly pistillate, but two or more stamens persist in most of the heads of perhaps only half-grown carpels.

***Thalictrum Wightianum* nov. sp.**

Caulis praealtus, striatus, glaucescens, glaberrimus, purpurascens, foliis amplis sessilibus obsitus. Foliola subcoriacea, superne pallide virentia et venis tenuibus albidis divergentibus notata, inferne glauca, ibique venis albidis elevatis ramossissimis manifestim reticulata, et setulis perpaucis albis, praecipue secus venis, obsita, terminalia 3-4 cm. longa, ambitu obovata, basi subcordata, apice leviter, late et inaequaliter 3-lobata, lobis obtusis, lateralia terminalibus dimidio minora, interdum ovalia, obtusa et integerrima. Panicula fertilis nuda, laxe lateque ramosa usque 4 dm.

longa. Carpella brevia, sessilia, plerumque elliptico-fusiformia, interdum breviora et ovali-elliptica, glaberrima, utroque latere costis 2-3 rectis acutiusculis percursa.

Along the Kalamazoo River at Allegan, Michigan, 11 Sept., 1902, collected by W. F. Wight. Two sections of a plant noted on the labels as "5 feet high" are on U. S. Herb. sheets 430181 and 430182. Being in good leaf and fruit at the date recorded indicates a plant flowering late in summer. It is of the *T. purpurascens* group, and the leaflets are revolute.

***Thalictrum amabile* nov. sp.**

Caulis verosimiliter metralis, striatus, glaber, pallide purpurascens, foliis sat amplis, sessilibus usque ad medium paniculae laxae instructus. Foliola firma, superne saturate viridia glaberrimaque, inferne glauca et indumento biformi, nempe, e papillis minutis numerosissimis et globulis majoribus paucas crystallinis sessilibus conspersa, terminalia ambitu rotundata, 3 cm. diametentia, apice leviter et latissime 3-lobata, lobis subaequalibus subtruncatis mucronatis. Rami paniculae plantae stamineae adscendentes, laxiflori. Flores mediocres albicantes. Sepala 4 oblanceolata, acuta. Filamenta nec numerosa, nec valde elongata neque manifestim clavellata, pendula. Antherae pro affinitate plantae breves, lineari-oblongae, aristato-mucronatae.

Only the staminate plant seen, and that in two specimens from near Mansfield, Ohio, collected in June, 1896, by E. Wilkin-son. On specimens showing so marked a habit, and so many characters of leaves and staminate flowers, there is little or no risk incurred in publishing a species on the one sex. The fine close papillose indument of the leaves beneath appears only under a very strong lens, but the sparse only subsessile larger transparent processes of the epidermis are visible with the simplest hand lens.

***Thalictrum Moseleyi*, nov. sp.**

Planta ut videtur metralis et ultra, caule valido, striato, purpurascente, glaucescente, glaberrimo. Folia inferiora ignota, superiora sessilia, supra saturate viridia, subtus glauca, undique glaberrima. Foliola 2-3 cm. longa, plerumque elliptica integra, interdum paulo latiora et 1-2-dentata. Panicula plantae stamineae ampla, circa 3 dm. lata, confertiflora, ramulis ultimis late patentibus vel modice recurvatis. Sepala oblongo-elliptica, albescentia.

Stamina numerosa, pendula; filamenta tenuia seorsim leviter clevellata antheris oblongis vel lineari-oblongis triplo longiora.

Type specimen in U. S. Herb., sheet 431249, collected in the township of Oxford, Erie Co., Ohio, 8 June, 1895, by E. L. Moseley. The specimen is labelled, by the collector, *T. polygamum*, though it bears no relation to that group of plants whose mark is upright clear white filaments bearing very short anthers. *T. Moseleyi* is clearly of the *T. purpurascens* alliance, though wholly distinct from that by its foliage alone if by no other character. One peculiarity of the present plant is, that what one would have liked to call its terminal large leaflets are all completely divided into three leaflets, the middle one of which is petiolulate, the other three sessile; and while the trifoliate terminals are together, as usual, larger than the laterals, some laterals are larger than the largest separate member of the triple terminal.

It has come of my long and careful study of thalictrum leaves of all groups of species, and from all over our country, that I place such dependence on these organs for specific distinction as to describe species, the fruits of which are unknown. Let the pistillate plants, and the fruits of each be what they will, and even just alike, if it so prove, this and *T. amabile* above, are valid and very different species.

