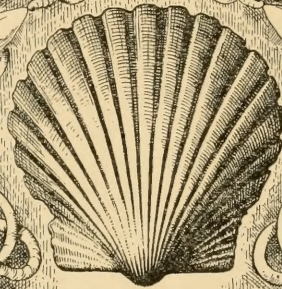






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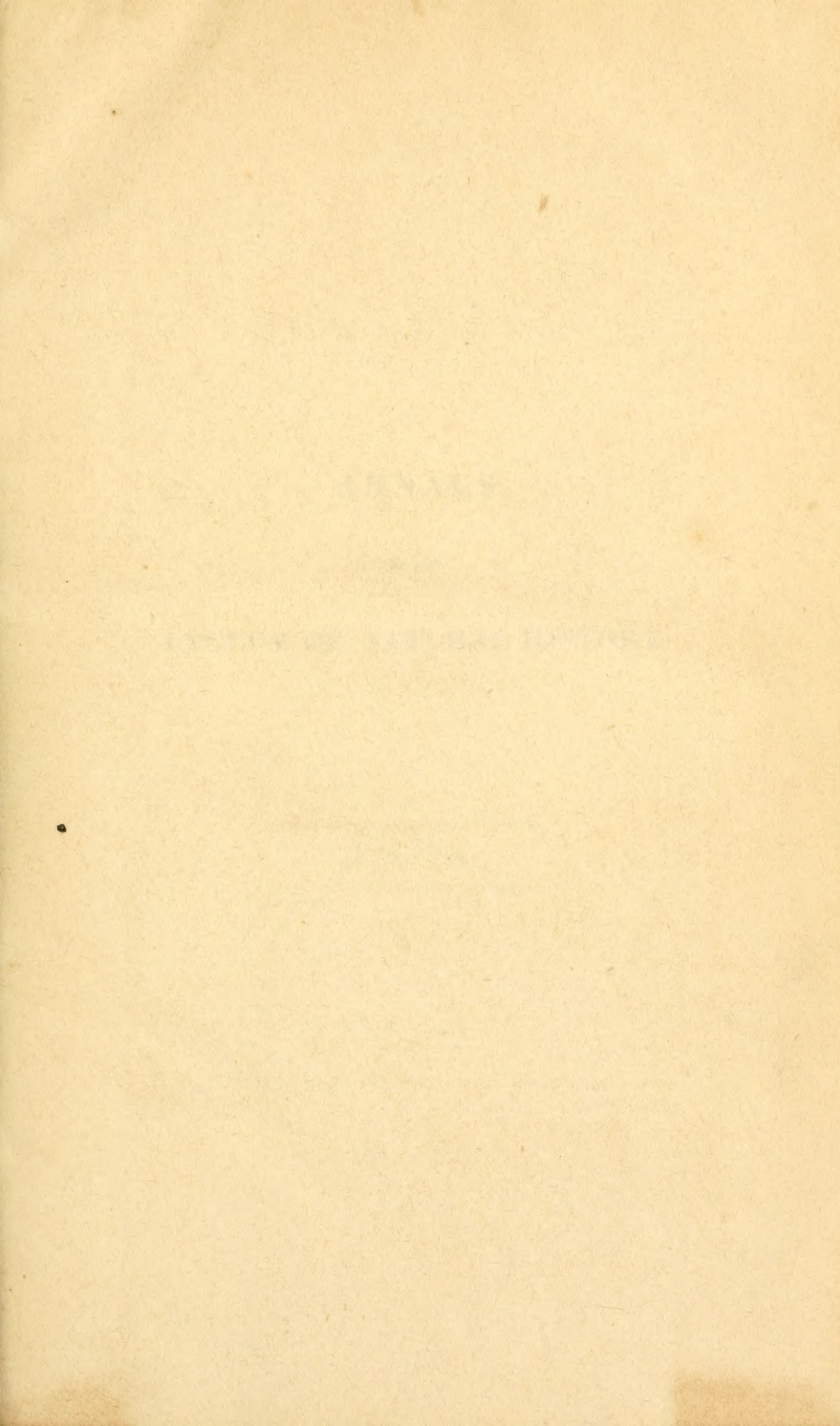
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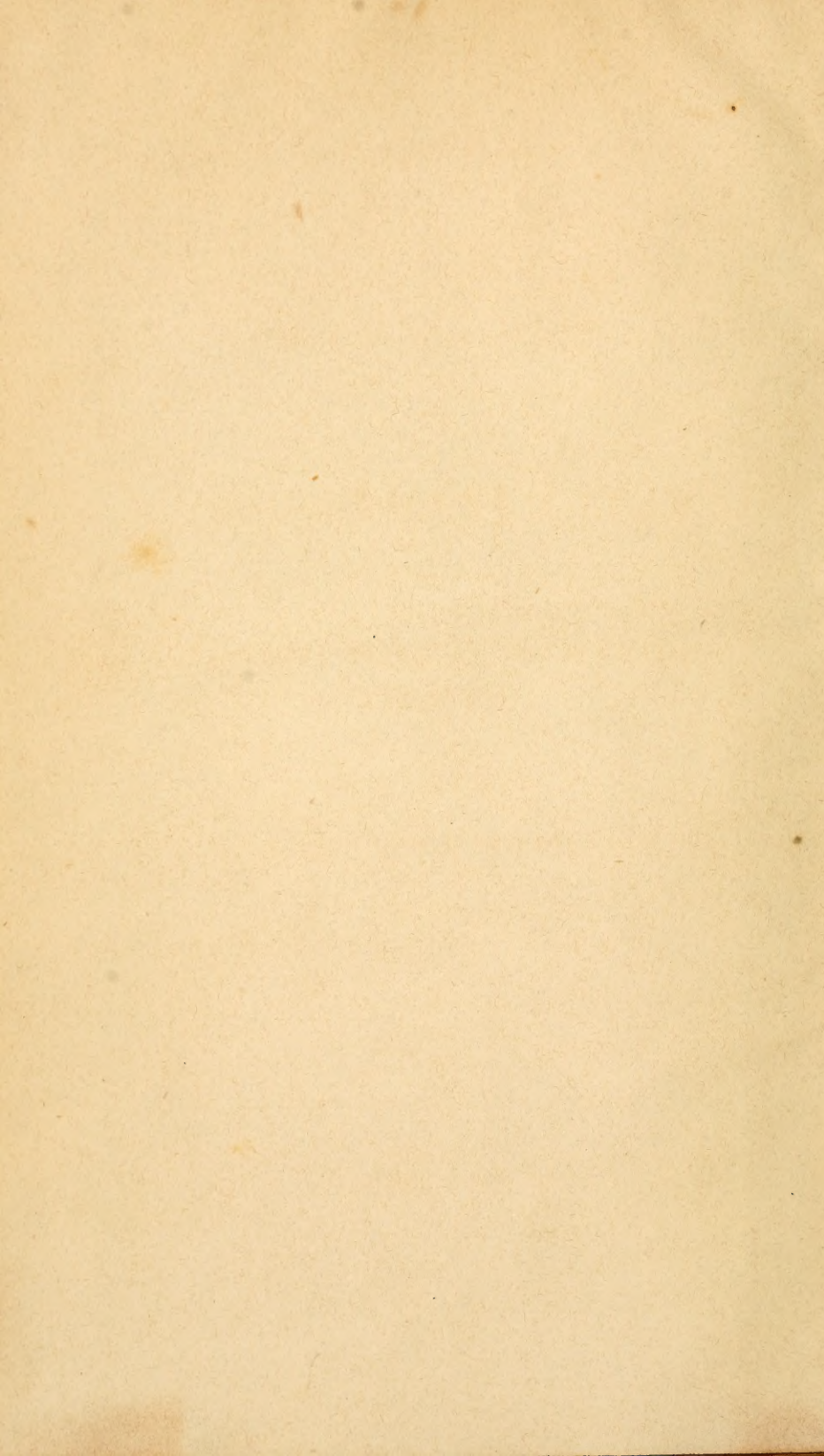














ANNALS  
OF THE  
LYCEUM OF NATURAL HISTORY.



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OF

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**VOL. III.**

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ANNALS  
OF THE  
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CHEMICAL EXAMINATION *of some Minerals, chiefly from America.\** By THOMAS THOMSON, M. D. F. R. S. L. & E. &c. Professor of Chemistry, Glasgow. With Notes by JOHN TORREY, M. D. Professor of Chem. and Bot. in the University of the State of New-York.

*Read November 5, 1827.*

THE following analyses were made in my laboratory during the course of the years 1826 and 1827. A considerable number of them were conducted by myself; but a still greater number were entrusted to my practical pupils. Their analyses may be considered as precisely the same with my own, because the methods employed are mine, the reagents and apparatus are mine, and because I carefully superintend every step of the process, till the pupil has acquired sufficient practical skill to conduct an analysis with accuracy.

The number of analyses was so great, that if I were to give a detailed account of each, I should have to write a treatise instead of a paper. It will shorten this essay very materially, if I premise a few observations on my methods of

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\* A large proportion of these minerals was sent to Dr. Thomson by Mr. Nuttall and myself. At the request of Dr. Thomson, I have added a few notes of explanation respecting the localities, history, &c. of some of the specimens.

J. T.



analysis in the first place, and then satisfy myself with stating the general results of each particular analysis, without entering into any details.

My methods were originally founded on a careful study of the analytical papers of Klaproth and Vauquelin. Their methods were a good deal improved, by repeating many of the excellent analyses given more lately to the public by Stromeyer and Berzelius. A careful examination of the properties of the various bodies usually found in minerals, naturally suggested new, or at least improved processes. But it is the perfection to which the atomic theory has been lately brought, which has conduced more than any thing else, to the accuracy introduced into the modern analyses of minerals.

In choosing a specimen for analysis great attention is requisite; for unless the mineral be pure, or nearly so, the labour is thrown away. If possible, it should be in crystals, and every portion exhibiting the least trace of foreign matter should be rigidly excluded. Even with every attention to the purity of the specimen selected, the results obtained are frequently such, as to lead to the suspicion that foreign matter had existed in our mineral. In such cases it is of great importance to repeat the analysis upon a specimen from a different locality, and, if possible, from a different species of rock; for it is not likely that the same kind of foreign matter should exist in two minerals extracted from rocks of different species. Thus, if we were to analyse two amphiboles, the one from a calcareous rock, the other from a greenstone rock, though both might be impure, yet the particular impurity would probably be different in each. We might expect a contamination of calcareous matter in the former, and of silica and alumina in the latter case.

Stony minerals, as far as their chemical analysis is concerned, may be divided into three sets.

1. Those which are soluble in nitric or muriatic acid.

2. Those which, in order to dissolve in muriatic acid, must be heated to redness, with a mixture of thrice their weight of dry carbonate of soda.

3. Those which require to be heated with caustic potash, in order to render them soluble in muriatic acid.

1. The greater number of the minerals formerly confounded under the general name of *zeolites*, are readily soluble (if in sufficiently fine powder) in muriatic acid. These consist of various hydrous silicates, united together in very different proportions. Silicates of alumina, of lime, of iron, of potash, or of soda, are the most common of these bodies.

a. I usually operate on 25 grs. or 30 grs. when the mineral contains much water. The mineral, previously reduced to a fine powder, is put into a flask, and digested on the sand bath with diluted muriatic acid till a solution is obtained. Great care must be taken to prevent any of the silica contained in the mineral from adhering to the inside of the flask. This is best done by agitation, which should be almost constant. And as soon as the mineral is dissolved, the whole contents of the flask should be poured into an open evaporating dish, before the silica begins to gelatinize. Should the silica from inadvertence be allowed to adhere to the inside of the flask, it cannot be washed out by water or acids. A little potash-ley, assisted by a gentle heat, will readily dissolve it. But great care must be taken not to act upon the glass flask.

The acid solution is evaporated to dryness, and water acidulated with muriatic acid, is digested on the dry residue, till every thing is taken up except the silica; the whole is then carefully washed into a filter.

The filtering paper which I use, is unsized printing paper, procured from the papermaker. Our paper, from the great diversity of materials employed in its manufacture, and from the process of bleaching the rags by means of chloride of

lime, differs so much in the quantity of earthy matter which it contains, that no two filters, though made of the same weight, would be found corresponding in this respect. By digesting the filtering paper in diluted nitric acid, and then washing and drying it, I easily get rid of the lime, which has probably been introduced during the bleaching of the rags. The inequality of the earthy matter contained in the washed paper, makes it impossible to estimate the weight of the powders collected on the filter, by burning it and weighing the ashes, as is done by the chemists on the continent of Europe. I have been obliged to have recourse to the following method, which however is sufficiently accurate. Two filtering papers are made of exactly the same weight, by balancing them against each other in a pair of scales, and cutting off pieces with a pair of scissors from the heaviest filter, till it is brought precisely to the same weight as the other. These two filters are placed one within the other, and the matter whose weight I wish to ascertain, is collected on the innermost one, by pouring the liquid in which it is contained into the filter. When the liquid has run off and left the silica, distilled water is to be poured over it, and this must be repeated till the silica be quite clear.

This process of washing deposits upon filters, is one of the most important parts of a chemical analysis. It is requisite that not merely the matter collected at the bottom of the filter should be clear, but that every thing soluble should be washed out of the filter itself. This is best done by means of the little instrument represented in the margin, which I call a *sucker*. It consists of a glass tube about a foot long, terminating below in an opening almost capillary, and having a portion about three or four inches from the top, blown into a globular cavity. This sucker is dipt into distilled water, and by the action of the mouth, water is drawn in till the globular cavity is filled. This water is then forced by the pressure





of the checks in a small stream, upon the upper margin of the filter all round. And this process is continued till the filter is quite clear, and till the water, which passes through when evaporated from a silver spoon over a spirit lamp, leaves no sensible residue.

The filter and silica thus washed clear, is left on the glass funnel till it can bear handling without risk of being torn. It is then taken off, put between two folds of brown paper, and placed on the sand bath, in a place cold enough not to char the paper, nor injure the filter, but hot enough to dissipate the moisture and dry the silica. As soon as it has become quite dry, and has fallen into the state of a fine powder, its weight is determined by placing the two filters in the scales in the same manner as at first, and then finding what weight is requisite to equipoise the silica. Let this weight be *a*. It gives us the weight of hydrous silica extracted from our mineral. The weight of this silica in an anhydrous state, is determined in the following way.

A small platinum crucible about an inch in height, is equipoised in the scales, and as much of the silica as can be conveniently taken off the filter, is put into it, and its weight determined. Expose the crucible to the flame of a spirit lamp till it becomes red hot, and keep it in that state for about ten minutes. As soon as it is cold, replace it in the scales, and determine the loss which it has sustained. From this it is easy to determine the loss of weight which the whole silica would have sustained, had it been subjected to ignition. Thus the weight of the whole anhydrous silica becomes known.

*b.* The liquid which has passed through the filter may contain alumina, lime, oxide of iron, and a fixed alkali. Let it be reduced by evaporation to so small a quantity that it can be conveniently operated upon; then add caustic ammonia in slight excess. The alumina and iron will be thrown down, but the lime and the fixed alkali will remain in solution.

c. Collect the precipitate on a filter as before, wash it, dry it, and expose it to a red heat, and then determine its weight. Let it be *a*.

Put it into a flask, and digest it in muriatic acid till a solution is obtained. A few white flocks of silica commonly remain. They are to be collected,edulcorated, ignited, and weighed. This weight is to be added to that of the silica already found, and deducted from the weight of *a*, which indicates the alumina and oxide of iron in the mineral. To the muriatic solution previously made nearly neutral by evaporation, add a considerable excess of potash-ley, which need not be very concentrated. Heat this mixture in a flask, boil it for some time, and the alumina will dissolve; but the peroxide of iron will remain behind in the state of red flocks. Collect the iron on a filter, wash it, dry it, and expose it to a red heat, then weigh it; let its weight be *b*. It is obvious that the weight of the alumina is  $a-b$ .

*d*. Sometimes manganese is also present in the liquid as well as iron. In such cases, the precipitated peroxide of iron (if we proceed in the way above directed) will contain the manganese. The presence of manganese is easily detected by a solution of chloride of lime. A drop of it let fall into a liquid containing manganese, will immediately produce a red precipitate in flocks. To separate the manganese from the iron, the easiest way is to dissolve the mixture in muriatic acid, and to pour into the solution, rendered as neutral as possible by concentration, a solution of chloride of lime; the manganese falls in the state of a red powder. Afteredulcoration and ignition, 6 of this matter is equivalent to 4.5 protoxide, or to 5 deutoxide of manganese. This amount being subtracted from the original weight of the mixture of iron and manganese, will leave the weight of the peroxide of iron contained in the mineral under analysis.

*e*. The liquid thus freed from alumina, iron, and mangan-

nese, still contains lime and a fixed alkali. It is to be heated, and oxalate of ammonia added to it as long as any precipitate falls. Let this precipitate, which is oxalate of lime, collect at the bottom of the vessel; decant off the pure liquid, and throw the oxalate of lime upon a double filter, wash it completely, then dry it, and determine the weight on the filter. As much of it as is convenient, is to be put into a balanced platinum crucible, and heated over the spirit-lamp till the oxalic acid is destroyed, and the charcoal at first evolved burnt away. Then mix the residual matter with a little carbonate of ammonia, and expose the mixture to the heat of the lamp, till the ammoniacal fumes are dissipated. It is now carbonate of lime containing  $\frac{1}{2}$ ths of its weight of lime. It is easy from the weight of carbonate thus obtained, to deduce that of the whole lime contained in the mineral.

*f.* The liquid thus freed from lime, still retains the fixed alkali. Evaporate it to dryness, and heat the residual salt in a platinum crucible (taking care not to fuse it) till all ammoniacal fumes are dissipated; what remains is an alkaline chloride. To determine its nature dissolve it in a little water, and add to the solution some muriate of platinum. If the alkali be potash, a yellow precipitate will fall; but none will appear if the alkali be soda;  $\frac{6}{57.5}$ , or  $\frac{1.2}{11.9}$ ths of the weight, indicates the quantity of potash, if the salt was a chloride of potassium;  $\frac{4}{71.5}$ , or  $\frac{8}{143}$ ths of the weight, is the quantity of soda contained in chloride of sodium. Chloride of potassium, and chloride of sodium, are permanent in the air; but chloride of lithium deliquesces.

2. When the mineral requires heating with an alkaline carbonate, an additional step in the analysis is requisite. Either carbonate of potash, or carbonate of soda, may be used at pleasure. I always make use of carbonate of soda, merely because I can easily procure it sufficiently pure for the purpose; whereas the carbonate of potash in this country would



require to be purified, and the bicarbonate, though pure, is much more expensive than carbonate of soda.

The mineral previously reduced to an inpalpable powder, is weighed out in a platinum crucible, and then mixed with about thrice its weight of dry carbonate of soda in powder. The two materials are mixed as intimately as possible, by means of a platinum spatula, and then exposed to a red heat for about half an hour. It is not necessary to fuse the mixture, though I often do so. A good spirit-lamp answers well enough to heat the crucible, though I find it more convenient to apply the heat of my common furnace, which is always at hand, and almost always fit for the purpose. If the mixture has not been fused, it may be easily taken out of the crucible by inverting it over an evaporating dish, and tapping it on the bottom. After fusion it adheres too strongly to the crucible to be so removed. In either case it is to be dissolved in diluted muriatic acid. It is easy to judge by the eye whether the mineral has been sufficiently acted upon by the alkali. The muriatic acid solution in that case is complete, or only a few light white flocks remain undissolved; whereas, when the powder has not been sufficiently acted on, it remains in the state of a dense mass at the bottom of the dish. When this happens, we may in general conclude that the mineral has not been sufficiently pulverized. We must reduce the undissolved portion to a finer powder, and heat it again with a new portion of carbonate of soda.

The muriatic solution must be treated precisely as described in a former part of this paper. But in minerals which require the assistance of an alkaline carbonate to make them soluble in muriatic acid, magnesia is a frequent constituent. Now minerals which contain magnesia require a peculiar treatment. It is difficult to separate magnesia completely from alumina. When we precipitate the alumina in the way formerly directed, it carries down with it a portion of magnesia. Such alumina is distinguished by a peculiar property

well known to analytical chemists. If it be heated to redness, and then moistened with water, it becomes very hot. This may be repeated as often as you please: pure alumina has no such property.

Let us suppose a mineral to be composed of silica, alumina, lime, magnesia, and oxide of iron; that it has been heated with carbonate of soda, dissolved in muriatic acid, the acid solution evaporated to dryness, and the residue digested in water acidulated with muriatic acid, by which means every thing is dissolved except the silica. The liquid containing the lime, magnesia, alumina, and oxide of iron, dissolved in an excess of muriatic acid, is put into a cylindrical glass jar, furnished with a square of window glass large enough to cover its mouth. Into this is poured (by small portions at a time) a solution of bicarbonate of potash, or bicarbonate of ammonia. After every addition a violent effervescence takes place; the glass plate must be put over the mouth of the vessel, to prevent the loss which might be occasioned by the little drops of liquid thrown out of the glass during effervescence. This addition is to be continued till the liquid is supersaturated with the bicarbonate. The alumina and oxide of iron are precipitated; but the lime and magnesia remain in solution, in the state of compound salts or bicarbonates. The precipitated alumina and oxide of iron, are to be treated and analyzed in the way already described.

Let the liquid containing the lime and magnesia be saturated with muriatic acid; add a little caustic ammonia, and then precipitate the lime by oxalate of ammonia. Treat the oxalate of lime as before directed, in order to obtain the lime in a separate state.

The liquid thus freed from lime is to be made boiling hot, and while in that state, mixed with an excess of carbonate of soda. Boil it for two hours on the sand, and then separate the precipitated carbonate of magnesia by the filter. Evapo-

rate the liquid which has passed through the filter to dryness, and re-dissolve the residual salt in water. A little carbonate of magnesia will remain: the whole of the magnesia thus obtained, is to be put into a platinum crucible, and exposed to a strong red heat. It is now pure magnesia.

When a mineral which contains a fixed alkali requires to be heated with carbonate of soda, in order to render it soluble in muriatic acid, the best way of proceeding, is to determine all the other constituents (except the alkali) by the methods just described. To obtain the alkali proceed in this manner. Twenty-five or thirty grains of the mineral are reduced to an impalpable powder, and mixed intimately in a platinum crucible, with a quantity of pounded fluor-spar, equal in weight to  $2\frac{1}{2}$  times the weight of the silica contained in the mineral: this mixture is drenched with sulphuric acid, and exposed for several hours to the heat of the sand bath. After all evolution of fluosilicic acid is at an end, the crucible is exposed for half an hour to a red heat, to drive off the excess of sulphuric acid, and to ensure a total decomposition of the fluor spar.

The dry matter is now digested in distilled water, till every thing soluble is taken up. The solution after being mixed with a solution of carbonate of ammonia, to throw down any lime that may be taken up in the state of sulphate, and filtered, is evaporated to dryness and heated to redness. What remains is the alkali of the mineral united to sulphuric acid. It is easy from the properties of the salt, to decide whether it be sulphate of soda, or sulphate of potash. And the known constitution of these salts, enables us at once to decide the weight of alkali which the mineral contains.

If the mineral contain magnesia, a portion of that earth in the state of sulphate, may be mixed with the alkaline sulphate. A good red heat will decompose this salt, and the magnesia will remain when the alkaline sulphate is dissolved in water.



In some cases it is convenient to throw down the iron by benzoate of ammonia. For this purpose the iron must be in the state of peroxide. To this state it is easily brought by adding nitric acid to the liquid containing it, and digesting it for some time on the sand bath. The liquid must be free from all excess of acid, otherwise the benzoate of iron will be again partly re-dissolved during the washing. To this state it may be brought, by adding caustic ammonia to it till the iron has begun to precipitate. Expose it to a moderate heat for an hour; if the iron be all taken up again, add a little more ammonia and heat it again. Continue these alternate additions of ammonia and heatings, till (the liquid still retaining a red color) a minute quantity of the iron refuses to re-dissolve. Benzoate of ammonia will now throw down the whole of the iron, and the benzoate may be collected upon a filter without loss. When dry let it be weighed by means of a double filter. Then put a determinate portion of it into a platinum crucible, and heat it till the benzoic acid is destroyed. Let the remaining matter be drenched in nitric acid, and heated slowly to redness. It will now be pure peroxide of iron, and from the portion thus got, the weight of the whole iron in the mineral may be easily deduced.

3. As no mineral requiring caustic potash to render it soluble in muriatic acid is treated of in this paper, it is needless in this place to make any remarks on the methods of analyzing such bodies.

#### 1. NATIVE SODA-ALUM.

The possibility of forming an alum by means of sulphate of soda, has not been known for more than twenty years; nor is an account of it as a peculiar salt to be found in all, even of the most recent works on chemistry. It is so soluble in water, and the crystalization of it so troublesome, that du-

ring hot weather, I have frequently failed altogether in my attempts to obtain it in regular crystals. Chemists will probably be surprised to learn that it exists native in South America, and probably in considerable quantity.

The specimens which I examined were sent to Dr. Hooker, Professor of Botany in Glasgow, by Dr. Gillies, who is settled at Mendoza, a city near the foot of the Andes, and about 1200 miles to the west of Buenos Ayres. It was ticketed, *Native alum from the province of St. Juan.*

The specimens are in irregular nodules, rather smaller than a hen's egg. From the rocky fragments occasionally attached to them, they seem to have been imbedded in a slate, which has a blackish-blue color, is very soft, and has a considerable resemblance to the *slate-clay*, which usually accompanies coal beds in this country. But these stony fragments are too minute to enable us to determine with certainty the true position of the rock to which they belong.

The alum is white, and composed of fibres adhering longitudinally, and having a certain breadth, but very thin. It bears some resemblance to fibrous gypsum; but is much harder, not being scratched by the nail of the finger, though very easily by the knife. It is sectile; the outer fibres are white and nearly opaque, obviously from the loss of a portion of their water. But internally the fibres are transparent, and have a glassy, or rather a silky aspect, showing that they contain a good deal of water of crystallization. The specific gravity of the transparent fibres is 1.88.

It tastes exactly like common alum. But is much more soluble in water. For at the temperature of 62°, 100 parts of water dissolve 377.3 parts of it. And boiling water dissolves any quantity of it whatever. When exposed to heat, it exhibits the same phenomena as common alum. When 53.25 grains of the transparent fibres were exposed to a red heat, the loss of weight was 24.79 grains. But it will be seen immediately, that the whole quantity of water in 53.25 grains

of this salt, amounts to only 22.5 grains ; the 2.29 grains of excess, were owing to the escape of a portion of the sulphuric acid.

The analysis of this salt was conducted in the following manner.

1. By a few trials, it was ascertained that when 53.25 grs. of the alum previously dissolved in water, are mixed with a solution of 54 grains of anhydrous chloride of barium, sulphate of barytes falls down, and the supernatant liquid is neither affected by muriate of barytes, nor sulphate of soda. Hence 53.25 grains of this alum contain just 20 grains of sulphuric acid.

2. 53.25 grains of the alum were dissolved in water, and mixed with a solution of 26.25 grains ( $=8.75 \times 3$ ) of recently ignited and pure carbonate of potash. An effervescence took place, and a white precipitate fell, which being collected and dried on the filter, weighed 14.15 grains. But by ignition was reduced to 7.05 grains. The liquid after the separation of the white precipitate, was heated to the boiling temperature, but no additional precipitate fell. Being tested by litmus paper, and by cudbear paper, it was found perfectly neutral, showing that 15 grains of the sulphuric acid had been in combination with the precipitate thrown down ; and that the remaining 5 grains of the acid, had been in combination with an alkali. Carbonate of ammonia was now added to the liquid, but no more precipitate fell.

The precipitate which was white, and obviously consisted chiefly of alumina, was re-dissolved in muriatic acid, evaporated nearly to dryness, diluted with water, and mixed and boiled with a quantity of caustic potash-ley. The precipitate, which had at first fallen, was gradually re-dissolved, with the exception of a dark colored reddish matter, which



swam in flocks through the liquid; and which when collected, dried and ignited, weighed 0.67 grains. Hence the weight of the alumina dissolved should have been 6.38 grains. Being precipitated from the potash solution, by neutralizing the potash with muriatic acid, and then adding carbonate of ammonia in slight excess, it weighed afteredulcoration and ignition 6.36 grains. The 0.02 grain of loss, (if no error was committed in the analysis) might be owing to some sulphuric acid having adhered to the precipitated alumina.

3. The 0.67 grains of dark reddish matter, which had refused to dissolve in the caustic potash, was treated with muriatic acid. A slight effervescence took place, and the whole dissolved except 0.012 grains, which was whitish, with a shade of red. This residue was too small to admit of examination. I consider it as silica not quite free from oxide of iron.

4. The muriatic solution was made as neutral as possible, and oxalate of ammonia being dropt into it, a white precipitate fell, which when well washed and dried weighed 0.31 grs. It was oxalate of lime, and equivalent to 0.136 grains of lime.

5. Benzoate of ammonia now threw down a white precipitate, which afteredulcoration, drying, drenching in nitric acid, and ignition, weighed 0.11 grain. It was peroxide of iron.

6. The liquid thus freed from lime and iron was put into a flask, mixed with carbonate of soda, and boiled for some time. A precipitate fell in white flocks, which gradually became yellow. It was, therefore, carbonate of manganese. It is obvious that the whole protoxide of manganese in the matter subjected to analysis, was  $0.67 - 0.247 = 0.423$  grains. A

minute examination of this manganese, detected in it a portion of magnesia. I did not attempt to determine the quantity, as it would have been very difficult to have separated so small a mixture of magnesia and oxide of manganese into their several parts without error.

7. 53·25 grains of the transparent fibres of the alum were dissolved in water; the alumina was thrown down by carbonate of ammonia, the residual liquid was evaporated to dryness, and the salt remaining, exposed to a red heat till it ceased to give out ammoniacal fumes. The remaining salt weighed 6·23 grains. Being dissolved in water, and left to spontaneous evaporation, it shot into well defined crystals of glauber salt. 6·23 grains of anhydrous sulphate of soda contain 2·77 grains of soda.

The alumina which had been precipitated by carbonate of ammonia after edulcoration and drying on the filter, dissolved with effervescence in muriatic acid, indicating the presence of something besides alumina. The alumina was separated by caustic ammonia, the liquid freed from alumina was evaporated to dryness, and the residual salt exposed to a heat gradually raised to redness to drive off the ammoniacal fumes. There remained two grains of common salt, equivalent to 1·06 grains of soda; thus the whole soda extracted amounted to 3·83 grains. A loss amounting to 0·17 grain of soda was obviously sustained. Some of this was probably owing to the mode of driving off the ammoniacal salts, which was too rapid; and some was still in all probability adhering to the alumina. But I did not think it worth while to prosecute the investigation farther, the observations in paragraph 2, leaving no doubt that the whole soda, had it been collected, would have saturated 5 grains of sulphuric acid, and therefore, would have amounted to 4 grains.

Thus the constituents of 53·25 grains of the soda-alum were found to be,—

Sulphuric acid,	-	-	-	-	-	-	20·000
Alumina,	-	-	-	-	-	-	6·360
Silica,	-	-	-	-	-	-	0·012
Lime,	-	-	-	-	-	-	0·136
Peroxide of iron,	-	-	-	-	-	-	0·110
Magnesia,							
Protoxide of manganese,							
						}	0·423
Soda,	-	-	-	-	-	-	4·000
Water,	-	-	-	-	-	-	22·209
							<hr/>
							53·250

As the sulphuric acid obtained is equivalent to exactly 4 atoms, it is obvious that the bases which saturate the acid, must constitute also atomic quantities. Now 6·75 make 3 atoms of alumina. The quantity actually found, was only 6·36, or 0·39 less than the atomic quantity. But the lime, peroxide of iron, protoxide of manganese and magnesia, (if we admit that the 0·42 contained 0·12 of magnesia) are equivalent to 0·39 alumina. It is clear from this, that these bodies took the place of a little alumina in the alum, and that if the alum had been pure, the quantity of alumina in 53·25 grains of it, would have been exactly 6·75 grains, or 3 atoms. Nor is there any reason to doubt that the soda would have been exactly 4, or 1 atom, had it been obtained without loss.

Hence the constituents of the soda alum are,—

4 atoms sulphuric acid,	-	-	-	-	-	20
3 atoms alumina,	-	-	-	-	-	6·75
1 atom soda,	-	-	-	-	-	4
20 atoms water,	-	-	-	-	-	22·5
						<hr/>
						53·25

Or, we may state it this way.

3 atoms sulphate of alumina,	-	-	-	-	-	21·75
1 atom sulphate of soda,	-	-	-	-	-	9
20 atoms of water,	-	-	-	-	-	22·5
						<hr/>
						53·25

The only difference between the native and the artificial soda-alum is, that the former contains only 20 atoms of water, while the latter contains 25 atoms. This no doubt occasions the difference in the shape of the crystals. Artificial soda-alum crystallizes in regular octahedrons. But the native seems to form prismatic crystals; at least if any inference can be drawn from its fibrous structure. I made some attempts to obtain it in regular crystals; but owing to the heat of the weather, they were not attended with success.

2. BISILICATE OF MANGANESE.

This mineral was first observed in Sweden. I have specimens of it from Cornwall, and it has been observed also in other places. About two years ago, a specimen was sent me by Dr. Torrey, from Cummington in Massachusetts, where it occurs in considerable abundance. It had the usual red color of this mineral, but was darker, and on one side almost black; and another specimen was quite incrustated with black matter. Its specific gravity was 3.83, which is lighter than the common bisilicate of Europe. This has a specific gravity of 3.5384. On treating the American specimen with an acid, an effervescence took place, showing the presence of a little carbonic acid. A careful analysis gave its constituents as follows:

Silica,	-	-	-	-	-	-	-	40.58
Protoxide of manganese,	-	-	-	-	-	-	-	38.92
Protoxide of iron,	-	-	-	-	-	-	-	13.50
Water,	-	-	-	-	-	-	-	3.00
Carbonic acid	-	-	-	-	-	-	-	3.23
								99.23

I did not weigh the carbonic acid; but it is easy to deduce its quantity from the composition of the mineral. If it be a

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bisilicate, as is obvious from previous analyses, the protoxide of manganese will be combined with 34·59 grains of silica. The remaining 6 grains of silica will saturate 6·75 grains of protoxide of iron ; there remain 5·75 grains of protoxide of iron for the carbonate ; this will require for saturation 3·23 grains of carbonic acid. The mineral then consists of about,

7 atoms bisilicate of manganese.

1 atom carbonate of iron.

There is a remarkable peculiarity in this specimen of bisilicate of manganese. A portion of the protoxide of manganese is replaced by an equal quantity of protoxide of iron.

*Note.* This mineral has been announced as a carbonate of manganese : but its property of effervescing with acids, is now ascertained to depend on the presence of a small quantity of the carbonate of iron.

By long exposure to the air its surface becomes of a black color. Sometimes it is covered with a dark crust an inch or more in thickness. This is owing to the protoxide of manganese absorbing more oxygen from the atmosphere ; so that a persilicate of that metal is formed.

### 3. SILICATE OF MANGANESE.

This mineral, so far as my reading extends, has not been hitherto noticed, though it constitutes a well marked species. I got it about two years ago from Dr. Torrey, under the name of *rhomboidal silicate of zinc*. It was found at Franklin, in New-Jersey.

The color of this mineral is light brownish-red. The fracture is foliated. Two distinct cleavages are perceptible, constituting a prism slightly oblique. But I am not certain as to the exact measurement. My first measurements gave me 80°, and 100° for the angles of the prism. But the mea-

surement of a more perfect specimen, which I have just received from Dr. Torrey, gives about  $86^\circ$  &  $94^\circ$ . These measurements were with the common goniometer. There is a third cleavage much less distinct, but seemingly rectangular to the edges of the prism. Hence the primary form may be a right oblique prism, with angles deviating  $3^\circ$  or  $4^\circ$  from right angles.

Lustre shining and vitreous.

Hardness nearly the same as that of felspar. It cannot be scratched by the knife.

Specific gravity 4.078.

Powder light red. Becomes brown by ignition, and loses 2.7 per cent. of its weight.

When digested in diluted muriatic acid, it gradually dissolves without any effervescence. Its constituents were found to be,

Silica,	- - - - -	29.64
Protoxide of manganese,	- - - - -	66.60
Peroxide of iron,	- - - - -	0.92
Moisture,	- - - - -	2.70
		99.86

If the iron and moisture be accidental ingredients, the mineral is a simple silicate of manganese, composed of,

1 atom of silica,	- - - - -	2
1 atom protoxide of manganese,	- - - - -	4.5
		6.5

I think it not impossible, that this mineral may have been previously observed by mineralogists, but confounded with carbonate of manganese. Never having seen a specimen of native carbonate of manganese, I am ignorant of its characters; nor have I seen any description of it that seems entitled to confidence.

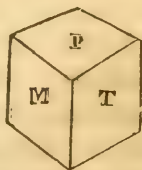
*Note.* This mineral is not scarce at Franklin. It is generally associated with the red zinc ore and massive Franklinite. Having recently examined its crystallographical characters in some perfect specimens, I think its primitive form is a rectangular prism, with slightly oblique bases.

#### 4. FERRO-SILICATE OF MANGANESE.

I received the mineral, which from its constituents, I have distinguished by the name of *Ferro-silicate of manganese*, from Dr. Torrey, under the name of *Manganesian feldspar*. It comes also from Franklin, in New-Jersey. Dr. Torrey informed me that it had been distinguished in a recent catalogue of North American minerals,\* as *Crystallized siliceous oxide of manganese*. He stated, that "if small fragments of the mineral be boiled in muriatic acid, much chlorine is evolved, and the fragments become light colored, but retain their form. They then resemble felspar, though the angles are different, and approach those of albite; but it is not that mineral. There appears to be much peroxide of manganese diffused through it, though it contains also a pretty large proportion in combination."

The color of this mineral is brown, with a shade of red. Externally it is dull, and has an earthy aspect, and may be scratched by the nail. But internally it is foliated and splendid, and of a gray color, with a shade of red, and is too hard to be scratched by the knife. Its hardness when fresh, is nearly the same as that of felspar.

A threefold cleavage may be perceived in it, indicating a doubly oblique prism for its primary form. P makes on M an angle of  $108^\circ$ ; P on T an angle of  $86^\circ 30'$ ; M on T an angle of  $86^\circ 30'$ . But these measurements are only approximations. The faces were not sufficiently flat nor



\* Robinson's Catalogue, p. 298.

smooth for accurate measurements. Judging from a small fragment which I lately received from Dr. Torrey, the figure may be a right oblique prism.

The specific gravity of the mineral in its natural state is 3.44. When it had been digested in muriatic acid till it became white, its specific gravity was 3.483.

A portion of the mineral was treated with muriatic acid, till it assumed a white color. Much chlorine was evolved, and nearly one fourth of the mineral was dissolved. From the solution I obtained,

Deutoxide of manganese,	-	-	-	-	17.716
Peroxide of iron,	-	-	-	-	6.480

The white residue was composed of,

Silica,	-	-	-	-	-	29.48
Protoxide of manganese,	-	-	-	-	-	34.64
Peroxide of iron,	-	-	-	-	-	6.74
Moisture,	-	-	-	-	-	3.17
						<hr/> 98.226

There can be no doubt that the mineral has undergone a species of decomposition externally from the action of the air; the protoxide of manganese having been converted into deutoxide. Originally its constituents seem to have been,

Silica,	-	-	-	-	-	-	29.48
Protoxide of manganese,	-	-	-	-	-	-	50.584
Peroxide of iron,	-	-	-	-	-	-	13.22
Water,	-	-	-	-	-	-	3.17

So that originally, it must have been a compound of 4 atoms silicate of manganese, and 1 atom persilicate of iron.

The white residue, were we to consider the peroxide of iron as foreign, would be a bisilicate of manganese. But this supposition is not likely to be the true one.



*Note.* This is the substance mentioned by Dr. Fowler, in the ninth volume of Silliman's Journal, p. 245 as crystallized siliceous oxide of manganese. The crystals are six or eight-sided prisms, with plane terminations, which are inclined to the axis at an angle of about  $108^{\circ}$ . They are sometimes two inches or more in length, and an inch in diameter.

#### 5. FERRUGINOUS SILICATE OF MANGANESE.

I received this mineral about four years ago from Dr. Torrey, under the name of *silicate of zinc*. The locality is Franklin, in New-Jersey.

Its external color was brown, with a slight shade of red. The external lustre glimmering, the internal shining and semi-metallic.

The specimen consisted of a group of crystals very imperfect, their faces being dull and far from flat, and their edges so much rounded, that it was very difficult to obtain a correct notion of their form. They had the aspect of dodecahedrons, with rhomboidal faces; if any conclusion could be drawn from the two or three faces of each, which were tolerably distinct. I was tempted to conjecture from a few imperfect measurements, that the primary form might be a rhombohedron, with angles of about  $124^{\circ}$ ; but this point can only be decided, when we shall have an opportunity of examining more complete crystals.

Fracture foliated, but rather imperfect, and no distinct cleavages could be made out.

Easily scratched by calcareous spar, but not by the nail.

Specific gravity 3.014 to 3.034 in different trials.\*

Powder flea-brown. It dissolved with effervescence in muriatic acid, giving out some chlorine, and leaving silica. On

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\* Professor Vanuxem and Dr. Troost state it to be about 4.

analyzing the solution, the following constituents were obtained.

Silica,	-	-	-	-	-	-	30.650
Protoxide of manganese,	-	-	-	-	-	-	46.215
Peroxide of iron,	-	-	-	-	-	-	15.450
Loss by heat,	-	-	-	-	-	-	7.300
							99.615

The matter driven off by heat was chiefly water. But 100 grains of the mineral gave out when heated, 0.1 cubic inch of carbonic acid gas, 0.16 cubic inch of oxygen gas, and 0.74 cubic inch of azotic gas.

These constituents approach very nearly to,

3 atoms silicate of manganese,  
1 atom sesqui-persilicate of iron.

From the phenomena which took place during the analysis, there could be no doubt that either the iron, or a corresponding portion of the manganese, was in a state of deutoxide. We have no means of determining which of the two.

*Note.* This mineral was announced about five years ago, by Professors Vanuxem, and Keating, as a silicate of zinc.\* Some time after, they published its analysis,† and stated its composition to be,

Silica,	-	-	-	-	-	25.44
Oxide of zinc,	-	-	-	-	-	68.06
Deutoxides of iron and manganese,	-	-	-	-	-	6.50
						100.00

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\* See an account of the Geology and Mineralogy of Sparta in New-Jersey, in Vol. II. of the Journal of the Philadelphia Academy.