#### *Thalictrum perpensum* nov. sp.

Caulis modice tenuis, 4-6 dm. altus, laete stramineus, plus minusve striatus, aut omnino glaber aut pilis setulosis brevibus sparsissime obsitus. Folia haud ampla, inferiora petiolata, superiora sessilia. Foliola terminalia 2-3 cm. longa, late obovata, apice trilobata lobis latis, brevibus, obtusiusculis, lateralia interdum ovalia, integra, omnia superne laete viridia et glabra, inferne pallida et sparse albo-hirtella. Florum pedicelli, nec non sepala extus, sparse pilosi. Stamina alba, erecta, clavellata. Carpella oblique elliptica, distincte stipitate, sparsissime setulosa.

Type specimens collected by myself on low prairie land about Strathroy in western Ontario, in June, 1910. It is the plant referred to by me under the name of *T. dasycarpum* in Vol. I. of this Journal, p. 104. I have now become convinced that real *T. dasycarpum* is a much larger plant, and of the group of *T. purpurascens*, while *T. perpensum* is unquestionably of the *T. corynellum* alliance by its clear-white filaments all clavate and

standing upright. On the page of the NATURALIST quoted I have attributed my plant to low prairies of Southern Michigan. I observed it there only from my window on the railway train, but have no doubt that the plant was the same afterwards studied and collected in adjacent Ontario; through I must say that the low white-flowered prairie plant quite failed as we passed into the wooded and marshy regions skirting the St. Clair River and lower Lake Huron, not reappearing until we were well out upon the prairie region of Ontario. Moreover, Mr. C. K. Dodge, who has sent me meadow rues from all about Port Huron, has not met with this plant there. Nor have we, in U. S. Herb., any member of this particular group from any part of Michigan. All that has been named "*T. polygamum*" from those parts belongs to the *T. purpurascens* alliance. There is, however, one sheet of exactly *T. perpersum* in the National Herbarium, but this also comes from Ontario, where it was gathered at Elmira, 13 July, 1899, by L. M. Umbach. I am, however, quite confident that the white-flowered one of the Southern Michigan prairies will prove to be the same.

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#### ACHILLAEA MULTIFLORA HOOK IN NORTH DAKOTA.

BY J. LUNELL.

Planta de rhizomate brevi oriens, perennis. Caules singulares vel interdum duo, usque inflorescentiam plerumque simplices, nonnumquam autem prope basin in 2-3 ramos principales divisi, supra corymbosi, 0.6-1 m. alti, leviter lanati, imprimis in iugis de basibus foliorum utrinque descendentibus. Folia basilaria et surculorum sterilium inferiora petiolata, caulina sessilia, numerosa, linearia vel anguste lineari-lanceolata, 2-10 cm. longa, 0.5-1 cm. lata, in surculis sterilibus glabrata, in plantis fertilibus superne laxe, subtus quidem densius lanata, ad glabritudinem magis minusve proclivia, pinnatifida lobis primis in lobis spinuloso-dentatis mensurae variabilis iterum fissis. Inflorescentia corymbis est compositus, apice plano vel plerumque ramis remotis de axillis eius foliorum infimis oriundis centralibus magnopere altioribus, ramis eius rigidis et robustis. Capitula numerosa, 7 mm. alta, 4 mm. lata. Involucra 4 mm. alta, 4 mm. lata, late campanulata,



pubescentia, bracteis carina viridi flavido-fuscis. Flores radiati 5-7, involucri multo breviores, albi, parvi, 1-1.5 mm. longi, 1.5-2 mm. lati, 3-lobati, lobo medio minimo. Planta odorem aromaticum mitem emittens.

Perennial from a short rootstock. Stems solitary or sometimes two, usually simple up to the inflorescence (but occasionally divided near the base in 2 or even 3 main branches), corymbosely branched above, 0.6-1 m. high, loosely woolly, the more so on ridges decurrent on both sides of the bases of the leaves. Leaves, basal and those lower of the sterile shoots petioled, those of the stem sessile, numerous, linear or narrowly linear-lanceolate, 2-10 cm. long, 0.5-1 cm. wide, on the sterile shoots glabrate, on the fertile plants loosely lanate on the upper side, more densely so on the lower, with a tendency for becoming more or less smooth, pinnately cleft, with the lobes again secondarily cleft in spinulose-dentate lobes of variable size. Inflorescence a compound corymb, flat-topped or usually with the peripheral branches from its lowermost leaf-axils rising considerably higher above the central ones, its branches being stiff and stout. Heads numerous, 7 mm. high, 4 mm. wide. Involucre 4 mm. high, 4 mm. wide, broadly campanulate, pubescent, its bracts yellowish-brown with green keel. Rays 5-7, very much shorter than the involucre, white, small, 1-1.5 mm. high, 1.5-2 mm. wide, 3-lobed, the middle lobe smallest. The plant has a faint aromatic odor.