† Ibid. Vol. IV. p. 10.

By another analysis they obtained,

Silica,	-	-	-	-	-	25.00
Oxide of zinc,	-	-	-	-	-	71.33
Oxide of manganese,	-	-	-	-	-	2.66
Oxide of iron,	-	-	-	-	-	0.67
Loss,	-	-	-	-	-	0.34
						100.00

These gentlemen supposed its primitive form to be a rhombic dodecahedron, while that of the ordinary electric calamine, is a hexahedral prism.

Dr. Troost, so justly distinguished for his attainments in crystallography, states that the nucleus of this mineral is a cube. He proposed to consider it as a distinct species.\*

It occurs crystalized in regular six-sided prisms, terminated by low three-sided pyramids. The faces and edges of the pyramids are imperfect, as if they had undergone partial fusion or solution, so that their angles cannot be determined with accuracy. The faces, however, appear to be inclined to each other at an angle of  $120^\circ$ , indicating the primitive form to be a cube, and the secondary a rhombic dodecahedron.

Sometimes the crystals occur six or eight inches in length, and two or three inches in diameter, but occasionally they are found very slender. They yield with considerable difficulty to cleavage,

## 6. SESQUISILICATE OF MANGANESE.

The mineral, to which from its composition I give this name, was contained in a specimen sent me about two years

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\* Journal of the Philadelphia Academy, Vol. IV. p. 220.

ago by Dr. Torrey, and labelled *Granular dysluite, massive garnet, and franklinite*. The locality is Franklin, in New-Jersey. The specimen appeared to the eye, a mixture of two different substances. One of them yellow-colored, semi-transparent and granular, had the appearance of garnet or chondrodite: the other in scales or small plates, had much the aspect of franklinite. It was this last substance which I subjected to analysis, and found to be a sesquisilicate of manganese.

The color was iron-black, and the lustre metallic. Powder brown, like that of franklinite.

It was composed of scales or plates laid upon each other, or interspersed through the other constituents of the specimen.

It was not scratched by the knife, but easily by quartz, and with some difficulty by felspar. The hardness seemed about that of hypersthene.

Did not act upon the magnetic needle. In this respect it differs from franklinite.

Brittle and easily reduced to a coarse powder.

Specific gravity 3.67. But the specimen employed was not quite free from the garnet-looking mineral.

Its constituents were found to be,

Silica,	-	-	-	-	-	-	-	38.388
Protoxide of manganese,	-	-	-	-	-	-	-	51.666
Peroxide of iron,	-	-	-	-	-	-	-	9.444
Lime, a trace,	-	-	-	-	-	-	-	
								99.498

If we suppose that the iron replaces a small portion of the manganese, it is obvious that the mineral is a *sesquisilicate of manganese*, or a compound of,

1½ atom silica,  
1 atom protoxide of manganese.



It is certainly specifically different from franklinite, to which in composition it bears no resemblance whatever.

*Note.* The mineral, called by Dr. Thomson *sesquisilicate of manganese*, is associated with the dysluite, (a mineral announced about five years ago by Professors Keating and Vanuxem, in a paper which they published in the Journal of the Philadelphia Academy,\*) and a variety of manganesian garnet. It has generally been considered as a modification of franklinite, but Dr. Thomson's analysis determines it to be a distinct species.

#### 7. DIPHOSPHATE OF IRON.

This mineral was sent me from North America by Mr. Nuttall. It is found at Mullica Hills, Gloucester county, New-Jersey. The mineral consists of cylinders about two inches long, and half an inch in diameter, incrustated with a yellowish-red sand, which also occurs interspersed through the cylinders; so that they look as if they had been formed in loose sand. The sand consists of grains of quartz, deeply tinged on the surface with oxide of iron.

The color of the cylinders is bluish-black; the lustre splendid and glassy. Each cylinder is a congeries of needle-form crystals, radiating from the axis of the cylinder.

These crystals are easily cut with a knife, and are sectile.

The specific gravity of a cylinder was found only 1.787. But it was not free from cavities. It contained also several grains of sand.

The constituents of this mineral were found to be,

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\* Vol. II. p. 287.

Phosphoric acid	-	-	-	-	-	24
Protoxide of iron,	-	-	-	-	-	42.65
Water,	-	-	-	-	-	25.00
Mixed grains of sand,	-	-	-	-	-	7.90
						<hr/>
						99.55

It seems to be a hydrous diphosphate of iron, composed of,

1 atom phosphoric acid,	-	-	-	-	-	4.5
2 atoms protoxide of iron,	-	-	-	-	-	9
4½ atoms water,	-	-	-	-	-	5.0625
						<hr/>
						18.5625

Or, if we suppose the half atom of water only mechanically lodged in the interstices of the mineral, the atomic weight will be 18.

This mineral is obviously the same with the phosphated iron from the Isle of France, and from Brazil, analyzed many years ago by Laugier and Cadet. Nor is there reason to believe that the transparent crystals found in Cornwall, and known by the name of Vivianite, constitute a distinct species. They are all hydrous diphosphates of iron, having a right oblique prism, with angles of  $125^{\circ} 15'$  and  $54^{\circ} 45'$  for the primary form.

*Note.* This mineral is found in various parts of the tertiary formation of New-Jersey. It frequently occurs in the form of belemnites and bivalve shells.

An account of it by Dr. J. Cutbush, appeared in the American Mineralogical Journal, Vol I. p. 86. Dr. Cutbush could not detect any phosphoric acid in it; but he states in a note, that Mr. Godon found this ingredient in a specimen of the ore which he examined.

Professor Cooper afterwards gave a description and analysis of the mineral in the first volume (new series) of the Ame-

rican Philosophical Transactions, and endeavoured to prove that it contained no phosphoric acid, but was merely a hydrous protoxide of iron. The analysis of Godon, however, was fully confirmed by Vanuxem, in his subsequent examination of the mineral, as may be seen in his memoir, published in the Journal of the Academy of Natural Sciences of Philadelphia, Vol. II. p. 82.

### 3. ARFVEDSONITE.

The name *Arfvedsonite*, has lately been given by Mr. Brooke to a mineral brought by Sir Charles Giesecké, from Kargardluarduk, in Greenland, which had been usually considered as a *ferruginous hornblende*. For the specimen subjected to chemical analysis, I am indebted to the kindness of Sir Charles Giesecké.

It had the form of a large oblique four-sided prism, without any distinct terminations. The angles of the prism, as determined by Mr. Brooke, are  $123^{\circ} 55'$ , and  $56^{\circ} 5'$ ; while in amphibole, the angles of the prism are  $124^{\circ} 30'$ , and  $55^{\circ} 30'$ ; constituting a difference of  $35'$ .

The color is pure black, or in some parts of the edge, having a slight tinge of blue, but none of green. The prism easily splits longitudinally into folia, some of which may be obtained pretty thin; but I could not procure a cleavage parallel to the summit of the prism.

Specific gravity of my specimen 3.369. Mr. Brooke makes it as high as 3.44.

It is softer than the more perfect crystals of amphibole. A fine black crystal from Finland, which I got from Mr. Nordenskiöld, scratched it distinctly; but this was not the case with a specimen of common hornblende from Arendal, having a blackish-green color. Its hardness is very nearly the same as that of hypersthene; but this last mineral has more lustre.

The constituents were found as follows.

Silica,	-	-	-	-	-	-	50.508
Peroxide of iron,	-	-	-	-	-	-	35.144
Deutoxide of manganese,	-	-	-	-	-	-	8.920
Alumina,	-	-	-	-	-	-	2.488
Lime,	-	-	-	-	-	-	1.560
Moisture,	-	-	-	-	-	-	0.960
							99.580

These constituents (omitting the alumina, lime, and moisture, as accidental) approach very nearly to,

15 atoms silica,	-	-	-	-	-	-	30
4 atoms peroxide of iron,	-	-	-	-	-	-	20
1 atom deutoxide of manganese,	-	-	-	-	-	-	5
							55

So that Arfvedsonite is a compound of,

4 atoms pertersilicate of iron,

1 atom pertersilicate of manganese.

Thus its constitution is quite different from that of amphibole, showing that it is a peculiar species.

### 9. FRANKLINITE.

This mineral exists abundantly at Franklin, in Sussex County, New-Jersey. An analysis of it was published in 1819, by M. Berthier,\* who found its constituents,

Peroxide of iron,	-	.	-	-	-	-	66
Red oxide of manganese,	-	-	-	-	-	-	16
Oxide of zinc,	-	-	-	-	-	-	17
							99

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\* *Annales des Mines*, 4:483. [See also a notice of it in the *Jour. Acad. Nat. Sciences*, Phil. Vol. IV. p. 5. J. T.]



But the specimens employed by him for analysis, were picked from an aggregate of franklinite, and *red oxide of zinc*, and might, therefore, have been contaminated with a little of the latter mineral. This led Dr. Torrey to wish for a new analysis of it. He sent me for that purpose, specimens of granular franklinite unmixed with any other mineral; and likewise an imperfect octahedral crystal, free from all foreign matter, requesting me to subject them to a chemical examination.

The color of the mineral is iron-gray; but that of the powder brown. The lustre is metallic.

The crystals are imperfect octahedrons, quite incapable of measurement. Dr. Torrey informs me that they have been found three inches in diameter.\*

They are not scratched by the knife, nor by felspar; but quartz crystal scratches them without difficulty.

Specific gravity of the pure crystals 5.069. That of pieces picked out of a mixture of franklinite and red zinc, was only 4.257. The specific gravity of the specimen analyzed by Berthier, was 4.87.

It acts sensibly on the magnetic needle. But it does not adhere to the magnet, even when reduced to powder. Nor could I detect any polarity in the crystals.

It was easy to discover in franklinite, the three constituents found by Berthier. On attempting a rigid analysis of the mineral, I tried the most promising of the six methods pointed out by Berthier; but I did not succeed by any of them, in separating the manganese and zinc from each other. This induced me to have recourse to chloride of lime, which I found to answer perfectly. The mineral was dissolved in

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\* The primitive form is the regular octahedron. Sometimes the crystals are extremely perfect and brilliant. They are often truncated on all the edges; more rarely they assume the form of the rhombic dodecahedron. J.T.

muriatic acid; the iron was thrown down by benzoate of ammonia, and the manganese by chloride of lime. The precipitate is red, and after ignition, six of it is equivalent to five deutoxide of manganese. The zinc was finally thrown down by means of hydrosulphuret of ammonia.

The constituents of the mineral were found to be,

Peroxide of iron,	-	-	-	-	-	66.10
Deutoxide of manganese,	-	-	-	-	-	14.96
Oxide of zinc,	-	-	-	-	-	17.425
Silica,	-	-	-	-	-	0.204
Water,	-	-	-	-	-	0.560
						<hr/>
						99.249

Thus my analysis agrees very nearly with that of Berthier, and serves to confirm it.

Whether franklinite constitute a peculiar species, or is to be considered as merely a variety of magnetic iron ore, is a question of some difficulty. The hardness, specific gravity, and even the crystalline form, agree nearly with those of magnetic iron ore. But the composition of the two minerals is quite different. Magnetic iron ore, by the analysis of Berzelius, is a compound of,

2 atoms peroxide of iron,	-	-	-	10
1 atom protoxide of iron,	-	-	-	4.5
				<hr/>
				14.5

And this analysis has been repeatedly confirmed in my laboratory; while franklinite contains either no protoxide of iron, or certainly very little: for the whole ferruginous constituent of the mineral, is thrown down from the neutral muriatic acid solution, by benzoate of ammonia, which would not be the case if protoxide of iron were present. Franklinite seems to be a compound of,

4 atoms peroxide of iron,	-	-	-	20
1 atom deutoxide of manganese,	-	-	-	5
1 atom oxide of zinc,	-	-	-	5·25
				<hr/>
				30·25

We may consider it as a compound of,

1 atom deutoferrate of manganese,	-	-	-	15
1 atom deutoferrate of zinc,	-	-	-	15·25
				<hr/>
				30·25

supposing the peroxide of iron to act the part of an acid.

Few chemists would hesitate to consider franklinite as a peculiar species. To what conclusion a crystallographer would come is not so clear.

#### 10. MANGANESIAN IRON ORE.

This mineral was sent me by Mr. Nuttall, from Sterling, in Massachusetts. The color is black; the lustre splendid and metallic.

It exhibits on some parts of the surface splendid facets, indicating a crystalized state. If any conclusion can be drawn from the position of these facets, the primary form is a regular octahedron.

So hard as not to be scratched by the knife. Scratched with difficulty by quartz. Streak red.

Acts feebly on the magnetic needle, but has no polarity.

Texture foliated; but cleaves only in one direction.

Very easily frangible.

Fracture small, conchoidal. This, together with the color and lustre, gives the mineral something of the aspect of cherry-coal.

Specific gravity 5·079.

The constituents of this mineral were found to be,

Peroxide of iron, - - - - -	75.5
Deutoxide of manganese, - - - -	22.65
Titanic acid, and peroxide of iron, - -	1.15
Moisture, - - - - -	0.40
	<hr/>
	99.70

These constituents are not in atomic proportions. They approach,

3 atoms peroxide of iron,  
1 atom deutoxide of manganese.

But there is an excess of peroxide of iron, amounting to rather more than one third of an atom.

This ore differs much in its appearance from oligist iron ore. It certainly constitutes a new species of iron ore.

## 11. BUCHOLZITE.

The first account of this mineral appeared in the 25th volume of the first series of Schweigger's *Journal* for the year 1819, written by Dr. Brandes. He had obtained the specimen which he examined, from Professor Weiss; and its locality was the Tyrolese Alps. Brandes gives a chemical analysis of this mineral, together with a very imperfect description of it; and I have seen no farther account of it in any subsequent publication. About two years ago, Mr. Nuttall sent me some specimens of American minerals, among which was one from Chester, on the Delaware, south-west from Philadelphia, which, on the authority of Mr. Heuland, he called Bucholzite. Being small and not very pure, I did not think it worth while to analyze it. But about a year ago he sent me some other specimens, which were larger, and one of them appeared sufficiently pure for examination.



The color of the mineral is grayish-white, with a very slight tint of yellow, not recognizable in the purest portions of the mineral.

It is composed of fibres, which in some places appear curved, and when viewed by a microscope, assume the appearance of plates, or imperfect crystals.

Lustre silky.

Not scratched by quartz, and with difficulty by topaz; but easily by sapphire.

Brittle. Easily frangible. Fragments sharp-edged.

Specific gravity 3.193.

The constituents of this mineral were found to be,

Silica,	-	-	-	-	-	46.40
Alumina,	-	-	-	-	-	52.92
						<hr/>
						99.32

It is, therefore, a silicate of alumina, composed of,

1 atom silica,	-	-	-	-	-	2
1 atom alumina,	-	-	-	-	-	2.25
						<hr/>
						4.25

Brandes' analysis gave,

Silica,	-	-	-	-	-	46
Alumina,	-	-	-	-	-	50
Protoxide of iron,	-	-	-	-	-	2.5
Potash,	-	-	-	-	-	1.5
						<hr/>
						100

It is obvious that the American specimen which I analyzed, was purer than Brandes's. My loss being only 0.8 per cent, I did not search for potash. If any is present, which I believe there is not, it must be a mere trace.

*Note.* Although the American variety of this mineral is now described for the first time, it has been well known to all

our collectors for more than five years, and has a place in most of our cabinets. It has generally been regarded as the fibrolite of Bournon, or a variety of cyanite. Its true nature is at length determined.

12. NACRITE.

I received this mineral from Dr. Torrey. It was ticketed, *Green Mica in Mica-slate, Brunswick, Maine.* It consisted of beautiful light-green colored scales, scattered through a mica-slate, composed chiefly of quartz, with abundance of iron pyrites interspersed.

The color of the scales was partly silvery white, partly a fine white light-green.

Lustre splendid and silky.

Very soft. The plates were flexible, but not elastic, and had a good deal of the appearance of talc.

After ignition they still retained their splendor and silky lustre; but had lost their green color, and become silvery white.

The specific gravity was 2.788.

The constituents were found to be,

Silica,	-	-	-	-	-	64.440
Alumina,	-	-	-	-	-	28.844
Peroxide of iron,	-	-	-	-	-	4.428
Water,	-	-	-	-	-	1.000
						98.712

It is obvious, both from the description and the constituents of this mineral, that it is the *talcite* of Kirwan, or *nacrite* of Brongniart.

There is, doubtless, an excess of silica, owing to the impossibility of excluding all the quartz grains. Though the scales were picked out one by one, with as much care as pos-

sible, still very small fragments of quartz would occasionally adhere to them. If we make allowance for this excess, we may consider nacrite as a *bisilicate of alumina*. It obviously constitutes a peculiar species.

Vauquelin, in an analysis of nacrite, detected in it 17·5 per cent. of potash. But the American variety contains no potash, or only a minute quantity, since I did not succeed in detecting any in it.

*Note.* There appears to be some confusion in the books respecting nacrite. The green mineral of Maine, differs in some of its characters, from the description of nacrite in Phillips, and Cleaveland, for it fuses with difficulty, and possesses scarcely any unctuous feel. The European mineral appears to have been twice analyzed by Vauquelin, for its composition, as stated by Cleaveland, differs very materially from the analysis quoted by Dr. Thomson. In the former case, the quantity of potassa is said to be 17·5, in the latter 8. Dr. Thomson found no alkali.

### 13. XANTHITE.

I have given this name to a mineral which I got about a year ago from Mr. Nuttall: it was found at Amity, Orange County, New-York. The specimen in which the xanthite occurs, is a rock composed of three distinct substances in grains.

1. Calcareous spar.
2. Xanthite.
3. Dark-green opaque grains.

The xanthite constitutes by far the greater part of the stone. It has a light grayish-yellow color, and consists of a congeries of very small rounded grains, easily separable from each other, and not larger than small grains of sand.

These grains are translucent: some of them indeed are transparent. The lustre of the transparent grains is splendid; that of the translucent grains shining. The lustre is inclining to resinous.

The grains are rounded, but when examined by the microscope, they seem to consist of imperfect crystals.

The texture before a powerful magnifier seems foliated; but the grains are so small, that it is not easy to make out its true texture with accuracy.

Specific gravity 3·201.

Easily crushed to powder by the nail of the finger. It is, therefore, soft. It does not scratch calcareous spar.

Infusible before the blow-pipe per se. Nor did it fuse along with carbonate of soda. The constituents were found to be,

Silica,	-	-	-	-	-	32·708
Lime,	-	-	-	-	-	36·308
Alumina,	-	-	-	-	-	12·280
Peroxide of iron,	-	-	-	-	-	12·000
Protoxide of manganese,	-	-	-	-	-	3·680
Water,	-	-	-	-	-	0·600
						<hr/>
						97·576

If we were allowed to consider the iron and manganese as accidental substances, the xanthite would be a compound of,

2 atoms silicate of lime,	-	-	-	-	-	11·0
1 atom silicate of alumina,	-	-	-	-	-	4·25
						<hr/>
						15·25

If the iron and manganese are considered as essential, then a portion of the lime, or alumina, must be accidental; otherwise the mineral could not be considered as a chemical compound.



The dark-green opaque grains in the rock, which accompanied the xanthite, were mostly rounded; though some had the appearance of crystalization, and seemed to approach to a four-sided flat prism, more closely than to any other shape.

Very easily frangible.

The hardness could not be determined, as the grains broke in pieces before the point of the knife, when an attempt was made to scratch them. Opaque.

Specific gravity 3.223.

The constituents were,

Silica,	-	-	-	-	-	24.72
Magnesia,	-	-	-	-	-	26.60
Peroxide of iron,	-	-	-	-	-	22.26
Lime,	-	-	-	-	-	21.60
Alumina,	-	-	-	-	-	3.60
						<hr/> 98.78

This approaches,

5 atoms disilicate of magnesia,

3 atoms disilicate of lime,

2 atoms disilicate of iron,

$\frac{1}{2}$  atom disilicate of alumina.

It is obvious from this analysis that the mineral is not amphibole. It is probably also new. But the small quantity in my possession did not admit of an accurate description.

*Note.* By some of our mineralogists, the xanthite of Dr. Thomson has been considered as the pyralloite of Nordenskiöld, a mineral which is very indifferently described in the books.

The small dark-green substance associated with it has been called pargasite, which is a mere variety of amphibole; but Dr. Thomson's analysis would seem to establish the Amity mineral as a peculiar species. It should, however, be re-examined, as Dr. Thomson operated on imperfect specimens.

14. PHYLLITE.

I have given this name to a mineral which I received about a year ago from Mr. Nuttall, from Sterling, in Massachusetts. The color of one portion composed of flat micaceous scales, is brownish-black; but the greatest part consists of thin bent plates, having a bluish-gray color, and no bad resemblance to plumbago in its appearance.

The lustre is shining and resinous, or rather semi-metallic. Feel greasy.

The flat brown plates are so hard as not to be scratched by the knife, and not easily by quartz. But the plumbago-looking portion (which constitutes almost the whole specimen) is so soft, that it may be scratched by the nail of the finger.

Sectile.

Specific gravity 2.889.

The constituents of the plumbago-looking portion of this mineral, were found to be,

Silica,	-	-	-	-	-	38.40
Alumina,	-	-	-	-	-	23.68
Peroxide of iron,	-	-	-	-	-	17.52
Magnesia,	-	-	-	-	-	8.96
Potash,	-	-	-	-	-	6.80
Water,	-	-	-	-	-	4.80
						100.16

It seems to consist of,

- 1 atom silicate of potash,
- 2 atoms bisilicate of magnesia,
- 3½ atoms silicate of iron,
- 11 atoms silicate of alumina.

Were we to suppose the silicates of potash and magnesia to be extraneous, the mineral would be a compound of.

3 atoms silicate of alumina,  
1 atom silicate of peroxide of iron.

But as it is not crystalized, we have no means at present of determining what are its essential constituents. It will probably constitute a new species, being very different in its appearance from any mineral which I have hitherto had an opportunity of seeing. The brownish-black plates in some of their characters, approach pinite; but the composition and characters of the plumbago-looking portion, are very different from all the other species of stony minerals that I have seen.

*Note.* Mr. Nuttall, with whom I have conferred respecting the minerals which he sent to Dr. Thomson, is not altogether certain that he recognises the substance called "phyllite." The specimen examined in this analysis, was labelled in his catalogue "titaniferous iron;" and he informs me, that the ore was imbedded in what he considered as a singular ferruginous mica-slate. It is the latter substance which was analyzed. The brownish-black micaceous scales noticed by Dr. Thomson, are what Mr. Nuttall supposed to be an ore of iron.

#### 15. HYDROUS SILICATE OF MAGNESIA.

There seems no reason to doubt that the Swedish mineral described in 1813, by Haussmann, under the name of *picrolite*, is the same with the *precious serpentine* of Werner. The external characters, as far as they have been given, are very nearly the same; and if we compare the analyses of these minerals by Hisinger, Stromeyer and Almroth, we shall find that they agree very closely, as may be seen by the following table.

	Precious Serpentine.	Picrolite.	
Silica,	43.07	41.660	40.04
Magnesia,	40.37	37.159	38.80
Lime,	0.50		
Alumina,	0.25		
Protoxide of iron,	1.17	4.046	8.28
Deutoxide of manganese a trace,		2.247	
Water,	12.45*	14.723	9.08
Carbonic acid,			4.70
	97.81*	99.835†	100.9‡

The mineral which I am going to describe, is obviously a specimen of *precious serpentine*. I got it from Mr. Nuttall, among a collection of North American minerals. It was found at Easton, in Pennsylvania.

The color was yellow, with a slight shade of green. It appeared when examined by a microscope, to be composed of a congeries of semi-transparent grains.

It was easily scratched by a knife, but not by fluor-spar.

Its specific gravity was at first 2.53; but after digestion in muriatic acid, to remove some calcareous spar with which it was contaminated, the specific gravity was reduced to 3.39.

The constituents were found to be,

Silica,	-	-	-	-	-	41.55
Magnesia,	-	-	-	-	-	40.15
Peroxide of iron,	-	-	-	-	-	3.90
Water,	-	-	-	-	-	13.70
						99.30

\* Hisinger, Afhandlingar, iv. 341.

† Stromeyer, Unlersuch, p. 370.

‡ Almroth, Afhandlingar, vi. 263.



It, therefore, is a compound of,

5 atoms silica,	-	-	-	-	10
4 atoms magnesia,	-	-	-	-	10
3 atoms of water,	-	-	-	-	3.375
					<hr/>
					23.375

Perhaps it may be considered as a compound of 5 atoms bisilicate of magnesia, and 3 atoms bihydrate of magnesia. The symbol would be  $5 MnS^2 + 3 MnAq^2$ . This view would accord with the constituents found, were we to consider the iron as an accidental ingredient.

#### 16. BISILICATE OF MAGNESIA.

The mineral, which from its composition I distinguish by the name of *bisilicate of magnesia*, was sent me from Bolton, Massachusetts, by Mr. Nuttall. It bears so much resemblance to the *picrosmine* of Haidinger, both in its character and composition, that I strongly suspect the two minerals will turn out mere varieties.

The bisilicate of magnesia has a white colour, with a slight shade of green. Its powder is white.

It consists of a congeries of prismatic crystals very irregularly disposed, and so involved in each other, that the shape cannot be distinctly made out. The few faces which were tolerably distinct, lead to the notion that the crystals are four-sided oblique prisms.

Lustre glassy. Translucent on the edges.

The crystals cleave longitudinally, but in no other direction.

Scratched by the knife, but not easily.

Specific gravity 2.976.

The constituents of this mineral are,

Silica,	-	-	-	-	-	56.64
Magnesia,	-	-	-	-	-	36.52
Alumina,	-	-	-	-	-	6.07
Protoxide of iron,	-	-	-	-	-	2.46
						<hr/>
						101.69

If the alumina and protoxide of iron be only accidental substances, then the constituents of the mineral are,

2 atoms silica,	-	-	-	-	-	4
1 atom magnesia,	-	-	-	-	-	2.5
						<hr/>
						6.5

The constituents of picrosmine, as determined by Mr. Magnus, are,

Silica,	-	-	-	-	-	54.886
Magnesia,	-	-	-	-	-	33.348
Alumina,	-	-	-	-	-	0.792
Protoxide of iron,	-	-	-	-	-	1.399
Protoxide of manganese,	-	-	-	-	-	0.420
Water,	-	-	-	-	-	7.301
						<hr/>
						98.146

The chief difference between the mineral described by Haidinger from Bohemia, and the American mineral, consists in the former containing 7.301 of water, while the latter is anhydrous. The specific gravity of Haidinger's mineral (owing to the water) is only 2.66, while that of the American mineral is 2.976. I have little doubt that they will be found ultimately, to be only varieties of the same species.

### 17. HYPERSTHENE.

The three mineral species, *pyroxene*, *amphibole*, and *hypersthene*, have considerable analogy both in their situation and composition. They all occur as constituents of trap rocks.

and may, therefore, perhaps be admitted to have once been in a state of fusion. They consist essentially of silica and magnesia. In *pyroxene* and *amphibole*, lime likewise enters as a constituent, and not unfrequently oxide of iron. The same thing happens with respect to hypersthene.

Hypersthene constitutes an abundant ingredient in a beautiful trap rock, to which the name of *hypersthene rock* has been given. It occurs in the north of England, and constitutes whole mountains of the most savage appearance, in that part of the Isle of Skye known by the name of Cuchullin. It is found also in large isolated crystals in the island of St. Paul, on the coast of Labrador, on which account it was distinguished by Werner, by the name of *Paulite*.

I thought it worth while to subject paulite and Isle of Skye hypersthene, to a chemical analysis. Paulite had indeed been already analyzed by Klaproth; but I am not aware that hypersthene, from Isle of Skye, has been hitherto examined by any chemist.

Paulite is black without any shade of green. Hypersthene is also black; but the surface of the crystal is splendid, and exhibits a false metallic lustre, somewhat similar to bronze. All the specimens of paulite which I have seen, are crystallized so irregularly that the shape cannot be made out. But the Isle of Skye hypersthene, is frequently in pretty regular crystals. They are four-sided prisms, with angles of  $87^{\circ}$  and  $93^{\circ}$ , which are very nearly the angles of pyroxene. I have never met with a crystal in which the summit of the prism is well defined. I do not, therefore, know whether the prism be right or not.

The specific gravity of paulite I found,       3.385.

The specific gravity of hypersthene,       3.338.

Klaproth gives the specific gravity of Paulite 3.390.

The hardness of both varieties, as far as I can make out, is precisely the same; and very nearly, if not exactly, equal to that of arfvedsonite.

The constituents of paulite are,

Silica,	-	-	-	-	-	46.112
Magnesia,	-	-	-	-	-	25.872
Peroxide of iron,	-	-	-	-	-	14.112
Protoxide of manganese,	-	-	-	-	-	5.292
Lime,	-	-	-	-	-	5.380
Alumina,	-	-	-	-	-	4.068
Water,	-	-	-	-	-	0.480
						<hr/> 101.316

The constituents of Isle of Skye hypersthene, were found to be,

Silica,	-	-	-	-	-	51.348
Magnesia,	-	-	-	-	-	11.092
Peroxide of iron,	-	-	-	-	-	33.924
Lime,	-	-	-	-	-	1.836
Water,	-	-	-	-	-	0.500
						<hr/> 98.700

Notwithstanding the difference between these two analyses, there seems no reason to doubt the two minerals belonging to the same species. The hardness of both is the same; their specific gravities very nearly agree; and so do their crystalline forms, as far as they have been determined. It is obvious that the constituents of hypersthene, like those of pyroxene and amphibole, are not constantly the same. The manganese and alumina being wanting altogether, and the lime very nearly, in the Isle of Skye hypersthene; perhaps we may be permitted to consider them as only accidental ingredients. In that case the essential constituents will be silica, magnesia, and peroxide of iron. The number of atoms of silica in the mineral, is twice as great as that of the magnesia and peroxide of iron taken together. Hence, it is clear that hypersthene consists of bisilicate of magnesia and peroxide of iron



united together. But it is impossible to say how much of each is necessary to constitute the mineral, as the proportions of magnesia and peroxide of iron vary in the two varieties analyzed. Paulite consists of about 3 atoms bisilicate of magnesia, and 1 atom of iron; while Isle of Skye hypersthene contains 2 atoms bisilicate of magnesia, and 3 atoms bisilicate of iron. It is obvious that the magnesia and peroxide of iron are capable of replacing each other in this mineral. We may exhibit the composition of hypersthene in general, by the formula  $xMnS^2 + yFS$ . X and y denoting the unknown number of atoms of the two bisilicates.

#### 18. CHONDRODITE.

This mineral was first described, analyzed and named by Count D'Ohsson, in the Kongl. Vetenskaps Acad. Handlingar, for 1817, p. 206. The specimen was from Pargas, in Finland, and the name *chondrodite*, (from  $\chi\omicron\nu\acute{o}\rho\omega\delta\eta\varsigma$  granular) was given to the mineral because it occurred in the specimen in the state of grains. The same mineral had been previously observed by Dr. Bruce, at Newton, Sussex County, New-Jersey, in small rhomboidal prisms imbedded in calcareous spar, but mistaken by him for an ore of titanium. In 1823, an analysis of it by Mr. Seybert, was read before the American Philosophical Society, and published in the 5th volume of Silliman's Journal. Seybert discovered in it the presence of fluoric acid, which had escaped Berzelius in two separate analyses which he made of this mineral. This led him to consider it as a new mineral, and to distinguish it by the name of *Maclurite*, as a tribute of respect to Mr. Maclure, the celebrated American geologist. Some of the American mineralogists had given it the name of *Brucite*.

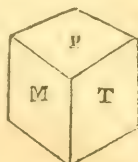
About two years ago, I received from Dr. Torrey some very fine specimens of what he called massive chondrodite from a new locality; namely, Eden, Orange County, New-

York, with a request that I would subject it to a new analysis, assigning as a reason, that though Seybert's analysis was excellent, he had perhaps operated upon poor specimens.

The specimens were pure, with the exception of a few crystals of albite on one corner, and small irregular veins of a gray colored mineral, seemingly quartz, visible in one of the pieces.

The color was reddish-yellow; the lustre considerable, and inclining to resinous. Indeed chondrodite has a considerable resemblance to garnet.

Fracture foliated, with a cleavage which seemed to indicate for the primary form, a doubly oblique prism. The incidence of M on T about  $75^\circ$ , and that of P on T about  $65^\circ$ . But as these measurements, which were made with the common goniometer, do not agree with those of Ha y, they are probably inaccurate.



The cross-fracture is granular.

Translucent on the edges. In thin fragments semi-transparent.

Easily scratched by the knife, but not by calcareous spar. Seems about the same hardness as fluor spar.

Brittle.

Specific gravity of my specimens 3.118. D'Ohsson found it 3.18; and Seybert, from 3.157 to 3.225.

Does not fuse per se before the blow pipe.

It dissolves without difficulty in nitric acid. Its constituents were found to be,

Silica,	-	-	-	-	-	-	36.00
Magnesia,	-	-	-	-	-	-	54.64
Peroxide of iron,	-	-	-	-	-	-	3.97
Fluoric acid,	-	-	-	-	-	-	3.75
Water,	-	-	-	-	-	-	1.62
							99.98

Seybert's analysis approaches very closely to mine. He obtained,

Silica,	-	-	-	-	-	-	-	32.666
Magnesia,	-	-	-	-	-	-	-	54.000
Peroxide of iron,	-	-	-	-	-	-	-	2.333
Fluoric acid,	-	-	-	-	-	-	-	4.086
Potash,	-	-	-	-	-	-	-	2.108
Water,	-	-	-	-	-	-	-	1.000
								96.193

D'Obsson likewise found 0.86 per cent. of potash. This induced me to search for it three several times, but without success. Hence I am satisfied that if any exist in the pure mineral, the quantity must be very minute.

It is obvious that chondrodite is a compound of,

1 atom fluate of magnesia,

6 atoms silicate of magnesia.

The iron and the water are probably accidental constituents. The potash was probably derived from some interspersed foreign mineral, which did not exist in my specimens.

*Note.* This mineral, which occurs abundantly in New-Jersey, New-York, and Massachusetts, was first noticed by the late Dr. Bruce in the year 1811. He observed it in a crystalized carbonate of lime, brought from Sussex County, New Jersey, and supposed it to be an ore of titanium. A notice of it appeared in the American Mineralogical Journal, p. 239. Some specimens were sent by Dr. Bruce to Haüy, who placed it in his cabinet, where it remained for many years unexamined, till Berzelius, in a visit to Paris, recognized it to be the Chondrodite.

Soon after the mineral was sent over to Europe, Dr. Langstaff, then a pupil of Dr. Bruce, undertook its analysis, and ascertained its ingredients to be silica, magnesia, and fluoric acid. He repeatedly analyzed the mineral as early as the year

1811, as is well known to many of his friends, but without being satisfied with the results, when circumstances obliged him to relinquish in great measure his scientific pursuits, so that he never published an account of his discovery. The notes of his experiments were exhibited to me in the year 1820, and extracts from them were communicated to Mr. Nuttall, as may be seen in Silliman's Journal, vol. vi. p. 171.

Dr. Langstaff obtained as the mean of several trials,

Silica, -	-	-	-	-	-	32
Magnesia,	-	-	-	-	-	51
Oxide of iron,	-	-	-	-	-	6
Fluoric acid,	-	-	-	-	-	9
Water, -	-	-	-	-	-	2

The quantity of fluoric acid was determined by the difference between the sum of the other constituents, and the amount of mineral subjected to experiment : a very imperfect method it must be confessed, but almost the only one that could at that time be employed.

The mineral soon became known to all our collectors, and as it appeared to be new, Colonel Gibbs, with the consent of Dr. Langstaff, proposed for it the name of Brucite. Under this appellation a large quantity of it was sent to Europe.

From some misunderstanding, it was supposed by several mineralogists to be a fluuate of magnesia, by which name it was introduced in the Tabular View of the first edition of Cleaveland's Mineralogy, published in 1816. The author of that excellent treatise states, that he expected to have received an account of the mineral in time to insert it in the body of his work, but was disappointed.

In Silliman's Journal for 1819, it was announced that an analysis of Brucite, a new mineral, would appear in the following number. But the analysis was not, however, published.

Just before this notice appeared, and without being aware



of Dr. Langstaff's prior experiments, I examined the mineral called Brucite by Colonel Gibbs, having been informed that it was the fluuate of magnesia alluded to by Professor Cleaveland. My analysis was read before the Lyceum of Natural History. I obtained about 4 per cent of fluoric acid, and 50 per cent of silica, an ingredient which I did not expect to find, at least in such large proportion, so that it proved to be a fluo-silicate, analogous, as I stated in my memoir, to the topaz. While I was repeating my analysis, with a view to its publication, I was informed that Dr. Langstaff had already examined the mineral, and had anticipated my results. I therefore prosecuted the subject no farther, and solicited the discoverer of the mineral himself to give the public an account of his experiments. As no account of the Sparta mineral had been published in 1821, when Professor Cleaveland was preparing a new edition of his work, I sent him a short description of it, under the name of *Brucite*, together with a history of its discovery. By that time some of our mineralogists learned from their Swedish correspondents, that the Brucite and chondrodite were supposed to be identical, but as D'Ohsson and Berzelius found no fluoric acid in the latter mineral, the Brucite was regarded by Colonel Gibbs and others, as a distinct species.

In May 1822, and before Cleaveland's second edition appeared, Mr. H. Seybert, of Philadelphia, read before the American Philosophical Society, an account of the New-Jersey mineral, to which he gave the name of Maclurite. He appears to have been unacquainted with the experiments made on this substance in New-York, and also with the fact, which was already well known to the mineralogists of this city, that Berzelius had pronounced the chondrodite and Brucite to be the same species, but without (it would appear) having detected any fluoric acid in either mineral. The analysis of Mr. Seybert displays great ingenuity and science. He obtained the fluoric acid, and determined with great ac-

curacy the proportion in which it exists. As this ingredient was not detected in the Finland chondrodite, analyzed by the Swedish chemists, Mr. Seybert considered the American mineral to be a peculiar species. His analysis was published in the American Philosophical Transactions, and in Silliman's Journal.\*

Before the analysis appeared, though after it was read to the Society above mentioned, Mr. Nuttall published in the first number of the New-York Medical and Physical Journal, an account of the Geology and Mineralogy of Sparta in New-Jersey, in which he introduced a description of the Brucite, and stated that it contains an *acid natal* and variable proportion of fluoric acid, so that he considered it as probably not distinct from chondrodite. The experiments of Mr. Seybert, however, proved that the fluoric acid is an essential ingredient of the mineral, and in his subsequent researches, he found it in the European variety, though Berzelius had failed in detecting it. Mr. S. was, therefore, convinced, that his Maclurite and the chondrodite were identical.† The remarks of Mr Nuttall on the Sparta mineral, (in the paper just quoted) were the occasion of some unpleasant controversy between this gentleman and Mr. Seybert, which I should willingly have passed over, had not the latter gentleman insinuated that Dr. Laugstaff and myself had combined to defraud him of the honour of having first discovered the fluoric acid in chondrodite or Brucite. It was so well known to all the New-York mineralogists, and also to Colonel Gibbs and others, that this acid exists in the mineral, that it was a matter of surprise that Mr. Seybert was ignorant of the circumstance. If any proof were necessary on this point, I might refer to the minutes of the New-York Lyceum, or to the second edition

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\* Vol. V. p. 336. et seq.

† Silliman's Journal, Vol. V. p. 366. et seq.

of Cicaveland's Mineralogy, the first part of which was printed before Mr. Seybert read his paper in Philadelphia. Indeed the fluoric acid is detected with the greatest ease in the variety of Brucite, which is so abundant at Sparta. Sulphuric acid immediately decomposes the mineral, while fumes are liberated which distinctly corrode glass.

The chondrodite of D'Ohsson, which has already received so many appellations, has recently been found identical with the Humite of Count Bournon, a mineral which occurs among the products of Vesuvius. As early as the year 1823, Mr. Nuttall communicated to me his opinion, that the Humite was not a distinct mineral from the Brucite. At his request, Mr. Bowen, now Professor of Chemistry in the University of Nashville, submitted to experiment the granular variety of the Humite, which accompanies the idocrase of Vesuvius, and detected in it fluoric acid.\* A full account of this mineral, under the name of chondrodite, is given in the "*Prodromo della Mineralogia Vesuviana, par T. Monticelli et N. Covelli, Napoli, 1825.*" The Brucite and Humite are quoted as synonyms. Its primitive form is exactly that of the chondrodite, as given by Haüy, *Traité de Min.* ii. p. 176-7, second edition.† Two secondary forms are described, one of which had been already noticed by Haüy. They are represented in Tab. III. f. 41 and 42. The first is a rectangular prism, terminated by two quadrangular pyramids; the second is a new variety, termed *octovigesimal*, or

\* See a note to Mr. Nuttall's memoir, in Silliman's Journal, V. p. 240.

† The primitive form of Brucite, given by Mr. Nuttall and Prof. Cleaveland from my notes, is incorrect. I mistook for that mineral, some small crystals of amphibole, which are generally associated with the Brucite. The Brucite itself is scarcely ever seen crystalized in the United States. Occasionally it exhibits the form of short rhombic prisms, differently modified, but so imperfect that their precise shape cannot be determined.

an eight-sided prism, terminated by eight-sided pyramids, of which the summits are truncated.

It appears that the Humite was first noticed by Bournon, in a publication entitled, "*Catalogue de la Collection minéralogique particulière du Roi de France. Paris 1817.*" Count D'Olsson's analysis of the chondrodite was published the same year, so that it is difficult to say which name of the mineral should take the precedence.

### 19. GÖKUMITE.

In the year 1814, I received a collection of Swedish minerals from Mr. Swedenstjerna, among which was one of a yellowish-green color, labelled *Mineral from Gokum quarry*. In its general aspect it bore a close resemblance to a mineral from the same quarry, called Loboite by Berzelius, and first described and analyzed in 1807, by Mr. C. A. Murray, under the name of *a green colored mineral from the lime quarry of Gokum*.\* In 1810 a new description of it was published by Chevalier Lobo du Silveira, together with an analysis of it by Berzelius.† Lobo called it *Gahnite*; but as this name had been already applied to the automalite, Berzelius gave it the name of Loboite. This mineral has been generally considered as a variety of idocrase. My specimen resembling Loboite in its external characters, I did not pay particular attention to it, till I happened to give a piece of it for analysis to two of my pupils, Messrs. Hilton and Mitchill. The result of the analysis was so different from that of Berzelius, that I suspected a mistake to have been committed, and therefore, repeated the analysis myself. But my results were very nearly the same as those already obtained by the previous analysis. It was obvious, therefore, that my mine-

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\* Afhandlingar, ii. 173.

† Ibid. iii. 276.



ral was not Loboite. I have called it *gokumite* from the name of the place where it was found.

The color is light yellowish-green. When examined with a glass, it appears to be composed of a congeries of irregular crystals, which bear a nearer resemblance to octahedrons, than to any other figure. The pyramids of the octahedrons are very low, and the faces are frequently striated parallel to the base.

The crystals are foliated.

Exceedingly frangible. Very small crystals, apparently of topaz, sparingly scattered through the mineral.

Opaque, or only slightly translucent on the edges.

Scratched by the knife.

Specific gravity 3.744.

Its constituents were,

Silica,	-	-	-	-	-	-	-	35.680
Lime,	-	-	-	-	-	-	-	25.748
Protoxide of iron,	-	-	-	-	-	-	-	34.460
Alumina,	-	-	-	-	-	-	-	1.400
Water,	-	-	-	-	-	-	-	0.600
								97.888

It is, therefore, composed of,

1 atom silicate of lime,	-	-	-	-	5.5
1 atom silicate of iron,	-	-	-	-	6.5
					12.0

My specific gravity of Loboite is only 3.543. It is harder than *gokumite*, and has a darker color. Its crystalline form is a four-sided prism, seemingly the same as that of *idocrase*. Its constituents, according to the analysis of *Berzelius*, are as follows,

Silica,	-	-	-	-	-	-	-	36.00
Alumina,	-	-	-	-	-	-	-	17.50
Magnesia,	-	-	-	-	-	-	-	2.52
Lime,	-	-	-	-	-	-	-	37.65
Peroxide of iron,	-	.	-	-	-	-	-	5.25
Lime, a trace,	-	-	-	-	-	-	-	0.36
								99.28

This analysis shows clearly, that gokumite and Loboite are two different minerals.

## 20. IDOCRASE.

This mineral was sent me by Dr. Torrey, with the label, *a new variety of garnet (idocrase of some) from Salisbury, Connecticut.* I have given it the name of idocrase, from the result of its chemical analysis.

The color is brownish-red, very similar to that of some garnets.

The fracture is granular, and when the specimen is examined by a microscope, it appears to consist of a congeries of prismatic crystals, some of which exhibit a brilliant facet or two; but the shape cannot be made out. In another specimen the extremities of four-sided prisms, apparently square, are distinctly visible, though the faces are too rough and uneven to admit of measurement, even with the common goniometer.

Scratched with difficulty by the knife, but easily by quartz.

Lustre shining, glassy.

Brittle. Easily frangible in the great; but the individual crystals are rather tough.

Specific gravity 3.503.

The constituents were found to be.

Silica,	-	-	-	-	-	-	-	40.89
Lime,	-	-	-	-	-	-	-	35.56
Protoxide of iron,	-	-	-	-	-	-	-	18.33
Alumina,	-	-	-	-	-	-	-	5.67
Water,	-	-	-	-	-	-	-	0.60
								101.05

It would seem from this analysis, to be a compound of,

5 atoms silicate of lime,	-	-	-	-	27.5
2 atoms bisilicate of iron,	-	-	-	-	17.0
1 atom silicate of alumina,	-	-	-	-	4.25
					48.75

The difference between this mineral and common idocrase, consists chiefly in a portion of the alumina being replaced by protoxide of iron.

*Note.* Specimens of this mineral, which I received from Dr. C. A. Lee, (who first discovered it at Salisbury) were crystalized in rhomboidal dodecahedrons, truncated upon all the edges. So that, notwithstanding the habitudes of the mineral before the blow-pipe, I concluded it to be a variety of garnet. It has a strong resemblance to the amber-colored garnet, lately found by Dr. Webster in Carlisle, Massachusetts, and like that mineral fuses easily into a transparent glass. Dr. Thomson's analysis, however, would seem to make the Salisbury mineral idocrase, if the composition alone be regarded.

21. BROWN MANGANESIAN GARNET.

This mineral was sent me by Dr. Torrey, under the name of *brown manganese garnet*. Its locality is Franklin, Sussex County, New-Jersey.

Color tombac-brown.

Texture granular, because the specimen consists of a congeries of imperfect crystals. Some of these crystals appear to be octahedrons, either complete, or wanting their apexes. Some are four-sided oblique prisms, terminated by four-sided pyramids. One of these prisms was measured. Its angles were about 111° and 69°.

Scratched with difficulty by quartz.

Brittle and very easily frangible.

Lustre glistening, except some crystalline faces, which are splendid. Resinous.

Nearly opaque, or only translucent on the edges.

Specific gravity 3.829.

The constituents of this mineral were found to be,

Silica,	-	-	-	-	-	-	33.716
Lime,	-	-	-	-	-	-	25.884
Alumina,	-	-	-	-	-	-	7.972
Protoxide of iron,	-	-	-	-	-	-	15.840
Protoxide of manganese,	-	-	-	-	-	-	16.704
Water,	-	-	-	-	-	-	0.080
							<hr/>
							100.196

This corresponds with,

5 atoms silica,

2 atoms lime,

1 atom protoxide of iron,

1 atom protoxide of manganese.

So that the mineral would appear to be a compound of,



2 atoms sesquisilicate of lime,	-	-	13
1 atom silicate of iron,	-	-	6·5
1 atom silicate of manganese,	-	-	6·5
			26·00

From the analyses and calculations of Count Trolle Wachtmeister,\* it follows that the garnet varies a good deal in its composition. It is usually a compound of two different silicates, which may be any two of the following.

Silicate of lime,  
 Silicate of alumina,  
 Silicate of iron,  
 Silicate of manganese.  
 Silicate of magnesia.

The variety just described, contains an atom more silica than usually exists in garnet. It contains three bases, and no variety of garnet hitherto analyzed, has been found to contain so much manganese.

## 22. PIPE-STONE.

I give this name to a curious stone from North America, which the Indians make use of for constructing tobacco-pipes. For the specimen which I analyzed, I am indebted to Dr. Scouler, who, some years ago, went out as a surgeon in one of the vessels sent to the west coast of North America by the North-west Company. He spent a summer between Nootka Sound and the Columbia river. Among other natural productions of the country, he brought home a specimen of this *pipe-stone*. He got it from the Indians, and was not possessed of any information respecting the part of the country, or the nature of the rocks where it is found.

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\* Kongl. Vetensk. Acad. Handl. 1823. p. 120.

It constitutes a compact stone, through which a few scales of mica are interspersed, and having somewhat the appearance of clay-stone, though less compact and much softer.

Color light grayish-blue. Powder light blue.

It is harder than gypsum, but soft enough to be scratched by the nail. Sectile.

The particles when scraped off with a knife, feel gritty between the teeth.

Specific gravity 2.606.

It does not fuse per se before the blow-pipe.

The constituents obtained by analyzing it were as follows,

Silica,	-	-	-	-	-	55.620
Alumina,	-	-	-	-	-	17.208
Soda,	-	-	-	-	-	12.160
Peroxide of iron,	-	-	-	-	-	7.612
Lime,	-	-	-	-	-	2.256
Magnesia,	-	-	-	-	-	0.112
Water,	-	-	-	-	-	4.600
						99.568

It consists of four bisilicates, namely,

- Bisilicate of alumina,
- Bisilicate of soda,
- Bisilicate of iron,
- Bisilicate of lime.

Were we to consider the bisilicates of iron and lime as only accidentally present, pipe-stone would be a compound of,

- 1 atom bisilicate of soda,
- 2 atoms bisilicate of alumina.

Differing from analcime and chabasie, by the absence of water, and by an atom less of bisilicate of alumina. But whether this stone be a chemical compound, or only a mixture, must remain doubtful at present.

## 23. EKEBERGITE.

This name has been given to a mineral first described and analyzed by Ekeberg in 1807.\* It has been usually considered as a variety of *scapolite*; and its mineralogical character, seems to leave no doubt that this is its true mineralogical place; though its constituents differ a little from those of pure *scapolite*. The specimen which I subjected to analysis, was sent me about fourteen years ago, by Mr. Swedenstjerna.

Its color is light greenish-gray.

Lustre glistening and waxy.

Structure imperfectly foliated. Translucent.

Easily scratched by quartz, and sensibly by the knife. Yet it strikes fire with steel.

Fragments sharp-edged.

Tough.

Specific gravity 2.723.

Before the blow-pipe it melts per se into a transparent olive-green glass.

An analysis of this mineral gave the following constituents,

Silica,	-	-	-	-	-	43.572
Alumina,	-	-	-	-	-	24.480
Lime,	-	-	-	-	-	15.460
Peroxide of iron,	-	-	-	-	-	5.540
Soda,	-	-	-	-	-	9.148
Water,	-	-	-	-	-	1.800
						100.000

These constituents indicate,

\* Afhandlingar, ii. 144.

11 atoms silicate of alumina,	-	-	-	46·75
5 atoms silicate of lime,	-	-	-	27 5
2 atoms bisilicate of soda,	-	-	-	16·0
1 atom silicate of iron,	-	-	-	6·5
				96·75

Were we to consider the bisilicate of soda, and silicate of iron to be accidental ingredients, the constitution of the mineral would approach very nearly to that of common scapolite.

#### 24. FAHLUNITE, OR TRICLASITE.

Two different substances have been distinguished by the name *fahlunite*, or *triclasite*. One analyzed by Hisinger,\* which seems to be the same with the Gie-eckite of Stromeyer. It has a blackish-green color, and nearly the same specific gravity as the hard fahlunite. But it contains 13·5 per cent of water. The other substance has been usually called *hard fahlunite*, from its greater hardness. It was analyzed in 1815 by Hisinger, and 1821 by Stromeyer. The following table exhibits the constituents of this mineral, according to the analyses of these chemists.

Silica,	-	-	-	45·9	50·247	
Alumina,	-	-	-	31·1	32·422	
Magnesia,	-	-	-	13·5	10·847	[iron.
Peroxide of iron,	-			3·0	4·004	protoxide of
Deutoxide of manganese,				0·5	0·682	
Lime, zinc,	-	-		0·2		
Moisture,	-	-	-	3·0	1·664	
				97·2†	99·866‡	

\* *Afhandlingar*, vi. 210.

† Hisinger, *Afhandlingar*, iv. 342.

‡ Stromeyer, *Unlersuchungen*, p. 553.



I got a specimen of this mineral about fourteen years ago, from Mr. Swedenstjerna. It occurs in Eric Matt's mine at Fablun, mixed with the dark-green fahlunite, and is always amorphous.

The color is yellowish-brown.

The lustre is waxy.

Principal fracture foliated; cross fracture granular.

Translucent when in thin pieces.

Scratched by quartz, but not by the knife.

Specific gravity 2.632.

Brittle. Tough.

When analyzed its constituents were found to be,

Silica,	-	-	-	-	-	-	51.840
Alumina,	-	-	-	-	-	-	24.780
Magnesia,	-	-	-	-	-	-	7.704
Protoxide of iron,	-	-	-	-	-	-	10.296
Protoxide of manganese,	-	-	-	-	-	-	2.248
Lime,	-	-	-	-	-	-	2.684
Water,	-	-	-	-	-	-	0.576
							<hr/> 100.128

This analysis differs considerably from those of Hisinger and Stromeyer, showing clearly that fahlunite, if it be a peculiar species, does not occur at Fablun in a state of purity. Stromeyer considers hard fahlunite as a variety of *dichroite*. This conclusion is deduced from the analysis; the mineralogical characters are too imperfectly marked to warrant any conclusion.

## 25. SPINELL AND CEYLANITE.

Though the nature of the rock in which the spinell occurs, has not been made out in a satisfactory manner, yet there seems no reason to doubt that it belongs to the primary rocks. I have specimens of primitive limestone from Sweden.

in which abundance of blue-colored spinell occurs. About a year ago Mr. Nuttall sent me some specimens from the United States of America. Among others there were three or four specimens of a rock composed of feldspar, quartz, and a green-colored substance, partly in grains, and partly in regular octahedrons, which it was easy to recognize as spinell. On one of these specimens there was also a portion of calcareous spar. No information was given me respecting the locality of this rock; though there could be no doubt from its constituents that it was a primitive rock. The number of grains of spinell in it was exceedingly great. Most of them were very small round grains. But some of them constituted very beautiful and regular octahedrons, though small. The color was a lovely green, and the crystals were all translucent, and some of them transparent.

Lustre vitreous, and from splendent to shining.

From the small size of the grains, the fracture could not be easily recognized. It was probably foliated.

Not scratched by quartz, but easily by sapphire.

Specific gravity 4.465. This is much higher than that of spinell commonly observed. I do not know to what to ascribe the difference. The specific gravity was carefully taken, and any foreign matter that might have been accidentally present, would rather tend to diminish, than increase the specific gravity.

The constituents, from a careful analysis, were found to be,

Silica,	-	-	-	-	-	5.620
Alumina,	-	-	-	-	-	73.308
Magnesia,	-	-	-	-	-	13.632
Protoxide of iron,	-	-	-	-	-	7.420
Lime, a trace,	-	-	-	-	-	
						99.980



It would appear from the analyses of the ceylanite from Ceylon, by MM. Collet Descotils and Laugier, that its constituents differ a good deal from those of the American mineral. This may be seen from the following table,

Silica, . . . . .	-	-	2	2
Alumina, . . . . .	-	-	68	65
Magnesia, . . . . .	-	-	12	13
Oxide of iron, . . . . .	-	-	16	16·5 with a trace of manganese.
			—	—
			98*	96·5†

The lime in the American ceylanites is probably derived from the calcareous spar in which the mineral was crystallized. There is a smaller quantity of alumina, and a greater of magnesia in the American, than in that of Ceylon. There is also a considerable difference in the proportion of oxide of iron, which each specimen contains.

The spinell (if we consider the silica and iron as accidental) is obviously a compound of,

1 atom magnesia,	-	-	-	-	-	2·5
6 atoms alumina,	-	-	-	-	-	13·5
						—
						16·0

This is also the proportion of the magnesia to the alumina, in the Ceylon variety. But the American ceylanite contains only,

1 atom magnesia,	-	-	-	-	-	2·5
4 atoms alumina,	-	-	-	-	-	9
						—
						11·5

---

\* Collet Descotils, *Ann. de Chim.* xxxiii. 11.  
 † Laugier, *Ann. de Chim. et de Phys.* xxvii. 313.  
 VOL. III. 10



We must, therefore, admit that in the American variety, there is a quantity of magnesia accidentally present, amounting to 6.42 per cent.

It has been long known to chemists, that there is a strong affinity between magnesia and alumina. Now it is curious, that when these bodies do combine, it is usually in the proportions which constitute spinell. If into a solution of a mineral in muriatic acid, which contains alumina and magnesia, you pour caustic ammonia to precipitate the alumina, the precipitate will be found to contain a certain quantity of magnesia. If this precipitate be thoroughly washed and ignited, and then digested in muriatic acid, a white insoluble matter will remain, which proves when it is analyzed, to be a compound of,

1 atom magnesia,  
6 atoms alumina.

It is, therefore, essentially the same with spinell. The silica and protoxide of iron found in spinell, are doubtless foreign bodies.

*Note.* The first variety of spinell alluded to by Dr. Thomson in this article, was from Franklin, in New-Jersey. It appears to be a green pleonaste, or ceylanite, but it may possibly constitute a new sub-species. The rock in which the mineral is imbedded is not primitive, as it is supposed to be by Dr. Thomson, but transition, as may be seen by referring to Mr. Nuttall's memoir on the geology and mineralogy of the valley of Sparta, first published in the New-York Med. and Phys. Jour. vol. i. No. 1. and afterwards reprinted in Silliman's Journal, vol. v. Also, a memoir on the same subject, by Professors Keating and Vanuxem, published in the journal of the Academy of Natural Sciences, vol. ii.

## 26. STILBITE AND HEULANDITE.

The stilbite of Haüy has of late years been subdivided into two species; viz. *stilbite* and *Heulandite*. They had been already subdivided into foliated and radiated zeolite by Werner, who recognized the distinction. Mr. Brooke first showed, that the angles of the two minerals are different. M Walmstedt, Professor of Chemistry at Upsal, first showed that the chemical composition of the two is different.

A pure crystalized specimen of red stilbite, from the rocks near Dumbarton, analyzed in my laboratory, was found composed of,

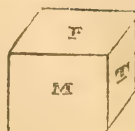
Silica,	-	-	-	-	-	-	52·500
Alumina,	-	-	-	-	-	-	17·368
Lime,	-	-	-	-	-	-	11·520
Water,	-	-	-	-	-	-	18·450
							<hr/>
							99·838

This mineral has been often analyzed in my laboratory, for it is generally one of the first minerals, (from its easy management) that I put into the hands of young analysts. In some other varieties, the quantity of alumina was rather greater than in the red stilbite. Probably its constituents are,

1 atom bisilicate of lime,	-	-	-	-	7·5
3 atoms bilicate of alumina,	-	-	-	-	18·75
5 atoms water,	-	-	-	-	5·625
					<hr/>
					31·875

Very fine specimens of Heulandite have lately been brought to Edinburgh from the Faroe islands. They are all crystalized, and the only shape which I have noticed, is that figured

by Mr. Brooke, in the *Edinburgh Philosophical Journal*, vol. vi. p. 112. The summit of the crystal constituting the face P, has a fine pearly lustre, while that of the other faces is glassy. The lustre is splendid.



Color snow white.

Structure foliated. Cleaves easily parallel to the summit.

Scratched by the knife; the pearly face easily; the other with more difficulty.

Specific gravity 2.195.

Its constituents were found to be,

Silica,	-	-	-	-	-	59.144
Alumina,	-	-	-	-	-	17.920
Lime,	-	-	-	-	-	7.652
Water,	-	-	-	-	-	15.400
						100.116

By Walmstedt's analysis, as given by Berzelius,\* the constituents are,

Silica,	-	-	-	-	-	59.99
Alumina,	-	-	-	-	-	16.87
Lime,	-	-	-	-	-	7.19
Water,	-	-	-	-	-	13.43
						97.39

So that its constitution is,

1 atom tersilicate of lime,	-	-	-	-	9.5
4 atoms tersilicate of alumina,	-	-	-	-	33.0
7 atoms water,	-	-	-	-	7.875
					50.375

\* *Edin. Phil. Jour.* vii. 11.

Another variety of this mineral from the neighborhood of Dumbarton, in very fine needles, was lately analyzed in my laboratory. Its constituents were,

Silica,	-	-	-	-	-	34.63
Alumina,	-	-	-	-	-	32.35
Lime,	-	-	-	-	-	18.65
Soda,	-	-	-	-	-	1.25
Water,	-	-	-	-	-	14.00
						<hr/> 100.88

It is evident from these different results, that this mineral is apt to be contaminated by some of the kindred species with which it is usually associated.

### 27. STEINHEILITE.

This mineral, which occurs in considerable quantity in Finland, was at one time distinguished by the name of blue quartz; and possesses the characters of quartz so completely, that it would be impossible to know where to place it, without a chemical analysis. It got the name of Steinheilite, from Count Steinheil, who first pointed out the difference between it and quartz. It occurs in a copper mine at Orriertwi, in the government of Tawestibus. Professor Gadolin analyzed it, and announced the existence of a new mineral substance in it. Stromeyer repeated this analysis, and published the results in the first volume of his *Untersuchungen*. He found it composed of,

Silica,	-	-	-	-	-	49.2487
Alumina,	-	-	-	-	-	32.0742
Magnesia,	-	-	-	-	-	11.5192
Protoxide of iron,	-	-	-	-	-	5.9682
Deutoxide of manganese,	-	-	-	-	-	0.6385
						<hr/> 99.4488



These constituents induced Stromeyer to infer that Steinheilite and dichroite, belong to one and the same species; and in this conclusion mineralogists have generally coincided.

I got specimens of Steinheilite about fourteen years ago from Mr. Swedenstjerna, and analyzed it at that time, though I have not hitherto laid the results before the public.

The color is blue; the fracture splintery, and very much like that of quartz.

It is translucent.

It is scratched by the knife, and also by quartz.

Its specific gravity is 2.6032.

Its constituents were found to be,

Silica,	-	-	-	-	-	-	-	52.352
Alumina,	-	-	-	-	-	-	-	33.488
Magnesia,	-	-	-	-	-	-	-	4.000
Protoxide of iron,	-	-	-	-	-	-	-	8.556
Water,	-	-	-	-	-	-	-	1.000
								99.396

Were we to consider both these analyses as rigidly exact, they would go far to prove that Steinheilite is not a chemical compound. Would it be too much to consider it as a mixture of quartz and dichroite?

## 28. HARMOTOME.

Chemists are aware that there are two varieties of harmotome, one composed of silica, alumina, barytes, and water; and the other of silica, alumina, lime, and water. Crystallographers have not hitherto attended to this diversity. It is likely that a difference will be found in the form of the crystals of each, and that they will be found to constitute two distinct species. The first of these varieties is found at Andreasberg, in the Hartz, and in many other places. The lime-

harmotome occurs at Annerode, and was analyzed by Wernekink.

I thought it worth while to make a chemical analysis of the harmotome crystals, which occur in considerable quantity in the lead mine of Strontian, in Argyleshire. These crystals are white, and translucent, and are all crystalized like the dodecahedral variety, figured by Haüy in his plate 85. fig. 271.

The fracture is foliated, the lustre glassy, the specific gravity 2.4.

Its constituents were found to be,

Silica,	-	-	-	-	-	-	-	48.735
Alumina,	-	-	-	-	-	-	-	15.100
Barytes,	-	-	-	-	-	-	-	14.275
Lime,	-	-	-	-	-	-	-	3.180
Potash,	-	-	-	-	-	-	-	2.550
Water,	-	-	-	-	-	-	-	14.000
								97.840*

Thus it contains both barytes and lime, and likewise potash, a constituent not yet observed in harmotome from other localities.

The following table exhibits the constituents of the different varieties of harmotome hitherto analyzed.

---

\* Another specimen analyzed in my laboratory by Mr. Thomas Muir, gave,

Silica,	-	-	-	-	-	-	-	-	52.652
Alumina,	-	-	-	-	-	-	-	-	9.900
Barytes,	-	-	-	-	-	-	-	-	13.140
Lime,	-	-	-	-	-	-	-	-	1.732
Peroxide of iron,	-	-	-	-	-	-	-	-	1.560
Potash,	-	-	-	-	-	-	-	-	5.040
Water,	-	-	-	-	-	-	-	-	14.800
									98.824

Silica, -	-	-	49	47.5	44.79	53.07
Alumina,	-	-	16	19.5	19.28	21.31
Barytes,	-	-	18	16	17.59	0.39
Lime, -	-	-			1.08	6.67
Oxides of iron & mang.					0.85	0.56
Water, -	-	-	15	13.5	15.32	17.09
			98*	96.5†	98.91‡	99.09§

It is probable that the barytes-harmotome, is a compound of,

1 atom bisilicate of barytes,  
4 atoms bisilicate of alumina,  
3 atoms water.

If the constitution of the lime-harmotome be similar, there is a deficiency of lime in the specimen analyzed by Wernekink. In the Strontian harmotome, the barytes, lime, and potash, seem altogether to make up the quantity of one atom.

### 29. THOMSONITE.

This mineral was constituted into a peculiar species by Mr. Brooke; and I published a chemical analysis of it in 1820, in the 16th volume of the first series of the *Annals of Philosophy*, from which I deduced its composition to be,

\* Klaproth, *Beitrage*, ii. 83. From Andreasberg.

† Tassaert, *Hauy's Tableau compar.* p. 201.

‡ Wernekink; *Gilbert's Annalen*, lxxvi. 175. From Schiffenberg.

§ *Ibid.* From Annerode.

1 atom silicate of lime,	-	-	-	-	-	5.5
3 atoms silicate of alumina,	-	-	-	-	-	12.75
2½ atoms water,	-	-	-	-	-	2.8125
						<hr/>
						21.0625

But I inadvertently gave Kilpatrick as the locality of the specimen which I employed. It was in reality from Lochwinnoch, a few miles west from Paisley. In the 7th volume of the Edinburgh Philosophical Journal, an analysis of Thomsonite from Kilpatrick, by Berzelius, is given as follows,

Silica,	-	-	-	-	-	-	38.30
Alumina,	-	-	-	-	-	-	30.20
Lime,	-	-	-	-	-	-	13.54
Soda,	-	-	-	-	-	-	4.53
Magnesia,	-	-	-	-	-	-	0.40
Water,	-	-	-	-	-	-	13.10
							<hr/>
							100.07

I was rather surprised at this analysis, because I had searched for soda in my specimen without finding any. A repetition of the analysis, after reading Berzelius's paper, was attended with no better success. This induced me to make some inquiry of Dr. William Couper, from whom I received the specimen, respecting its true locality. He assured me that it had come from Lochwinnoch, and not from Kilpatrick. This induced me to examine a specimen which I had myself procured at Kilpatrick, and concerning the locality of which, therefore, there could be no doubt. The result of this new analysis was as follows,

Silica,	-	-	-	-	-	37.08
Alumina,	-	-	-	-	-	33.02
Lime,	-	-	-	-	-	10.75
Soda,	-	-	-	-	-	3.70
Water,	-	-	-	-	-	13.00
						<hr/>
						97.55

Thus the existence of soda in the Kilpatrick variety was confirmed. It is obvious, however, that the Lochwinnoch specimens are purer than those of Kilpatrick, and that soda does not exist in them. Of course, the true type of this mineral must be,  $3 \text{AlS} + \text{CS} + 2\frac{1}{2} \text{Ag}$ .

## 30. NUTTALLITE.

I got a specimen of this mineral (constituted into a new species by Mr. Brooke) about two years ago from Mr. Nuttall. But it was so small, and apparently so impure, that I did not think it worth while to examine it. Since that time, I have got specimens of it both from Mr. Nuttall and Dr. Torrey, some of which being much purer, I took the opportunity of analyzing it, as hitherto nobody has made us acquainted with its chemical constitution. The locality is Bolton, Massachusetts. Dr. Torrey informs me that he has seen perfect crystals of it.

It occurs in crystals, in a rock consisting partly of calcareous spar, and partly of a green colored mineral in grains, having the aspect of amphibole. Small brown-colored specks were interspersed, which might be sphene.

The crystals were eight-sided prisms, without any terminal planes. These crystals (as Mr. Brooke first observed) cleave in the direction of a right square prism, which seems to be its primary form.

Color white, in some parts of the crystal yellowish, in others bluish or greenish. The yellowish-white portions are translucent, or almost transparent; the bluish nearly opaque. Is not this owing to the presence of a foreign substance?

Lustre glassy, or very slightly inclining to resinous.

Easily scratched by the knife.

Specific gravity varied in different trials, from 2.748 to 2.758.



The constituents of the purest looking part of the specimens were found to be,

Silica,	-	-	-	-	-	-	-	37.808
Alumina,	-	-	-	-	-	-	-	25.104
Lime,	-	-	-	-	-	-	-	18.336
Protoxide of iron,	-	-	-	-	-	-	-	7.892
Potash,	-	-	-	-	-	-	-	7.305
Water,	-	-	-	-	-	-	-	1.500
								97.945

Were we to consider these constituents as all belonging to the chemical constitution of the mineral, it would be a compound of,

9 atoms silicate of alumina,

3½ atoms silicate of lime,

1⅓ atoms silicate of iron,

1 atom silicate of potash.

Which of these constituents are only accidental, and which are essential to the constitution of the mineral, can only become known, when Nuttallite from different localities shall have been subjected to examination.

*Note.* This mineral was noticed by Dr. Wm. Meade about four years ago, in Silliman's Journal, vol. vii. p. 52, under the name of *elaölite*. The specimens examined by Mr. Brooke, it appears, were imperfectly crystalized, so that the structure of the mineral could not be determined with great accuracy. I have seen it in very perfect, though minute, rectangular prisms, terminated by four-sided pyramids, which afforded measurements by the reflecting goniometer very similar to those of *scapolite*.

## 31. ARSENIET OF ANTIMONY.

Although this species has not yet found its way into mineralogical treatises, it is by no means uncommon. The specimen in my collection, comes from Allemont, in the department of Isere, in France. I got it from Mr. Heuland.

It is not crystalized; but has a bluish-gray color, and the metallic lustre. Texture fine, granular. Sectile, but not malleable. Soft.

Specific gravity 6.130. Not altered by exposure to the air.

Before the blow-pipe it fuses and sublimes in a white smoke, having a strong arsenial smell, leaving scarcely any visible residue.

Its constituents were found to be,

Antimony,	-	-	-	-	-	-	46.612
Arsenic,	-	-	-	-	-	-	38.508
Loss,	-	-	-	-	-	-	14.880
							<hr/> 100.000

This indicates a compound of,

1 atom antimony,	-	-	-	-	-	-	5.5
1 atom arsenic,	-	-	-	-	-	-	4.75
							<hr/> 10.25

The specific gravity is considerably above the mean, which is 6.056, showing that the two metals have contracted in the act of union. This probably implies a considerable affinity to exist between them.



Perhaps we may view it as a compound of,

1 atom disulphuret of iron,	-	-	-	-	9
1 atom disulphuret of arsenic,	-	-	-	-	11·5
					20·5

This at least accords with the analysis. The specific gravity of this mineral indicates a considerable condensation in the constituents. The mean specific gravity of 3·5 iron, 4·75 arsenic, and 2 sulphur, is only 5·681. The condensation, therefore, amounts to about two-ninths of the whole specific gravity.







REMARKS on the *Prunus americana* of Marshall. By WM.  
DARLINGTON, M. D. With a plate.

Read May 18, 1829.

NOTWITHSTANDING the progress which has been made in American Botany, our native species of PRUNUS continue to be involved in much obscurity and confusion. The descriptions are, for the most part, so vague and imperfect, as to leave the student in doubt respecting the species intended; and in some instances, it would seem that the same specific names had been applied to entirely distinct plants. This confusion has arisen from a neglect to notice the proper discriminating characters: and especially that important one, which, in this family, is afforded by the *fruit*. The earlier botanists who explored our country, being mostly foreigners, and transient visitors, appear to have had a very imperfect knowledge of several of the species; and succeeding authors have too often contented themselves with copying the descriptions of their predecessors, and coupling names with those descriptions at random, instead of examining the plants for themselves. These observations are strikingly applicable to the *Prunus americana* of the late Humphrey Marshall. This species, commonly called red plum, or yellow plum, is well known throughout Pennsylvania, and probably in several other states. When I published my "Catalogue of Westchester Plants," not finding a satisfactory description of this plum in any work, except that of Marshall, (who was a resident of this vicinity,) I concluded it must be very limited in its range; but I have since had occasion to observe that it is quite common from the Delaware to Lake Erie. I also saw it in the western parts of New-York; and, in one instance, on the shore of the Hudson, near West Point. I have little doubt that it may likewise be found

in Canada.\* Being surprised to find the species so extensively distributed and yet so imperfectly and obscurely described, I was induced to procure the accompanying plate, for the purpose of aiding to determine its character. It is a curious fact, that although Marshall, in his *Arbustum americanum*, gave a pretty good description of this plum so long ago as 1785, yet no subsequent botanist, that I know of, has noticed that description, nor given any clear and satisfactory account of the plant itself. On the contrary, the modern books have only increased the uncertainty, and rendered "confusion worse confounded."

There can be no doubt that Muhlenberg was well acquainted with this species; and it is probable that the absurd name, *nigra*, is intended for it in his Catalogue, as it stands thus—"P. *nigra* (*Americana*), Yellow Plum!" What the P. *nigra* of Aiton, Willdenow, Persoon, Pursh, &c. really is, I have not the means of ascertaining; but a part of the description, at least, (viz. "petiolis biglandulosis,") is not applicable to the one in question.

Although Muhlenberg gives the P. *hiemalis*, as a *distinct* species from the foregoing, yet Michaux's description of the P. *hiemalis* seems to be intended for our plum, except where he says, "fructus *nigricans* ..... *hieme* edulis," which, I apprehend must be a mistake. I doubt, indeed, whether any plum in the United States, can with propriety be called a *winter* plum. Mr. Elliott, in the description of his P. *hiemalis*, comes still nearer to our plum than Michaux has done: and he remarks, further, that what is commonly called the winter plum in the low country, really ripens in July and August. The *Prunus americana* also matures its fruit in August; and I strongly incline to the belief that they are identical, though Mr. Elliott has unfortunately omitted to mention the *color* of the ripe fruit of his P. *hiemalis*. As to Pursh's plant of this name, if

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\* It grows abundantly in several parts of Massachusetts, particularly in the neighbourhood of Amherst.—PUB. COMM.

his "r. v." is correctly appended, it is very clear that he refers to a totally distinct species, the fruit being "small, black, extremely astringent, but eatable in winter; called *Black choke-cherry*." Mr. Nuttall, in his *Travels in Arkansas*, speaks of the *Prunus hiemalis* as being a "gray plum." Such are the contradictory notices which the books afford of this plum: and I am not aware of any authorities which throw additional light on the subject. It is rather surprising that Marshall's account of it should have been so uniformly overlooked, as his descriptions were generally, and in this instance undoubtedly, made from personal observation; and, although couched in a familiar style, they are for the most part very accurate. I will transcribe his notice of this species.

"*PRUNUS americana*.—*Large yellow sweet plumb*.—"This generally rises to the height of twelve or fifteen feet, spreading into many stiff branches. The leaves are oblong, oval, acute pointed, sharply sawed on their edges, and much veined. The flowers generally come out very thick round the branches, often upon thick short spurs, and are succeeded by large oval fruit, with a sweet, succulent pulp. We have a great variety of these, growing naturally in a good moist soil, with reddish and yellowish fruit, but differing much in size, taste and consistence."

The description of the leaves, stipules, &c. of *P. hiemalis*, by Michaux, and especially by Mr. Elliott, applies very well to our plant, as far as it goes. The leaves vary somewhat in form, being oval, oblong-ovate, and sometimes obovate; and in this last case, particularly, ending with an abrupt and strong acuminations. They are for the most part acutely and doubly serrate. The stipules are compound, mostly three-parted, the segment setaceous or lance-linear, and fringed with short setaceous teeth, bearing small glands on the points. The pedicels are glabrous, aggregate 2 to 5 (usually 3 or 4,) but the fruit is mostly solitary. The calyx-segments are pubescent, lance-linear, rather obtuse, and generally with two or three minute, setaceous teeth at the apex. The petals are oval, or obovate.

very obtuse, or rounded, and frequently with small crenatures at the end. The young branches are slender and virgate; the older ones rugged, with short spine-like processes, or spurs, which bear leaves and flowers, and afford a good illustration of the fact, that spines are merely abortive branches.—The *fruit*, when mature, is of a reddish yellow, or a blending of both colors, the red sometimes predominating, and it varies, also, considerably in size. When it has been long and carefully cultivated, I have seen the fruit as large as a common apricot; but in its wild state it is generally not more than half, and sometimes scarcely one third that size. The quality is equally affected by culture. When fully ripe, the pulp is sweet and luscious; but the skin is thick, coriaceous, and acerb, and always rejected in eating the fruit.

The plate which accompanies these remarks, was engraved from a drawing made by an ingenious and accomplished young lady of this borough. It is an accurate representation of the specimen from which the drawing was taken, though I think the fruit, in this instance, was rather more *globose* than it usually is: when of a larger growth, especially, it inclines more to an oval form.

W. D.

West-Chester, Pennsylvania, May 9, 1829.



DESCRIPTION of the Species of North American Tortoises.  
By Major J. LE CONTE of the U. S. Army, F. L. S. &c.

Read December 7, 1829.

NOTWITHSTANDING all that has been written on the subject of American Tortoises, they appear to be as yet but imperfectly known. It is therefore hoped that this endeavour to reduce our knowledge of these animals to some degree of certainty, will be favorably received. It is not offered as any thing perfect, but merely contains descriptions of such species as have fallen under my own observation. Many more undoubtedly yet remain to be described and named, and there is reason to believe, from certain scarcely reconcileable differences observed in one or two species, that some confusion yet exists in the determination of their true characters.

I have enumerated and described in this paper, exclusive of two that I do not consider well established, seventeen species; two more than have been attributed to this country; and, at the same time, have shown as having no existence, ten that had been received by the highest authority in Europe. It is to be hoped that the most scrupulous caution, as well as the long time, and the minute attention devoted to a favorite subject, have made me avoid many errors which others have fallen into.

In Daudin's Natural History of Reptiles, which contains the descriptions of fifty species of this genus, collected from all parts of the world, fifteen at least are non-entities, being either extremely young, and therefore having no character, or else mere varieties. Fourteen of his species are inhabitants of this country, but two of these are duplicates of others. Schoepfi has done better, but of the twenty-four species which he describes, three should be stricken out. More detailed ob-

servations on these errors, will be affixed to those species to which they apply.

With the exception of *Trionyx*, the name of the old Linnean genus *Testudo* has been retained, because I could not conscientiously adopt any of the modern divisions which have been proposed. The monstrous absurdity which runs through these is as shocking to all natural method, as it is insulting to common sense. Taking Merrem's division as the newest and most approved, what can we think of the *Testudo Muhlenbergii* being separated from the genus *Emys*, and placed in what he calls *Chersine*; again, who would have dreamed of uniting the *Testudo clausa* with the *T. pensylvanica* and *T. odorata*; and what is still worse, making an accidental variety of the last species, which belongs to his *Terrapene*, a different genus, *Emys*? Can a system which admits of such absurdities, be conformable to nature or to sense?

Were I to propose a division of these animals into different genera, it strikes me that the following would be the most natural:

First.—Such as have the sternum furnished in a greater or less degree with wings which are a prolongation of the pectoral and abdominal sections, and joined to the chest by bony commissures: these wings are generally supported on each side by a smaller bony process, furnished with a plate, which may be termed the supplementary plate of the wings. The marginal plates are twenty-five, and the sternal twelve. This would include the *Chersine* of Merrem, (*Testudo* of others,) and the *Emys*; but if all the species of the former have the two caudal marginal plates united into one, as is the case in the only species which we have, this character, joined with the indistinct toes and the terrestrial habit, would separate it from the other.

Second.—Such as have the sternum joined to the shell by bony commissures, but the supplementary plates interposed between the shell and the wings, the sternum generally (in

young ones always,) more or less jointed: marginal plates twenty-three, sternal eleven.

Third.—Such as have the sternum joined to the shell by a membrane, as in the *T. clausa*: in this the sternum is bivalve, but whether this should be taken as a generic mark, remains yet to be determined. Some European species, I believe, have the sternum joined to the shell in the same manner: marginal plates twenty-five, sternal twelve.

Fourth.—Such as have the sternum joined to the shell by wings, which are a prolongation of the pectoral sections alone, the abdominal being wanting,) and the supplementary plates interposed between the shell and the wings: marginal plates twenty-five, sternal ten. This is our *T. serpentina*.

These observations relate only to the Tortoises which are natives of our country; how far they may be applicable to those which inhabit Europe and Asia it is impossible to say, as there is no possibility of inspecting a numerous collection of the species of this genus.

## I. TRIONYX.

### I. TRIONYX FEROX.

Testa cartilaginea, ovalis, integerrima, antice ad marginem tuberculata, disco lineis brevibus, longitudinalibus, tuberculatis: os labiatum, antice nudum, labiis revolutis oppositis: pedes antici squamis tribus latis et acutis supra et antice, et duobus tuberculis oblongis postice instructi; pedes postici squama unica infra et postice: cauda brevis.

*Testudo ferox*, Gmel. &c. *T. cartilaginea*, ejusd. *T. Boddaerti*, Schneider. Leipz. Mag. zur. Natur. und Oecon. 1706.

III. p. 263. & II. *Trionyx spiniferus*, (spinifer) Le Sueur, Mémoires du Museum d'histoire naturelle, ann. 8. fascic. 4, p. 267. Soft-shelled turtle, vulg.

Shell oval, entire, very much depressed, bony in the middle, cartilaginous on the sides, dusky, irregularly mixed with brown, furnished on the fore part of the margin with thickly set round and pointed tubercles, and on the disc with short longitudinal raised and tuberculated lines, which in young ones are only perceptible on the hind part; sternum white, entire, oval and ample on the fore part and extending beyond the shell, bony only in the middle, hind part oval, suddenly contracting from the wings, reaching but half way to the end of the shell and bony to the edge. Skin above cinereous brown or brownish, dusky, in some spotted with darker, beneath white. Head large, tapering very much to the nose, which is extended, cylindric, and flexile: eyes contiguous; irids yellow, with a longitudinal black stripe through the middle; mouth naked before, (that is to say, the lips not reaching to the front of the mouth) furnished with broad, revolute opposite lips: neck very long; legs large; feet five-toed, palmate, the web extending along the hinder side of each leg as far as the first joint, that on the fore legs furnished with two processes like false toes, on the hind legs with one; fore legs with three broad and sharp scales on the upper and anterior, and two oblong tubercles on the posterior edge. Tail thick, short, not extending beyond the shell; vent on the tail, not more than half an inch from its point.

Length of the shell two feet; breadth one foot and a half; length of the head and neck, seventeen inches.

The young ones are nearly round, paler coloured, and generally marked on the back with subocellate spots of dusky.

Inhabit in the rivers of Georgia and Florida, and although not found in any of the streams which empty immediately into the Atlantic ocean to the northward of Savannah, they abound in all those which run into the Mississippi. The fact of two



young individuals having been taken in the Hudson, does not authorise us in saying that they inhabit there, although they are numerous in the Mohawk, and in all the lakes both above and below the cataract of Niagara. I know not from what circumstance the name of *ferox* has been taken, as they are not more inclined to bite than most other species of tortoise. Of all animals of the family of Chelonides, they furnish the most delicious and nourishing food. They are sometimes caught with the hook, but more frequently are speared or shot.

## 2. TRIONYX MUTICUS.

Testa cartilaginea, ovalis, integerrima, interdum ad medium dorsi depressa; glaberrima, antice nuda, sive ad marginem non tuberculata: os labiatum, antice nudum, labiis revolutis oppositis: pedes antici squamis tribus latis et acutis supra et antice, et duobus tuberculis oblongis postice instructi: pedes postici squama unica infra et postice: cauda brevis.