The first time the writer noticed this plant in the Turtle Mountains was on July 7, 1910. I found two plants, both of them sterile, "fern-like" shoots. A thorough search for the fertile plant was futile. On July 29, 1910 and on June 4, 1911 I secured one shoot at a time. My first successful find was unexpected. On May 26, 1912 I drove on a mountain road to Fish Lake (altitude 2600 feet), and from the carriage I perceived a stiff, cinnamon-colored plant about a meter high, in a distance. I told the driver to stop the team and went for it. At last I had found my plant, bearing a small green shoot and the faded stem and inflorescence from last year, the persistent disks furnishing the bright color. If it had had the dull, ashy gray color characterizing the faded involucre of *A. Millefolium* or *A. lanulosa*, it would not have attracted my attention. Now I had an unmistakable clue, and on August 22, 1912, I at last collected the flowering plant in the vicinity of St. John, Rolette County.

Gray reports this plant as growing in Saskatchewan to Fort Franklin and Behring Strait (at that time Assiniboia was a separate province, not as now incorporated with the first named). It was therefore quite unexpected to meet such an extremely northern plant in North Dakota. It is described as 2 feet high, with 10 or 12 rays. Our plant, reaching a length of 1 m., has only 5-7 rays, and if there are more differences, they can only be ascertained by a confrontation with Hooker's type or some of the northern plants. Until then, and if some additional differential characters should warrant the change of name, my inclination of naming this species *A. chelonica* must continue to be suppressed.

*Leeds, North Dakota.*

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#### TITHYMALOPSIS AND DICHROPHYLLUM, SYNONYMS.

BY J. A. NIEUWLAND.

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The most logical treatment of our Euphorbiaceae is that of Dr. J. K. Small in his Flora of the South Eastern United States.\* The heterogeneous group of plants commonly aggregated under the name *Euphorbia* he has separated into a number of natural genera, some like *Tithymalus* and *Chamaesyce* recognized by Theophrastus or Dioscorides, and all pre-Linnaean botanists.

This impossible aggregate, *Euphorbia* Linn. was accepted almost without question or objection by manual writers in our country in spite of the fact that no real *Euphorbia* is to be found native in our country. The typical *Euphorbias* are succulent spiny plants of the old world like *E. officinarum* Linn. or *E. anti-quorum* Linn., and the name should disappear from all our American manuals as it has from the Flora of the South Eastern United States.

Besides *Tithymalus* and *Chamaesyce* among others, the genera *Poinsettia* R. Graham, (1836), *Tithymalopsis* Kl. and Garcke (1859), and *Dichrophyllum* Kl. & Garcke (1859), are also recognized by Dr. Small. Several or all of these have been published as genera under older names by Rafinesque, and I have been unable to guess why this author's perfectly valid names in two of the three instances have not been accepted in the Flora of the South Eastern United States, unless the author has entirely overlooked them, and this, strange to say, though every one of Rafinesque's

names are noted in the Kew Index, and should therefore have come up for consideration when the genera were taken up.

Rafinesque's *Agaloma* antedates Klotzsch and Garcke's *Tithymalopsis* by a score of years. Moreover, there is little room for quibbling about the identity of the names as the author, though admitting a considerable number of species to the genus, clearly points out which plant is the type of his new group. He says: "*Agaloma corollata* R. Euph. do. O. type of the G." Any group of correlated species segregated from the Linnaean *Euphorbia*, and containing *Euphorbia corollata* Linn. ought to be included under Rafinesque's name.

Klotzsch and Garcke's *Dichrophyllum* is likewise preceded by Rafinesque's *Lepadena*,\* under which he quotes *Euphorbia marginata* Pursh. In the same pages of revision of *Euphorbia* Rafinesque protests that the then recently published *Poinsettia* Graham (1836) was anticipated in 1833 by his own *Pleuradena*, though he had in 1825 made another *Pleuradonia* (= *Collinsonia* sp.). Graham's name enjoys validity therefore for this third genus.

Following is the synonymy of the genera with some of the transferred species.

*AGALOMA* Raf. Fl. Tell. p. 94 (1836).

*Tithymalopsis* Klotzsch & Garcke, Monatsb. Acad. Berl.  
(249 (1859).

*Euphorbia* Linn. Sp. Pl. 450. (1753) pro parte.

*Agaloma corollata* Raf. do. p. 95.

*Tithymalopsis corollata* Kl. & Garcke. l. c.

*Euphorbia corollata* Linn., Sp. Pl. p. 459 (1753).

*Agaloma polyphylla* (Engelm.)

*Tithymalopsis polyphylla* (Engelm.) Small l. c. Fl. S. E. U. S.  
p. 716 (1903).

*Euphorbia polyphylla* Engelm.

*Agaloma gracilis* (Ell.)

*Tithymalopsis gracilis* (Ell.) Small. l. c.

*Agaloma eriogonoides* (Small).

*Tithymalus eriogonoides* Small. l. c.

*Euphorbia eriogonoides* Small.

*Agaloma mercurialina* (Michx.)

*Tithymalopsis mercurialina* (Michx.) Small, l. c.

*Euphorbia mercurialina* Michx.

**Agaloma Curtisii** (Engelm.)

*Tithymalopsis Curtissi* (Engelm.) Small, l. c.  
*Euphorbia Curtisii* Engelm.

**Agaloma exserta** (Small).

*Tithymalopsis exserta* Small, l. c. p. 717.

**Agaloma Joorii** (Norton).

*Tithymalopsis Joorii* (Norton) Small, l. c.  
*Euphorbia corollata* var. *Joorii* Norton.

**Agaloma zinniflora** (Small).

*Tithymalopsis zinniflora* Small, l. c.

**Agaloma apocynifolia** (Small).

*Tithymalopsis apocynifolia* Small, l. c.  
*Euphorbia apocynifolia* Small.

**Agaloma discoidalis** (Chapm.)

*Tithymalopsis discoidalis* (Chapm.) Small, l. c.  
*Euphorbia discoidalis* Chapm.

**Agaloma olivacea** (Small)

*Tithymalopsis olivacea* Small, l. c.  
*Euphorbia olivacea* Small.

**Agaloma paniculata** (Ell.)

*Tithymalopsis paniculata* (Ell.) Small, l. c.

**Agaloma Ipecacuanhae** (Linn.)

*Tithymalopsis Ipecacuanhae* (Linn.) Small, l. c. p. 716.  
*Euphorbia Ipecacuanhae* Linn., Sp. Pl. 455, (1753).  
*Vallisneria spiralis* (Linn.) Raf. Fl. Tell. 96. (1836).

**Agaloma arundelana** (Bartlett).

*Euphorbia arundelana* Bartlett. Rhod. 13, p. 164 (1911).

**LEPADENA** Raf. Fl. Tell. p. 96 (1836).

*Dichrophyllum* Klotzsch & Garcke, Monatsb. Acad. Berl. 249 (1859).

*Euphorbia* Pursh. Fl. Am. Sept. II. 249 (1814) pro parte.

**Lepadena marginata** (Pursh).

*Lepadena leucoloma* Raf. l. c.

*Dichrophyllum marginatum* Kl. & Garcke, l. c.

*Euphorbia marginata* Pursh. Fl. Am. Sept. II. 607, (1814).

**Lepadena bicolor** (Engelm & Gray).

*Dichrophyllum bicolor* (Engelm & Gray) Kl. & Garcke, l. c.

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## CIRSIUM IN NORTH DAKOTA.

BY J. LUNELL.

## 1. CIRSIUM NEBRASKENSE.

*Carduus nebraskensis* Britton, in Britton and Brown, Ill. Flora III., p. 487 (1898).

*Cirsium nebraskense* Lunell.

This species is found occasionally mixed with the following variety in meadows and pastures, and in its natural, undisturbed growth it reaches the same size as the latter. Like the latter it has the pappus-bristles of the outer flowers barbellate, and of the inner plumose. Its involucre are glutinous. It can be produced pathologically from the following by cutting or otherwise injuring the stem, and the parts growing out afterwards above the injury have entire or slightly toothed leaves.

2. *Cirsium nebraskense* var. **discissum** var. nov.

Folia lanceolato-oblonga vel lanceolata, lobis dentatis triangularibus oblongis vel lanceolatis profundis magis minusve spinosis vestita. Involucra et seti papposi speciei consimiles.

Leaves lanceolate-oblong or lanceolate with dentate triangular, oblong or lanceolate, deep lobes, more or less prickly. Involucre and pappus-bristles as in the species.

This is the most common thistle in the state, and has been identified under various different names. The state institutions have agreed about *Cnicus undulatus* as the correct name, as has been repeatedly shown in their bulletins of earlier and later dates. An exalted eastern institution of learning has called it *Cnicus altissimus filipendulus* (in common with the species), and this identification stimulated me to spend many hours on physical exercise of changing the original position of bushels of dirt, for the futile purpose of unearthing its tubers, which were nothing but imaginary quantities as far as this thistle is concerned. I have myself been used to recognize it as *Carduus Flodmannii* Rydb., which suggestion was accepted by Dr. F. Petrak when the North Dakota plant of my collection was incorporated with his *Cirsiotheca universon* II., no. 19 (1911) as *Cirsium Flodmannii* Petrak. But Dr. Rydberg's species has its pappus-bristles plumose (vide Memoirs of the New York Botanical Garden I, p. 451 (1900),

or Flora of Montana), and its barbellate outer bristles place our plant with *Cirsium nebraskense*.