Le Sueur, Mémoires du Museum d'histoire Naturelle ann. 8. fascicul. 4, p. 267

This species, which was first noticed by M. Le Sueur, inhabits the north-western lakes and the western rivers along with the preceding: I cannot, however, as yet consider it perfectly distinct. The only real difference between the two consists in the perfectly smooth shell of this; I have examined eight different individuals of various sizes, which all agreed in this respect. I cannot, however, admit of two other characteristics pointed out by M. Le Sueur—first, that the margin of the shell is confounded with the neck when this is extended; the same is the case with regard to the *T. ferox*, the only distinction being the projecting tubercles in front; secondly, he



states that there is a longitudinal depression along the back.— This I could perceive in but one specimen, which indeed was the largest of all that fell under my inspection, being ten inches in length, and in this the depression was not more than three inches long, and might not have been visible had the animal been alive. The shell appears to be less varied and mixed with dusky than in the *T. ferox*, but this may be the result of youth. Upon the whole, I think it better to be cautious in admitting unrestrictedly this species, until future researches shall have shown to us one which has reached what may be considered the full size. All animals vary with age, and no description can be considered as correct unless taken from a perfect and full formed animal. The young of the other species differ almost as much from the old ones as this does.

### 3. *TRIONYX BARTRAMI.*

*Caput collumque appendiculis tuberculiformibus, retractilibus, instructa.*

In Bartram's Travels is the figure and description of another species of this genus, which he found in St. John's River of East Florida: the preceding specific character has been selected from them. The peculiar appendages on the head and neck render it perfectly distinct from every other species. He, however, represents his animal, with five claws on each foot. Now, although it is not impossible that this may be the case, for it does not follow that every species of this genus must have but three claws on each, any more than that the hard-shelled tortoises should have five before and four behind, (which, by the by, is not always the case,) yet, as the circumstance has been called in question by writers, this characteristic has been omitted in the description. Mr. Bartram was but little of a

naturalist, and very frequently incorrect in his observations. He may be erroneous here, and I think his figure evidently shows that the specimen from which it was taken was not in a very recent state ; the feet, therefore, may have been shrunk and drawn up, and some of their parts portrayed from memory, which in this case may have been treacherous. In the meantime it becomes our duty to search diligently for this animal, and to remove the obscurity which hangs over it.

## II. TESTUDO.

### 1. TESTUDO CAROLINA.

Testa valde convexa, dorso plana, fuscescenti-flavida, saturiore nebulata, scutis marginalibus posterioribus depresso-incurvis, duobus postremis coadunatis ; sternum anterius porrectum, posterius profunde emarginatum : caput genæque squamis oblecta : cauda brevissima.

*Testudo Polyphemus*, Daudin. *T. Tabulata*, Schoepff. 56, t. xiii. a young one. \* Mungôfa, vulg.

Shell very convex, flat on the top, bent inwards behind, and entire, brownish yellow, somewhat clouded with darker ; the plates, particularly the lateral and marginal ones, marked with

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\* The letter ô in this word has the sound of the French ou, or the English oo.

concentric striae; first vertebral plate pentagonal, the acute angle anterior, the rest hexagonal; first lateral plate triangularly four-sided, the rest oblong, nearly rectangular; the superior faces more or less angled; intermediate marginal plate small, oblong, the first unequally five-sided, the second oblong, the rest oblong or square, more or less angled on the superior face, the last on each side, that is to say, the two which are situated over the tail united into one. Sternum yellow, deeply emarginate behind, almost bifurcate; scapular plates four-sided, projecting forwards so as to form a spade-shaped process, which is rectangular in front, but oblique behind; brachial plates nearly square, oblique in front, so as to receive the angle formed by the posterior faces of the scapular plates; pectoral plates oblong, narrow, five-sided; abdominal plates four-sided, with a projection on the lower side near the outer face, the rest four-sided: sides of the shell rounded in such a manner as to render the marginal plates beneath scarcely distinct; the wings, likewise, are not distinguishable from the pectoral and abdominal plates; their anterior supplemental plate is oblong, and very narrow; the posterior triangular. Skin dusky cinereous; top of the head and checks scaly, the scales darker coloured; neck granulate, speckled with dusky; chin with a round wart on each side; jaws finely serrate, the lower yellowish, the upper one the colour of the skin; legs and tail scaly, fore legs very large, clavate, spotted beneath and behind with yellow, and furnished behind with a spur pointing backwards; hind legs of one colour, furnished with a spur like the fore legs, above which are two large, horny, contiguous scales; feet five-toed; toes very short, indistinct, claws 5-4: tail very short and thick.

Plates of the margin twenty-three; of the sternum twelve.

Length thirteen inches and a half; height five inches and three-quarters; length of the spade-form process in front of the sternum two inches.

Inhabit the pine forests of Georgia and Florida, and are never found north of Savannah river. Dig large and deep

holes in the earth, with a considerable hillock at the mouth.— They rarely venture out, except at night; their food is chiefly vegetable, and they commit great depredations in the fields of sweet potatoes, and in gardens when they can effect an entrance. Their strength is prodigious; one will easily walk with a man upon his back, and it has been said that they can support a weight of six hundred pounds. It is not difficult to tame them, and children will sometimes after rendering them docile, harness them to small wagons, and make them draw them about. The flesh is eatable, and they are often sold in the markets.

I have little doubt that this is the original *Testudo Carolina* of Linnæus. His description is—"pedibus digitatis, testa gibba, cauda nulla," (Linn. Sys. Nat. Edit. xii. p. 361.) From so short and imperfect a notice, it is difficult to draw any certain conclusion, and his quotation from Gronovius of "testudo pedibus digitatis, calloso-squamosis, testa ovali subconvexa, scutellis planis striatis, medio punctatis," is as inapplicable to this species as to the *Emys clausa*, which by most authors is considered as synonymous with Linnæus's *T. Carolina*, and seems to me rather to suit the *T. Muhlenbergii* of Schoepff.— But he likewise quotes Seba's *Thesaurus*, I. tab. LXX. fig. 1. for a representation of his animal, where is found a very large species, said to come from Curassoa, which, as far as a judgment can be formed from the extremely ill executed plates of that heavy work, very much resembles the Mungôfa. As for the country it is said to come from, nothing can be drawn from this against our position, for Seba is very inaccurate in noting the native countries of the animals which he possessed. But Gmelin, in his detailed description, certainly had before him this tortoise, for he says, "caput subobtusum squamis callosis obtectum, scuti incisura anterior lunata, margo acutus, scutella lata, plana, margine striata, medio excavato-punctata; sternum antè truncatum, posterius bifidum:" the scaly head, which is peculiar to this species, and the shape of the sternum, for-



bid its being considered as any other. I have, therefore, restored to it what I consider the original Linnæan denomination. Although the name is not unobjectionable, yet any thing is preferable to the ridiculous appellation of *Polyphemus*.

The young ones have a prominent boss in the centre of each of the plates, which are also deeply marked with concentric striæ: from one of these Schoepff has made his *T. tabulata*.

## 2. TESTUDO FLORIDANA, L. C.

Testa ovalis, ecarinata, longitudinaliter rugosa, fusco-nigra lineis irregularibus flavis notata, lateralibus plus minus radiantibus; scutellum intermedium marginale triangulare, integerimum; maxilla inferior edentula.

Shell gibbous, oval, slightly emarginate behind, ecarinate, longitudinally rugous, dark brown, with numerous irregular lines of yellow, those on the lateral plates more or less radiating. First vertebral plate seven-sided, urceolate, the smallest side anterior, the posterior angle a little re-entering; the second and third oblong, four-sided, angled on the sides; fourth five-sided; fifth triangularly seven-sided: lateral plates large, the first triangular, the rest oblong; intermediate marginal plate triangular, wider behind, the first five-sided, the rest oblong or square. Sternum yellow, emarginate behind, scapular plates triangular, a little projecting at the exterior and anterior angle; brachial plates triangular, with the apices truncate; pectoral, abdominal, femoral, and caudal, oblong, four-sided; marginal plates beneath yellow, with each a large black spot, including a yellow one. Skin dusky, head and neck striped with yellow, chin and throat paler, nearly cinereous; a broad yellow stripe commences at the point of the former and bifurcates a



short distance from its origin, including in the bifurcation a narrower one of the same colour; aside of this bifurcated line is another narrow one, and outside of that another, which bifurcates forwards at the angle of the mouth, one branch running along the lower jaw, and the other upwards towards the eye. Eyes yellow, with a broad, black stripe through the middle. Legs and tail scaly, striped with yellow; tail very short. Feet palmate, five-toed; claws, 5-4.

Plates of the margin twenty-five; of the sternum twelve.

Length, one foot three inches; height, seven inches and a half.

Inhabits in St. John's river of East Florida, and has been confounded by Mr. Say with the next.

### 3. TESTUDO RUBRIVENTRIS, L. C.

Testa ovalis, posterius dilatata, ecarinata, longitudinaliter rugosa, fusco-nigra, lineis irregularibus, latis, perpendicularibus, maculisque confluentibus rubris notata: scutellum intermedium marginale, lineare, serratum, dentibus parvis quinque vel sex; maxilla inferior dentata.

*Emys serrata*, Say, Journ. of the Acad. Nat. Scien. Phil. Vol. IV. part. 2. Red-bellied Tarapin, vulg.

Shell moderately gibbous, oval, wider and emarginate behind, ecarinate, longitudinally rugous, dusky, varied with confluent spots, and broad irregular lines of red, or red varied in the same manner with dusky. First vertebral plate narrower than the rest, urceolate, six-sided; the three next six-sided; the fifth seven-sided: lateral plates large, the first nearly triangular, the rest subrhomboidal, with their inferior sides a little angled:

intermediate marginal plate narrow, linear, finely serrate before, with five or six small teeth, the rest all entire, oblong or square, the ninth, tenth, and eleventh each projecting on its posterior exterior angle beyond the succeeding one; those above the hind legs larger than the rest, and spreading. Sternum emarginate behind, and with the marginal plates beneath red, varied, and spotted with dusky, the colors on the latter more distinct: scapular plates triangular, projecting a little beyond the others at the exterior and anterior angle: brachial plates triangular, with the apices truncate; caudal plates triangular, with the posterior angles rounded, the rest quadrangular; the femoral projecting at their posterior and exterior angle beyond the caudal. Skin black; head and sides of the neck with some obscure lines of yellow; throat with four lines of red or yellow, one on each side lateral, the next commencing at the chin and bifurcating a short distance from its origin, the fourth commencing in the middle of the bifurcation and running along the middle of the throat. Lower jaw toothed, the middle tooth the longest and largest, upper jaw hooked at the tip and emarginate, as if to receive the middle tooth of the lower jaw. Eyes yellow, with a broad, black stripe through the middle. Legs and tail scaly, striped and spotted with red: feet palmate, five-toed; claws 5-4.

Plates of the margin, twenty-five; of the sternum, twelve.

Length eleven inches, height four inches.

Inhabit in rivers from New-Jersey to Virginia, chiefly, I believe, in such as are rocky; in the Delaware, near Trenton, they are very numerous. This species has been described by Mr. Say as the *Emys serrata*, to which it has no resemblance, none of the marginal plates being serrate, and the back being destitute of a keel. Is eaten, and considered as tolerably good.

## 4. TESTUDO RETICULATA.

Testa ovalis, posterius dilatata, ecarinata, longitudinaliter rugosa, fusco-nigra, lineis brevibus flavis reticulata, collum prælongum caputque flavo-lineata.

*Emys reticulata*, Merrem. Yellow-bellied Tarapin, vulg.

Shell moderately gibbous, oval, wider and subemarginate behind, ecarinate, longitudinally rugous, dusky or dark brown reticulate with short yellow lines, which form spaces in some degree shaped like the plates; a line of the same colour extends along the middle of the back. First vertebral plate almost pentagonal, broader on the forepart; the second hexagonal, with sometimes a double sinus on its anterior face, but oftener without; the third hexagonal, a little re-entering on its posterior side; the fourth hexagonal, broader, and rounded on its anterior face, so as to enter the sinus of the third, narrower and sometimes emarginate behind; the fifth heptagonal, rounded on its two posterior sides: lateral plates large, subrhomboidal, the first with the sides antiparallel, the two next a little angled on their superior faces: intermediate marginal plate narrow, oblong, entire, the rest nearly square; those above the hind legs broader, and spreading, all of them with a yellow perpendicular line through the middle. Sternum emarginate behind, very smooth, and with the marginal plates beneath yellow, the latter (except those anterior to the brachial plates) sometimes with each a large black spot placed at the junction; a broad black bar also sometimes extends along the wings (frequently two only of the marginal plates on each side have a black spot and the hinder part of the wings another—sometimes again the wings are marked with a broad black bar, and there are no

spots,) scapular plates triangular, extending beyond the others, with a small projection at the exterior angle directed forwards; caudal plates triangular, with the posterior side rounded, the rest quadrangular. Skin dark brown or dusky, neck very long; head and neck above, with numerous longitudinal stripes of yellow, four of them extending the whole length of the neck, and very distinct; the rest, except a very short one in the middle between the eyes, rather indistinct; cheeks striped in the same manner with a bright yellow line reaching from the top of the eye to the tympanum, and another broader one from the bottom of the eye dilated at its extremity, and turning towards the throat; jaws, chin, and throat yellow; jaws striped with dusky, chin with transverse waving lines of the same, throat striped with brighter yellow; eyes yellow, with a broad black stripe through the middle. Legs and tail scaly; fore legs dusky, yellow on the inner half, and sometimes striped with yellow; hind legs and tail, beneath yellow, the latter striped above with the same. Feet palmate, five-toed; claws 5-4.

Plates of the margin twenty-five; of the sternum twelve.

Length of the shell eight inches, height three inches and a half: length of the head and neck, four inches.

Inhabits in ponds of the southern states, whence it was first brought to the notice of naturalists by the late Mr. Bosc. It has not been observed further north than Fayetteville, in North Carolina. It is most remarkable for the extraordinary length of its neck, which when protruded from the water, exactly resembles the upper extremity of a serpent. Flesh very good.



## 5. TESTUDO SERRATA.

Testa gibba, subrotunda, carinata, longitudinaliter rugosa, fusco-nigra, lincis irregularibus subradiatis flavis; scutellum intermedium marginale angustum, lineare, subsemicylindricum, porrectum, genæ macula magna flava; scutella marginalia posteriora serrata.

*Emys serrata*, Merrem. Yellow-bellied Tarapin, vulg.

Shell gibbous, oval, almost round, scarcely wider behind than before, emarginate behind, carinate, longitudinally rugous, brownish-dusky marked with irregular lines of yellowish, those on the lateral plates subradiating. First vertebral plate urceolate, much wider behind than before, the second, third and fourth six-sided, the fifth seven-sided, resembling a triangle with its apex truncate, and its base cut into four sides; lateral plates (except the last, which is small and square) large, subrhomboidal, with their superior side a little angled; intermediate marginal plate, narrow, linear, subsemicylindrical, subacuminate and projecting; the rest either square or oblong, the first and second projecting beyond the others, and generally two-toothed, the first very deeply, the second slightly, the five posterior plates on each side two-toothed, so that the shell is deeply serrate behind, two marginal plates over the tail rather bent down. Sternum emarginate behind, and with the marginal plates beneath yellow; the scapular, and brachial, and generally all the marginal plates with each a large, round, or oblong black spot; scapular plates triangular, extending beyond the others, with a small projection at the outer angle of each directed forwards; brachial plates triangular, with the apices truncate, the rest quadrangular; the femoral projecting at the exterior and posterior angle beyond the caudal. Skin



black; top of the head and sides of the neck striped with yellow, the stripes on the former narrow, faint, and curved at their origin, except one extending from the nose to the middle of the cranium, which is straight, broader, and more distinct, and generally connected with another transverse one, which runs across the top of the nose between the eyes; upper jaw a little emarginate, the lower half yellow, the remainder black, with a few faint, indistinct yellow lines; lower jaw and throat black, the latter with three yellow stripes, the intermediate one bifurcating a little from its origin, the others lateral, nearly parallel, each bifurcating upwards to the eye near the joint of the jaw, and joining a large yellow spot on the cheek. Eyes yellow, with a broad black stripe through the middle. Legs and tail scaly; fore legs with three or four yellow stripes on the upper side, and sometimes as many beneath; hind legs beneath yellow, sometimes varied with black, with an abbreviated yellow line on the upper side near the edge; soles of the feet generally black. Tail short, yellow underneath, with a line of the same color on the top, which towards the base is bifurcate. Feet palmate, five-toed; claws 5-4.

Plates of the margin twenty-five; of the sternum twelve.

Length one foot, height six inches.

Inhabits the southern states in rivers and swamps; its most northern range appears to be the southern part of Virginia.— It is more numerous than the *T. reticulata*, but is not so good for food, its flesh being drier and less sapid. We are indebted for the first description of this animal likewise to *M. Bosc*.

#### 6. *TESTUDO CONCINNA*, L. C.

*Testa lævissima, glabra, ovalis, ecarinata, fusco-nigra, lineis maculisque flavis plus minus confluentibus, et subreticulatis: collum flavo lineatum, linea laterali antè bifurcata.*

*Emys reticulata*, Say, Journ. Acad. Nat. Sciences, Philad. Vol. IV. Part 2.

Shell oval, smooth, ecarinate, emarginate behind, brownish dusky, varied with differently formed and placed lines of yellow, those on the lateral plates somewhat reticulate, the spaces formed by them frequently filled with short lines of yellow, all of them more or less confluent. First vertebral plate hexagonal, the second, third and fourth likewise hexagonal, the lateral angles projecting out very far; the fourth less oblong than the rest, the fifth heptagonal, much broader behind; the first, second, and third lateral plates five-sided, the fourth quadrangular: marginal plates all marked either with a straight line, or a subquadrangle of yellow; the intermediate one small, oblong, the first projecting a little beyond the second and somewhat pentagonal, the rest more or less square or oblong, the ninth, tenth, and eleventh each projecting on its posterior face beyond the succeeding one. Sternum emarginate behind, and with the marginal plates beneath yellow, each of the latter with a large black spot at the junction; wings with a black longitudinal line confluent with the spots on the marginal plates opposite to them, scapular plates triangular; brachial plates triangular with the apices truncate; the rest more or less oblong or square. Skin black, head and neck striped with orange, the stripe on the side of the neck bifurcate on the fore part, one branch running to the eye the other to the chin, so that the jaw is embraced between them; stripe on the chin bifurcating posteriorly a short distance from its origin, and running along the throat, including a shorter one between its branches; jaws striped with yellow, the upper one slightly emarginate. Eyes yellow, with a broad black stripe through the middle.—Legs and tail scaly; fore legs above striped with yellow, beneath with three transverse and two longitudinal lines of the same; hind legs above obscurely striped with red, beneath irregularly marked with orange or yellow. Tail above striped

with red, beneath with yellow. Feet palmate, five-toed ; claws 5-4.

Plates of the margin twenty-five ; of the sternum twelve.

Length eight inches and a half, height three inches and three quarters.

Inhabits in the rivers of Georgia and Carolina, where the beds are rocky. I have never seen them below Augusta on the Savannah, or Columbia on the Congaree. This species has been confounded by Mr. Say with another to which it bears no resemblance. The *T. reticulata* is rough, while this is smooth ; but were any thing wanting to make it absolutely certain that this author is wrong in his *T. serrata* and *T. reticulata*, it is this—that I have examined the identical specimens which were carried by M. Bosc from this country to France, and from which Daudin drew up his descriptions, and have found them to agree, even in the most minute particulars, with the two species which I have described under those names.

#### 7. TESTUDO GEOGRAPHICA.

Testa ovalis, (disco obovato) emarginata, carinata, lævis, postice serrata, dentibus octo vel decem, olivacea, aut fusciscenti-cinerea, lineis brevibus, pallidioribus, irregularibus, subreticulatis notata.

*Emys geographica*, Say, loco citato.

Shell oval, (the disc more or less obovate,) emarginate both before and behind ; more or less carinate, smooth, except a few horizontal striæ on the lateral plates, olive brown indistinctly marked with short, irregularly placed lines of paler brown or yellowish, some of them reticulate ; keel black at the

posterior side of each plate. First vertebral plate hexagonal, slightly and sharply pointed in front, the posterior face curved in form of a prolate cycloid, the second, third and fourth hexagonal, the lateral angles acuminate, the anterior face of the second with a deep sinus receiving the projecting curve of the first plate, the fourth with a deep sinus on its posterior face, the fifth hexagonal, its anterior face curved like the posterior face of the first plate, and entering the sinus of the preceding one : first lateral plate six-sided, second and third pentagonal, the lower faces slightly divided into three, the fourth quadrangular, its lower face divided into two : marginal plates edged outwardly with yellow, the intermediate one triangular, its apex pointing forward, truncate and three-toothed, the first pentagonal, projecting at its posterior and exterior angle beyond the next, the rest square or oblong, the second projecting like the first, the eighth, ninth, tenth and eleventh wider and spreading, each projecting beyond the preceding one, the ninth, tenth, eleventh and twelfth two-toothed, so that the posterior edge of the shell is serrate, with eight teeth. Sternum deeply emarginate behind, and with the lateral plates beneath yellow : scapular plates small, triangular with a small projection at the outer angle directed forwards ; brachial plates triangular with the apices truncate ; pectoral plates narrow, oblong ; abdominal plates large, square ; femoral and caudal plates four-sided, the posterior face of the former and the anterior face of the latter oblique, the former also extends beyond the latter at the inferior and exterior angle ; marginal plates beneath marked with concentric lines of dusky ; wings striped with the same. Skin black : head and neck striped with yellow, the stripes frequently red towards their base, stripe on the top of the head reaching from the point of the nose, abbreviated and more distinct than the others, a large triangular yellow spot behind each eye, chin and throat striped with black and yellowish, the black stripes conduplicate. Legs and tail scaly ; legs striped and varied with yellow, particularly on the fore part ; claws yellow, with a black spot at the base of each :



tail short, striped with yellow. Eyes yellow, with a broad black stripe through the middle. Feet palmate, five-toed: claws 5-4.

Plates of the margin twenty-five; of the sternum twelve.

Length ten inches; height three inches.

*a.* Shell more gibbous, more distinctly carinate, with two remarkable prominent tubercles, on the second and third vertebral plates, smooth, except a few concentric striæ on the lateral plates, and some diverging rugæ on the others: colour cinereous brown with a few irregular marks of paler, the keel and fore-part of the vertebral tubercles more or less black; lateral plates with a dusky spot more or less distinct on the hind part of each; marginal plates outwardly edged with yellow, and with each a dusky spot on the hinder part, where it joins the next. First vertebral plate the smallest and narrowest, much elevated in the middle, somewhat urceolate, pentagonal, the acute angle in front, and very sharp, the second, third and fourth hexagonal, the fifth three-sided, the anterior face curved, the two others posterior and straight; first lateral plate six-sided, second and third five-sided, the fourth quadrangular; intermediate lateral plate small, oblong, wider and deeply emarginate behind, so as to receive the acute and projecting angle of the first vertebral plate, all the rest quadrangular; the exterior and posterior angle of the two first projecting beyond the rest, and each other, the eighth, ninth, tenth, eleventh and twelfth wider and spreading, projecting like the two first, the eighth, ninth and tenth slightly toothed, the eleventh and twelfth very much so, so that the posterior margin of the shell is deeply serrate with eight or ten teeth on each side. Sternum deeply emarginate behind, and with the lateral plates beneath yellow; scapular plates rather small, triangular, with a small projection at the exterior angle directed forwards; brachial plates triangular, with the apices truncate; pectoral plates oblong; abdominal and femoral nearly square, the anterior sides of the latter oblique; caudal plates nearly square; marginal plates beneath



marked with concentric lines of dusky, wings striped with the same. Skin black, top of the head with a straight yellow line reaching from the top of the nose to the middle of the cranium, a parallel shorter one on each side, and another shorter and oblique one, reaching from about the middle of the orbit of each eye to the one on the middle of the head; behind each eye is a curved yellow spot, which becomes a line towards the back part of the head, and joins a straight red line which runs down the back of the neck; upper jaw, cheeks, and neck, striped with yellow, the stripes on the last becoming red as they approach the head; above the hinder part of the upper jaw is a conspicuous yellow spot: lower jaw, chin and throat yellow, all of them striped with black, the stripes on the last in pairs and conduplicate. Legs and tail scaly, striped with yellow: claws yellow, with a black spot at the base of each.

Length six inches, height two inches.

A younger one was more gibbous; the first vertebral plate simply pentagonal; shell without any paler marks, except on the marginal plates; lateral plates with concentric striæ.

Inhabits Lake Erie and the western rivers; was first described by M. Le Sueur in the *Mémoires du Museum d'Histoire naturelle* Ann. 8 fasc. iv. p. 267—268. He seems to consider the variety  $\alpha$  as his *T. geographica*, and the other variety as a distinct species; yet the figure in the *Journal of the Academy of Natural Sciences of Philadelphia*, agrees better with this latter; neither of them, however, has the tail annulate with yellow. There are not sufficient differences between the two to constitute them separate species: I have examined a considerable number of both, but never found one that was ecarinate.

## I. TESTUDO INSCULPTA, L. C.

Testa ovalis carinata, fusca, lineis flavis striisque radiantibus, quæ striis concentricis intersecantur.

*Emys scabra*, Say, loco citato.

Shell oval, carinate, emarginate behind, all the plates with radiating lines of yellow and deeply radiating striæ, which are cut by other concentric striæ. First vertebral plate pentagonal, the second and third subhexagonal, the fourth heptagonal, very narrow behind, the fifth hexagonal, four of its faces anterior: first lateral plate heptagonal, the second and third quadrangular, the superior faces rather angled, the latter somewhat three-sided on the lower face, the fourth hexagonal: intermediate marginal plate small, oblong linear, the first pentagonal, projecting a little beyond the next, the rest more or less square or oblong, the ninth, tenth and eleventh each projecting beyond the preceding one, and sometimes revolute.—Sternum emarginate behind, and with the marginal plates beneath yellow, all the plates marked with a large black spot and with concentric striæ; scapular plates triangular, projecting beyond the brachial at the exterior angle; the rest quadrangular; the femoral projecting beyond the caudal at the exterior and posterior angle. Skin black: fore part of the throat speckled with red, hind part red speckled with black, a line which is yellow on the fore part and red on the hind, or altogether red or yellow, commences at the point of the chin, and runs along each side of the throat: jaws horn colour, the upper one emarginate, the lower with a few brownish spots: irids dark brown, pupil black, surrounded by a yellow ring.—Legs and tail scaly; feet palmate, five-toed; claws 5-4.

Plates of the margin twenty-five; of the sternum twelve.

Length eight inches, height two inches and three-quarters.

Inhabits the northern states in rivers and ponds: is fonder of leaving the water than any other aquatic species, and will remain uninjured in a dry place for some months.

Mr. Say has erroneously supposed that this is the *Testudo scabra* of Linnæus: without entering into the consideration of a question which has been so often discussed, and which has long ago been determined by M. Latreille, I shall merely observe, that every thing combines to prove Mr. Say mistaken. The reader is referred to what has been written on this subject by MM. Latreille and Daudin in their respective works.

#### 9. *TESTUDO PALUSTRIS.*

Testa ovalis, depressa, carinata, nigra vel fusca, pallidiore indistincte variata, striisque numerosis concentricis impressa: vel lævis, grisea, lineis concentricis nigris in utroque scuto.

*Testudo centrata*, Daudin. T. Terrapin, Schœpff. *Emys centrata*, Merrem. Salt-water Tarapin of the southern states.

Shell depressed, oval, carinate, emarginate behind, above dusky or brown, indistinctly varied with paler, all the plates marked with concentric striæ. First vertebral plate four-sided, the anterior face a little curved; or pentagonal, the second, third, fourth and fifth hexagonal, the three posterior faces of the last much smaller than the others; lateral plates large, more or less hexagonal, the second and third pentagonal, the fourth tetragonal, the sides antiparallel; or sometimes pentagonal; intermediate marginal plate oblong, rectangular, or triangular, with the apex truncate, the rest nearly quadrangular,

some of them rather inclining to the pentagonal form, those near the tail sometimes a little revolute. Chest emarginate behind, yellow, the plates marked with concentric striæ, and slightly varied with concentric lines of dusky, seldom more than two on each plate; scapular plates triangular; brachial plates obliquely four-sided, the exterior lateral face rounded; the rest quadrangular; marginal plates beneath yellow with a duskyish irregularly shaped ring, and frequently a black spot in the centre of each; wings marked in the same manner; supplementary plates frequently wanting. Skin cinereous, spotted with dusky. Irids the color of the skin; pupils black. Legs and tail scaly; feet palmate, five-toed; claws 5-4.

Plates of the margin twenty-five; of the sternum twelve.

Length seven inches, height two inches and three-quarters.

*α.* Smooth, with very few concentric striæ. Shell above gray, with concentric marks of black on each plate. Sternum yellow, spots on the skin larger.

*β.* Dark brown somewhat varied with black; lateral and marginal plates more or less marked with concentric striæ; vertebral plates smooth.

*γ.* With concentric striæ on all the plates, and black concentric marks on some of them.

It is unaccountable how this species has lost the very appropriate name given to it by Linnæus, when there could have been no doubt respecting it. It is found from New-York to Florida, and even in the West Indies, in salt water and always in the neighbourhood of marshes. As an article of food it is much preferred to every other species, particularly when dug out of the marshes in a torpid state; immense numbers of them are annually brought to market. The males are smaller, and have the concentric striæ more deeply impressed than the



females. The trivial name terrapin, which Schæpff has affixed to this species, is by no means appropriate, as the word is a generic term among us, and signifies land or fresh water tortoises as distinguished from marine, which it is well known are ridiculously enough called turtles.

#### 10. TESTUDO PICTA.

Testa oblongo-ovalis, lævissima, scutis antice fusciscenti-flavo marginatis; scutellis marginalibus flavo vel rubro pictis.

*Testudo cinerea*, Schæpff, tab. iii. fig. 3, is a young one.—*Testudo novæ hispaniæ lusitanis ragado d'aqua appellata*, Seba I. tab. lxxx. fig. 5. *Emys picta*, Merrem.

Shell oblong-oval, rather depressed, smooth, with a very small emargination behind, dusky brown, all the dorsal plates bordered with yellowish, or very pale brown, or more generally only the second and third row of dorsal plates edged on the fore part with yellowish; a longitudinal line of the same colour frequently runs along the middle of the back. First vertebral plate nearly quadrangular, wider on the fore part and elongated behind in the middle, so as to enter a sinus in the next; the second hexagonal, the third quadrangular; the fourth hexagonal, narrowed behind; the fifth heptagonal: first lateral plate triangularly-foursided, the superior face the smallest, and with the inferior face generally rounded; the second and third five-sided, the latter sometimes square; intermediate marginal plate emarginate, linear, narrowed before, so as to leave an open space resembling an emargination on each side; the rest oblong or square; the first finely serrate on the anterior face, all of them with a large red or yellow spot in the



middle, surrounded by concentric lines of the same. Sternum yellow, finely serrate before, and with a very small emargination both before and behind; scapular plates triangular, projecting a little beyond the rest; brachial plates triangular, with the apices truncate; caudal plates triangular, the posterior face rounded; the rest quadrangular; pectoral plates narrow. Skin black, an oblong yellow spot behind each eye, and another on the top of the back part of the head; upper jaw, chin and cheeks striped with yellow, throat and sides of the neck with red, being continuations of the yellow stripes on the chin and cheeks. Legs and tail scaly; fore legs with two red stripes on the upper side, and a few irregular spots of the same on the toes and beneath; hind legs with two red stripes on the under side, and some spots of the same above: tail with two yellow stripes above, and two red ones on the sides which unite beneath into one. Eyes yellow, with a broad black stripe through the middle; upper jaw slightly emarginate. Feet palmate five-toed; claws 5-4.

In some individuals the lateral plates are marked with a perpendicular curved yellowish line and sometimes are reticulate with yellow near the inferior face.

Plates of the margin twenty-five, of the sternum twelve.

Length nine inches, height four.

Inhabit only in the northern states from Canada to Virginia in ponds, never in streams of running water. Here they may be seen in great numbers, basking in the sun on rocks or logs, and plunging instantaneously into the water on the approach of any one. They vary much in the intensity of their color, and in the liveliness of the markings on the plates: the young ones, however, are always more brilliant than those which are more advanced. They die in a very few days after being taken from the water.

## II. TESTUDO PUNCTATA.

Testa ovata, lævis, nigra, flavo punctata.

*Testudo guttata* and *T. anonyma*, Schneider. *T. terrestris amboinensis*, Seba I. tab. lxxx. fig. 7.

Shell ovate, smooth, generally emarginate behind, ecarinate, black spotted with yellow, the vertebral plates with scarcely ever more than one spot, the lateral with from one to nine, the marginal with always one on each. First vertebral plate sub-quadrangular, rather wider before than behind; the three next hexagonal, the fifth heptagonal; all of them nearly equal in size: lateral plates larger, the first nearly triangular, the rest quadrangular: intermediate marginal plate linear, narrow, the rest all oblong or square, the first one projecting beyond the rest at its outer angle. Sternum emarginate behind, yellow, with large dusky blotches on the fore part and sides; or black, with a little red on the sides and middle, the plates marked with concentric striæ; marginal plates beneath yellow, those near the wings generally varied with dusky; scapular plates triangular, extending a little beyond the rest, with a small projection at the exterior angle directed forwards; brachial plates triangular, likewise extending beyond the next at the exterior and posterior angle; pectoral and abdominal plates oblong; femoral plates oblong with their lower faces oblique, projecting beyond the caudal at their exterior and posterior angle; caudal plates triangularly-quadrangular; supplementary plates of the wings unconnected with the wings, and placed on the under side of the fourth and seventh marginal plates. Skin black; head smooth; neck granulate, more or less spotted with yellow; jaws yellow, or dark horn color, or reddish brown, the upper one emarginate. Legs and tail scaly, the fore legs be-

fore red varied with black, behind black spotted with red or yellow ; hind legs before black spotted with red and yellow, behind red a little varied with black ; tail with a few yellow spots, region of the anus red. Eyes black, irids surrounded by a red circle. Feet palmate, five-toed ; claws 5-4.

*α.* Depressed ; very little convex, wider behind, marginal plates above the hind legs very spreading : head with a few yellow spots, neck with many, particularly on the under side.

Length four inches and a half, height one inch and three-eighths.

*β.* More convex ; spots on the shell large, marginal plates beneath sometimes reddish, those over the hind legs not spreading. Sternum black, a little red on the middle and edges ; sometimes the jaws, fore part of the throat, and a line running from the lower jaw along the side of the neck, orange.

Length four inches and one eighth, height one inch and three quarters.

*γ.* Convex like the last ; shell not emarginate behind, with fewer spots, rarely any on the lateral plates ; plates of the disc with concentric striæ ; marginal plates over the hind legs not spreading, the first one not projecting beyond the rest, all of them beneath very dark brown, varied with yellow. Sternum very dark brown, yellow on the middle and on the sutures of the plates.

Length three inches and three quarters, height one inch and a half.

*δ.* Convex like the last ; plates marked with concentric striæ ; and with generally but one spot on each : head with four yellow spots on the top, another at the corner of each eye, and a large one on the side of the hind part of the head extending and growing narrower to the neck.

Length four inches ; height one inch and three quarters.

Inhabits from one end of the United States to the other, in small clear streams, never in ponds or muddy water. The variety  $\alpha$ . differs very much in its appearance from the rest.

## 12. TESTUDO MUHLENBERGII.

Testa oblongo-ovalis, gibbosa, carinata, postice subdilata lateribus medio contractis, nigrescenti-fusca areolis lineisque subradiantibus, flavis, striisque concentricis in utroque scuto; capitis latera macula magna aurantiaca.

Schœpff. 132, tab. xxxi. *Emys biguttata*, Say, loco citato. *Chersine muhlenbergii*, Merrem.

Shell gibbous, oblong-oval, carinate, a little wider and emarginate behind, rather contracted on the sides near the middle, dusky-brown with yellowish or reddish areolæ and subradiating lines (sometimes very indistinct,) and concentric striæ on each plate, which last in aged ones are only perceptible on the lateral plates. First vertebral plate pentagonal, the second hexagonal the lateral angles rounded, the third and fourth hexagonal, the fifth heptagonal, the upper face rounded; lateral plates, except the last, which is generally smaller, subequal, the first four-sided, the lower face rounded, the second and third pentagonal, the fourth square; intermediate marginal plate linear, very small, the three next large, the four next small, the remainder large and spreading, all of them oblong or square, with one or more reddish spots on each. Sternum deeply emarginate behind, very dark brown, varied with yellow or red, particularly towards the middle; scapular plates triangular, projecting at the exterior angle, the rest quadrangular, the femoral projecting beyond the caudal at the inferior and exterior angle, all of them marked with concentric striæ: supplementary plates



of the wings very small, the posterior one scarcely perceptible. Skin black, cheeks and sides of the back part of the head with a large irregular orange spot extending to the neck : jaws with a few spots of red, the upper one emarginate. Legs and tail scaly, the former varied on the inner side with red ; toes and tail varied on the top with the same ; irids brown. Feet palmate, five-toed ; claws 5-4.

Plates of the margin twenty-five, of the sternum twelve.

Length three inches and a half, height one inch and a quarter.

Inhabits New-Jersey and Pennsylvania in clear streams ; is not very common : the old ones are frequently almost entirely smooth. This species was sent to Schoepff by the Rev. H. Muhlenberg, so deservedly celebrated for his botanical knowledge ; Schoepff, however, very strangely considered it as a variety of the *T. punctata*.

### 13. TESTUDO PENNSYLVANICA.

Testa ovalis, lævis, dorso plana, ecarinata, nigra vel fusca, scutis vertebralibus imbricatis. Sternum ut plurimum antice et postice mobile. Caput magnum, obtusum, maxilla superiore hamata : brachia duabus plicis vel squamis magnis posterioribus ; cauda apice unguolata.

*Testudo lutaria pensylvanica*, Edward's Gleanings, Part II. p. 77. tab. cclxxxvii. *T. tricarinata*, Schœpff, is probably a young one. *Kinosternon pensylvanicum*, Bell, Zool. Journal, No. VII. *Cistudo pensylvanica*, Say, loco citato. *Terrapene pensylvanica*, Merrem. Mud tortoise, Pennant Arctic Zoology, Supplem. p. 80. Mud tarapin of the southern states.



Shell gibbous, flattened on the back, ecarinate, oval, very slightly emarginate behind, dusky or brown of different degrees of intensity. Vertebral plates more or less imbricate behind; the first long, narrower than the rest, resembling a triangle with its apex pointing backwards and truncate, a little elevated along the middle; second, third and fourth hexagonal, the anterior angles rounded, the lateral acuminate, the fifth triangularly-pentagonal; lateral plates large, pentagonal, except the first which is quadrangular; marginal plates small, forming a narrow border around the shell, which is separated from the lateral plates by a deep groove as far as the tenth, the tenth and eleventh wider than the rest, continuous with the last lateral and vertebral plates, being only distinguished from them by the sutures; intermediate marginal plate square, the rest oblong. Sternum emarginate behind, jointed at the pectoral plates, and sometimes also imperfectly at the posterior face of the abdominal, yellow (of which colour likewise is the under side of the marginal plates), each plate with a dark brown border where it joins the next; scapular plate single, triangular; abdominal plates foursided, the rest triangular; supplementary plates of the wings triangular, interposed between the wings and the marginal plates, the posterior one very large. Skin dusky cinereous, inclining to brown, head blunt, large, and with the upper side of the neck, spotted with pale brown; jaws, sides of the neck, throat and chin more inclining to cinereous; upper jaw with a hooked tooth; chin with two warts. Legs naked, fore legs with two folds or large scales on the hinder side, and a few small scales beneath at the insertion of the feet; hind legs with eight or ten scales beneath. Irids dark brown: tail naked, short, furnished at the tip with a blunt nail. Feet palmate, five-toed; claws 5-4.

Plates of the margin twenty-three, of the sternum eleven.

Length four inches, height one inch and three quarters.

Inhabits from New-Jersey to Florida in ditches and muddy streams: has a strong and not disagreeable odour of musk. Preys upon small fish and other aquatic animals, bites readily

at the hook, and is therefore very troublesome to anglers; it takes hold of the bait very gently and draws it slowly to the bottom of the water, and is frequently several minutes before it seizes it in such a manner as to allow of its being taken.

#### 14. TESTUDO ODORATA.

Testa lævis, gibba, plus minus carinata, sæpe dorso plana, nigra, scutis vertebralibus imbricatis. Sternum sæpius antice mobile; postice profundissime emarginatum; scuto scapulare parvo. Caput subacuminatum: brachia tribus plicis vel squamis magnis anterioribus; cauda simplici.

*Testudo glutinata*, Daudin, and *T. pensylvanica sterno immobili*, Schoepff. 110. tab. xxiv. fig. B. are the same. *Cistudo odorata*, Say, loco citato. *Sternothærus odoratus* and *Boscii* Bell, Zool. Journ. No. VII. *Kinosternon shavianum*, ejusd. ibid. *Terrapene odorata* and *Boscii*, Merrem. Mud tarapin of the southern states.

Shell gibbous, more or less carinate, oblong-oval, generally not emarginate behind, black or dusky, mixed and clouded with brown, sometimes with a few radiating lines of the latter colour on the lateral plates. Vertebral plates imbricate behind, the first long, narrow, and triangular, with the apex pointing backwards, and truncate, the second, third, and fourth hexagonal, the anterior angles rounded, the lateral acuminate, the fifth triangularly-pentagonal; lateral plates large, pentagonal, except the first which is four-sided, with the lower face rounded; intermediate marginal plate small, subtriangular, the rest oblong, forming a narrow border which is separated from the lateral plates by a deep groove as far as the tenth; the tenth and eleventh wider than the rest, continuous with the last late-

ral and vertebral plates, being only distinguished from them by the sutures. Sternum small, narrow, very deeply emarginate behind, sometimes imperfectly jointed at the pectoral plates, dirty yellowish, each plate often bordered with dusky; scapular plate single, very small, subtriangular, irregular in shape; brachial plates projecting beyond the pectoral at the exterior and posterior angle, small, irregular, sometimes triangular, sometimes four-sided, frequently one of them triangular, the other four-sided; the abdominal the largest, the femoral approaching to a triangular form; supplementary plates of the wings irregular, interposed between the wings and the marginal plates, the posterior the largest. Skin dusky, head rather pointed, jaws inclining to yellow, an interrupted yellow line proceeds from the nose above the eye along the side of the neck, and another similar one from the bottom of the eye towards the throat; throat and sides of the neck granulate or papillous; chin furnished with several small warts. Legs naked; forelegs with three folds or large scales on the fore part, and somewhat granulate, sometimes with a few small scales beneath at the insertion of the feet; hind legs granulate beneath and with a few small scales at the base of the feet. Eyes black, pupil surrounded by a yellow ring. Tail naked, simple, furnished above with numerous pointed warts, which are somewhat disposed in rows. Feet palmate, five-toed; claws 5-4.

Plates of the margin, twenty-three; of the sternum, eleven.

Length three inches and a half, height one inch and a half.