It would certainly have been in better harmony with the conception of these plants viewed through North Dakota glasses if the variety had been discovered first and become the species.

3. *CIRSIUM MEGACEPHALUM*.

*Cnicus undulatus megacephalus* Gray, Proc. Am. Acad. 10: 42 (1874).

*Carduus megacephalus* A. Nels., New Manual of the Botany of the Central Rocky Mountains, p. 587 (1909).

*Cirsium megacephalum* Lunell.

This is a short, stout and rigid plant, probably not widely distributed within the state. The only locality from which it is known to me is Pleasant Lake, Benson County, where it is growing sparsely along the railroad.

4. *CIRSIUM MUTICUM*.

*Cirsium muticum* Michx., Fl. Bor. Am. II.: 89 (1803).

This beautiful thistle grows in the sloughs of the Turtle Mountains, and has also been reported from Walhalla, Pembina County.

5. *Cirsium arvense* var. *HORRIDUM*.

*Serratula arvensis* L., Sp. Plant. ed. 1, p. 820 (1753).

*Cirsium arvense* Scopoli, Fl. Carn. ed. 2. II, p. 126 (1772).

*Cirsium arvense* var. *horridum* Wimmer et Grabowski, Fl. Silesiaca II., p. 92 (1828).

Known as Canadian thistle in this country, it got its variety name on account of its abundance of prickles, which in combination with its nearly irrepressible tendency for spreading and its ability of suffocating almost any other vegetation make it one of the most formidable and pernicious weeds known. It grows not only in fields and pastures, but establishes itself in wet meadows and sloughs. I have one specimen from Colorado collected by Mr. Geo. E. Osterhout, and I do not know if the species grows on this continent. In Europe the variety is exceptional, and the species common almost everywhere. The latter is a comparatively harmless plant with short, sparse prickles or often nearly unarmed, and without apparent disposition for exclusive appropriation of large patches of ground, and many farmers do not know its name or ever noticed it, and Linnaeus referred it to the genus *Serratula* which is not even a thistle

*Leeds, North Dakota.*

## MIGRATION OF OUR BIRDS IN THE SPRING OF 1912.

BY BROTHER ALPHONSUS, C. S. C.

This year the first migrants were two weeks later than their usual dates for arriving. The Bluebird and Song Sparrow were three weeks late. A number of species that may be seen in March, when the month is mild, did not arrive until April. Such were the Mourning Dove, Chipping Sparrow, Vesper Sparrow, Cowbird, Red-winged Blackbird and Kingfisher.

In April the average temperature for the whole month was below 55°, which caused many of the birds that may be seen even in March to come as late as the 5th or 10th of April. Among these tardy arrivals were the Kingfisher, Flicker, Golden-crowned Kinglet, Cowbird and Chipping Sparrow.

In May the temperature rose to 68° on the 2nd and remained there for several days. Immediately a strong influx of warblers and other species was noticeable. Twenty species arrived during the first six days. There was then a gap of seven days, during which the temperature was below 68°, with no new arrivals. Although the temperature did not rise above 68° until the 19th, still the migration was resumed on the 13th, when the thermometer registered 45° at 9:50 A. M. Between this date and the 19th, seventeen species arrived.

The period in which warblers arrived was from April 16th until May 26th—40 days. The total number of warblers seen was twenty.

Migrants not seen this spring were: Purple Finch, Hell Diver, Maryland Yellowthroat, Purple Martin, Dickcissel, Sparrow Hawk, Wilson Warbler, Long-billed Marshall Wren, Yellowlegs, Prairie Horned Lark, Hummingbird, Yellow-bellied Flycatcher, Black-billed Cuckoo and Chickadee.

## MARCH

14 Robin	22 Song Sparrow
14 Killdeer	25 Bluebird
18 Cardinal	26 Chicken Hawk
19 Purple Grackle	27 Herring Gull
19 Meadowlark	31 Loggerhead Shrike
21 Goldfinch	31 Field Sparrow

## APRIL

1 Vesper Sparrow	11 Downy Woodpecker
2 Fox Sparrow	12 Sapsucker
2 Towhee	13 Barn Swallow
2 Red-winged Blackbird	15 Brown Thrasher
2 Phoebe	16 Myrtle Warbler
3 Mourning Dove	21 Bobwhite
5 Chipping Sparrow	22 Spotted Sandpiper
5 Hermit Thrush	23 Tree Sparrow
6 Cowbird	26 Red-headed Woodpecker
6 Golden-crowned Kinglet	27 Golden-crowned Kinglet de- parted
6 Brown Creeper	27 Sapsucker departed
7 Screech Owl	29 Black and White Warbler
8 Kingfisher	30 Warbling Vireo
10 Flicker	30 Brown Creeper departed
10 White-breasted Nuthatch	

## MAY

1 Chimney Swift	5 Ruby-crowned Kinglet de- parted
1 Least Flycatcher	5 Yellow Palm Warbler
1 Bittern	5 Chestnut-sided Warbler
2 Ruby-crowned Kinglet	5 Cape May Warbler
2 White-throated Sparrow	5 Magnolia Warbler
2 Baltimore Oriole	6 Wood Pewee
2 Catbird	6 Crested Flycatcher
2 Kingbird	13 Yellow-throated Warbler
2 Scarlet Tanager	13 Bay-brested Warbler
3 House Wren	13 Bobolink
3 Yellow Warbler	13 Rose-breasted Grosbeak
3 Blackburnian Warbler	14 Indigo Bird
3 Redstart	15 Wood Thrush
3 Black-poll Warbler	15 White-crowned Sparrow
3 Tennessee Warbler	17 Tennessee Warbler departed
3 Nashville Warbler	17 Rose-breasted Grosbeak de- parted
3 Black-throated Green War- bler	17 Red-breasted Nuthatch de- parted
4 Red-breasted Nuthatch	18 White-throated Sparrow de- parted
4 Black-throated Blue Warbler	
4 Orchard Oriole	
4 Snowbird departed	



18 Chestnut-sided Warbler departed	21 Myrtle Warbler departed
19 Cape May Warbler departed	22 Least Flycatcher departed
19 Nighthawk	24 Cedarbird
19 Yellow throated Vireo	26 Whip-poor-will
19 Red-eyed Vireo	26 Black-poll Warbler departed
19 Canadian Warbler	27 Yellow-billed Cuckoo
20 Alder Flycatcher	29 Black-throated Green Warbler departed
20 Pine Warbler	30 Hermit Thrush departed
Total number of migrants seen, 82	

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### A QUESTION OF SYNONYMS.

BY J. A. NIEUWLAND.

Following the lead of Dr. Rydberg\* who proposed the genus *Galeorchis* with *Orchis spectabilis* Linn. as type, Dr. Small† also rejects Rafinesque's name *Galearis*‡ for that plant, because there was an earlier name *Galearia* Presl,§ a segregate of *Trifolium*. For that matter there was a still earlier *Galearia* Heist, (1748), and since Rafinesque's time another such for a group of Euphorbiaceous plants.§ Rafinesque's name *Calistachya*, (1808) of which *C. virginica* (or *Veronica virginica* Linn.) is the type has not been admitted and the *Leptandra* Nuttall (1818) given preference, because there was a *Callistachys* Vent. (1803).¶ for a similar reason to that stated above. Whether *Galearis* and *Galearia*, a four syllabled word and the other of five, though of common derivation, are so sufficiently alike as to constitute synonyms, need not be decided here, but may be left to the reader to form his own opinion. As a matter of note we may mention that the spoken name may be regarded as the name of the plant, for one of the

\* Rydberg. P. A. Britton's Manual Fl. N. U. S. 292 (1901).

† Small, J. K. Flora S. E. U. S. p. 312 (1903).

‡ Rafinesque, C. S. Fl. Tell. p. II. p. 39, (1836).

§ Presl. Symb. Bot. I. 49, (1830).

§ Zoll. & Mor. Syst. Verz. Zoll. 19 (1845-46).

¶ This name was translated into *Calistachya* Sm. Trans. Linn. Soc. IX, 267 (1808). The latter example is not perhaps as typical as the former.

principal uses for a name at all is the same spoken word. If two names sound alike they may be considered as synonyms; for synonyms are principally to be avoided because of confusion of an enunciated appellations. Otherwise, a system of distinguishing plants more satisfactory perhaps for tabulation purposes might be suggested such as is applied to fixed stars. In any case the names *Galearis* and *Galearia*, *Calistachya* and *Callistachys* are referred to here in regard to another instance of synonymy in which a stronger reason for regarding names as synonyms has not been admitted by our manuals, and notably the two manuals already referred to.