*α.* Shell dark brown, very convex and sharp on the back, with a conspicuous keel; plates marked with radiating lines of dusky, and with concentric striæ.

*β.* Shell flattened along the middle of the back, so as to resemble the *T. pensylvanica*.

In old individuals the joint in the sternum becomes obsolete.

Inhabits with the last, which it entirely resembles in habits and odour. The synonyms quoted to this species show more plainly the absurdity of the proposed divisions of the tortoise family than any thing which I can say. I therefore omit the considerations which would obviously present themselves to the mind, and leave every one to draw his own conclusions.

### 15. TESTUDO CLAUSA.

Rotunda, gibbosissima: testa carinata, ut plurimum, nigra, vel fusca, flavo-variegata. Sternum ad testam membrana junctum, bivalve, valvis antice et postice singulatim cludentibus, et testam arcte obserantibus.

*Testudo caroliniana*, Schneider 33. No. 7. *T. virginica*, Grew Mus. tab. iii. fig. 2. *T. Carolina* of most authors. *T. virgulata*, Daudin, is the same. *Cistudo clausa*, Say, loco citato. *Terrapene clausa*, Merrem. *Terrapene carolina*, *T. maculata*, *T. bicolor*, *T. subulosa*, Bell Zool. Journ. No. VII. are the same. *Chequered tortoise*, Pennant Arctic Zool. Sup. 79. Land turtle of the northern states; Pine-barren tarapin of the southern.

Shell round or oval, very gibbous, almost hemispherical, carinate, entire, dusky or brownish yellow, with spots or stripes of yellow or greenish, the stripes disposed in radii; and conversely; most generally also with concentric striæ. First vertebral plate pentagonal, urceolate, second, third and fourth hexagonal, all of them more or less angled on their anterior



faces, fifth pentagonal ; first lateral plate four-sided, narrower on the upper face, and curved on the lower, second oblong-pentagonal, third and fourth four-sided, the latter narrower above, the two superior angles nearly obliterated ; intermediate marginal plate very small, linear or oblong, generally projecting beyond the others, the rest quadrangular, some of them approaching to the pentagonal form, the ninth, tenth and eleventh frequently revolute. Sternum entire, joined to the shell by a membrane, bivalve, both the valves moving on the same axis, smooth, yellow, dusky, or dark brown, or mixed yellow and dusky, or dark brown spotted with yellow ; scapular and brachial plates triangular, the latter with their apices truncate ; pectoral and abdominal oblong, rectangular ; femoral and caudal triangular, the former with the apices truncate. Head and neck varied, or striped, or spotted with black, or dusky, or brown, and yellow or red ; throat black, or yellowish cinereous, or dusky, with a few red or yellow spots, or striped with yellow. Legs and tail scaly, dusky or cinereous, fore legs spotted with yellow, particularly above, hind legs with a few spots of red or yellow on the hind part and beneath, or entirely yellow beneath ; tail short, with a few yellow spots on the top. Upper jaw generally emarginate ; irids red or yellow. Feet palmate, five-toed ; claws, 5-4.

Plates of the margin twenty-five ; of the sternum twelve.

Length, six inches ; height, two inches and a half.

*α.* Very dark brown, obscurely spotted with yellow, with a few radiating lines of the same : sternum very dark brown with a few blotches of yellow : top of the head yellow ; jaws varied with yellow and black ; neck yellowish-cinereous spotted with yellow.

*β.* With larger and more distinct spots of yellow, some of them confluent and subradiating. Sternum yellow : jaws yellow striped with black, top of the head mostly yellow :



sides of the neck black, striped with yellow; throat yellow, varied with black.

γ. Shell brown, the plates marked with concentric striæ, and with numerous round and oblong spots of yellow; keel yellow: sternum yellow unspotted: head and neck black, spotted above, and varied on the sides with orange; chin and throat yellow; jaws yellow, the upper one slightly marked with brown. This is the *Testudo virgulata* of Daudin, and the description was made from the very specimen he possessed, compared with three others.

δ. Smooth, yellowish brown, with a few indistinct spots of dark brown: sternum yellow, unspotted: skin cinereous brown, fore legs darker, top of the head yellowish; jaws orange, the lower one marked with one or two dusky spots, sometimes unspotted; chin and throat yellowish, rarely marked with a few spots of dusky; hind legs and tail unspotted.

ε. Shell and sternum entirely very dark brown, without spots: plates deeply marked with concentric striæ.

Inhabits from Hudson's Bay to Florida, always in dry situations; in the northern states in hilly woods, and in the southern in pine forests. Naturalists who wish to bound and circumscribe nature within the narrow limits of their own systems and hypotheses, have striven hard to make this species not an exclusive inhabitant of the land; but it is as decidedly a land tortoise as any that exists: indeed the shape of its shell would render the water a very improper place for its habitation, nor would it probably feel much at home were it forced to seek its food along with its numerous congeners in ponds or rivers.

The shell is so hard and the animal so strong that it can

easily walk with a weight of sixty pounds on its back. Its food consists of fruit, insects, and the edible fungi, particularly the different species of clavaria. Many persons are in the habit of keeping them in their cellars, where they destroy snails, crickets, and other noxious insects; it may however be questioned whether they ever attempt, as has been said, to devour rats and mice; they are not well formed for the pursuit of such active animals, who have too much sense to suffer themselves to be caught by so sluggish a hunter. The same may be said of the ridiculous stories of their catching and destroying snakes. This species has been cited as an example of longevity among animals of the lower classes: all tortoises are long-lived; but the finding of an individual with a name and date engraven on its sternum proves nothing: the idle and the foolish are fond of inscribing their names every where, and may as well antedate the time by half a century, as state the true year of their attempts at immortality.

#### 16. TESTUDO SERPENTINA.

Testa ovalis, plus minus carinata, postice utrinque tridentata: sternum parvum, angustum, rhombiforme: caput magnum. mandibula superiore hamata; cauda magna, longa, cristata.

*Chelonura serpentina*, Say, loco cit. *Emys serpentina*, Merrem. *Serrated tortoise*, Pennant Arct. Zool. Supp. No. 6. Alligator tarapin of the southern states; loggerhead or snapping turtle of the northern.

Shell oval, rather depressed, more or less carinate, emarginate behind, above dusky or dark cinereous. First vertebral plate pentagonal, wider in front, the lateral faces rounded. the

second, third and fourth quadrangular, or slightly hexagonal, the fifth pentagonal: lateral plates marked near the base with concentric striæ, the first triangular with its apex truncate, and lower face rounded, the rest quadrangular with their lower faces slightly curved, the upper faces not angled; marginal plates oblong, the posterior ones widened, the intermediate very narrow, the tenth, eleventh, and twelfth projecting beyond each other so as to form three obtuse teeth on each side. Sternum small, narrow, lozenge-shaped, pointed and entire at both ends, and with the marginal plates beneath yellowish, wings narrow, five or six-sided, supplementary plates triangular, interposed between the wings and the marginal plates of the shell; scapular plates small, triangular; brachial plates triangular, their apices rounded; pectoral five-sided, the exterior posterior side small; abdominal plates wanting; femoral sub-quadrangular; caudal narrow, triangular. Head, neck, and limbs very large: skin above granulate, dusky, beneath warty, cinereous, or dirty white, or yellowish. Eyes brown, with a black line through the middle; jaws hooked, varied with yellowish brown and dusky, top of the head scaly; chin with two prominent warts: fore legs with five rows of sharp and broad scales, those on the hinder edge the largest; hind legs with six or seven large and broad scales beneath; tail scaly, very long, crested with six or seven prominences; claws 5-4.

Plates of the margin twenty-five; of the sternum ten.

Length of the shell twelve inches, height four inches and a half.

Length of the tail eight inches and four-fifths.

The young ones have the concentric lines on the plates more distinct: the vertebral and lateral plates are each furnished with an obtuse projection, so that the shell is tricarinate, these projections are marked with raised lines which radiate forwards, and on the lateral plates are wider and more prominent.

Inhabits from New-England to Florida in rivers, and seems to prefer muddy and impure water to that which is clear. It has also been sent to the Lyceum from Lake Superior by Mr. Schoolcraft. This species is very voracious in its habits and destroys great quantities of fish; it is also more ferocious than any other, and will seize with violence any thing presented to it, nor let go its hold even when the head is separated from the body: the wound inflicted by its bite is very severe. It is much sought after as an article of food, but when old the flesh is apt to be rank and disagreeable, at all times it possesses a strong musky odour; from which circumstance, as well as from its long and crested tail, it has received in the southern parts of our country the name of alligator tarapin.

The French naturalists appear to have described two species resembling this, the one, *T. lacertina*, answers exactly to our *serpentina*, and the other, which they term *T. serpentina*, seems to be the same animal in a less advanced stage, the chief difference between the two, consisting in three rows of prominences on the shell.

With respect to the *Testudo denticulata*, said to be an inhabitant of this country, if the figure published by Shaw is a correct representation of it, no one I think can hesitate to pronounce it an imposition. Nature is consistent with herself: and whatever supposed aberrations may be observed in any of her works, we never see such an outrageous monstrosity as is exhibited in this suppositious species.

Thus it is to be hoped that I have reduced to some certainty all the species of land and fresh water tortoises that have fallen under my observation. Many remain to be discovered by some more fortunate naturalist. The extensive regions of the west have yet to be explored, and even the rivers of the



northern states have not been sufficiently examined. What are the large tortoises to be seen at all times in the Mohawk river, and what were those observed by Major Long's party in the tributary streams of the Missouri, and which at hazard are stated to have been the *geographica*? Time will undoubtedly add to the number already known; I have only offered my humble contribution towards the increase of our knowledge: others may perfect what I have begun.

‘ *Alius alia potest invenire; nemo omnia.*—*Aus.*

#### NOTE.

Since writing the foregoing observations, the author has seen the second volume of the new edition of Baron Cuvier's "*Règne Animal.*" He wishes it to be distinctly understood, that he is not answerable for the errors and mistatements there introduced, into the account of the tortoises of this country; and he appeals to the names which he gives to the species, and the synonyms which he quotes, as a direct proof that so many contradictions could not have originated with him. Whether he has been misunderstood by M. Cuvier, or whether the names which he furnished have since been accidentally or wilfully changed, it is needless to conjecture. It will be conceived that the author does not wish to enter into a more detailed exposition of the matter, suffice it then to point out what these errors are.\*

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\* See Cuvier, *Reg. An.*, n. ed. Vol. II. p. 11, note (2.)



The *Emys reticulata* of Daudin is given to him, when it had appeared under that name many years ago, in the works both of Latreille and Daudin.

*Emys concinna*, L. c. is quoted as synonymous with *E. geometrica* of Le Sueur. It is not easy to discover what is meant by this: if the *E. geographica* was intended, there is very little resemblance between the two species, and M. Le Sueur probably never saw the *concinna*.

*E. concentrica*, is some other person's name for the *palustris*.

*E. pulchella* of Schæpff' is totally distinct from the *insculpta* of L. c. In the Museum of the king's garden at Paris is a decapitated specimen of the *insculpta* which is labelled *pulchella*, but it differs entirely from Schæpff's animal, and must have been named by some person but little conversant with this family of reptiles. The *Emys odorata* is likewise attributed to the author, although he never has adopted *Emys* as a genus, and even if he had, would not have placed this animal in it.

Great names frequently give a currency to matters of little importance which otherwise might have passed unnoticed. An individual but little known, and living in a country remote from the scientific capital of the world, might have felt flattered at being noticed by one who is considered as the oracle of natural science, but he would, at the same time, wish not to be misrepresented.

DESCRIPTION of a new genus of the order Rodentia.  
By Major JOHN LE CONTE, U. S. Army, F. L. S. &c.

Read December 21, 1829.

IN the pine forests of Georgia, is found a small subterraneous animal which is commonly known by the name of Ground Mouse: upon an attentive comparison of it with the known genera of the order Rodentia, I do not hesitate to pronounce it different from them all, and constituting a new genus. I propose to call it *Psammomys*, from the nature of the soil it inhabits. The teeth somewhat resemble those of the *Hypudæus* of Illiger (*Arvicola* of others) but the first of the lower jaw has one more triangle, in which it resembles the *Fiber* (*Mus Zibethicus*, Linn.) Although externally the animal bears so strong a remembrance to *Spalax* and *Georychus*, yet its system of dentition is entirely dissimilar to that of both; a detailed description of this is omitted, as the plate, which has been drawn and engraved with great care, will give a better idea of it than words can do.

This animal, like some of its congeners, and like the *Sorex* and *Scalops*, forms long galleries under ground: its chief food is roots, and it proves very destructive in fields of the sweet potatoe (*Convolvulus batatas*.) Being difficult to find, and living almost entirely concealed from view, but little can be known of its habits; this much however has been learnt, that it never makes its appearance in the day time, and anxiously avoids every situation where it may be exposed to water.

PSAMMOMYS.

*Dentes primores* subexserti, superiores scalpro lato, æquali, cæstriformi. *Molares* abrupti, lamellosi. tritorii. contigui.

ægre distinguendi, utrinque tres, superiores subæquales, inferiores inæquales, posteriores minores. *Rostrum* breve, obtusiusculum; *rhinarium* latiusculum cartilagineum; *nares* lateraliter pendentes. *Oculi* parvi. *Auriculæ* parvæ, sub vellere latentes. *Cauda* brevis, teres, pilosa. *Mammæ* apertæ, ventrales. *Pedes* distincti ambulatorii, pentadactyli; digitis externis brevioribus; hallux brevissimus; ungues quinque (excepta hallucari) falculares.

PSAMMOMYS PINETORUM, L. C.

Hair short, shining dark cinereous, above tipped with brown, beneath with very pale ash. Head rather large and blunt: eyes very small; whiskers short; ears very short, naked, almost entirely concealed in the fur; neck thick and short; legs very short; feet hairy, ash-coloured, with a tinge of flesh colour; thumb very short, furnished with a rather obtuse and straight nail; the rest of the nails long, sharp, and hooked. Tail short, round, hairy.

Length three inches and seven-tenths; tail three-quarters of an inch.

Plate II. (a) upper jaw, (b) lower.

ON the Remains of Extinct Reptiles of the genera *Mosasaurus* and *Geosaurus* found in the secondary formation of New-Jersey; and on the occurrence of the substance recently named *Coprolite* by Dr. Buckland, in the same locality. By  
J. E. DE KAY.

Read January 11 and 25, 1830.

THE investigation of the structure of those animals whose existence dates beyond history or tradition, is among the most interesting inquiries of the naturalist. From an isolated fragment of bone, found buried deep in the earth, to be enabled to verify to what animal it belonged, to trace its relations with other animals who have likewise perished, and to determine with tolerable precision the nature of the catastrophe which had thus concealed it from view, all these have exercised the learning and labor and ingenuity of modern naturalists. The connexion between zoology and the history of our globe thus becomes evident, and those who undervalue the one must have but limited views of the importance of the other. The illustrious Cuvier, alluding to one of the animals upon which we are about to treat, says, "la détermination précise du fameux animal de Maestricht, nous paroît surtout aussi remarquable pour la théorie des lois zoologiques que pour l'histoire du globe."

It is proposed in the present paper to examine the remains of several animals from New-Jersey, which are now in the Cabinet of the Lyceum, and to determine to what genera they belong, leaving to other and abler hands those geological deductions which naturally arise from the subject.

## 1. Of the Mosasaurus. Pl. III. figs. 1 and 2.

I was led to the investigation of this fossil relic, consisting of a single tooth and fragment of a jaw, from a remark made by Cuvier respecting it, which seemed to leave it uncertain whether the specimen in our cabinet really belonged to the genus *Mosasaurus*.\*

Another foreign naturalist, who could only have seen a drawing of this fossil, declares unreservedly that it belongs to the *Ichthyosaurus*.

We shall first give the history of this fossil, and as the work in which it was noticed and figured is now out of print, we have deemed it useful to reproduce the figure from a new drawing.

In Professor Mitchill's "Observations on the Geology of North America," appended to the New-York edition of Cuvier's *Essay on the Theory of the earth* (1818) there is a figure of the relic in question. It is briefly noticed as "a tooth and part of the jaw of a lizard monster or saurian animal resembling the famous fossil reptile of Maestricht." On the plate it is stated to be the "tooth and part of the jaw of an animal resembling the saurian reptile of Maestricht. Foot of the Neversink hills, Sandy Hook." The label which accompanies it in the Cabinet, states, that it was obtained from a marle-pit in Monmouth county, New-Jersey.

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\*" Je vois dans une note adressée par le Docteur Mitchill de New-York a l'administration du Museum, que ce savant a des dents fossiles, tirées des marnières du comté de Monmouth dans l'Etat de New-Jersey qu'il considère comme de la meme espèce que l'animal de Maestricht.— L'auteur n'en donne point de description détaillée." *Ossemens Fossiles* Tome v. 2me. partie 310.

I perceive also that Dr. Morton, in his valuable *Synopsis of the organic remains of the ferruginous sand formation* in the 17th vol. of the *American Journal of Science* partakes of the same doubt in referring the remains of this animal to the *Mosasaurus*.



To supply the brevity of these notices we shall here add a few observations which we trust will be found to confirm the sound and accurate views respecting this fossil long since entertained by our respected associate.

The upper part of the tooth is irregularly fractured—see Pl.III. fig. 1,—but enough remains to enable us to describe its general form, which is pyramidal, slightly curved backwards, and divided into two distinct surfaces by an anterior and posterior edge, destitute of serratures. The outer surface represents at the base the segment of a large circle, while the inner surface describes the segment of a smaller one, giving a section of the base of the enamelled part of the tooth the appearance represented at figure 2. The tooth is covered with a smooth, brownish black shining enamel, without striæ, which descends somewhat lower on the external than the internal side. The osseous support is of a dingy white color, entirely resembling in structure that of the Maestricht animal. The cavity which held the vicarious tooth (dent de remplacement) is smoother towards the apex, where it was in contact with the enamel of that tooth, than elsewhere. The fragment of jaw exhibits none of the external surfaces of that bone except beneath, and even there its existence is somewhat problematical. The following are the principal dimensions in English inches and tenths.

Height of tooth,	-	-	-	-	1·06
Diameter at base, from outside to outside,	-				1·02
Do. in the direction of the length of the jaw,					1·33
Height of osseous support from upper side of jaw,					1·00
Length of cavity which contained the vicarious tooth,					2·05
Depth of jaw,	-	-	-	-	2·04

We will now examine what differences exist between the Maestricht animal and that which has been described. The external surface of the former is described as being “plane.” If by this word it is meant that the surface is flat, which is the

presumed meaning, as the other surface is in contradistinction called round and demi-conical, it differs somewhat from our fossil, and this may hereafter serve for one of its specific distinctions. We imagine however that it is only meant that one surface forms a segment of a larger circle than the other, as in the Monmouth fossil. In this supposition we are supported by all the figures given of the teeth of *Mosasaurus*.

There are no measurements of the teeth given either in the work of Cuvier, nor in that of Faujas St. Fond,\* by which a comparison may be formed in regard to the relative size of these animals. Our recollections of the Maestricht animal are too vague to assist us in the determination of this point. Cuvier, however, gives the depth of the lower maxillary at various places, from which we should judge (assuming that the fragment of jaw in our specimen is nearly complete) the Monmouth animal to have been considerably larger than that of Maestricht.† It only remains to state what must be evident after perusing these observations, that the fossil tooth of Monmouth agrees in no one particular with the characters assigned to the *Ichthyosaurus*. It will, we trust, be equally evident that the tooth in our Cabinet, noticed and figured by Mitchill, and which has formed the subject of the preceding remarks, belongs to the genus *Mosasaurus*, hitherto the largest fossil reptile discovered on this continent.

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\* *Essai de Geologie ou Mémoires pour servir a l'Histoire Naturelle du Globe.* Paris 1803. His large work entitled *Histoire Naturelle de la Montagne de St. Pierre de Maestricht* is not in this city.

† Dr. Harlan has noticed (*Jour. Acad.* IV. 235. pl. xiv.) a fossil mineralized tooth from marle pits near Woodbury, New-Jersey. From its serrated edges, and concave internal surface, we are disposed to consider it *as sui generis*, although allied in all probability to *Mosasaurus*.

2. Of the *Geosaurus*. Pl. III. figs. 3 and 4.

This subgenus appears to us well established upon another fossil tooth with a small fragment of attached jaw, from the same locality with the preceding. As far as we are acquainted it has hitherto been unnoticed, and the following description is offered in confirmation of our opinion.

The tooth is compressed, pyramidal, curved backwards, with sharp edges dividing it anteriorly and posteriorly into two surfaces. The posterior edge is the most acute. Both of these surfaces are subdivided into four or five facets, which are however, so indistinct as to be visible only when held in a certain position. The sharp edges are not manifestly serrated, but by the aid of a lens, there are indications of a serrature towards the base. The whole tooth is covered with a smooth jet black shining enamel, except at the apex, where it has been worn by use. The osseous support presents nothing peculiar, being similar in shape, color, and structure to the preceding.

The following are the principal dimensions.

Length of tooth,	-	-	-	-	0·09
Width at base,	-	-	-	-	0·07
Do. transversely,	-	-	-	-	0·45
Distance of base of tooth from upper end of jaw,					0·06

From various considerations we should be disposed to place this tooth among the most anterior of the lower jaw, but postponing the consideration of this matter until more perfect specimens shall be found, let us examine what relation the animal to which this tooth belonged bears to other fossil marine reptiles. The elevated position of this tooth on its osseous support places it in the groupe composed of *Mosaurus* and *Geosaurus*, while its compressed shape removes it from the former, and its indistinctly serrated edges might cause some hesitation in arranging it with the latter. In describing the subgenus *Geosaurus*, Cuvier appears to attach much import-

ance to the presence of these serratures, although he does not rely upon them alone in establishing his subgeneric division. Sömmerring, in his *Memoir Ueber die Lacerta gigantea der Vorwelt*, describes the edges as sharply toothed.\* In the large plate which illustrates the memoir of Sömmerring, this serrated appearance is more distinct than in the reduced figures given by Cuvier, but in order to make them evident to the eye, the German Professor has been obliged to represent them magnified. Another peculiarity in which the form of the teeth of the *Geosaurus*, as described by Sömmerring and Cuvier, differs slightly from our fossil. A section of the base of the tooth of the *Geosaurus* shows that the external face is bluntly faceted or divided into three planes—see fig. 5.† The same planes may be seen in the teeth of the recent *Tupinambis*. In our specimen both surfaces are alike divided into four or five small planes—see fig. 4. These differences may serve as one of the specific distinctions, but it is proper to add that Cuvier, in his description of the *Monheim* fossil and with the memoir of Sömmerring before him, passes over in silence the figure of a section of the base of the tooth as if it was unimportant, or not always a constant character. A comparison of the dimensions of the tooth belonging to the Cabinet of the Lyceum as given above, with those of the *Monheim* fossil, shows that the former must have been more than twice the size of the latter, and approaching nearer in this particular to the *Mosasaurus*.

It will appear, from what has been said, that the tooth now described agrees with those of the *Geosaurus* in the important particulars of shape, attachment, and manner of dentition. It

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\* “Die auswendige Fläche der Krone wird von der inwendigen durch eine scharfe schwartze gezahnelte kante abgegränzt.”

† “Die auswendige Fläche ist nicht nur weniger convex als die innere Fläche, sondern die ueberdies noch der Länge nach stumpfeckig gleichsam facetirt.” p. 8.



differs from it specifically in size, in not having distinctly serrated edges, and instead of being faceted on one side only, it is faceted equally on both. Assigning then to the Monheim fossil the name of *G. Soemmerringi*, we would propose to designate our New-Jersey animal, (in compliment to the generous donor, and as a mark of respect due to one of our most active and zealous naturalists) by the name of *G. Mitchilli*.

### 3. Of the Coprolite.

The learned and indefatigable Professor Buckland, in a Memoir recently read before the Geological Society of London, has communicated several curious facts in relation to the fæces of terrestrial and aquatic carnivorous animals, which he has found in a fossil state. They occur in formations of all ages from the carboniferous limestone to the diluvium. The names Ichthyocopros, Sauro-copros, Hyaino-copros, have been assigned to the excrements of fish, saurians, and the hyæna. To other fossils long supposed to be petrified, and called cones of fir, Professor Buckland assigns the name of Copros iuloïdes, and from analogy supposes them to be derived from the ray and shark. All these fossil fæces are to be distinguished by the name of Coprolite. In the Cabinet of the Lyceum a specimen of Coprolite from Monmouth county is preserved, which has long attracted our attention, and we are indebted to one of our associates, Mr. I. Cozzens, for a suggestion which enabled us to ascertain its real nature. It is figured plate III. fig. 6, of the natural size.

It is composed of the same convoluted spiral structure attributed to the Sauro-copros, and the marks of pressure on the superior part show it to have been the nucleus of a much larger substance. On the external surface the impressions left by the membranous coat of the intestines are clearly discernible. The length of this specimen is nearly one inch. its sub-



stance is homogeneous, black, and it effervesces freely with acids. A small cavity on one side, where was probably undigested matter, is now by a few experiments ascertained to contain carbonate and phosphate of lime, with minute siliceous pebbles. Professor Torrey proposes to furnish the Lyceum with a complete analysis of this very remarkable substance.

OBSERVATIONS on the *United States Species of the Genus  
Pancratium.* By Major JOHN LE CONTE, U. S. Army.  
F. L. S. &c.

*Read January 25, 1830.*

THE following remarks on the species of *Pancratium* peculiar to the United States, are the result of observations made upon them both when cultivated and in a state of nature. It has been confidently asserted that two species only were to be found in our country ; but it is presumed that the characteristic differences, which several years close examination of these beautiful plants has enabled me to discover, will show this assertion to be groundless.\*

Although the family resemblance be very strong, few plants are more distinctly marked, particularly in habit, than all these species. They amount in number to four, two of which are found more or less in the interior of the country, and two near the borders of the Atlantic Ocean. What other species may be hereafter discovered, depends upon the approach which the plants of our remote southern frontier make to those of the adjacent provinces of Mexico and New Spain. It is highly probable that at some future day our Flora will be enriched by the discovery of some more.

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\* Vide Elliott's "Sketch of the Botany of the Southern States,"  
Vol. I. page 383.

## 1. PANCRATIUM MEXICANUM.

*Bulbus* stolonifer; *folia* 6—8, lineari-lorata, obtusa, concavuscula, medio aliquanto latiora, striata, dorso convexa, ecarinata, apice plana: *scapus* anceps, striatus, subglauescens, 2—6 florus: *germen* ovato-trigonum, pyramidale; *tubus* subtrigonus, angulis rotundatis, virescens, striatus; *petala* alba, linearia, recta, concava, tubo longiora, exteriora canaliculata, subtus virescentia; *corona* alba, fundo subvirescente, plus minus stellata, margine irregulariter eroso, ut plurimum mucronibus paucis acuminatis instructo; *filamenta* e sinibus coronæ, incurva, alba; *antheræ* verticales flavæ; *pistillum* declinatum, incurvum, filamentis longius, apice viride; *capsula* dirumpens et marcescens ante seminum maturationem: *semina* post capsulæ destructionem crescentia.

*α.* *Bulbus* unum solum scapum edens: *folia* octo, sesquipèdalia: *scapus* 19—uncialis: *petala* subhorizontalia: *corona* primo expansa infundibuliformis, postea exacte rotata vel disciformis petalis triplo brevior.

*β.* Altior. *Bulbus* unum solum scapum edens: *folia* sex, bipèdalia, *scapus* 2 pedes et demi altitudine: *petala* horizontalia, aut etiam subdeflexa: *corona* infundibuliformis, interdum exacte rotata aut disciformis, vix stellata, petalis plus triplo brevior margine uno alterove mucrone acuminato instructo.

*γ.* Præcox. *Bulbus* scapos duos semper proferens: *folia* sex, pedalia: *scapus* pedalis: *petala* expansa non rotata: *corona* infundibuliformis, nunquam rotata, petalis semi brevior.

*δ.* *Bulbus* unum solum scapum edens, *folia* sex, pedalia; *scapus* pedalis: *petala* expansa, subhorizontalia; *corona* exacte rotata, stellata dentibus erosis, petalis triplo brevior.

This species is found on the banks of the rivers of Georgia and Carolina, in places overflowed by the tide, but grows ex-

tremely well in the dry soil of a garden. Variety  $\alpha$  I have never seen but on the Ogeechee river:  $\beta$  is found near the mouth of Savannah river, and  $\gamma$  in some of the streams of South Carolina, rather farther from the sea than the other two; might almost form a distinct species: it flowers at least a month earlier than the two first:  $\delta$  is found along with  $\alpha$ .

## 2. PANCRATIUM ROTATUM.

*Bulbus stolonifer, scapum unum edens: folia octo, lineariorata obtusa sesquipedalia, medio latiora, striata, concaviuscula, dorso convexa, ecarinata, apice plana: scapus sesquipedalis 4-florus, anceps, glaucus, striatus: germen oblongo-ovatum, subtrigonum: tubus subtrigonus, angulis rotundatis, pallide virescens: petala ochroleucoidea, striata, linearia, recta, horizontalia, aut etiam subrecurva, concava, subcanaliculata; corona duplo longiora marginibus involuta, exteriora subtus viridescens: corona alba fundo viridescens, infundibuliformis, interdum exacte rotata, nunquam disciformis, sinibus subprofundis, margine irregulariter eroso, dentibus staminiferis, ut plurimum truncatis: filamenta e dentibus coronæ, incurva, alba; antheræ verticales flavæ: pistillum viride declinatum, incurvum, filamentis longius; capsula integra persistens ad seminum maturationem.*

$\beta$ . Omnibus partibus minor.

This species I have observed only on the river St. John's, of East Florida; the smaller variety is found near the sea, the larger higher up the river, in swamps which are always under water: at the head of Lake George it is peculiarly large, growing in a soil composed entirely of coarse sand and shells of Helices.

It seems to thrive better in a garden than in its native situation.

3. *PANCRATIUM CORONARIUM*.

*Bulbus* non stolonifer, scapum unum edens : *folia* octo, lineari-lorata, obtusa, bipedalia, medio latiora, striata dorso convexa, ecarinata, versus basin canaliculata, ita ut semicylindrum concavum referre, apice plana ; *scapus* bipedalis, 4-florus, striatus, anceps, non glaucus : *germen* parvum, ovato-trigonum : *tubus* subtrigonus, angulis rotundatis, virescens : *petala* alba (non ochroleucoidea) lineari, recta, striata, concava, corona longiora, canaliculata, exteriora, subtus viridescens ; *corona* ampla, infundibuliformis, (non rotata) alba, stellata, dentibus staminiferis latis, integris, utrinque dente acuminato instructis sinibus profundis, irregulariter eroso-dentatis ; fundus viridi stellatus demum ochroleucus : *filamenta* corona triplo breviora e dentibus coronæ, incurva, alba : *antheræ* verticales, flavæ : pistillum versus apicem viride declinatum, incurvum filamentis vix longius : *capsula* dirumpens et marcescens ante seminum maturationem, *semina* post destructionem capsulæ crescentia.

Inhabits in Savannah river, at the rapids, a few miles above Augusta, where it covers the rocky islets. I have also seen it in the Congaree river, at Columbia, in South Carolina, occupying similar situations. It is undoubtedly the species observed by Bartram, and mentioned in his Travels as the *Panocratium fluitans* ; but as, although it almost always grows under the water, it never can be said to float, I have thought proper to change the name given to it by him, particularly as it has never been before described or admitted into any system.

However this species may resemble the preceding, the circumstance of its producing young bulbs joined to the old root, and not at the end of long runners, sufficiently distinguishes it. In *P. mexicanum* and *P. rotatum*, the stolones frequently run to the distance of two feet ; but in the present species the bulbilli are always attached to the parent, as in different *Narcissi*.



4. *PANCRATIUM OCCIDENTALE*.

*Bulbus* non stolonifer, scapum unum solum edens : *folia* plurima, lineari-lorata, obtusa bipedalia, striata, dorso convexa, ecarinata profunde et obtuse canaliculata, pallide viridia, glauca : *scapus* bipedalis, 6-florus, striatus, anceps, glaucus : *germen* subtrigonum, subglaucum : *tubus* subtrigonus, glaucus : *petala* utrinque alba, unguiculata, linearia, striata, expansa, recta (non rotata) apice subrecurva corona longiora : *corona* infundibuliformis, alba stellata, sex lobata, lobis diverse dentatis, dentibus 2—4, fundus viridescens : *filamenta* coronam æquantia, e sinibus coronæ, subincurvæ : *antheræ* verticales, flavæ : *pistillum* versus apicem viride, declinatum, incurvum filamentis longius : *capsula* magna, polysperma integra persistens ad seminum maturationem.

This species is found in the western parts of the state of Georgia and in Tennessee and Kentucky : it differs from all the others, in not growing in the water, but in upland meadows. It very rarely increases by bulbs, and is therefore generally found growing single ; it is, however, very readily propagated by seeds. Although all the plants of this genus produce very fragrant flowers, yet this species surpasses them all in this respect ; its odour is exactly that of the early flowering hyacinth.

It may be expected that something should here be said of the *P. carolinianum* of Walter ; which, although hitherto not detected in our country, still holds a place in all botanical works. If this *P. occidentale* be not it, I am inclined to think that it may as well be given up as a nonentity. I regret much that it is not in my power to furnish a figure of this as well as of the other species. As for the plant referred to in Catesby, as Walter's, it is decidedly the *P. maritimum* ; and the figure given in the third volume of the Journal of Science and Arts, by Mr. Ker, is a distorted delineation of the same. Although said to be drawn "certissima manu Dryandri," it represents an absurdity and an impossibility.

PLATE IV.

PANCRATIUM MEXICANUM.

- Fig. 1.  
2.  
3.

PANCRATIUM ROTATUM.

- Fig. 4.  
5.  
6.

PANCRATIUM CORONARIUM.

- Fig. 7.  
8.  
9.

REMARKS on the *Plants of Europe which have become naturalized in a more or less degree, in the United States.* By the late LEWIS D. DE SCHWEINITZ.

*Read January, 1832.*

THE fact, that a number of European plants have become naturalized in the United States since the original forests have yielded to cultivation, is generally known and perfectly natural. Their number, however, especially of those which are so generally introduced that they would be considered indigenous, if their foreign origin was unknown, is comparatively much smaller than it would appear on a superficial view. With very few exceptions they are, moreover, exclusively derived from Great Britain and the north of Europe; bearing testimony to the fact, that this country received its culture of every description from thence; notwithstanding the climate of a great portion thereof would have favoured a similar vegetable colonization from the southern parts of Europe as readily.

The subject has, for some considerable time, attracted my attention; and presents some observations which, I think, are not without interest to the naturalist. In every instance known to me, it is very easy to account for the fact, that these plants have been introduced. A respectable number have been purposely brought hither to be cultivated, for the purposes of agriculture, or for some real or fancied value they possess; and in consequence of their natural habit so to do, have more or less spread in the country. Others have been evidently involuntarily introduced with the imported seeds of agricultural plants, and have arrogated to themselves the same place they occupy in Europe, as weeds in fields and meadows, unwelcome as some of them necessarily were. Others again have only straggled from the gardens, and are met with exclusively in the vicinity in which they are, or formerly were cultivated. But it is not

equally easy to account for the circumstance, that other European plants, which, from a parity of circumstances in their native country, should have likewise been introduced by the same means, are not at all to be met with; or at least so rarely, and in such confined localities, that they are readily recognised as strangers by the most inexperienced. Not one of the common grain kinds, wheat, rye, barley, oats, buckwheat, &c. has spread through the country, so as to deserve to be considered as naturalized in the sense here intended. Of the numerous segetal plants which are met with in every field of Europe, and of the flowers and herbs which grow intermingled with the cultivated grasses of pastures and meadow grounds there, but a very small proportion seem to participate in that facility of emigration, and that readiness to usurp the soil of a new country which signalizes a few equally with the human inhabitants. To judge by the effects produced by these few, it is well that it is so; otherwise our native vegetation would have been swept from the scene, as has been the human race of aborigines, together with no small portion of the quadrupeds; especially as it is a well known fact, that the number of our native herbaceous plants of a decidedly gregarious growth, *i. e.* exclusively occupying larger tracts, is but inconsiderable; in consequence of which our native plants would have stood as little chance of maintaining their ground against a phalanx of vegetable colonists from Europe, as our straggling aborigines did against the columns of emigrants from that part of the world, were these vegetable colonists as prone to establish themselves. In the mean time, it is not without interest to note those few which form an exception, and which have followed the steps of cultivated man, nay, in some cases, have even preceded him into the wilderness.

I propose to communicate a list of all those which have any just claim to be considered as naturalized, *i. e.* which are regularly reproduced, and gradually extending themselves, without present cultivation, under certain general heads, and to subjoin such remarks as I have had an opportunity to make.

1. Plants which have become more or less *generally* naturalized in the United States.

1. *Introduced by cultivation, for agricultural or other purposes.*

- |     |                                  |   |  |
|-----|----------------------------------|---|--|
| 1*  | <i>Veronica officinalis.</i>     | } | Not in the southern states. Widely spread in advance of cultivation, in soils peculiarly adapted. Very common in the western country, and common everywhere. |
| 2   | <i>Phleum pratense.</i>          |   |  |
| 3   | <i>Anthoxanthum odoratum.</i>    |   | Common every where.  |
| 4   | <i>Agrostis alba.</i>            |   | Common.  |
| 5   | <i>Agrostis vulgaris.</i>        |   | Common in the northern states.   |
| 6   | <i>Poa pratensis.</i>            |   | Common every where.  |
| 7   | <i>Holcus lanatus.</i>           |   | Do.  |
| 8*  | <i>Plantago major.</i>           |   | No part known to me where it is not.   |
| 9*  | <i>Cynoglossum officinale.</i>   |   | Spread so generally in the western country that it seems native.   |
| 10* | <i>Verbascum Thapsus.</i>        |   | Much more frequent every where than in Europe.   |
| 11* | <i>Verbascum blattaria.</i>      |   | Do. do. perhaps native.  |
| 12* | <i>Datura Stramonium.</i>        |   | Generally disseminated, even in forests, but purposely planted about camping places in the first instance.   |
| 13  | <i>Daucus Carota.</i>            |   | Both southwardly and northwardly.  |
| 14  | <i>Pastinaca sativa.</i>         |   | Far the most generally spread umbelliferous plant; more so than any native.  |
| 15  | <i>Rumex crispus,</i>            | } | Every where, in advance of cultivation.  |
| 16  | <i>Rumex obtusifolius,</i>       |   |  |
| 17* | <i>Scleranthus annuus.</i>       |   | Not in the southern states.  |
| 18* | <i>Stellaria (Alsine) media.</i> |   | This, at least in Carolina, was intentionally introduced, as food for Canary birds; and spread, in ten years, upwards of fifty miles.                        |
| 19* | <i>Rosa rubiginosa.</i>          |   | Every where about cultivated farms.  |
| 20* | <i>Chelidonium majus.</i>        |   | Every where in immense plenty.   |
| 21* | <i>Nepeta cataria.</i>           |   | Every where do.  |
| 22* | <i>Marrubium vulgare.</i>        |   | Do. In some localities this is not seen.   |
| 23* | <i>Barbarea vulgaris.</i>        |   | Very general, but not in quantities.   |
| 24* | <i>Sinapis nigra.</i>            |   | Every where, especially westward.  |
| 25* | <i>Trifolium repens.</i>         |   | Do. do.  |
| 26  | <i>Trifolium pratense</i>        |   | Do. do.  |
| 27* | <i>Leontodon taraxacum.</i>      |   | Spread to an incredible extent, and preceding cultivation.   |



- 28\* *Salix vitellina*. } Very generally met with, but I doubt if they  
 29\* *Salix alba*. } propagate naturally.  
 30 *Cannabis sativa*. Very common, but not in quantities.  
 31 *Leonurus cardiaca*. Very generally diffused.

The asterisk marks such as have been originally introduced for some medical or other special use. No other intentionally introduced plants have taken root extensively in the country, unless some under the next subdivision ought to be arranged here. Those which are naturalized in confined localities are mentioned in the last rubric but one.

2. *Introduced fortuitously with agricultural seeds.*

N. B. Most of these (often noxious) have a still more decided claim to be called naturalized, than the preceding ones, on account of their prevalence.

- 32 *Veronica arvensis*. Every where.  
 33 *Veronica agrestis*. Somewhat less frequent.  
 34 *Poa annua*. Very general.  
 35 *Bromus secalinus*. Every where.  
 36 *Setaria glauca*. In the remotest regions.  
 37 *Triticum repens*. Rare southwardly.  
 38 *Lolium perenne*. Every where.  
 39 *Plantago lanceolata*. Do.  
 40 *Chenopodium album*. Do.  
 41 *Allium vineale*. More or less prevalent, but met with almost every where.  
 42 *Polygonum aviculare*. Absolutely every where.  
 43 *Cerastium vulgatum*,  
 44 *Cerastium viscosum*, } Do.  
 45 *Cerastium semidecandrum*, }  
 46 *Agrostemma githago*. Do.  
 47 *Hypericum perforatum*. Southwardly and westward of the mountains this noxious weed is beginning to show itself.  
 48 *Lamium amplexicaule*. The same remark holds good of this. In Carolina I traced its spread onward for more than fifty miles in ten years.  
 49 *Antirrhinum linaria*. Not yet beyond Pittsburg, nor southwardly frequent.  
 50 *Thlaspi bursa pastoris*. Every where.  
 51 *Commelina sativa*. Do.  
 52 *Raphanus raphanistrum*. Every where.

- 53 *Erysimum officinale*. Westward, preceding cultivation, in great quantities.
- 54 *Sonchus oleraceus*. Every where.
- 55 *Cnicus lanceolatus*. Far surpassing in quantity and dissemination any native species of Cnicus.
- 56 *Carduus arvensis*. Not farther south than New Jersey.
- 57 *Arctium Lappa*. Every where.
- 58 *Chrysanthemum leucanthemum*. Rapidly advancing westward, where eight years ago it had not made its appearance.
- 59 *Anthemis cotula*. Decidedly the most universal of our gregarious plants. In the west and south it precedes cultivation.
- 60 *Achillæa millefolium*. Every where.
- 61 *Urtica urens*. Very generally spread.
- 62 *Urtica dioica*. Do. do.
- 63 *Lithospermum arvense*. Very generally.