The name *Wolffia* Horkel, (1839) was antedated by a *Wolfia* Dennst. (1818), a *Wolfia* Sprengel, (1825) and a *Wulffia* Necker (1799). Though not perhaps named after the same person, the three above-mentioned are practically identical, and to most of us there will seem less of difference between these, whether written with an *o* and two *f*'s or a *u*, than there was the difference between *Galearis* and *Galearia* on the ground either of derivation or spelling. It would seem then that if one rejects *Galearis*, one would have greater reason for rejecting the name *Wolffia* for the Lemnaceous plants.

In fact this genus of rather insignificant plants has been rather unfortunate with the number of synonyms, applied to it as the following resumé of names will show.

BRUNIERA Franch, in Billotia 25, (1864).

*Wolffia* Horkel ex Schleid. Linnaea XIII 389 (1839) = *Wolffia* Kunth Enum. Pl. III. 4 (1841) not *Wolfia* Dennst. Schluss. Hort. Malab. 38. (1818) nor *Wolfia* Sprengel, Syst. I. 808 (1825) nor *Wulffia* Necker, Elem. I. 35 (1790).

*Grantia* Griff. ex Voigt Hort. Suburb. Calc. 692 (1845) et Notul III. 223 (1851) not *Grantia* Bois. Diag. Ser. I, vi. 79, (1845).

*Horkelia* Reichenb. ex Bartl. Ord. 76 (1830) not *Horkelia* Cham & Schlecht in Linnaea II., 26, (1827).

***Bruniera columbiana*** (Karsh.)

*Wolffia columbiana* Karsten.

*Grantia Columbiana* (Karst.) MacM. (1892).

***Bruniera punctata*** (Griseb.)

*Wolffia punctata* Griseb.

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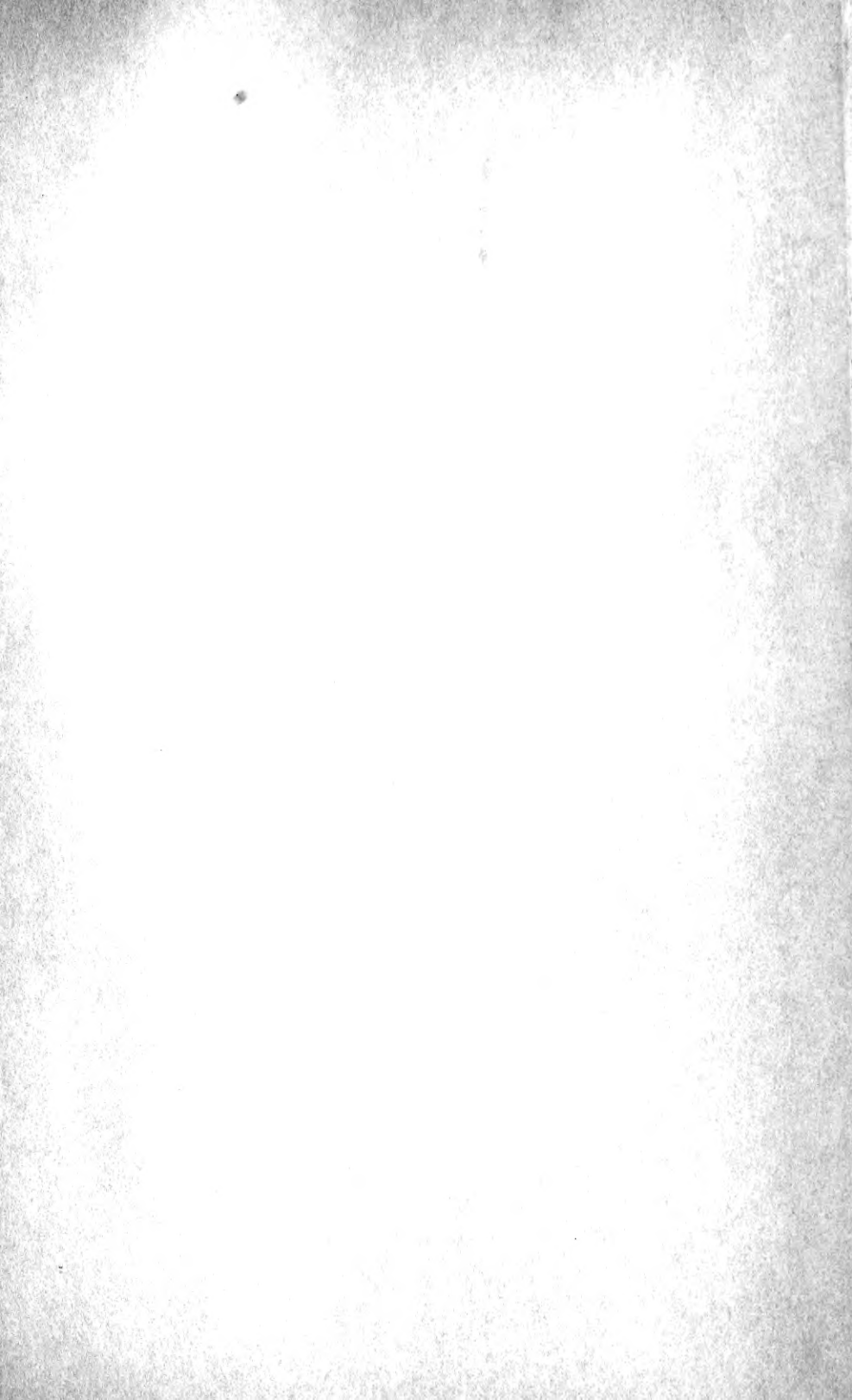


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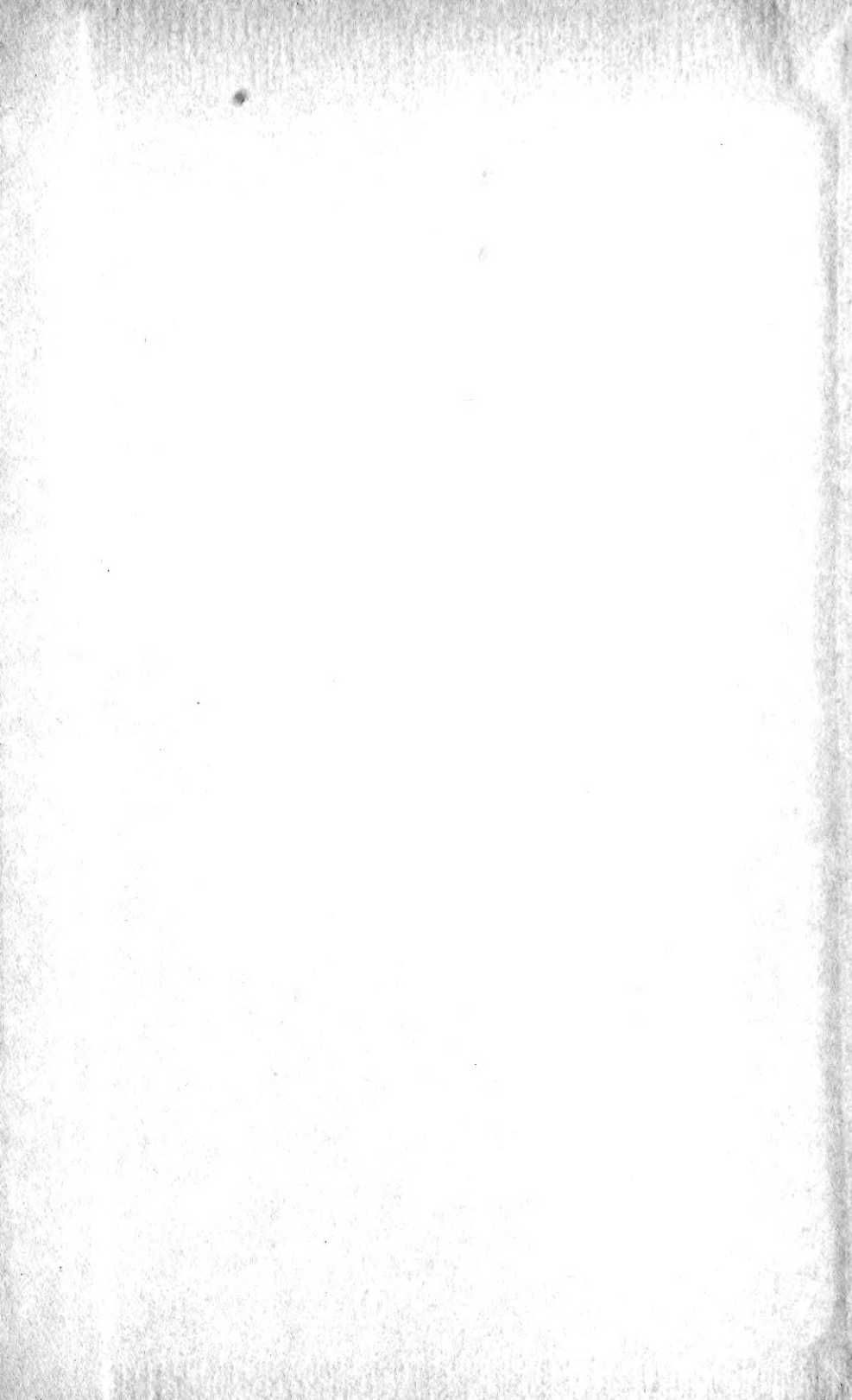
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