II. Plants but *partially* spread.

- 64 *Fedia olitoria*. Tennessee and Carolina, in some localities.
- 65 *Agrostis spicaventi*. New England and Carolina, in some localities.
- 66 *Arrhenatherum avenaceum*. Tennessee and Carolina, do.
- 67 *Dactylis glomerata*. New Eng. Tennes. Carol. do.
- 68 *Alopecurus pratensis*. New England—not widely spread.
- 69 *Bromus mollis*. Do. in northern localities.
- 70 *Lolium temulentum*. New England and Tennessee.
- 71 *Setaria viridis*. Here and there northwardly.
- 72 ——— *verticillata*. Do.
- 73 ——— *italica*. Do.
- 74 *Briza media*. New England.
- 75 *Blitum capitatum*, }  
 76 *Blitum virgatum*. } New England and New York.
- 77 *Galium verum*. New England.
- 78 *Echium vulgare*. Spread beyond the Susquehannah.
- 79 *Anagallis arvensis*. Northwardly.
- 80 *Verbascum Lychnitis*. About Philadelphia.
- 81 *Hyoscyamus niger*. In the eastern states.
- 82 *Solanum dulcamara*. Sparingly in the northern states.
- 83 *Bupleurum rotundifolium*. Here and there in Carolina, occupying whole fields.
- 84 *Chenopodium urbicum*. Northern states.
- 85 ————— *rubrum*. New England and New York.
- 86 ————— *glaucum*. Do.

- 87 *Conium maculatum*. Here and there in the northern states.  
 88 *Ornithogalum umbellatum*. Spreading greatly in the northern states.  
 89 *Polygonum orientale*. Southward and westward.  
 90 *Saponaria officinalis*. Here and there—common.  
 91 *Spergula arvensis*. Northern states.  
 92 *Ranunculus arvensis*. Do.  
 93 ————— *repens*. Do.  
 94 *Mentha viridis*. In many localities.  
 95 ————— *piperita*. In Carolina, here and there.  
 96 *Thymus serpyllum*. In Pennsylvania, common.  
 97 *Melissa officinalis*. Here and there.  
 98 *Lepidium officinale*. Pennsylvania.  
 99 *Thlaspi arvense*. In many localities.  
 100 ————— *campestre*. Do.  
 101 *Sisymbrium officinale*. Do.  
 102 *Malva rotundifolia*. Very rarely southward—common northward.  
 103 *Fumaria officinalis*. Very confined localities—Carolina.  
 104 *Genista tinctoria*. New England.  
 105 *Vicia sativa*. Here and there.  
 106 *Melilotus officinalis*. Do.  
 107 *Trifolium procumbens*. Very common southward, and beginning to become universal.  
 108 ————— *agrarium*. Confined to localities northward.  
 109 *Medicago lupulina*. Near Carlisle and other localities.  
 110 ————— *intertexta*. Southwardly only. (S. Carol.)  
 111 *Cichorium intybus*. Northwardly, in some localities.  
 112 *Apargia autumnalis*. New England.  
 113 *Sonchus arvensis*. Do.  
 114 *Cynara scolymus*. Virginia. (Nuttall.)  
 115 *Inula helenium*. Along the Ohio hills in great quantities, and elsewhere, here and there.  
 116 *Senecio vulgaris*. New York and New England.  
 117 *Euphorbia helioscopia*. Shores of Lake Erie and elsewhere.  
 118 *Amaranthus Blitum*. Northwardly.  
 119 *Xanthium spinosum*. Southwardly, as far as Washington.

III. Introduced only in the vicinity in which they are or were cultivated.

- 120 *Ligustrum vulgare*.  
 121 *Syringa vulgaris*.  
 122 *Phalaris canariensis*.  
 123 *Nicotiana rustica*.

154 *Plants of Europe naturalized in the United States.*

- 124 *Periploca græca.* New York.  
 125 *Chenopodium bonus henricus.*  
 126 *Hemerocallis fulva.*  
 127 *Tanacetum vulgare.*  
 128 *Achillæa ageratum.* North Carolina, in some localities.  
 129 *Tussilago farfara.* Pennsylvania.  
 130 *Helianthus tuberosus.* Pennsylvania and Carolina.  
 131 *Centaurea cyanea.*  
 132 ———— *nigra.*  
 133 ———— *jacea.*  
 134 ———— *benedicta.*  
 135 ———— *calcitrapa.*  
 136 *Prunus spinosa.* New England.  
 137 *Dipsacus sylvestris.* Pennsylvania.

No *Scabiosa*, no *Viola*, no *Papaver*, and no other segetal plants occur at all naturalized. The *Bellis perennis*, so universally disseminated in Europe, is never seen. None of the shrubs usual in hedge-rows, have become naturalized. It is particularly remarkable, that the *Centaurea cyanea*, though very frequently cultivated for ornament, in the gardens of the German farmers in Pennsylvania, has never spread into grain fields, in which it is so prevalent in Europe. This is likewise the case with *Delphinium consolida* and many others; while the introduction into a garden in North Carolina of *Antirrhinum linaria*, and of *Stellaria media*, in a very few years contaminated the whole vicinity for many miles. The readiness with which plants like *Leontodon taraxacum*, *Cnicus lanceolatus*, &c. with feathered seeds spread, is easily conceived. Not so readily explained is the cause which renders *Anthemis cotula* so wonderfully prevalent. In the mean time it is observable that a large river is apt, as well as a tract of land intervening entirely unsuited to the growth of some of these emigrants, to stop their progress for a time. But when once the passage is forced at any point, the dissemination appears to proceed the more rapidly.

In 1823, the *Anthemis arvensis*, or *cotula*, in Tuscarawas county, Ohio, had widely spread up to the eastern bank of the

Muskingum or Tuscarawas river, but had not crossed to the western bank. In 1831 I met with it, in incredible quantities, every where. The circumstances which prevent some plants, that are naturalized to a great extent in certain localities, from extending generally, are often not to be discovered. Thus, for fifty years at least, *Cichorium intybus* is as much spread in the vicinity of Bethlehem as any native plant; while I never saw it westward of the Susquehannah, nor in this neighbourhood at any considerable distance from the town. The worst enemies of the farmers, at least in the northern states, are all foreigners; on which account we have reason to congratulate ourselves, that no greater number of these foreign weeds are prone to usurp the soil; for it is certainly worthy of remark, that among upwards of four thousand species of plants in the United States, not more than from 120 to 130 foreigners should have obtained any thing like a permanent and extensive footing.

The following few plants, in some degree naturalized in the southern states, are not derived from Europe:—

*Polycarpum tetraphyllum.*

*Cardiospermum halicacabum.*

*Melia azedarach.*

*Leucas martinicensis.*

*Cucurbita lagenaria.*



OBSERVATIONS on a Fossil Jaw of a species of *Gavial*,  
from West Jersey. By J. E. DEKAY.

*Read January, 1833.*

IN a paper which I had the honour to lay before the society some time since, the attention of the members was called to some fossil remains from the southern parts of New Jersey. The interest which has been excited, both here and in Europe, on this subject, induces me to submit a few additional observations on some organic remains from the same locality. For the opportunity thus afforded me I have to express my obligations to Lieut. Mather, of the army, who has kindly placed the specimens in my hands for examination.

A few brief remarks upon the region from whence these and other remains are found in such abundance, may be necessary previous to describing the fossils themselves.

West Jersey, or that part of the state of New Jersey which lies south of a line drawn from Trenton to Amboy, is composed entirely of sand, passing at some places into gravel. At the Highlands of Navesink, which rise into hills 300 feet high, a rock formation appears, containing fossil shells and crustacea. This same rock appears on the borders of a stream at Tinton Falls, and from its composition is called ferruginous sandstone. It consists of iron and silex with potash and alumine; and the same materials, in various proportions, compose those numerous local deposits which are found extensively scattered over this whole region. To some of these are applied the name of marle pits, on account of their fertilizing properties; although totally dissimilar to the marle of Europe; and, in fact, only acting mechanically, like any other clay, when mixed with a sandy soil. In these various deposits are found animals of fresh and salt water, of such as were formed to encounter the

billows of the ocean, to float on the placid bosom of a fresh water stream; and of others, like the mastodon, living exclusively on dry land.

The remains of the mastodon, an animal which lived, in all probability, on the surface of the earth as it appears at this day, are strongly contrasted, in some of these deposits, with others which must have existed at a period antecedent to the present condition of the globe. In Europe the remains of reptiles are found far beneath those formations which contain the oldest known quadrupeds. Thus, for example, the region about Honfleur, in France, is particularly rich in the remains of reptiles: now, the oldest known vertebral animals are found in the gypsum of Montmartre; but beneath this gypsum are extensive formations of shell lime, (*calcaire coquillier*) reposing upon beds of chalk of immense thickness, and underneath these beds occur the remains of reptiles. In New Jersey these reptiles are found a few feet beneath the surface, without any superincumbent bed whatever. It has been questioned whether such beds ever existed in this place in this region; or whether, at some former period in the history of the world, these upper beds have not been carried off and destroyed by the action of deluges or torrents of greater or less extent. But if such a catastrophe occurred, we should find traces of the existence of still more recent formations; and this, upon examination, appears to be the case. We have, for instance, the plastic clay formation, as characterized by amber, beds of blue clay surcharged with mica, beds of a recent calcareous origin, deposits of coarse and fine gravel, from the decomposition of amygdaloid, and other remnants of strata long since broken up and deposited elsewhere. We may therefore conclude, that although fossils in general characterize formations, and determine their respective epochs, yet that we can draw no safe conclusions respecting the age of these deposits in New Jersey, when we find, in the same locality, remains of antediluvian animals and the workmanship of human hands. They may be considered as the result of a catastrophe, or a series of events which have

destroyed all the superincumbent strata, excepting the more compact iron sand-stone of the Navesink, and thrown them into irretrievable confusion.

For further details respecting this interesting region, the reader may consult Mitchill's edition of Cuvier, the papers of Pierce and Morton in the 16th and 18th vols. of the American Journal, and of Harlan, in the 4th vol. of the Journal of the Academy of Nat. Sc. Phila.

The entire collection consists of fragments of the jaw of a saurian reptile; a portion of a curious small jaw, upon which I am unable to form a decided opinion; and several vertebræ of fish and reptiles.

*Dimensions of Fragment, fig. 7, plate III. or left Dental Bone.*

Length 4·1. Extreme breadth 1·5 nearly.

Distance between sockets ·8.

Depth of sockets 1·5.

Projection of tooth above the alveole 1·1.

Transverse diam. of tooth above the socket ·5.

Longitud. diam. ·6.

Diameter within the socket ·65.

In order to understand the structure and arrangement of these teeth, it may be necessary to recur to the process of dentition, as it exists among these animals. Their number never varies with age; and although they are formed by superimposed coats, yet their interior is always hollow. At the bottom of the socket is to be found the replacing tooth, which gradually increasing, ascends into the hollow of the old tooth, presses upon, and of course destroys, the pulpy nucleus within, which has furnished nutriment to the old tooth. This latter tooth, of course, easily falls out, is replaced by the new one, which, in its turn, makes way for another; and this is often repeated during the whole life-time of the animal. Hence, at any period, if we examine the teeth of these animals we shall find always

the replacing tooth either within the old one or in a rudimentary form, or at the bottom of the socket. Among the loose fragments, to which I regret being unable to assign its proper place, but which is near the bottom of a socket, is a small replacing tooth,  $\cdot 25$  in length. It is of a conical form, and blunt at its summit. See fig. 8. It is worthy of remark, that this tooth, instead of originating from the centre of the bottom of the socket, lies near the inferior and anterior side. Are we authorized to infer, that the individual species under examination belonged not to an adult animal, but to one which had not yet attained its full growth, and that the position of this replacing tooth indicates that the outer edge of the alveole would be advanced farther with the growth of the animal? According to Cuvier, the replacing tooth generally commences near the inner surface; and hence it is on this side, by its compression, that the old tooth frequently exhibits, near the upper edge of the alveole, a notch or indentation on its inner side, proving that absorption has taken place.

The sockets and parts of sockets are  $\cdot 8$  apart on the superior surface of this dental bone, and approach nearer at their bases. The central socket contains the most perfect tooth in all the fragments. Fig. 7 represents its appearance, describing a segment of a circle whose diameter is four inches. The whole length of the tooth is  $2\cdot 6$ . The direction of this curve is forward and outwardly; or, in other words, its lower extremity is near the internal plane of the dental bone, while the external portion of the tooth is not far from the outer edge of the same bone. Within the socket the tooth is cylindrical, and, as is common among animals of this class, it is larger than the exposed portion. It is hollow, and filled with the soil in which it was found. The upper part of the tooth is much injured, but enough remains to enable us to describe its general form, which is conical, recurved, and rather broader in the transverse axis of its base than in the longitudinal direction of the dental bone. A very minute portion is all that is left of its external coat; but from this we may state, that it is of a brown

colour, very minutely striated, and, in a proper light, appears divided into a number of minute facets. We cannot, however, from this small fragment, aver that the same appearance pervades the whole crown of the tooth; nor can we pronounce with certainty that the teeth were furnished with edges.

*Pl. III. fig. 9, or right Dental Bone.*

This fragment, in fact, consists of portions of three bones; but in the figure, the right dental bone only is shown, in order to exhibit the figure and direction of the sockets. Its principal dimensions are as follow:—

Total length 5·7.

Breadth undetermined, on account of the imperfection of the fragment.

Depth at symphysis 2·1.

Depth, just anterior to the second tooth, 1·7.

Depth of socket behind, 1·6.

Depth of jaw at anterior portion 1·6.

Distance between 1st and second alveole ·9.

between 2d and 3d ·7.

between 3d and 4th ·4.

Of the fourth, or posterior socket, only a portion remains.—The third is filled up with the body of a tooth, which is visible in its whole length, and exhibits its base compressed in the direction of the vertical plane of the jaw. The second and first alveoles are likewise filled with the body of teeth, but are concealed in consequence of the perfect state of the bone in these places. At the anterior part of this bone is a portion of another socket, which cannot be exhibited in the figure. Connected with the dental bone are two others, which will be better understood when we connect these fragments in their original position. We shall then have fig. 10,—a large and important portion of the lower jaw of a fossil reptile.

In this figure *a* represents the fragments of the left, and *b* of the right dental bones already described, as seen from above.



At *c c* are seen portions of two bones which are peculiar to animals of this family, and were termed, by Adrian Camper, opercular bones: they form the symphysis of the lower jaw, and the dental bones repose against them, and go off posteriorly to form the branches of the lower maxillary.

The total length of the fragment of the opercular bone of the right side is 7·8.

From the symphysis to the anterior termination of the same bone is 6·2.

Breadth of both operculars, just before the symphysis, is 2·4.

Presumed breadth at symphysis 4.

Breadth of jaw, at outer extremity 2·7.

Thickness at same place 1·7.

The upper surface of the opercular bones is smooth, and its substance is very compact. The surface of the right dental bone is likewise tolerably even; but its side, and particularly its inferior surface, has the same corroded and worm-eaten appearance noticed in its companion on the left side.

We are now furnished with sufficient data to pronounce that the fragments under consideration are a portion of the lower jaw of some species of animal belonging to a family of reptiles which includes the crocodiles.

In the last edition of that work which is destined to confer immortality upon the name and labours of Cuvier, he has indicated three groups, into which may be classed all the living and fossil reptiles hitherto loosely designated under the name of crocodile. It is not intended to give an analysis of his labours, but it is necessary for our purposes to notice that he divides them into three subdivisions, viz. *Alligators*, *Crocodyles*, and *Longirostres*, or Gavials. The first includes the crocodiles of America with semipalmate feet, and the fourth tooth on each side of the lower maxillary received into a depression of the upper jaw. Four living species are enumerated. The second subgenus, or crocodiles proper, distinguished by palmate feet, and the fourth of the lower jaw passing by the upper,

includes seven living species, from Asia, Africa, and the island of St. Domingo. The third subgenus, which so far contains only two species, inhabiting the Ganges, is distinguished by a very elongated cylindrical beak or snout and palmated feet.

Here are at least twelve well determined living species, divided into three distinct groups, which not many years ago contained but one species. Cuvier himself, in making this division, seems to have acted with that laudable reserve which characterizes all his researches; for while he clearly pointed out the distinction, he seems to have only indicated them, without seizing the occasion to designate them by distinct appropriate names.

Of the fossil species of this family he has indicated eleven species of the division Crocodile, chiefly from France and England; and three species of the third division, Longirostres, from France and Germany. In our own country but one fossil species, and that belonging to the crocodiles proper, has as yet been discovered. For our acquaintance with this species we are indebted to Dr. Harlan, of Philadelphia; a gentleman whose researches have ably illustrated, in almost every department, the natural history of his country.

To those who are in the slightest degree acquainted with the osteology of the order of reptiles, the position, arrangement, and structure of the teeth, in the specimen under consideration, and the cylindrical, attenuated lower maxillary, will be sufficient to show that it cannot be referred to either the subgenus alligator or crocodile. On the other hand, the position and configuration of the opercular bones as clearly indicate that our specimen belongs to this subgenus, or subdivision, the longirostres, or gavials.

We may now inquire how far this American Gavial resembles any known living or fossil species. In this investigation we have, it is true, but scanty data to enable us to arrive at a satisfactory conclusion.

There are but two living species of Gavial, both from the

Ganges. The first, *C. gangeticus*, has from 25 to 26 teeth on each side of the lower jaw, and the length of the jaw is to that of the body as one to seven and a half. The second, *C. tenuirostris*, has the same number of teeth, and is chiefly distinguished by a longer cranium. It appears to be doubted whether it is specifically distinct from the preceding. Upon a comparison of our fragment with these, the following differences were noted. The opercular bones, forming the symphysis of the lower jaw, occupy, in the living gavials, (p. 107) nearly one third of the whole length of the medial suture of the jaw, which, if applied to our specimen, would give it a length of 18 inches. And as the teeth in the living species are nearly regular and equidistant, if we assume the same thing with regard to our specimen, we shall be led to attribute to it, when perfect, but 15, or, at the farthest, 18 teeth on each side, which would contradistinguish it sufficiently from the living species.

The head of the Gavial of the Ganges is about 2·6, and the whole animal 16 feet long. Upon the supposition that our specimen has the same proportions, and that we have one third of the total length of the head and beak, we may reasonably conclude, that our specimen belonged to an individual between 9 and 10 feet long.

It may be alleged, that this length, being merely conjectural, is not sufficiently accurate to form a just comparison. We are ready to admit the force of this allegation; the more readily, because, from the sudden tapering of the beak, as shown by the measurements above, and the position of the anterior socket in the right dental bone, the jaw could scarcely have been more than twice its present length, which would give only 12 or 14 teeth on each side. This, it will be perceived, would separate it still farther from the living species.

Among the fossil crocodiles, it has been remarked, that although more species have been discovered in Europe belonging to the second subdivision, yet that more remains have been found which clearly belonged to the division of gavials.

The proportions between the length of the symphysis and the branches of the lower jaw, in the *Gavial of Monheim, C. priscus* of Sommering, (p. 129) we are unable to compare with our fragment; but the regularly alternating long and short teeth mark sufficiently strong specific differences. In the *Gavial of Honfleur* the angle of the symphysis is very acute, which separates it broadly from that of New Jersey; for this circumstance alone would produce strong difficulties in the shape and configuration of the head, and, by consequence, in other parts of the animal. From the Gavial of Caen we can only distinguish our specimen by the relative proportion between the depth and width of the lower jaw. In the Caen Gavial the proportion between the depth and width of the lower jaw, near the symphysis, appears to be as 1 to 3.

In the New Jersey Gavial, as 1 to 2.

In the living Gavial, as 1 to 5.

In the Honfleur Gavial, as 1 to 4.

Our specimen is, however, too imperfect to determine this question, which must be left to time and to future observers. Enough, however, has been advanced to establish the existence of remains of gavials in the United States, apparently differing from any others hitherto found in Europe.

It may not be unworthy of remark, that although Cuvier has only indicated the subdivisions of the group of crocodiles, yet that our fossil clearly indicates a species differing so materially, especially from the alligators and crocodiles proper, as to show the propriety of considering them an independent genus. In effect, the long curved bodies of the teeth, hollow through so great a part of their extent, and terminating at their base in a thin shell of bone, remind one much more of the incisores of the Rodentia, among the mammalia, than of the teeth of a reptile. In other respects their similarity to the teeth of saurians is complete; but, at the same time, sufficiently distinct to warrant the formation of a well-defined and characterized genus.

This portion of a jaw is accompanied with several vertebræ,



one of which belonged to some cartilaginous fish. Another, labelled "from Schenk's, Freehold," I take to be the caudal vertebra of a crocodile or gavial, with the following dimensions:

Length 2.9.

Diameter of concave extremity 1.8.

———— of convex extremity 1.7.

The processes are more or less injured, but the foramen, for the reception of the spinal marrow, is complete.

Another vertebra, from a marle pit, is labelled "from James' pit, two and a half miles south of Bassett's," has the following dimensions:

Length 2.

Diameter of concave extremity 1.9.

———— of convex extremity 1.7.

From its compressed body, and the appearance of the portions of the branches of the spinous processes, we may infer, that this is also the caudal vertebra of a fossil crocodile.

There is also a vertebra, or rather, a portion of one, (fig. 11) which has been supposed to have belonged to some of the cetaceous mammalia. Its ends are nearly plane, and slightly elevated in the centre; but its size, the proportions between its length and breadth, and the existence of two small oval fossæ on the under side of the body, would seem to disprove this idea (p. 447.) It is, in fact, more nearly allied to the gigantic genus *Plesiosaurus*. The following are its principal dimensions:

Length of the body 2.6.

Depth 3.

Antero-posterior diam. of the articulating surface

for rib 1.1.

Transverse do. do. 1.5.

Nearly one third of the body is broken off; but by measuring one half of the entire part, we can determine the horizontal thickness of this dorsal vertebra, which is 3.8.



*A REPORT on some Fossil Bones of the Megalonyx, from Virginia; with a notice of such parts of the skeleton of this animal as have been hitherto discovered, and remarks on the affinities which they indicate. By WILLIAM COOPER.*

*Read January, 1833.*

THESE bones were presented to the Lyceum about a year ago, by Mr. G. S. Bibby, of this city. Two of them are evidently ungueal phalanges: and the third, which fits well upon the upper extremity of the larger of them, and probably belongs to it, is a middle phalanx. By comparing them with the casts of those originally discovered in Virginia, their place in the skeleton may be determined with much exactness. The larger corresponds to that which Cuvier, having the metacarpal bones and first phalanges, and numerous objects of comparison among the kindred animals, pronounces the last phalanx of the left middle finger, or fore toe. A slight difference, however, in the convexity of the two sides, which in ours is greater on the left, while in the Jefferson bone it is greater on the right, shows that it is from the opposite side of the animal. It is therefore the last phalanx of the right middle finger, to which also the middle phalangeal bone must have belonged.

The other ungueal phalanx corresponds to that which Cuvier judges to have been the last of the annular or third finger of the left side; except being also, for the same reason, evidently from the opposite side. It is, however, in better preservation than the analogous one now in Philadelphia, as it retains all of one side of the great bony sheath, of which Cuvier, from an examination of the casts, supposed the *Megalonyx* to have merely the vestiges:\* but, as Dr. Harlan has already remark-

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\* Ossem. Foss. V. pt. 1. p. 190.

ed, all the ungueal phalanges were furnished with very large ones, though they are generally found broken off. In these remarkable sheaths the foot resembles that of the *Megatherium*, which had them so large as to encase the phalanx for more than half its length. In the *Megalonyx* the sheath was not complete, as it appears to have been open above, along the back of the bone; a circumstance which is also observed in the *Myrmecophaga jubata*. The use of these sheaths was to strengthen and support the *great claws*, the base of which they firmly embraced.

The extreme rarity of these remains, and the unusual kind of animal which they bespeak, confer an interest upon every additional discovery. The bones now presented to the Lyceum had been preserved, for several years, as curiosities, at the mansion of the late President Monroe, and were thought to be "petrified lobster's claws." Their origin is no longer known, but to judge from their colour and appearance, they have been preserved from decay in the same manner as those first described by Mr. Jefferson, and very probably belonged to the same skeleton; of which many bones were carried off and dispersed before the discovery became known to him. It is a circumstance in favour of this conjecture, that they now prove to have belonged to the corresponding limb of the opposite side. Notwithstanding an appearance of antiquity, they are hard and sound, and their composition is apparently unchanged.

The following is a general view of the parts belonging to the skeleton of the *Megalonyx* that have been hitherto discovered, and of the affinities which they indicate with the other animals of the order *Edentata*.\*

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\* It will be observed that I speak of these bones as all belonging to one species of animal. Dr. Harlan and Mr. Rafinesque, on the contrary, are of opinion that those found in Kentucky belonged to a different species from the *Megalonyx* of Jefferson. Dr. H. founds his opinion,

1. Upon the different proportions, and the longitudinal grooves or flutings observable in the teeth from Kentucky.

2. The different form and proportions, and greater strength of the ungueal phalanges, and their having a notch instead of a vascular foramen.

§. *Of the Head.*

The only portions of the head yet known to have been discovered in the United States are two or three teeth, presumed to be from the upper jaw, and a very much mutilated right lower jaw and teeth. This was found at Big-Bone Lick. A tooth was found in a cave in Virginia, and another in a cave in Kentucky; which, with Big-Bone Cave, in Tennessee, are the only known localities of these remains in this country.

This jaw is too imperfect to show whether, like all others of this family, the animal was deprived of incisor teeth. As well as can be judged, it resembles that of the *Ai*, or *Three-toed Sloth*, more than any other; having, like it, a sort of doubtful canine tooth, but compressed laterally, instead of trans-

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3. The great difference between a supposed metacarpal bone from Kentucky and those found in Virginia.

These distinctions do not seem to me such as can be safely depended on. In the first place, it appears from Cuvier's figure of the only tooth known of the Virginian *Megalonyx*, that it possessed the same characteristic fluting, though in a slighter degree; and secondly, all the five teeth from Big Bone Lick are different from each other in this respect, four being very deeply and variously grooved, and the fifth, though imperfect, having very evidently been but slightly so; like, in this, to the tooth from Virginia. In proportions, those in the jaw from Kentucky are totally unlike each other.

The differences observed in the phalanges I would account for, partly by supposing that those from Kentucky have belonged to the hind foot. Those from Virginia are, no doubt, from the fore feet. Along with those from Kentucky were found an os calcis, tibia, and other portions of the hinder extremity. Their having a notch in place of a foramen, may be fairly attributed to imperfect ossification, as it appears, from the condition of the other bones, that the individual was not adult.

The last point of difference is indeed important, and would be decisive of the difference of species, if the bone hitherto called, even by myself, metacarpal, were well determined to be in fact such. The metacarpals of the Virginian *Megalonyx* are sufficiently known to prove that it cannot be any of them. But is it not metatarsal? I see no difficulty in considering it such; and in size and strength it corresponds with the large ungueal phalanges from Kentucky, which, as I have observed, there is reason to think belonged to the hind foot.

versely to the jaw, and three molars, different from any before known, and of which an idea may be best formed by referring to the figure given by Dr. Harlan in the American Journal of Geology. The structure of these teeth is the same in all; consisting of a bony substance, encased in enamel, which merely forms a border round the crown. This jaw-bone is now preserved in the collection of the Lyceum.

#### § §. *Of the Trunk.*

But few portions of the trunk have been found: they include seven vertebræ, three entire ribs, with fragments of others, and the chief portion of an os ilium. Part of these were discovered in the White Cave, in Kentucky, and the rest in Big-Bone Cave, in Tennessee. For a knowledge of the latter locality we are indebted to Dr. G. Troost, who has recently published an account of it in the Transactions of the Geological Society of Pennsylvania. The remains from White Cave are described and figured by Dr. Harlan, in the Journal of the Academy of Natural Sciences.\*

#### § § §. *Anterior Extremity.*

This is better known than any other part of the skeleton.—The scapula is among those found in the White Cave, and the clavicle at Big-Bone Lick. A humerus, young and imperfect, accompanied the scapula; but one more complete has been dug up at Big-Bone Lick. The bones of the fore-arm were amongst those originally discovered in Virginia, and a young radius was found in White Cave.†

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\* At a recent meeting of the Lyceum, Dr. Harlan informed the Society, that the bones which he had described as from White Cave, he had since ascertained to have been found in Big-Bone Cave, Tennessee. This would reduce the known localities to three, unless we include the Mummy Cave, mentioned by Mr. Rafinesque.

† Or, according to Mr. Rafinesque, in the Mummy Cave near it. Atl. Jour. vol. I. p. 28.

The carpus is yet unknown. Of the metacarpus there are three bones from Virginia, supposed to be of the fore, middle, and third toes of the left fore-foot. The same locality furnished the three bones of the middle toe of the same foot; with the middle and last phalanges of the third, and the last of the second, with a rudimentary bone representing the fourth. The three phalanges just received by the Lyceum belong, as we have seen, to the right fore-foot.

Of the animals belonging to the same order, whose osteology is best known, the scapula of the *Megalonyx* most resembles, as Dr. Harlan has pointed out, that of the *Great Ant-eater*, which is itself very different from most of its kindred in the form of this bone. That of the *Megalonyx* wants the ridge, so like a second spine, which distinguishes the scapula of this Ant-eater. It has also the same foramen, in place of a notch, near the anterior border, which is observed in several others besides these, especially the Sloth and *Megatherium*.

In having perfect clavicles the *Megalonyx* resembled the *Megatherium*, one species of Sloth, and one *Myrmecophaga*; but differs from others of the same families, the Ai having merely imperfect clavicles; while the two species of *Manis*, the *Orycteropus*, and two *Myrmecophagæ*, have none at all.

The humerus of the *Megalonyx* is materially dissimilar from the same bone in both the Sloths and the *Megatherium*, with which genera it has been usual to confound this animal. It has neither the excessive length and slenderness of that of the former, nor the short and massive form peculiar to this bone in the latter, which it approaches in the great breadth and flatness of the lower portion. It is much more like the humerus of the Ant-eaters, and especially the *Orycteropus*, an animal from which, in other particulars, it differs more perhaps than from any other of this order. It is, as in this and other Edentata, but excepting the Sloth and *Megatherium*, perforated below on the side next the body.

In the bones of the fore-arm the *Megalonyx* partakes of the characters of the Sloths and Ant-eaters: but shorter and stouter



than the former, and with proportions more like the latter of these animals.

The osteology of the fore-foot presents a combination of characters drawn from the sloths, ant-eaters, and some species of *Armadillo*, particularly the twelve-banded and the giant *Armadillo*; though Cuvier considers it to have resembled one of these last more than any other. The ungueal phalanges resemble those of the Sloths, but with a bony sheath, like that of the Ant-eaters, open above on the back of the phalanx. In the inequality of the fingers, and particularly the great relative size of the medius, it is like the *Armadilloes* and Ant-eaters. Similar affinities to all these animals may be traced in the other bones composing the metacarpus and phalanges.

§ § § §. *Posterior Extremity.*

Of this very little is known. Dr. Harlan describes\* the lower extremity of a femur, which, with a young tibia and a calcaneum, were found in the White Cave. There is likewise a tibia of an adult individual, found at Big-Bone Lick. If my conjecture is right, we have also a metatarsal from the same place; and two phalanges of the hind foot, from White Cave. But what is most extraordinary, and a fact of high interest to the geologist especially, one of the claws, in excellent preservation, was procured from the same cave.

From these portions it is, however, easy to detect no less difference between the hinder, than we have found to exist between the anterior extremities of the Sloth and the *Megalonyx*. The tibia, in its average dimensions, is not much more than twice as long as broad; and though it does not much resemble any of the co-ordinate animals in this part, it comes nearest to the *Megatherium*. The union of the tibia and fibula into one, which takes place in the *Megatherium* and the *Armadilloes*, is not found in the *Megalonyx*; or if they were slightly joined at the upper extremities, the anchylosis was not so complete as

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\* Journal Acad. Nat. Sc. Phila. vol. VI.

to prevent the two bones from being essentially distinct. In the *Megatherium* found in Georgia they form but one, without a trace of suture or any other indication of having been ever separated at either extremity.

So little is known with certainty of the hind-foot, that we cannot safely hazard any remarks upon it. On the whole, it appears probable to me, that in the posterior extremity the *Megalonyx* most resembled the *Megatherium*; except, perhaps, in the foot. In the latter this member was furnished with only one apparent toe, armed with an enormous claw. The rudiments of others were concealed beneath the skin.

In short, we find united in the *Megalonyx*, a head like that of the *Sloth*, (*ai*) a scapula like the *Great Ant-cater's*, the humerus of the *Orycteropus*, the fore-arm of the *Ant-caters*, the feet of an *Armadillo*, with a resemblance also to those of the *Megatherium*; while, in the hinder extremities, it presented a structure peculiar to itself. In size it far exceeded any species of the same order now existing. The humerus found at Big-Bone Lick, when compared with the largest *Bison's*, which are common at that spot, indicated a much larger animal. It must have been equal to the largest ox, though greatly inferior to the ponderous bulk of the *Megatherium*.

It is evident, therefore, from this comparison, that the *Megalonyx* formed one of a tribe of animals, in which are comprised several distinct genera, with all of which it had many important characteristics in common, but differed from each and all in so many particulars, as to deserve, on every account, to constitute an independent genus. This was foreseen by Jefferson when he proposed for it the name it still bears: and though some naturalists have been disposed to consider it a species of *Bradypus*, and others have declared it the same with the *Megatherium*,\* yet it can no longer, in the present state of zoology, be included even in the same genus, without giving an unphi-

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\* Pander et d'Alton. Das Riese Faulthier.

losophical latitude to the term. Even Cuvier, however, in the latest edition of his great work,\* speaks of these two animals as belonging to one genus. But, though they seem to have had a somewhat similar form of the head, and the same number of teeth, yet the great differences which are obvious in these, at the first view, in their kind, their form, and their structure,† render such an union forced and incongruous.

The *Megatherium* and the *Megalonyx* have been found in both North and South America. The former having been first discovered in the southern continent, and the latter in the northern, have become in a manner identified with these respective localities, as peculiar to each of them; but they appear, from what is now known, to have inhabited a region extending for many degrees on each side of the equator.

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\* Ossem. Foss. v. p. 67.

† See Ann. Lyc. vol. I. p. 121. pl. viii.

On a new genus of Serpents, and two new species of the genus *Heterodon*, inhabiting Tennessee. By Dr. G. TROOST, Professor of Chemistry and Natural History in the university of Nashville, Tennessee.

Read April, 1833.

THE cultivator of Natural History, residing in large and populous cities, surrounded by every thing that is artificial, if not unnatural, and admiring nature in the contemplation merely of a few stuffed skins of animals; or occupied in calculating, from the inclination of the faces of small crystals, the height and breadth of imperceptible, perhaps imaginary, molecules, may easily conceive the delight he would enjoy, if placed, like myself, amid the rich and varied stores of nature, in the luxuriant far west. Let it not therefore, surprise those, to whom I am only known as a mineralogist, to see, from my pen, the description of other productions of nature.

As yet but little is known of the natural history of this beautiful and happy country; this is particularly the case with its herpetology. I heard, during my rambles through Tennessee, dreadful tales of various reptiles; of the dangerous bite of the *cotton-mouth*, the *moccason*, the *spreading adder*, and many other snakes.

The *cotton-mouth* snake, which, it seems, inhabits principally in the western district, or that part of Tennessee which is situated between the Tennessee and Mississippi rivers, was particularly dreaded. As these reptiles are known only by trivial names, and as the same animal is known under various names in different parts of the state, I was always uncertain what snake was spoken of, and endeavoured, therefore, to collect all those that came in my way. My friends throughout the state have also lent me their assistance. I am indebted to the politeness of Mr. Ruffin, one of the students of our university,

and at present resident at La Grange, near Memphis, Tenn. for the specimen of the *cotton-mouth*, from which this description is drawn up, and which was figured by Mr. Petit-colas immediately after it was killed by spirit of wine; in which delineation the colour and distinctive characters are perfectly represented.

If we may consider the arrangement of the subcaudal plates in connexion with other distinctive marks, as the generic character, then the reptile under consideration, forms the type of a new genus, and this idea is sanctioned by other naturalists.—“La presence,” says Daudin, (tom. V. p. 23,) “ou absence des ecailles, des plaques et des double plaques sur la peau du corps et de la queue doivent invariablement servir a l’établissement des genres, et leur nombres approximatives peut offrir quelquefois un moyen auxiliaire de distinguer les especes, etc.” Nevertheless, although this arrangement of the subcaudal plates be considered as the generic character, I have hesitated to consider the animal under examination as belonging to a non-descript genus, till I obtained another specimen, possessing all the generic characters. This, by its habits, colours, and arrangement of its colours, convinced me that it must form another species of the same genus.

The general appearance of this genus is as follows:—A strong, rather short, thick body, with a short cylindrical tail, which terminates in a small horny point. The large size of its head, and the small diameter of its neck, at the first glance warn you of its dangerous character. In figure it resembles much the *crotalus*; but its tail is not furnished with rattles, and its head is covered with large plates as far as behind the eyes, the back part being covered with small scales; and we have for diagnosis, on which this genus is established:—

*Caput ovatum a corpore distinctum:*

*Apertura inter nares et oculos.*

*Tela venenifera.*

*Scuta ad basem caudæ.*

*Scutella sub apicem caudæ:*



I have named this genus *ACONTIAS*.\*

Sp. I. *ACONTIAS LEUCOSTOMA*.

White-mouthed *Acontias*, generally known by the name of Cotton-mouthed Snake.

Caput erectum depressum. Apertura inter oculos et nares in utroque latere. Scuta in vertice prolongata novem. Posterior pars capitis squamis ovatis sub-carinatis tecta. Supra fuscus cum maculis irregulariter rhomboidalibus, colore nigro fuscoque variegato, abdomine maculato griseo et fusco.

Scutis abdominalibus 135.

Scutis subcaudalibus ad basem 21.

Scutellis sub apicem caudæ 21, quarum 4to, 5to, et 6to, sunt integra.

Squamis dorsalibus ovatis subcarinatis cum duobus punctis flavis pseudo-metallicis ad basem.

Telis perforatis veneniferis duobus in maxilla superiore.

The total length is - - - - - 26 inches.

Tail - - - - -  $3\frac{4}{5}$

Head  $1\frac{6}{20}$ , of which the larger plates cover  $\frac{4}{5}$

Breadth of the head - - - - -  $1\frac{9}{10}$

Diameter of the neck - - - - -  $\frac{2}{5}$

Tail a little more than  $\frac{1}{7}$  of its whole length.

The head is of an oval form, the upper lip forming an angle of about 85 deg. with the upper part of the head, which is flat, and separated from the lip by a distinct edge. The fore part of the head, as is seen in the engraving, (plate V.) is covered with nine large plates; the two foremost are quadrants of a circle, the two next being irregular pentagons; the three succeeding, the middle one of which is a hexagon, having one

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\* *Acontias*, from *ακοντιας*, a word used by Nicander and other ancients for Snakes, is an unmeaning denomination, but is better than names designating characters not applicable to the whole genus.

acute angle towards the back part of the head: and the two side ones being irregular and more or less rounded, forming the uppermost of the orbits, are followed by two larger plates, which complete the number; having an irregular hexaedral form, and reach a little farther than the middle of the head.—The hind part is covered with carinated scales, similar to those that cover the back. The upper lip is composed of twice eight polygon plates, which are joined by a large irregular hexagonal plate with curvated edges: the second plate from the large hexagonal one forms one of the sides of the aperture mentioned. The lower lip is composed of twice eleven plates, which are joined in the front by a triangular one.

The upper part of the body and tail is covered with oval scales, slightly carinated; having at the base, on each side of the keel, a small point, which is hardly perceptible by the naked eye; but when magnified, and kept in a certain position in regard to the light, reflects a yellow pseudo-metallic lustre, while, in other directions, these points have the same colour that the scales have.

In the individual from which this description is drawn up, the poisonous perforated fangs were not visible, they being entirely hidden by a muscular cover. When this cover was removed with the scalpel, I found one curvated, perforated fang on each side. The other teeth are small, and are pointed backwards.

The colour of the upper part of the body is rather of an umber or bistre brown, variegated with lighter shades; but of which a better idea may be formed by examining the drawing. The colour of the upper part of the head is mostly uniform brown; not quite as dark as the body, but rather intermediate between the darkest and the lightest part of the back.

A dark longitudinal spot runs from the eyes, and terminates at the extremity of the *os articulare* of the lower jaw, running side by side with the white border which surrounds the mouth.

The body is very irregularly marked—dark brown spots running from one side to the other across the back; from the

left side, for instance, in an oblique direction downwards, till it reaches the upper part of the back; from thence forwards, on the right side, also in an oblique direction, forming a kind of chevron: the succeeding spots are placed in a reversed position, so that the legs of the two chevrons nearly meet, and the light-coloured spot, which is inclosed in these two chevrons, forms an irregular rhombus, the smaller diagonal running in the direction of the spine, and having in the middle a dark spot. There is also a dark spot in the triangular spots, which is formed by the external sides of two rhombi and the abdominal plates. The sides of these rhombi are not rectilinear, but run in an irregular zigzag manner.

This arrangement of colour does not extend over the whole body; the blackish or dark colour forming here and there merely stripes, though, throughout the whole, the rhomboidal tendency prevails. The upper surface of the tail is uniformly black.

The colour of the lower part of the body is of a dirty white, or gray, variegated with brownish black. Two elongated brown spots run from the sides of the lower lip over about one fourth part of the head, while the middle of the head is of the white colour before mentioned. About half way up the mouth begins another brown spot, which runs somewhat in a curve; and becoming more and more light, is lost under the neck: by which arrangement the borders of the upper and under lip continue in a white elongated spot, which runs as far as the extremity of the *os articulare* of the lower jaw; the middle of the head being entirely white, while the triangular plate on the tip of the lip is dark gray.

The distribution of the spots over the abdominal plates is very irregular. The upper part of these plates, where they are in contact with the scales, may be considered as blackish brown with white spots, which originate at the scales and seldom reach the middle of the belly—sometimes two plates being white, sometimes three. In the middle of the body the white, or rather the gray, predominates: the dark spots are very large or

very small, but are separated in the middle by the gray colour, which is irregularly punctuated with blackish brown points; while the lower part of the abdomen, for about  $3\frac{1}{2}$  inches, is almost entirely black, having only here and there small white spots in an irregular order: but every plate has two of them running transversely across it. The lower plate, which covers the anus, and which is semi-circular, is more white, having a triangular black spot towards the centre, and black points towards the circumference. The subcaudal plates are all black, while the scutella are white; some entirely, others having black spots at their base. The abdominal plates are more or less iridescent, reflecting, when seen in a certain position in regard to the light, a sky-blue colour.

From this description, it is evident that the *Acontias* cannot belong to any of the established genera. From the *Cenchrus*, Daud. it is distinguished by the arrangement of the subcaudal plates, and the aperture between the nostrils and the eye.—According to Daudin the double subcaudal plates in the *Cenchrus* are at the base of the tail; the reverse is found in our reptile. Also the arrangement of the plates at the head is different in the *Cenchrus*. The figure given by the author, mentioned above, and concerning which he says, “*que j’ai fait peindre avec une grande exactitude, et sous mes yeux*,” (tom. v. p. 31) does not resemble the *Acontias*. In the *Cenchrus* the large plates of the head terminate in two large plates. I wish to make the difference between the *Cenchrus mokeson* of Daud. and our new genus evident, because the following species is known in the west by the name of *highland moccason*.

The aperture between the nostrils and eyes assimilate the *Acontias* to the genus *Crotalus*; but the arrangement of the subcaudal plates and the rattles at the tail are sufficient to distinguish them from each other.

The arrangement of the subcaudal plates seems to be the same in the *Hurria*; but that genus has no venomous fangs, and differs in several other respects.



The aperture already mentioned between the eyes and nostrils would assimilate it to the genus *Trigonocephalus* of Opper, but in that case we should disregard the arrangement of the plates altogether. His *Trigonocephalus amodytes* has, according to Daudin, only subcaudal scuta. I have never seen the *T. lanceolatus* nor *T. tigrinus* of Opper; but I am very familiar with one which, Opper says, must belong to his genus *Trigonocephalus*. Speaking of the *Heterodon* of Palisot de Beauvois, which has no venomous fangs, and has the subcaudal plates exactly as the genus *Coluber*, he says, “*ce genre paroît, de preference sur tout les autres, etre essentiellement caracterisé; je ne hasardirai cependant point d'en decider absolument, n'ayant jamais pu parvenir a en voir un individu; mai j'ai trouvé dans la collection de Paris une espece qui repondoit entierement, tant a la description, qu'a la figure, mais ce seroit pour lors un trigonocephalus mihi, et on auroit mal defini les deux dents venimeuses tres avancées.*” (*Annal. du Mus. tom. xvi. p. 270.*) If the description of the *Heterodon* can be made applicable to an individual which is a *Trigonocephalus*, then certainly the *Acontias mihi* cannot be a *Trigonocephalus*.

The *ACONTIAS LEUCOSTOMA* is always found near, or in water, and in swampy places. I do not know whether it occurs in any other part than the western district of Tennessee. It is not as peaceable as the rattlesnake, which does not bite except when irritated, and in self-defence, or to procure food; but the *A. leucostoma* attacks every thing that comes within its reach, putting itself in an erect posture, with its mouth wide open; which being white, and the outside of the head brown, looks like a pod of cotton newly opened; from which circumstance it has obtained the name of *cotton-mouth* snake. Its bite is considered dangerous, nevertheless it is often cured. The Indian, when bitten by a cotton-mouth, abandons all hope of recovering—rolls himself up in his blanket, and lies down and dies.



Sp. II. ACONTIAS ATRO-FUSCUS.

Blackish brown Acontias.

Vulgarly called Highland Moccason. As I have already mentioned, different names are given to the same animal, so the present species is also called copper-head and pilot—while these names are given also to other poisonous snakes.

Caput ovatum depressum. Apertura inter oculos et nares in utroque latere. Scuta in vertice prolongata novem; posterior pars capitis squamis hexagonis non carinatis tecta. Supra, colore nigro cum maculis atrofuscis variegato. Abdomine albo cum nigris maculis. Cauda nigra.

Telis veneniferis perforatis conspicuis quatuor.

Scutis abdominalibus 133.

Scutis subcaudalibus ad basem 25.

Scutellis sub apicem caudæ 18.

Squamis dorsalibus ovatis carinatis cum duobus punctis ad basem.

Total length	- - - - -	25 inches.
Tail	- - - - -	$3\frac{4}{5}$
Head $1\frac{2}{5}$ , of which the large plates cover		$\frac{3}{4}$
Breadth of the head	- - - - -	$1\frac{3}{4}$
Diameter of the neck	- - - - -	$\frac{1}{2}$

Anus transversal simple.

Tongue long, slender, and forked.

Circumference of the thickest part of the body  $4\frac{1}{2}$  inch.

The thickness of the body diminishes abruptly at the tail, which is short, cylindrical, slender, and terminates in a small, horny point.

The form of the head is pretty much the same as that of the preceding species: it is also covered with the same number of plates, and, in figure and arrangement, similar to those that cover the head of the *Leucostoma*; but the small scales, which cover the back part of the head, are of an irregular hexagonal

form, not carinated; whereas the small scales, which cover the back part of the head of the preceding species, are of the same form as those that cover the body.

The mouth is furnished with four strong poisonous fangs, two on each upper jaw, which are very conspicuous. In this respect it differs also from the *Leucostoma*; in which the poisonous fangs were only two, and these were small.

In this species also the apertures between the eyes and nostrils are found; which, in fact, forms one of the generic characters.

The scales on the body are elongated, oval, and more deeply carinated than in the preceding, and have similar small points at their base; which are here merely round cicatrices, and have not the pseudo-metallic luster of the *Leucostoma*.

The colour of the upper part of the body must be considered as black, variegated with brown spots, which are not of an uniform shade, but pass from dark into a lighter colour: they are irregularly scattered over the body; nevertheless, they exhibit a tendency to run from one side towards the other, widening towards the back. The light spots are composed of smoky gray, passing into blackish brown, exhibiting all the intermediate shades between these two colours: they are rather small stripes, of the breadth of from two to four scales, and disappear near the tail altogether, which is entirely black, having only four small white points, which are probably accidental.

The upper part of the head is black, bordered with gray; which becomes white behind the eyes. A dark longitudinal spot runs from the eyes, and terminates near the tympan bones. The upper lip is white, terminating near the tip in gray.

The lower part of the body is also irregularly spotted with black and a dirty white. The white colour predominates, from the head backwards, beyond the middle of the body, where the black gradually increases as far as the tail, which, as has been mentioned, is entirely black. The white is punctuated with black over the whole of the lower part of the body. The under part of the head is also irregularly marked with black

and white, the white predominating; but the lower lip has three white spots, the tip being gray.

The habits of this reptile differ much from those of the preceding species. It is always found on dry high land, in the pine barrens and similar places, never in water or swamps; and is therefore known, amongst the inhabitants, by the name of *Highland Moccason*. It is a very vicious animal, and its bite is very dangerous. General Robertson, one of the first settlers and founders of Nashville, was bitten both by a rattlesnake and a highland moccason; and, according to the statement of his son, Dr. F. Robertson, the pain or wound of the latter was more excruciating than that of the former.

The name of Moccason is applied to several snakes. The one described by Daudin, under the name of *Cenchris Moccason*, must be a different animal. The one known by the name of Water Moccason is a harmless reptile, and belongs to the genus *Coluber*. The same name is sometimes given to the *Heterodon*.

There is another reptile, also called Water Moccason, which I have often seen, but have never been able to obtain, as it lives mostly in water, and is visible only when it suns itself, and retires immediately into the water when approached.—From the shape of this snake, it being short and thick, with a large head, and having a rusty black colour, I believe it to be poisonous.

The *A. atro-fuscus* occurs in several places in Tennessee. For the one from which this description is drawn up, I am indebted to the politeness of Mr. Skipwith, who found it in Maury county, Tenn.

#### HETERODON, *Palisot de Beauvois*.

It seems as yet undecided whether *Heterodon* should be considered as a genus, or merely a species of *Coluber*. The diagnosis given by Daudin is only partly correct.—“*Naso sub-*

*erecto, clato, antice acuto supra carinato; dentibus duabus longioribus et simplicibus in utroque latere maxilla superioris: Cauda  $\frac{2}{11}$ .*" I said that this diagnosis is only partly correct. The long teeth mentioned here are not two, but four in number: and besides the teeth, the skeleton of the head differs in several particulars from that of the *Coluber*. And these characters are permanent in three different species, in case we consider *Heterodon* as a genus; if it form a species of *Coluber*, they must be considered as varieties.

Desirous to see what occasioned this singular shape of head, and also to convince myself of the absence of the venomous fangs, I dissected several heads; and not only found that the above-mentioned teeth amounted to four, but that the whole bony structure differed from that of the *Coluber*.

The dimensions of the different bones which compose the head of the *Heterodon* differ much from those of the other genera of this order of animals. The following are the comparative dimensions of the corresponding parts of the head of a *Heterodon* of the size of the one which has been described in this paper, and a *Coluber* of between six and seven feet long.

	Heterodon.	Coluber.
	INCHES.	
Tympana - - - -	$\frac{7}{10}$	$\frac{1}{2}$
From the extremity of the parietal bone to the extremity of the intermaxillary, or the tip of the muzzle - -	$\frac{7}{10}$	1
Os articulare joined to the os dentale of the lower jaw - - -	$1\frac{1}{10}$	$1\frac{3}{5}$
From the tip of the muzzle to the occiput	$\frac{17}{20}$	$1\frac{3}{20}$
From the extremities of the posterior os frontis, across the head, giving the breadths of the same - -	$\frac{1}{2}$	$\frac{3}{5}$

We see, in these proportions, the remarkable length of the *tympana*, in proportion to the dimensions of the other bones: they are of the same length of the whole head, from the extremity of the parietal bone to the tip of the muzzle, both being



$\frac{7}{10}$  of an inch; and of course the animal, when irritated, extends its tympana, which then form a right angle with a line drawn from the intermaxillaries towards the occiput; which enables it (adding something for the deviation of the ossa mastoidea) to give an extension to its head of almost three times the length of the head. (Twice  $\frac{7}{10}$  of an inch, the length of the two tympana, and  $\frac{1}{2}$  an inch, the width of the head =  $1\frac{9}{10}$  of an inch.) The head is almost translucent when the animal is enraged.

Though the Coluber has the power of extending its head when irritated, it cannot do it to the same extent; its tympana are only half as long as its head, besides its occipital bone is long, so that the flattening of the head is not great.

With regard to the large teeth mentioned by Palisot de Beauvois, the number of which, according to that naturalist, is two, I have to remark, that, in the specimen which I dissected, four large conical teeth were found. They are hollow, though not perforated at the apex; more or less curved, and somewhat moveable; and if not carefully handled during dissection, they become entirely loose, being only attached to the pterygoidea interna by a sinew which fills the hollow of the tooth. I believe this serpent makes use of them to work the large animals, which it takes for food, into its stomach. I found in the stomach of the one I dissected, the hind legs of one of our common toads, which was three inches long; so that the whole toad must of course have been about six inches in length.— This animal went through the mouth of a head not longer than one inch!

I found in the state of Tennessee three distinct species. The first, and which occurs most frequently, is black, and generally the largest, is found over the whole state. The second is variegated, black, with orange transversal stripes. It is not quite as large as the black species, and is found in the western district of Tennessee. The third, which is the smallest, is variegated with black and yellowish gray, or bright mulatto colour. I have found this snake in Davidson and Maury counties, in Tennessee.



1. HETERODON NIGER. *P. de Beauv.\***Hognose Snake, Spreading Adder.*

Abdominal scuta, from 135 to 146.

Subcaudal scutella, from 52 to 55.

Whole length 34 to 36 inches.

Of which the tail is  $5\frac{1}{2}$  to  $5\frac{4}{5}$  inch.Head, to the extremity of os articulare  $1\frac{1}{2}$  inch.Of which the larger plates cover  $\frac{9}{10}$  inch.

The head is nearly of the same diameter with the neck ; so that when we are not acquainted with the skeleton of the head we cannot determine where the head terminates and the neck commences, but the skeleton shows that the head terminates with the large plates ; so that, in the individual, the dimensions of which have been given, the os occipitis lies exactly under the posterior edge of the plates ; and the head being about an inch, and the tympana half an inch long, the latter projects half an inch behind the former.

The head is covered with ten plates. The upper lip, or tip of the muzzle, is flat, erect, running, keel-shaped, backwards ; upon which follows a small elongated oval plate, forming, with the keel mentioned, an irregular tetrahedron. The two first plates, having an irregular triangular form, are placed on each side of this tetrahedron : they constitute part of the edge of the nostrils, and join to the three following ; of which the middle one is the small oval plate already mentioned ; and the two side ones, having a very irregular trapezoidal form, compose the upper edge of the nostrils, and extend as far as the upper part of the small oval plate. Next follow two large irregular

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\* As all the descriptions which have come under my observation are very incorrect, and in many parts deficient, particularly in the description of the head, which also is badly represented by Daudin, (pl. LX, fig. 28) I suppose a more correct description will be acceptable to the herpetologist who does not inhabit the places where these reptiles are found.

shaped plates, bending much down towards the orbits, and terminating in an obtuse angle, they form together a zigzag line, in which are placed three large plates; the middle one being a hexagon, broad below and narrow above: the two side ones form the upper edge of the orbits, and resemble somewhat the middle one in an inverted position; and one of the angles, where it forms part of the orbit, is truncated. The two following plates, which terminate the number, fit in a less regular zigzag line, formed by the three hexagons, and, both combined, form a half circle, reaching to about the occiput of  $\frac{5}{20}$  of an inch behind the eyes. The eyes, besides the plate which forms the upper edge, are surrounded by ten trapezoidal, or rather cuneiform plates. The lips are covered with twice eight plates, which increase in size towards the back part of the mouth: the lower lip is covered with twice ten plates, increasing in size in a contrary direction.

The whole snake is rather thick; the circumference of the one of which the dimensions are given being rather more than four inches.

The dorsal scales are very long, oval, and slightly carinated.

The colour above is uniformly black; below the head it is yellowish white; the abdomen gray, or bluish white.

It is generally known under the name of Spreading Adder, and is much dreaded. Though quite harmless, the *Heterodon* is a vicious snake: and when it perceives that it cannot escape its antagonist by running, it then prepares for battle, makes a very hissing noise, and flattens its head more than any other snake, then darts at any thing presented to it. But when a little roughly handled, even without hurting it, as pushing it with a stick a few times from one place to another, it will feign to be dead. In such state I carried for some time the first that I met with, imagining that it was really dead; but when I arrived at my lodging I laid my snake down, to prepare a bottle to put it in; when, lo! after a few minutes, it made its escape, and I had difficulty to find it.

One of those that I dissected was a female: she had 140 abdominal plates; and I found in her 25 eggs, of an oval shape, three quarters of an inch long, without calcareous cover.

Sp. II. HETERODON ANNULATUS.

Heterodon annulatus; annulis latis et alternatim nigris et aurantiis dispositis.

Scutis abdominalibus	-	-	138.
Scutellis subcaudalibus	-	-	43.
Total length	-	-	-
Tail	-	-	-
Head	$1\frac{1}{2}$ in.	of which the large plates occupy	$\frac{17}{20}$

The form of the dorsal scales is similar to those of the *H. niger*.

The general form of the *H. annulatus* coincides pretty much with that of the *H. niger*, but is rather more slender. The disposition of the plates on the head, and the form of the scales covering the back part of the head, are also similar to those of the preceding.

The body is regularly surrounded with black and orange rings. The head is perfectly black; and immediately behind it is the first orange ring, which continues alternating with black rings, till the very extremity of the tail, forming 31 orange and 30 black rings; which nevertheless do not surround the whole body, but run only from one side of the abdominal plates towards the other. Below it is yellowish white.

I found this reptile in Perry county, in the western district, Tenn. I am not acquainted with its habits, but I suppose it frequents, in preference, swampy places; such was the place where I found it. The inhabitants told me that it was not uncommon, they also called it Moccason.

## Sp. III. HETERODON TIGRINUS.

*Heterodon tigrinus*. Colore cinereo cum maculis ovatis nigris dorsalibus, aliisque maculis rotundis et nigris in utroque latere.

Scutis abdominalibus	-	-	133.
Scutellis subcaudalibus	-	-	52.
Total length	-	-	16½ inches.
Tail	-	-	2½
Head	1 inch, of which the large plates cover $\frac{3}{5}$		

The form of the dorsal scales, and the plates on the head, is similar to that of the two preceding species; also the general appearance is pretty much like the *H. niger* and *H. annulatus*, but it differs much in size. I never saw any specimen longer than 16½ inches; all that I have seen were shorter.

This species is very beautifully variegated: the generality of the colours is black and ash gray: which is, in the young ones, light, and in the old ones dark, approaching to brown. A black stripe, commencing at the corner of the mouth, runs in an oblique direction over the eye to above the little oval plate; where, crossing the head, it runs over the other eye to the other corner of the mouth, forming a figure approaching to that of the horse-shoe. Two black spots run from the two, terminating large plates, diverging at first, but afterwards they approach one another again. At the point where they are the farthest apart is an elongated oval spot. These spots are repeated over the whole body; they are about  $\frac{3}{10}$  of an inch long, and are  $\frac{1}{5}$  of an inch apart. On each side is a row of smaller circular black spots, placed below the intervals between the oval ones: this arrangement continues on to the tail, on which the same colours are arranged in regular bands.

The lower part is yellowish white under the head, gray under the body, and white under the tail.

I found one near my dwelling, near the University of Nashville; and I received another from Mr. Skipwith, Maury co. Tenn. it was considered by him as a Highland Moccason.

The *H. tigrinus* and *annulatus* are both of rare occurrence.

I have amongst my reptiles, collected in Tennessee, several Colubers, which are not mentioned by those whose writings on these animals have come under my perusal; these I intend to describe in a continuation of this memoir.

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*Note by the Author.*—Having inadvertently employed the name *Acontias*, which is preoccupied, I request the reader to substitute *Toxicophis* in place of it.



A. MONOGRAPH of the North American species of  
RHYNCHOSPORA. By ASA GRAY, M. D.

*Read December, 1834.*

The natural order CYPERACEÆ has, in proportion to the number of species it comprises, been less carefully studied than any other family of phenogamous plants. Notwithstanding the researches of R. Brown, Kunth, Nees von Esenbeck, &c. who have illustrated particular portions of this family, the distinctive characters of the genera are, in many cases, highly unsatisfactory, and the determination of species is frequently difficult. The whole order requires an elaborate revision by some competent person, who can consult the principal herbaria of preceding botanists, as well as many important works, which, from their great cost or extreme scarcity, are inaccessible to us.— But the plants of any single country may be most advantageously studied by a botanist who is familiar with them in their native situations, and who has opportunities of examining and comparing with each other numerous specimens from various localities.

A person who in this way confines his attention, for a time at least, to the critical examination of a single genus or family of plants, and who carefully records the *facts* which he observes, may furnish important materials to those who, with more ample means, are to succeed him in the same field; and thus contribute, in some degree, to the advancement of the cause of science.

The following account of the North American species of Rhynchospora has been prepared under circumstances highly favourable for arriving at correct results. With a liberality which does honour to the cause in which they are engaged, my botanical friends have placed their collections at my disposal

or permitted me to examine them; and have, in various ways, favoured me with important assistance.

To the kindness of Abraham Halsey, Esq. I am indebted for the drawings of the fruit, &c. of all the species which are described in this paper. My acknowledgments are also especially due to Professor Torrey; who has, with great liberality, placed in my hands his entire collection in this genus, together with some interesting notes upon the specimens contained in the herbarium of Michaux, at the Garden of Plants in Paris; and a suite of the spikelets and flowers of most of the species described by that author, taken, by the kind permission of the curators, from his original specimens. By the aid of these specimens and notes, I have been enabled to determine, with entire satisfaction, all the species described in the *Flora Boreali-Americana* of Michaux.

The herbarium of Professor Torrey is also especially rich in specimens from the southern states, communicated by the late Mr. Elliott, the late Rev. Mr. Schweinitz, Dr. T. R. Ingalls, of New Orleans, Rev. Moses A. Curtis, of Wilmington, North Carolina, &c.

I am also under obligations to Dr. Charles Pickering, principal curator of the Academy of Natural Sciences at Philadelphia, for the opportunity of examining the herbarium of the late excellent Mr. Schweinitz, now in the possession of that institution. I also had the privilege of examining a very extensive and interesting collection in this genus, made in Georgia and Florida by the late Dr. Baldwin of the United States navy and army: a suite of which, with the original labels, now forms a part of that herbarium.\* Major J. Le Conte had the kindness to allow me to examine a fine collection made by himself in Georgia and South Carolina.

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\* Since this paper was prepared for the press I have had the opportunity of consulting the manuscripts and original herbarium of Dr. Baldwin, now in the possession of Dr. Torrey. Among his papers we find detailed descriptions of all the species of *Rhynchospora* which his her-

By far the greatest number of the species of Rhynchospora are natives of America. The *Systema Vegetabilium* of Sprengel, the latest enumeration I have seen, comprises 38 species, exclusive of 5 species of Carpha of R. Brown, which are by Sprengel referred to this genus. To these we may add 5 species from Rœmer and Schultes, *Mantissa*, vol. II. which increases the number of species to 43. Of these, 30 are natives of America, 6 of New Holland, 4 of the East Indies, 1 of the Cape of Good Hope, and 2 are common both to Europe and North America.

In Willdenow's *Species Plantarum* two species of Rhynchospora are described as natives of North America, viz. Schœnus glomeratus and cymosus. Lamarck, in the first volume of his illustrations of the Genera of Plants, published in 1791, has imperfectly characterized three species, which were collected in Carolina and Florida by Mr. Fraser. Two of these can be satisfactorily determined, and to these the specific names of Lamarck must be restored, to the exclusion of those conferred by later authors. Michaux, in the *Flora Borcali-Americana*, has enumerated nine species, and they are, for the most part, very accurately described. The *Descriptio Uberior Graminum* of Muhlenberg, contains detailed descriptions of thirteen species of this genus. Specimens of many of these, however, do not exist in his herbarium; and those which have a place there are in such a state of confusion, (there being often three or four species with a single label) that little information is to be obtained by consulting it.

The species of Schœnus with hypogynous bristles and a sub-articulated tubercle were separated to form the genus Rhynchospora, by Vahl, in the second volume of his *Enume-*

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barium comprises. It appears that he had paid much attention to this genus and to the Cyperaceæ in general, and many of his observations are valuable.

I have adopted the specific names proposed by Dr. Baldwin, except in cases where they have been previously applied to other species, or are for some other reason objectionable.

*ratio Plantarum*, which was published in the year 1806. His specific characters are drawn almost exclusively from the culm, leaves, and inflorescence—characters of minor consequence—to the exclusion of the much more eligible and important ones which are furnished by the spikelets, bristles, and fruit. Consequently, there remain some doubts as to the synonymy of Vahl, which can only be removed by the examination of his original specimens.

Pursh appears not to have studied this genus with care. In the *Flora America Septentrionalis* ten species are enumerated, and the specific characters of Vahl are quoted without alteration.

The late Mr. Elliott, in the Botany of South Carolina and Georgia, has described thirteen species of *Rhynchospora*. Although the synonymy is often inaccurate, yet his detailed descriptions are so far correct, that we have little difficulty in determining the plants to which they are intended to apply. In a few cases, moreover, I have had the opportunity of examining authentic specimens, labelled by Mr. Elliott, and by him communicated to Dr. Torrey.

### RHYNCHOSPORA. *Vahl.*

SPICULÆ paucifloræ; glumis undique imbricatis, inferioribus vacuis. SETÆ hypogynæ plerumque sex. NUX indurata, basi styli persistente subarticulata.

*Vahl, Enum.* II. p. 229. *R. Brown, Prodr. Fl. Nov. Holl.* I. p. 229. *Pursh, Fl. Am. Sept.* I. p. 24. *Nuttall, Gen. N. Am.* pl. I. p. 33. *Rœmer et Schultes, Syst. Veg.* II. p. 2.—*Elliott, Bot. S. Car. et Georg.* I. p. 57. *Torrey, Fl. N. et M. Un. St. Am.* I. p. 54. *Sprengel, Syst. Veg.* I. p. 129. *Nees von Esenbeck, Cyp. Ind. in Wight. Contrib. Bot. India.*

SCHÆNI species, *Linn. Gen. Pl.* 92. *Willd. Sp. Pl.* I. p. 259. *Lamarck, Ill. Gen.* I. p. 135. *Michaux, Fl. Bor. Am.* I. p. 34. *Persoon, Syn. Pl.* I. p. 58. *Muhlenberg, Gram.* p. 4



CHÆTOSPORA, Humboldt, Bonpland, and Kunth, *Synop. Pl. Æquinoc. Orb. Nov.* I. p. 158.

ORD. NAT. CYPERACEÆ, R. Brown, *De Cand.*, Agardh, Bartling, etc. CYPEROIDEÆ, Juss. CALAMARIÆ, Linn. *In Syst. Sex.* TRIANDRIA MONOGYNIA.

*Culms* mostly simple, triangular or subterete, leafy. *Inflorescence* corymbose, paniculate or fasciculate, rarely capitate.

*Corymbs* one or several, terminal or lateral, mostly single, but sometimes 2 or 3 emerging from the same sheath.

*Spikelets* ovate or lanceolate, few-flowered.

*Glumes* (bracteæ, Lindl.; bracteolæ, Bartl.; squamæ, R. Brown,) loosely imbricated on every side, one-nerved, cuspidate; the inferior ones shorter and empty.

*Perianthium*,\* (R. Brown, Bartling,) (prolongations of the torus, *De Cand.*†) composed of a definite number of hypogynous bristles. *Bristles* 5—12, but for the most part 6, in two series: the 3 outer ones opposite to, and the 3 inner ones alternate with, the stamens, plumose or denticulate-hispid; the hispidness directed either upward or downward.

*Stamens* 3; rarely 2, 6, or 12. *Filaments* broad and flat.

*Anthers* linear, exserted.

*Style* 1, bifid (rarely entire), dilated at the base.

*Nut* (R. Brown) (seed, Linn.; caryopsis, Spreng.; akenium, Kunth,) crustaceous, ovate, obovate or rotund, lenticular or subglobose; often attenuated at the base, crowned and subarticulated with the indurated, persistent base of the style, or

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\* "Perianthium nullum vel setosum, rariusve membranaceum 1—3 valve." R. Brown, *Prodr. Fl. F. Holl. (in charac. famil. Cyperac.)* I. p. 212.

† "Le torus se prolonge quelquefois autour du fruit, ou sous forme d'écaillés petaloides distinctes, comme dans l'ancolie; ou des filets pili-formes, comme dans plusieurs cyperacées." *De Cand. Organogr. Veg.* II. p. 89.



(as in *R. laxa* and *R. macrostachya*) with the whole style indurated and persistent.

*Seed* ovate or globose, not adhering to the pericarp.

\* *Nut rugose.*

1. *RHYNCHOSPORA CYMOSA*, Nutt.

*R.* culmo triquetro; corymbis subcymosis, terminalibus axillaribusque; spiculis ovatis, glomeratis; nuce orbiculato-obovata, subcompressa, transversim undulato-rugulosa, setis sursum hispidulis longiori; tuberculo brevi conico.

*R. cymosa*, Nutt. *Gen.* I. p. 33. *Ram. et Schult. Mant.* II. p. 47. *Torrey, Fl.* I. p. 56. (excl. syn. Elliott and Pursh).

*Schoenus cymosus*, Willd. *Sp. Pl.* I. p. 265. *Muhl.! Gram.* p. 9.

*Culm* 1—2 feet high, smooth, acutely triangular. *Leaves* 2—3 lines wide, glabrous; the radical ones somewhat crowded, the upper cauline ones often overtopping the culm. *Sheathes* striate. *Corymbs* 3—4, somewhat densely flowered; the terminal ones largest, the lateral ones on short, exsert peduncles. *Spikelets* aggregate in fives (in threes, Willd.) on the ultimate division of the corymbs. *Glumes* fuscous; the inferior ones sub-orbicular, emarginate, mucronate; the interior ones ovate. *Bristles* 6, a little more than one half the length of the nut, slightly hispid upward. *Stamens* 3. *Style* bifid. *Nut*\* a line in length, compressed or somewhat tumid. *Tubercle* (the persistent base of the style) depressed conic, about one-fourth the length of the nut.

**HAB.** New Jersey to Louisiana; July—August. Near Princeton, New Jersey, *Torrey*; Pamunkey, Maryland, *Dr. Robbins*; Charleston, S. Carolina, *B. D. Greene, Esq.*; Georgia, *Le Conte*; New Orleans, *Dr. Ingalls*; Middle Florida, *Dr. Chapman*.

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\* When the nut is compared with any other part, or its length referred to, the tubercle is always excluded.

OBS. *R. cymosa* of Elliott is described as having a terete culm and a smooth nut. His plant is most probably *Schænus fascicularis* of Michaux.

## 2. RHYNCHOSPORA TORREYANA.

*R. culmo gracili*, subtereti; foliis setaceis; paniculis corymbosis, subsparsifloris; spiculis ovatis, plerumque pedicellatis; nuce elliptico-obovata, compressa, transversim rugosa, setis sursum hispidulis longiori; tuberculo compresso-conico, basi latitudine nucis.

*R. micrantha*, Gray, *Gram. et Cyp.* I. no. 96, (excl. syn.)

*Culms* cæspitose, 1—3 feet high, striate, subterete and with the leaves glabrous. *Radical leaves* 6—8 inches long, narrow and rigid; cauline ones much shorter, setaceous. *Panicles* 1—3, corymbose, somewhat loosely flowered, on short peduncles. *Spikelets* ovate, mostly pedicellate. *Glumes* fuscous, ovate, mucronate. *Bristles* 6, hispid upward, one-half to two-thirds the length of the nut. *Stamens* 3. *Nut* exceeding a line in length, oblong-ovate, very evenly transversely rugose, with minute longitudinal striæ. *Tubercle* compressed conic, very broad at the base, scarcely one-third the length of the nut.

HAB. Monmouth county, New Jersey, *Torrey*; also in wet ground, near Quaker Bridge, New Jersey. July—August.

OBS. In its nut and bristles this species approaches *R. rariflora*, but its habit is widely different.

## 3. RHYNCHOSPORA RARIFLORA, Ell.

*R. culmis cæspitosis foliisque setaceis*; paniculis simplicibus, paucifloris; spiculis ovatis; nuce obovata, compressa, transversim rugosa, setis sursum hispidulis longiori; tuberculo compresso-conico.

*R. rariflora*, Elliott, *Bot. S. Car. et Georg.* I. p. 58. (excl. syn.)  
*Schænus rariflorus*, Michx. *Fl.* I. p. 36. et *Herb.!* Pers. *Syn.* I. p. 60. *Muhl. Gram.* p. 10.

*Culms* capillary, 6—12 (rarely 15) inches high. *Leaves* setaceous, shorter than the culm. *Panicles* sub-corymbose, nearly simple. *Spikelets* few, (3—8) ovate, all pedicelled. *Glumes* ovate, mucronate, fuscous. *Bristles* 6, very fragile so that the whole number is seldom seen when the fruit is mature, minutely hispid upward, variable in length, but always shorter than the nut. *Stamens* 3. *Style* bifid. *Nut* obovate, deeply rugose, crowned with a compressed conic tubercle scarcely half the length of the nut.

HAB. S. Carolina and Georgia, *Elliott* and *Dr. Baldwin*; Louisiana, *Dr. Ingalls*; Middle Florida, *Dr. Chapman*.

OBS. This plant was erroneously referred by Vahl, (*Enum. I. p. 231.*) to his *R. micrantha*, from the West Indies, a species nearly allied to ours, but which differs in the length of its bristles and tubercle. There is no specimen of *Schœnus rariflorus* in Muhlenberg's Herbarium.

#### 4. RHYNCHOSPORA MILIACEA.

*R. culmo triquetro, folioso; paniculis axillaribus terminalibusque, ramis divergentibus, laxe multifloris; spiculis turgido-ovatis, omnibus pedicellatis; nuce globuloso-obovata, transversim rugulosa, setis sursum hispidulis  $\frac{1}{3}$  brevioribus; tuberculo brevissimo, depresso-conico.*

*Schœnus miliaceus, Lamarck, Ill. Gen. (1791) I. p. 137.*

*S. sparsus, Michx. Fl. I. p. 35. Muhl.! Gram. p. 7.*

*Rhynchospora sparsa, Vahl, Enum. II. p. 230. Pursh. Fl. I. p. 48. Rœm. et Schult. Syst. Veg. II. p. 83, et Mant. II. p. 45. Elliott, Bot. S. Car. et Georg. I. p. 62. tab. II. Torrey, Fl. I. p. 56. Spreng. Syst. Veg. I. p. 195.*

Whole plant smooth and somewhat glaucous. *Culm* 2 feet high, triangular, fistulous, very leafy below. *Lower leaves* linear lanceolate, 8—10 inches long, 3—4 lines wide; the upper ones 2—3 inches in length, linear. *Panicles* corymbose, compound, diffuse, 5—7, on subsessert peduncles. *Spikelets* ovate, turgid, ("vix magnitudine seminis milii," *Rœm. et Schult.*) borne on slender pedicels  $\frac{1}{4}$ — $\frac{1}{2}$  an inch in length; each spikelet perfecting 4—6 nuts. *Glumes* fuscous, very ca-

ducous, ovate, carinate. *Bristles* 6, about one third longer than the nut, (twice as long as the seed, *Ell. setæ nonnullæ, Rœm. et Schult.*) somewhat caducous, hispid upward. *Style* bifid. *Nut* about half a line in length, tumidly obovate or ovate, crowned with a depressed-conic tubercle, scarcely one-fourth its length.

HAB. "Wet soils, in pine barrens generally," *Elliott*; New Bern, North Carolina, *Mr. Moses A. Curtis*; Georgia, *Le Conte*; New Orleans, *T. Drummond*; Middle Florida, *Dr. Chapman*.

OBS. This species is also a native of *Puerto Rico*, where it was collected by *Bertero*; *vide Rœm. et Schult. Mant. l. c.* I have adopted the specific name of *Lamarck* on account of its priority.

5. *RHYNCHOSPORA CADUCA, Ell.*

*R. culmo triquetro*; paniculis axillaribus terminalibusque, erectis; spiculis ovatis; nuce orbiculato-ovata, paululum planoconvexa, transversim rugulosa, basi subattenuata, tuberculum excedente, setis sursum hispidis subduplo brevioribus.

*R. caduca, Elliott, Bot. S. Car. & Georg. I. p. 62. Rœm. & Schult. Mant. II. p. 51. Spreng. Syst. Veg. I. p. 196.*

*Culm* acutely triangular, 1—2 feet high. *Leaves* broad-linear, 2—3 lines wide, glabrous. *Panicles* corymbose with the flowers somewhat crowded, on peduncles twice as long as the sheaths. *Spikelets* ovate, acute, nearly twice as large as in *R. cymosa*, pedicellate or sessile. *Glumes* caducous; exterior bones broad-ovate, carinate, with a short mucro; the interior ones longest, acute. *Bristles* 6, twice the length of the nut, hispid upward. *Stamens* 3. *Style* long, slightly bifid. *Nut* a line in length, somewhat plano-convex, crowned with a compressed-conic tubercle, nearly one-third its length.

HAB. In wet soils, Charleston, S. Carolina, *Elliott*; Wilmington, North Carolina, *Mr. Curtis*; St. John's, Florida, *Dr. Baldwin*.

OBS. "This species is nearly allied to *R. sparsa*, (*R. milicea, nob.*) from which it differs in having its spikelets larger,



clustered, and its panicle rather appressed than diffused. It is also remarkable for the facility with which it drops its mature glumes; so that, in a specimen where the seeds are perfect, many of them will be found naked, adhering to their pedicels." *Elliott, l. c.* It is also closely allied to *R. cymosa*, but it is readily distinguished from that species by its larger, often pedicellate spikelets, plano-convex fruit, and longer bristles.

#### 6. RHYNCHOSPORA INEXPANSA, Vahl.

*R. culmo subtriquetro, debili; paniculis subsparsifloris, ramulis approximato-erectis; spiculis fusiformibus; nuce oblonga, compressa, transversim rugosa, setis sursum hispidis dimidio longiori; tuberculo nuce subtriplo brevior.*

*R. inexpansa, Vahl, Enum. II. p. 233. Elliott, Bot. S. Car. & Georg. I. p. 61. Rœm. & Schult. Syst. Veg. II. p. 85. Spreng Syst. Veg. I. p. 197.*

*Schœnus inexpansus, Michx. Fl. I. p. 35, et Herb. Muhl. Gram. p. 9.*

*Culm*  $1\frac{1}{2}$ —2 feet high, obscurely triangular, slender, somewhat nodding. *Leaves* narrow-linear, smooth and short; cauline ones rather remote, as long as the internodes. *Panicles* 2—4, on filiform subpendulous peduncles. *Spikelets* fusiform, subfasciculate. *Glumes* fuscous, ovate, acute. *Bristles* 6, twice as long as the nut, hispid upward. *Stamens* 3. *Style*, long, deeply bifid. *Nut* oblong, compressed, evenly rugose. *Tubercle* compressed, acute, with the base about the width of the summit of the nut.

**HAB.** Charleston, S. Carolina, *Elliott*; Georgia, *Dr. Baldwin*; near New Orleans, *Dr. Ingalls*.

#### 7. RHYNCHOSPORA MULTIFLORA.

*R. culmo triquetro, basi folioso; paniculis axillaribus terminalibusque, ramis subapproximatis, laxifloris; spiculis ovatis; nuce obovata, compressa, valde rugosa, setis sursum hispidis duplo brevior.*



*Scirpus schœnoides*, Elliott, ! *Bot. S. Car. & Georg.* I. p. 89.

*Culm* about three feet high, triangular, leafy, especially towards the base. *Leaves* somewhat coriaceous, glabrous, 2 lines wide; the lower ones 8—10 inches in length; the upper ones much shorter and somewhat distant. *Panicles* 4—5, on somewhat exerted peduncles; the terminal one largest. *Branches* of the panicle subapproximate, filiform; the lower ones nearly 2 inches in length, with a scabrous, setaceous bract at the base of each. *Spikelets* ovate, small, rather loosely disposed upon the ramuli, on short pedicels or glomerate in twos and threes. *Glumes* fuscous, broad-ovate, carinate, with a very short mucro. *Bristles* 6, twice as long as the nut, strongly hispid upward. *Style* long, cleft almost to the base. *Nut* a little exceeding half a line in length, obovate, much compressed, deeply transversely rugose, crowned with a compressed-conic tubercle, nearly one-third its length.

HAB. New Orleans, *T. Drummond*, (*v. sp. in Herb. Torr.*); St. Mary's, Florida, *Dr. Baldwin*; Georgia, *Le Conte*; Gadsden County, Middle Florida, *Dr. Chapman*.

OBS. This very distinct species somewhat resembles *R. caduca*; from which, however, it may be readily distinguished by its more numerous and smaller spikelets, its strongly hispid bristles, and its much compressed and deeply rugose nut. The herbarium of *Dr. Baldwin* contains specimens of this plant, with *R. incxpansa* and *R. patula*, under the name of *R. pendula*. In his manuscript detailed description he has very strangely confused these three species; but the plant here described is doubtless the one which he transmitted under this name to *Elliott*, as a specimen of *Scirpus schœnoides* from *Mr. Elliott* in the herbarium of *Dr. Torrey*, agrees in all respects with our plant. This species produces a greater number of nuts than is usual with the genus, on which account *Mr. Elliott* referred it to the genus *Scirpus*; but *R. miliacea* and *R. caduca* often ripen nearly the same number.

#### S. RHYNCHOSPORA PATULA.

*R. culmo triquetro, superne gracili; corymbis axillaribus terminalibusque, patulis, laxifloris; spiculis ovatis; nuce orbi-*

culata (vel orbiculato-obovata), compressa, transversim rugosa, setis sursum hispidis brevioribus.

*Culm* about 2 feet high, thick and strong at the base, slender above. *Leaves* linear, shorter than the culm; cauline ones very short, narrow-linear, flat. *Corymbs* 3—5, (the terminal one largest) exsertly pedunculate, compound or decomposed, many-flowered, diffusely patulous. *Bracts* setaceous, shorter than the corymbs, smooth or somewhat scabrous on the margins. *Spikelets* ovate, about as large as in the preceding species. *Glumes* ovate, mostly mucronate. *Bristles* 6, less strongly hispid than in *R. multiflora*, somewhat exceeding the nut. *Stamens* 3. *Style* bifid. *Nut* about half a line in length, nearly orbicular, compressed, transversely rugose, with minute longitudinal striæ. *Tubercle* compressed-conic, dilated at the base, nearly half as long as the nut.

HAB. Florida, *Le Conte*. "In moist lands and near streams of water, Savannah, Georgia; also in East Florida," *Dr. Baldwin*. Flowers June—July.

OBS. This species is very nearly allied to the preceding, with which it is confounded in the herbarium of *Dr. Baldwin*. It is sufficiently distinguished, however, by its nearly orbicular and less deeply rugose nut, its shorter bristles and patulous corymbs.

#### 9. RHYNCHOSPORA MICROCARPA, *Baldw.*

*R. culmo gracili subtrigono; corymbis sparsifloris, exserte pedunculatis, plerumque approximatis; setis fragilibus, sursum hispidulis, nucem minimam, ovatam, compressam, rugosam, subæquante.*

*R. microcarpa, Baldw. Mss. et Herb!*

Cæspitose. *Culms* slender, obscurely triangular. *Radical leaves* narrow-linear, somewhat coriaceous, 4—6 inches long and about 2 lines wide. *Cauline leaves* few, very narrow, flat, with setaceous tips. *Corymbs* 4—5, exsertly peduncled and rather loosely flowered; the 3 upper ones approximate at the summit of the culm; the lower ones rather

remote. *Spikelets* turgidly ovate, about a line in length. *Glumes* dark fuscous. *Bristles* 6, ? very fragile, scarcely equalling the nut, minutely hispid upward. *Stamens* 3. *Nut* less than half a line in length, ovate, flattened, transversely rugose, with minute longitudinal striæ. *Tubercle* very short, compressed.

HAB. In wet savannahs. Flowers June—July. St. Mary's Florida, *Dr. Baldwin*; Wilmington, N. Carolina, *Cr. Murtis*.

Obs. The bristles in this species, on account of their extreme fragility, are seldom found entire when the fruit is mature.

#### 10. RHYNCHOSPORA PLUMOSA, *Ell.*

*R. culmo triquetro foliisque setaceis; glomerulis paucifloris, ad summitatem culmi subcongestis; bracteis aristatis; nuce globuloso-ovovata, transversim rugosa, setas plumosas æquantem; tuberculo brevissimo.*

*R. plumosa, Elliott, Bot. S. Car. & Georg. I. p. 58. Ræm. & Schult. Mant. II. p. 50. Spreng. Syst. Veg. I. p. 195.*

*Schœnus ciliaris, Muhl. Gram. p. 11.*

*Culm* 8—12 inches high, triangular, smooth. *Leaves* setaceous and somewhat rigid, shorter than the culm. *Flowers* in small fascicles, forming a loose cylindrical spike, sometimes furnished with a sub-remote, pedunculate, axillary spike. *Bracts* setaceous; the lower ones an inch or more in length. *Glumes* fuscous, broad-ovate; the outer ones mucronate. *Bristles* 6, plumose, as long as the nut. *Nut* globosely obovate or ovate, about a line in length. *Tubercle* short, depressed-conic, apiculate.

HAB. In dry pine barrens. Flowers from June to August. Charleston, South Carolina, *Elliott*; Florida, *Dr. Baldwin*; Georgia, *Le Conte*; Fayetteville, N. Carolina, *Schweinitz*; Wilmington, N. Carolina, *Mr. Curtis*.

#### 11. RHYNCHOSPORA PUNCTATA, *Ell.*

*R. paniculis corymboso-fasciculatis, exserte pedunculatis; nuce obovato-compressa, reticulato-rugulosa, alveolis impressis,*

setis sursum hispidulis paulo brevioribus; tuberculo compresso-conico.

*R. punctata*, *Elliott, Bot. S. Car. & Georg. I. p. 60. Ræm. & Schult. Mant. II. p. 51. Spreng. Syst. Veg. I. p. 196. (excl. syn.)*

*Culm* slender, triangular, 1—2 feet high. *Radical leaves* not seen; cauline ones 1—2 inches in length, linear-lanceolate, acute. *Corymbs* 3—4, lateral and terminal, fasciated; the lateral ones subsimple, distant and long-peduncled. *Fascicles* subtended by short setaceous and rigid bracts. *Spikelets* ovate. *Glumes* chestnut-coloured, ovate, the lower ones mucronate. *Bristles* 6, a little exceeding the nut, slightly hispid upward. *Stamens* 3. *Nut* ovate, compressed, reticulately rugose, with impressed alveoli. *Tubercle* compressed-conic, shorter than the nut.

**HAB.** Savannah, Georgia; and St. Mary's, Florida, *Dr. Baldwin.* Flowers May—June.

**OBS.** In the specimens collected in Florida by the late Dr. Baldwin, the discoverer of this species, the lateral corymbs are distant and not clustered together at the summit of the culm. Except in this unimportant variation, the plant I have described agrees in every respect with the detailed description of Elliott, who also obtained his specimens from Dr. Baldwin.

## 12. RHYNCHOSPORA ELLIOTTII.

*R. culmo triquetro; corymbis fasciculatis, paucifloris; spiculis ovato-oblongis; nuce subgloboso-ovata, lævissime rugulosa, setis sursum hispidis paulo brevioribus; tuberculo brevi, depresso-conico.*

*R. distans*, *Elliott, Bot. S. Car. & Georg. I. p. 59, (excl. syn.) non Vahl.*

*Schoenus distans*, *Muhl. Gram. p. 10.*

*S. fuscus*, *Muhl. Gram. p. 6.*

*Culm* 1—2 feet high, rather slender, exactly triquetrous. *Leaves* narrow-linear, flat, glabrous. *Corymbs* 3—4, terminal and lateral, exsertly

pedunculate, nearly simple and few-flowered. *Spikelets* fasciculate, sessile, ovate or oblong-ovate. *Glumes* light chesnut-coloured, ovate; the interior ones mucronate. *Bristles* 6, hispid upward, fuscous, a little longer than the nut, but scarcely exceeding the tubercle. *Stamens* 3—6. *Style* very long, deeply bifid. *Nut* brownish red, subglobose ovate, a little attenuate at the base and slightly produced at the summit; under a lens appearing minutely transversely rugose, but to the naked eye nearly smooth. *Tubercle* very short, depressed-conic.

HAB. In damp savannahs, Wilmington, North Carolina, *Mr. Curtis*; Havana, Georgia, and New Smyrna, Florida? *Dr. Baldwin*, (*sub. nom. R. distans.*); Gadsden County, Middle Florida, *Dr. Chapman*.

DES. This species, which is well described by the distinguished botanist whose name it bears, differs widely from *Schœnus distans* of Michaux. It is compared by Elliott with his *R. punctata*, which indeed it somewhat resembles, but the two species cannot be confounded. The light chesnut-coloured spikelets in this species are quite remarkable. There is a specimen of this plant in Muhlenberg's herbarium, labelled "*Schœnus fuscus, Elliott*;" and from this specimen the detailed description of *S. fuscus, Muhl. Gram.* was probably drawn, as it compares quite well with this species, and not at all with *S. fuscus, Linn.* There is no specimen under the name of *S. distans* in Muhlenberg's herbarium; but as he asks whether his *S. fuscus* may not be *S. distans, Michx.* and as he probably drew his description from specimens sent either by Elliott or *Dr. Baldwin*, I cannot doubt that the synonym is properly referred.

\* \* *Nut not rugose.*

### 13. RHYNCHOSPORA CORNICULATA.

*R. corymbis decompositis, diffusis; spiculis (magnis) laxe fasciculatis; nuce obovata, lævi, stylo persistente multo brevior, setis subulatis, inequalibus, sursum hispidulis, longiori.*



*Schoenus corniculatus*, *Lam'k. Ill. Gen.* I. p. 137.

*S. longirostris*, *Michx. Fl.* I. p. 87. *Muhl.! Gram.* p. 7.

*S. umbellatus*, *Walt. Fl. Car.* p. 70.?

*Rhynchospora laxa*, *Vahl Enum.* II. p. 231. *Pursh. Fl.* I. p. 48. *Ræmer & Schultes, Syst. Veg.* II. p. 84. *Torrey,! Fl.* I. p. 57. *Sprengel, Syst. Veg.* I. p. 196.

*R. longirostris*, *Elliott, Bot. S. Car. & Georg.* I. p. 59.

Whole plant smooth and somewhat glaucous. *Culm* triquetrous, 3—6 feet high. *Leaves* a foot or more in length,  $\frac{1}{4}$ — $\frac{1}{2}$  an inch wide, smooth, scabrous on the margin. *Flowers* axillary and terminal, in decomposed, subumbellate corymbs; the terminal one largest. *Spikelets* subulate by the persistent exerted styles; when mature nearly an inch in length, loosely fascicled in fours and fives at the extremity of the elongated triquetrous peduncles. *Glumes* ovate, fuscous. *Bristles* for the most part 6, subulate, minutely scabrous upward; the three outer ones (one of which is frequently wanting) about  $\frac{1}{2}$  the length of the nut; one of the inner series about  $\frac{1}{2}$ , and the two others  $\frac{1}{2}$  the length of the nut. *Stamens* 3. *Style* undivided. *Nut* smooth, obovate, compressed, crowned with the scabrous (upward), persistent, indurated style, about twice and a half its length.

HAB. In wet places, Ohio to Florida; common; Delaware, *Muhlenberg, (Cat. Pl. Am. Sept.)*

OBS. I have restored the specific name of Lamareck on account of its priority.

#### 14. RHYNCHOSPORA MACROSTACHYA, *Torrey, Herb.*

*R. corymbis axillaribus simplicibus, terminalibus compositis; spiculis magnis, confertim fasciculatis; nuce obovata, lævi, setis sursum hispidulis dulpo—stylo persistente subquadriplo—breviore.*

*Culm* 2—3 feet high, smooth, triangular. *Leaves* glabrous, 1—2 feet long and 2—4 lines broad; the upper ones scabrous on the margin. *Corymbs* about 4, densely fasciculated; the lateral ones subsimple, on peduncles twice the length of the sheaths; the terminal one largest, compound, subsessile, leafy; the fascicles sessile and pedun-

culate. *Glumes* fuscous, scarious, acute; the outer ones ovate; the inner ones ovate-lanceolate. *Bristles* 6, filiform, minutely hispid upward, about twice as long as the nut; the 3 exterior ones somewhat shortest. *Stamens* 3. *Style* undivided; the whole indurated and persistent, hispidly scabrous upward; when mature, nearly four times the length of the obovate, compressed nut.

HAB. "Leverett Pond," near Amherst, Massachusetts, *Prof. Hitchcock*; New Bedford, *Mr. Thomas A. Greene*.

OBS. This species and the preceding, to which it is closely allied, differ in habit from the other North American species; they also have simple and entirely persistent styles, and might perhaps be referred to the genus *Cephaloschænus* of Nees von Esenbeck.\*

15. RHYNCHOSPORA DODECANDRA, *Baldw.*

R. paniculis corymbosis, laxiusculis; spiculis ovato-lanceolatis; staminibus duodenis; nuce oblonga, lævi, tuberculum sub-hemisphericum longe excedente; setis sursum hispidulis nucem æquante.

R. dodecandra, *Baldw. Mss. et Herb.!*

*Culm* triquetrous, 2 feet or more in height. *Radical leaves* not seen. *Cauline leaves* equalling the culm, rigid and subcoriaceous, 3—4 lines wide, smooth, a little scabrous on the margin. *Panicles* 5—6, lateral and terminal, on peduncles twice the length of the sheaths, corymbose, loosely flowered; the lateral ones simple; the terminal one compound, or with two or three clustered together at the summit of the culm. *Spikelets* ovate-lanceolate, sessile and pedicellate. *Glumes* chestnut coloured. *Bristles* 6, equalling the nut, minutely hispid upward. *Stamens* 10—12. *Anthers* long-linear, orange-red. *Style* bifid. *Nut* (immature) oblong, somewhat attenuated downward, smooth or slightly corrugated longitudinally. *Tubercle* short, hemispherical, somewhat compressed, as wide as the summit of the nut.

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\* CEPHALOSCHÆNUS. Spiculæ hermaphroditæ. Stylus simplex. Perigynium setosum, setis antrorsum denticulatis aut hirsutis. Caryopsis styli basi persistente discretæque rostrata. *Nees, Cyp. Indicæ l. c. p. 71.*

HAB. "Near the sea shore, Fort George Island, East Florida, April, 1817." *Dr. Baldwin.*

OBS. The habit of this remarkable species is very similar to that of *R. corniculata* in a young state. *Dr. Baldwin* remarks of this species, that the bristles equal the stamens in number. I have seen only six in the specimens which I have examined.

#### 16. RHYNCHOSPORA MEGALOCARPA.

*R. hexandra*; corymbis sparsifloris; nuce ovata, lenticulari, lævi, nigrescente, tuberculo obtuse conico confluyente; setis caducis, sursum hispidulis, nucem subæquante.

*Schœnus macrocarpus*, *Baldw. Mss. et Herb.!*

*Culm* glabrous, somewhat triangular, 4 feet high. *Leaves* rigid and coriaceous, pungently acute, carinate, smooth; radical leaves numerous, 1—2 feet in length, 3—5 lines wide; cauline ones few and short. *Corymbs* axillary and terminal, exsertly pedunculate, few and loosely flowered. *Spikelets* about  $\frac{1}{3}$  of an inch in length, ovate, tumid, sessile or on short pedicels. *Glumes* obtuse, the inner ones mucronate. *Bristles* 6, caducous, minutely scabrous upward, equalling the nut. *Stamens* 6. *Nut* (including the tubercle,) 2—3 lines in length, smooth and shining, becoming black with age, round-ovate, and strongly convex on both sides. *Tubercle* turgidly conic, much shorter than the nut, with which it appears to be confluent.

HAB. Fort George, East Florida, *Dr. Baldwin.*

OBS. The bristles in this species are so exceedingly caducous that they escaped the notice of *Dr. Baldwin*, who referred the plant to the genus *Schœnus*. He remarks, however, that it only differs from *Rhynchospora* in wanting the bristles.

#### 17. RHYNCHOSPORA PYCNOCARPA.

*R. corymbis sparsifloris*; spiculis turgido-ovatis; nuce lævi, ovata, tumida, vertice crasso, tuberculo acutiusculo, brevissime conico, ampliore; setis densis, caducis, sursum hispidulis, nucem subæquante.

*Culm* triangular, 2—3 feet high, *Leaves* rigid, broad-linear, carinate, pungently acute; the lower ones elongated, 3—4 lines broad; the upper ones narrower, short. *Corymbs* terminal and lateral, somewhat distant, few and loosely flowered. *Spikelets* ovate, turgid, 3—4 lines in length. *Glumes* ovate, acute or mucronate. *Bristles* 10, equal to the nut or a little shorter, minutely hispid upward, somewhat caducous. *Stamens* 3, *Style* slender, deeply bifid. *Nut* rufous, smooth and shining, slightly attenuated and compressed at the base, tumid above, with the summit somewhat thickened and wider than the depressed-conic, very short tubercle.

HAB. In dry sandy barrens, Wilmington, N. Carolina, *Mr. Curtis*; Georgia, *Le Conte*; West Florida, *Mr. Ware*, (in *Herb. Nutt.*)

OBS. This species is very similar to the preceding, in habit and general appearance.

18. RHYNCHOSPORA CILIATA, *Vahl.*

*R. foliis obtusis bracteisque ciliatis; spiculis ovatis, corymboso-fasciculatis, terminalibus; nuce lævi, orbiculato-ovata, lenticulari, setis sursum hispidulis triplo longiori.*

*R. ciliata, Vahl, Enum. II. p. 238. Pursh. Fl. I. p. 49. Ræm. & Schult. Syst. Veg. II. p. 87. Spreng. Syst. Veg. I. p. 196.*

*Schœnus ciliaris, Michx. Fl. I. p. 36, et Herb.!*

*Culm*, leaves and sheaths beautifully striate and somewhat glaucous *Culm* 1—2½ feet high, obscurely triangular. *Leaves* broad-linear, obtuse; radical ones 4—6 inches in length and 2—3 lines wide; cauline ones few and short. *Flowers* in a crowded, terminal corymb, sometimes with a much smaller, pedunculate, lateral fascicle. *Bracts* somewhat exceeding the corymb. *Glumes* ovate, carinate, mucronate, pubescent on the back above the middle. *Bristles* 6, very short, minutely hispid upward. *Stamens* 3. *Nut* nearly orbicular, lenticular, minutely alveolate under a powerful lens. *Tubercle* about one-third as long as the nut, broad at the base, compressed.

HAB. St. Mary's and St. John's, Florida, *Dr. Baldwin*; New Orleans, *Dr. Ingalls*; Georgia, *Le Conte*; Wilmington, N. Carolina, *Mr. Curtis*.

## 19. RHYNCHOSPORA BALDWINII.

- R. foliis acutis, glaucis; spiculis ovatis, corymboso-fasciculatis, terminalibus; nuce lævi, (ovata vel suborbiculato-ovata,) lenticulari; setis duodenis, sursum hispidulis, nucem æquante.*  
*R. glauca, Baldw. Mess. et Herb.!*

*Culms* acutely triangular, 2—3 feet high, rather slender and, with the leaves, glaucous. *Leaves* linear, carinate, somewhat narrower than in the preceding species, acute, with slightly scabrous margins. *Corymb* terminal, crowded; sometimes with a smaller, rather distant, pedunculate axillary one. *Eraets* shorter than the corymb, setaceous, with hispid-scabrous margins and keel. *Glumes* ovate, cuspidate. *Bristles* 12, minutely hispid upwards, scarcely longer than the mature nut. *Stamens* 3. *Nut* very smooth, ovate or subrotund, lenticular. *Tubercle* about  $\frac{1}{3}$  the length of the nut, somewhat narrowed at the base, compressed.

**HAB.** "Georgia, in pine barren swamps, between the Satilla and Altamaha rivers, December, 1816." *Dr. Baldwin.*

**OBS.** This species is very similar in habit to the preceding; but it differs in having acute, not ciliate leaves, a larger nut, and longer bristles. *R. ciliata* also has six bristles, the ordinary number for this genus: this species has uniformly twelve. *R. glauca*, of Vahl, a native of Æquinoctial America, has a rugose nut, and is doubtless distinct from our plant. I have therefore dedicated this species to the memory of its enterprising discoverer, who paid much attention to the genus *Rhynchospora*.

20. RHYNCHOSPORA FASCICULARIS, *Nutt.*

- R. culmo subtrigono; spiculis oblongis, corymboso-fasciculatis, pauciusculis, terminalibus lateralibusque; nuce lævi, ovata, lenticulari, setis sursum hispidulis duplo longiori; tuberculo compresso, nuce brevior.*  
*R. fascicularis, Nutt. Gen. I. p. 33. Vahl, Enum. II. p. 334? Pursh, Fl. I. p. 48?*



*R. cymosa*, Elliott, *Bot. S. Car. & Georg.* I. p. 58?

*Schœnus fascicularis*, Michx. *Fl.* I. p. 37, et *Herb! Pers. Syn.*  
I. p. 60.

*Culm* 18 inches to 2 feet high, obscurely triangular. *Leaves* narrow-linear, shorter than the culm. *Corymbs* about 3, densely fasciated and somewhat few-flowered; the lower one subdistant, exsertly pedunculate; the two upper approximate, subsessile. *Pedicels* very short. *Bracts* setaceous. *Spikelets* oblong. *Glumes* ovate, carinate, with a long mucro; the exterior shorter, obtuse; the inner ones acute. *Bristles* 6, about half as long as the nut, minutely hispid upward. *Stamens* 3. *Style* bifid. *Nut* lenticular, ovate or round-ovate, smooth. *Tubercle* much compressed, with the base as broad as the nut, about half its length.

HAB. In Carolina, Michaux; Georgia, Dr. Baldwin; New Orleans, Dr. Ingalls.

OBS. The spikelets, nut, and bristles of our plant agree in every respect with a fragment of *Schœnus fascicularis* from Michaux's herbarium. The description in his *Flora Boreali-Americana* applies minutely to our specimens, excepting the paragraph "*setulis semine lævi duplo longioribus* : whereas in his own plant, and in all the specimens I have examined, the reverse is true, the nut being about twice the length of the bristles. Elliott, who copies the description of Michaux, remarks that the plant had not fallen under his observation. I suspect that he has taken it for *R. cymosa*. I have not the means of determining whether our plant is the *R. fascicularis* of Vahl: it certainly does not agree in some respects with the detailed description of that species in Rœmer and Schultes' *System a Vegetabilium*. There is no specimen under the name of *Schœnus fascicularis* in the Muhlenbergian herbarium.

## 21. RHYNCHOSPORA PANICULATA.

*R. culmo triquetro*; paniculis numerosis, approximatis, interdum geminatis; spiculis oblongo-lanceolatis, ad ramulos fasciculatis; nuce lævi, obovata, lenticulari, tuberculum subula-

tum æquante; setis retrorsum hispidis, nucem plus duplo longioribus.

*Culm* triangular, 3—4 feet high. *Leaves* linear, smooth, somewhat scabrous on the margin and keel. *Panicles* numerous, approximate, so as to appear like a single elongated, compound panicle; often two or more from the same sheath. *Peduncles* compressed, scabrous, nearly erect, much longer than the sheaths; the lower ones longest. *Bracts* filiform-setaceous, with scabrous margins, equal to the panicles. *Flowers* in small fascicles, crowded on the ultimate divisions of the panicles. *Spikelets* ovate-lanceolate, *Glumes* lanceolate, rather obtuse, with a short mucro. *Bristles* 6, conspicuously retrorsely hispid, more than twice the length of the nut. *Stamens* 3. *Style* slightly bifid. *Nut* smooth, obovate, lenticular, broad at the summit, subattenuate at the base. *Tubercle* subulate, compressed, as long as the nut.

HAB. New Orleans, *T. Drummond*, (*in Herb. Torr.*); Middle Florida; *Dr. Chapman*.

## 22. RHYNCHOSPORA OLIGANTHA.

*R. culmo* subaphyllo, filiformi; spiculis paucissimis, ovato-oblongis; setis sursum hispidis, infra medium plumosis, nucem oblongiuscule obovatam (minutissime exasperatam,) paulo superante; tuberculo brevissimo, conico.

*Culm* filiform, 6—12 inches high, nearly leafless. *Spikelets* 1—4, two to four lines long, solitary or in twos or threes on a slender, scabrous peduncle, surrounded by a single filiform bract, which appears like a continuation of the culm: sometimes there is a single, remote, long-pedunculate, lateral spikelet. *Glumes* broad-ovate, acute. *Florets* raised on a naked, articulated stipe, about a line in length. *Bristles* 6, as long as the nut and tubercle, hispid upward, plumose below the middle. *Stamens* 3. *Style* bifid. *Nut* to the naked eye nearly smooth, (minutely roughened under a powerful lens,) obovate-oblong, subterete, with a very short acumination supporting a conic tubercle, scarcely  $\frac{1}{4}$  the length of the nut.

HAB. Fayetteville, N. Carolina. *Schweinitz* (*sub nom. R. varifloræ*); near Wilmington, N. Carolina, *Mr. Curtis*.

23. RHYNCHOSPORA SEMIPLUMOSA.

R. culmo subtereti; foliis bracteisque setaceis; spicis approximatis ad summitatem culmi; setis sursum hispidis, infra medium plumosis, nucem ovatam, lævem, paulo superante; tuberculo compresso-conico, nucem subæquante.

*Culm* a foot high, subterete, striate, smooth. *Leaves* setaceous, shorter than the culm, scabrous on the margin. *Bracts* setaceous, surpassing the culm. *Spikes* 3, oblong, densely flowered, approximate, nearly sessile. *Spikelets* small, ovate. *Glumes* ovate, acute. *Bristles* 6, a little exceeding the nut, hispid upward, plumose below the middle. *Stamens* 3. *Filaments* very broad. *Style* deeply bifid. *Nut* ovate, compressed, smooth or with a very minute deciduous pubescence. *Tubercle* compressed-conic, acute, minutely hispid, nearly as long as the nut.

HAB. New Orleans. *Dr. Ingalls.*

OBS. This species is nearly allied to *R. plumosa*, but it is well characterised by its bristles, which are only plumose below the middle, its smooth nut, and long flattened tubercle. I regret, however, that I have seen no specimens in which the fruit is fully mature.

24. RHYNCHOSPORA ALBA, Vahl.

R. culmo superne triquetro; spiculis corymboso-fasciculatis; setis denis, retrorsum hispidis, nuce lævi, lenticulari, basi subattenuata, longioribus.

R. alba, *Vahl, Enum.* II. p. 236. *Pursh, Fl.* I. p. 49. *Elliott, Bot. S. Car. & Georg.* I. p. 57. *Rœm. & Schult. Syst. Veg.* II. p. 87. *Torrey, Fl.* I, p. 54. *Gray, Gram. & Cyp.* I. n. 92. *Schœnus albus, Linn. Sp. Pl.* 65. *Michx. Fl.* I. p. 64. *Muhl. Gram.* I. p. 5. *Bigel. Fl. Bost.* p. 17.

*Culm* slender, a foot or 18 inches high, glabrous. *Leaves* setaceous, shorter than the culm. *Flowers* in close, corymbose clusters, terminal

and axillary, with short setaceous bracts at the base. *Spikelets* lanceolate. *Glumes* ovate, acute, white, becoming brownish with age. *Bristles* 10, retrorsely hispid, nearly  $1\frac{1}{2}$  the length of the nut, (equaling the nut with the tubercle.) *Stamens* 2, (3, 2, and 1, *Muhl.*) *Style* bifid. *Nut* lenticular, ovate, somewhat attenuate at the base, when young triquetrous, elevated on a short stipe upon which the bristles are inserted. *Tubercle* compressed, one-half the length of the nut.

HAB. In sphagnous swamps, common; Canada to Carolina.  
Flowers, July—September.

OBS. The North American plant agrees in every respect with specimens from the north of Europe.

### 25. RHYNCHOSPORA CAPILLACEA, *Torrey.*

*R. culmo trigono, gracili; spiculis 3—6, plerumque terminalibus; nuce lævi, oblongo-ovata, stipitata, setis retrorsum hispidis dimidio—tuberculo duplo—longiori.*

*R. capillacea, Torrey, ! Fl. I. p. 55. Gray, Gram. & Cyp. I. n. 95.*

*Schœnus setaceus, Muhl. ! Gram. p. 6.*

*Culm* 6 to 12 inches high, very slender, smooth. *Leaves* setaceous, nearly flat; radical ones short. *Spikelets* oblong, mostly terminal, with a setaceous bract at the base of each. *Glumes* chestnut coloured, with scarious margins, oblong-ovate, carinate, mucronate. *Bristles* 6, large, retrorsely hispid, about twice the length of the nut. *Stamens* 3. *Style* bifid. *Nut* oblong-ovate, somewhat lenticular, attenuate at the base, triquetrous when young, raised on a short stipe which bears the bristles. *Tubercle* compressed, acute, about half as long as the nut.

HAB. In swamps, Pennsylvania, *Muhlenberg*; Penn-Yan, New York, *Dr. H. P. Sartwell*. On limestone rocks, Watertown, New York. Flowers in July.

26. RHYNCHOSPORA FUSCA, *Ræm & Schult.*

*R. foliis setaceis, canaliculato-carinatis; spiculis ovato-oblongis; nuce lævi, obovata, subtumida, basi paulo attenuata, setis sursum hispidulis duplo brevioribus; tuberculo compresso, margine serrulato-scabro.*

*R. fusca, Ræm. & Schult. Syst. Veg. II. p. 81. Spreng. Syst. Veg. I. p. 194.*

*R. alba var. fusca, Vahl. Enum. II. p. 236.*

*Schœnus fuscus, Linn. Sp. Pl. p. 1664. Wahl. Fl. Succ. I. p. 23.*

*Culm* 6 to 12 inches high, very slender, smooth. *Leaves* setaceous, channelled; radical ones elongated; cauline ones very short. *Fascicles* 1—3, few-flowered; the uppermost approximate, on short included peduncles; the lowest remote, exsertly pedunculate. *Spikelets* ovate, oblong, acute. *Glumes* mucronate, dark fuscous and shining. *Bristles* 6, very slender, hispid upward, about twice the length of the nut; three alternate ones somewhat shortest, or scarcely exceeding the nut. *Stamens* 3. *Nut* smooth, but with its surface often slightly irregular, obovate, sub-attenuate at the base, lenticular, somewhat tumid. *Tubercle* much compressed, broad at the base, serrulate on the margin, attenuate into the style, which is sometimes almost wholly persistent.

**HAB.** Pine barrens of New Jersey, *Torrey*; Boston, *Dr. Pickering*.

**OBS.** Our plant agrees in every respect with a Swedish specimen of *R. fusca*, except that in the foreign plant, the nut is somewhat uneven and a little more tumid than in ours. I am, however, satisfied of their identity. This species is quite distinct from *R. alba*, of which some European botanists have considered it a variety. It is much more nearly related to *R. capillacea*, from which it is well distinguished by the form of the nut, the upward direction of the hispidness of the bristles, and the serrulate tubercle. In this species the glumes are dark fuscous; in *R. capillacea* they are light fuscous or chesnut coloured. *R. fusca* has carinate and channelled leaves; in *R. capillacea* they are nearly flat.



*R. fusca* is said by Sprengel, Rœm. & Schult. &c. to have but three bristles; there are six in all the specimens, both European and American, which I have examined. A specimen from N. Carolina, collected by Mr. Curtis, appears to differ from this species only in its smaller spikelets, but it is too imperfect to be positively determined.

## 27. RHYNCHOSPORA GRACILENTA.

*R. culmis foliisque gracillimis; corymbis minimis, subconfertis, terminali subsessili, lateralibus exserte pedunculatis; nucem lævi, ovata (vel orbiculato-ovata), lenticulari, setis sursum hispidulis brevioribus; tuberculo subulato, basi dilatato, nucem subæquante.*

*R. fusca*, Gray, *Gram. & Cyp.* I. n. 93. (excl. syn.)

*Culm* slender, sometimes almost capillary, 1—2 feet high, obscurely triangular. *Leaves* linear-setaceous, 4—12 inches in length. *Fascicles* 2—4, (often with a solitary terminal fascicle or subcapitate corymb) lateral and terminal, small, few-flowered; the uppermost subsessile, the lower ones exsertly and often filiformly pedunculate. *Spikelets* ovate. *Glumes* ovate, acute or mucronate, fuscous. *Bristles* 6, about half as long again as the nut, minutely hispid upward. *Stamens* 3. *Nut* ovate or round ovate, smooth. *Tubercle* subulate, dilated at the base, compressed.

HAB. Pine barrens of New Jersey: Aug.—Sept. Philipstown, Putnam county, New York, *Dr. Barratt*; Salem, N. Carolina, *Schweinitz*.

OBS. This plant is proposed as a new species with some hesitation. It is possibly *R. distans* of Vahl, but is quite different from *Schœnus distans* of Michaux. It does not disagree with the specific character of *S. axillaris* Lam'k. *Ill. Gen.* I. p. 137; but the character of that species is so brief and general that it applies equally well to several other species.

## 28. RHYNCHOSPORA DISTANS, Nutt.

*R. corymbis fasciculatis, lateralibus subdistantibus; spiculis*

subconfertis, ovatis; nuce lævi, ovata, lenticulari, tuberculo brevi apiculata, setis sursum hispidulis subæquante.

*R. distans*, *Nutt Gen.* I. p. 33, non *Vahl?* nec *Elliott*.

*Schœnus distans*, *Michx. Fl.* I. p. 36, et *Herb!* *Pers. Syn.* I. p. 60.

*Culm* rather slender, 1—2 feet high, obtusely trigonous: *Leaves* narrow-linear, flat; the lower ones 4—6 inches in length; the upper ones shorter. *Corymbs* fascicled; the (2 or 3) upper ones aggregated at the summit of the culm; the lateral ones (1 or 2) distant, on short, exsert peduncles. *Spikelets* ovate. *Glumes* fuscous, broad-ovate, mucronate. *Bristles* 6, minutely hispid upward, about as long as the nut. *Nut* smooth, broad-ovate, lenticular. *Tubercle* compressed-conic, a little dilated at the base, one-third the length of the nut.

*HAB.* In Carolina, *Michaux*; Wilmington, N. Carolina, *Mr. Curtis*.

*β.* fasciculis laxiusculis; setis nucem excedente.

*R. tenuis*, *Baldw. Mss. et Herb.!*

*Culm* somewhat acutely triangular. *Corymbs* rather loosely fasciculate, the lower ones long-pedunculate. *Bristles* nearly twice the length of the nut. *Tubercle* not dilated at the base.

*HAB.* Savannah, Georgia, *Dr. Cutler*, (*in Herb. Baldwin.*)

*OBS.* The synonyms of *Vahl* and *Pursh* are omitted, as it is impossible to determine the plant to which they belong. They may be referred with about an equal chance of correctness to *R. glomerata*, *R. gracilentata*, and the present species. *Var. β*, although differing in the above-mentioned particulars, and uniformly having bristles longer than the nut, is not, I think, specifically distinct.

## 29. RHYNCHOSPORA GLOMERATA, *Vahl*.

*R. corymbis* fasciculato-glomeratis vel subspicatis, axillaribus terminalibusque, interdum germinatis; spiculis ovato-oblongis; nuce lævi, obovata, lenticulari, basi attenuata quasi sti-

pitata, tuberculum subulatum æquante; setis retrorsum hispidis, nucem duplo longiori.

- R. glomerata*, *Vahl, Enum. II. p. 234. Pursh, Fl. I. p. 48. Ræm. & Schult. Sys. Veg. II. p. 86. Elliott, Bot. S. Car. & Georg. I. p. 61. Torrey, Fl. I. p. 55.*  
*R. capitellata*, *Vahl, Enum. II. p. 235. Ræm. et Schult. Syst. Veg. II. p. 87. Elliott, Bot. S. Car. & Georg. I. p. 61.*  
*Schœnus glomeratus*, *Linn. Sp. Pl. 65. Willd. Sp. Pl. I. p. 236. Muhl. Gram. p. 8. Walt. Fl. Car. p. 69.*  
*S. capitellatus*, *Michx. Fl. I. p. 36.*  
*S. capitatus*, *Pers. Syn. I. p. 60. Muhl. Gram. p. 10?*

*Culm* 1—2 feet high, triangular. *Leaves* narrow-linear, carinate, smooth, scabrous on the margin, shorter than the culm. *Flowers* in corymbose or capitate fascicles, on included or somewhat exerted peduncles, lateral and terminal, often 2 or more from the same sheath; the lower ones distant. *Spikelets* ovate-oblong or lanceolate. *Glumes* brownish, lanceolate, mucronate. *Bristles* 6, retrorsely hispid, twice as long as the nut. *Stamens* 3. *Nut* smooth, obovate, lenticular, attenuate at the base. *Tubercle* subulate, compressed, equalling the nut.

**HAB.** In bogs and moist places; Canada to Florida. Flowers from July to September.

### 30. RHYNCHOSPORA CEPHALANTHA.

*R. capitulis axillaribus terminalibusque, subglobosis, multifloris, interdum geminatis; spiculis oblongo-lanceolatis; nuce lævi, orbiculato-obovata, lenticulari, submarginata, basi attenuata, tuberculum subulatum æquante; setis sursum vel retrorsum hispidis, nuce duplo longiori.*

*Culm* thick, triangular, 2—3 feet high. *Leaves* narrow-linear, flat, subcarinate; lower ones elongated; the upper ones much shorter. *Capituli* 2—7, large, subglobose, remote, on included or slightly exerted peduncles, often two or more from the same sheath. *Spikelets* oblong-lanceolate. *Glumes* fuscous, ovate-oblong, acute. *Bristles* 6, about twice the length of the nut, hispid upward or downward. *Stamens* 3. *Style* bifid. *Nut* larger than in *R. glomerata*; when mature appear-

ing as if surrounded with a thickened margin, smooth, obovate, very broad at the summit, attenuate at the base as if raised on a short stipe. *Tubercle* subulate, compressed, as long as the nut.

HAB. Pine barrens of New Jersey and on Long Island about Babylon, *Torrey*; Wilmington, N. Carolina, *Mr. Curtis*; Georgia, *Le Conte*; New Orleans, *Dr. Ingalls*; Gadsden County, Middle Florida, *Dr. Chapman*.

OBS. This interesting species was discovered by Prof. Torrey several years since, in the pine barrens of New Jersey and on Long Island; and as in these localities it occurs, for the most part, with only two heads, it received the name of *R. biceps*. Our specimens from the southern states, however, have uniformly more than two heads, and often six or seven. I have therefore ventured to substitute for the manuscript name of Professor Torrey, one which is in a good degree characteristic of the habit of the species. This plant is very closely allied to *R. glomerata*, but is much larger and stronger in all its parts. Its larger and margined nut, and its more ample, and for the most part, spherical heads, will sufficiently distinguish it from that species. A most remarkable circumstance with regard to this species, and so far as my observation extends, peculiar to it, is the diversity in the direction of the hispidness of the bristles: even in different individuals from the same cluster some of the bristles are hispid upward and others downward. With this single exception, the direction of the hispidness of the bristles is, in each species of this genus, perfectly constant.

*Species inquirenda.*

*Schenus axillaris*, "culmo triquetro, folioso; corymbis minimis, alternis, axillaribus; spiculis confertis." *Lam'k. Ill. Gen. I. p. 137.*

HAB. Carolina, *D. Fraser*.—*Lamarck*.

## EXPLANATION OF PLATE VI.

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FIG.

1. *Rhynchospora cymosa*, *Nutt.*
2. *R. Torreyana.*
3. *R. rariflora*, *Ell.*
4. *R. miliacea.*
5. *R. caduca*, *Ell.*
6. *R. inexpansa*, *Vahl.*
7. *R. multiflora.*
8. *R. patula.*
9. *R. microcarpa*, *Baldw.*
10. *R. plumosa*, *Ell.*
11. *R. punctata*, *Ell.*
12. *R. Elliottii.*
13. *R. corniculata.*
14. *R. macrostachya*, *Torr.*
15. *R. dodecandra*, *Bald.*
16. *R. megalocarpa.*
17. *R. pycnocarpa.*
18. *R. ciliata*, *Vahl.*
19. *R. Baldwinii.*
20. *R. fascicularis*, *Nutt*
21. *R. paniculata.*
22. *R. oligantha.*
23. *R. semiplumosa.*
24. *R. alba*, *Vahl.*
25. *R. capillacea*, *Torr*
26. *R. fusca*, *Ræm. & Schult.*
27. *R. gracilentia.*
28. *R. distans*, *Nutt.*
29. *R. glomerata*, *Vahl.*
30. *cephalantha.*



*A notice of some new, rare, or otherwise interesting PLANTS, from the Northern and Western portions of the State of New York.* By ASA GRAY, M. D.

*Read December, 1834.*

### RANUNCULACEÆ.

I. ANEMONE CYLINDRICA (*sp. nov.*); sericeo-pubescentis; foliis ternatim sectis, segmentis lateralibus bipartitis, intermedio trifido, laciniis lineari-lanceolatis apice inciso-dentatis, involucralibus petiolatis conformibus; involucellis nullis; sepalis obovatis, obtusis, subcoriaceis; carpellis lanatis, in capitulum cylindricum congestis.

*Root* perennial, fibrose-fasciculate, *Stem* 1—3 feet high, and with the leaves, covered with an appressed silky pubescence. *Radical leaves* mostly on long petioles, finely and reticulately veined, light green above, paler beneath. *Peduncles* 2—6 (rarely 1), 1-flowered, all arising from the same point, 8—12 inches in length when the fruit is mature. *Leaves of the involucre* on short petioles, twice or three times the number of the peduncles, somewhat crowded. *Involucels* none. *Sepals* 5, pale yellowish-green, obovate, obtuse, somewhat coriaceous, sericeous beneath. *Carpels* acuminate into a very short style, with the apex deflexed; in every part densely covered with a long, silky tomentum, and disposed in a cylindrical elongated capitulum, about an inch in length.

**HAB.** In dry pine barrens, near Oncida Lake, New York. Flowers in June.

**OBS.** This species, although closely allied to *A. Virginiana*, *Linn.* is quite distinct. It must be referred to the section ANEMONANTHEA of De Cand., and be placed next to *A. alba*, which it resembles in many respects. From *A. Virginiana* it is readily distinguished by its more finely divided leaves, by the greater number and length of its peduncles, the absence of involucels, its obtuse sepals, and especially by its long, cylindrical and very woolly head of carpels. In this species also all

the flowers expand nearly at the same time, and the peduncles are not, as in *A. Virginiana*, developed one by one during the summer, so that both flowers and mature fruit are found at the same time.

2. *A. MULTIFIDA*,  $\beta$  *HUDSONIANA*, *De Cand. Prodr.* I. p. 21. *De Les, Ic.* I. tab. 16. *Hooker, Fl. Bor. Am.* ( $\gamma$ . *sanguinea*) I. p. 7. *A. sanguinea*, *Pursh, in Herb. Lamb.* *A. Hudsoniana*,  $\beta$ . *sanguinea*, *Rich. in Frankl. Jour. ed. 2. App.* p. 22.

On limestone rocks, Watertown, Jefferson county, where it was discovered by *Dr. I. B. Crawe*. My specimens agree well with *De Lessert's* figure. The mature heads of pericarps are oblong and very woolly.

3. *TROLLIUS LAXUS*, *Salisb. in Linn. Trans.* VIII. p. 303. *Pursh, Fl.* II. p. 391. *T. Americanus*, *Muhl. Cat.* p. 56. *De Cand. Syst.* p. 313. *Hook. Fl. Bor. Am.* I. p. 23.

Shady sphagnous swamps near Utica.

*Flowers* twice as large as those of *Ranunculus acris*. *Sepals* 5—6, ochroleucous, with a tinge of green beneath. *Petals* 15—25, minute, deep orange-yellow. *Carpels* 8—15.

4. *RANUNCULUS PURSHII*, *Hook. Fl. Bor. Am.* I. p. 15.  
 $\alpha$ . "foliis omnibus capillaceo-multifidis, flore majore, caule fistuloso." *Hook. l. c.* *R. multifidis*, *Pursh, Fl.* II. p. 736. *De Cand. Prodr.* I. p. 34. *R. lacustris*, *Beck & Tracy in Transactions of the Albany Institute*, I. p. 148. tab. 5.

In stagnant water, throughout the western and northern portions of the state.

$\beta$ . "foliis submersis capillaceo-multifidis, natantibus, reniformibus palmato-multifidis." *Hook. l. c. tab.* VII. B. fig. 1.

In muddy pools, near Oneida Lake.

$\gamma$ . "repens, foliis inferioribus lineari-multipartitis, superioribus reniformibus palmato-multifidis." *Hook. l. c. tab.* VII. B. fig. 2. *R. Purshii*, *Rich. in Frankl. Jour. App.* p. 23.

In marshes, Watertown, Jefferson county.

CRUCIFERÆ.

5. *NASTURTIUM NATANS*, *De Cand. Syst.* II. p. 198; *Prodr.* I. p. 139. *De Less. Ic.* II. tab. 15.

β. *AMERICANUM*; petalis calyce duplo longioribus; siliculis obovatis. *N. natans*, *Hook. Fl. Bor. Am.* I. p. 39. *Beck. Bot. Northern and Middle States*, p. 32.

*HAB.* Oneida Lake, where it is very abundant, in water 2—5 feet deep. In the St. Lawrence river, near Ogdensburgh, *Dr. I. B. Craue.* Flowers in July.

*OBS.* This plant, which I observed at the first mentioned locality several years since, differs in some respects from the Siberian *N. natans*, as described by De Candolle and figured by De Lessert. In our specimens the flowers are about *twice as large as those of N. amphibium*, the petals are *pure white* in the living plant, *oblong*, and *twice the length of the calyx*, the mature silicles *obovate or obovate-oblong*, *more than 2 lines in length*; but in all other respects they agree minutely with De Candolle's detailed description and De Lessert's figure. The submersed leaves separate with great ease at their articulation with the stem, so that perfect specimens are not readily obtained. Although a rare plant, its geographical range is quite extensive, as Dr. Ingalls has recently found it at New Orleans.

6. *DRABA INCANA*, *Linn. Sp. Pl.* p. 897. *Hook. Fl. Bor. Am.* I. p. 54. *D. contorta*, *Ehrh. De Cand. Syst.* II. p. 348. *Prodr.* I. p. 170. *D. confusa*, *Ehrh. De Cand. l. c. Hook. Fl. Bor. Am. l. c.*

β. *GLABRIUSCULA*; læviter substellato-pubescent; foliis radicalibus spathulato-lanceolatis, caulinis oblongis, repando-dentatis; siliculis oblongo-linearibus. *D. glabella*, *Pursh. Fl.* I. p. 344? *Hook. Fl. Bor. Am.* I. p. 54?

Whole plant covered with a minute, branched pubescence, but not hoary. *Root* perennial! *Stems* many from the same root, simple or a little branching from the base. *Radical leaves* numerous and crowded, forming a roseolate tuft, oblong or lanceolate spathulate, much attenuated at the base, sparingly dentate. *Cauline leaves* oblong

or oblong-lanceolate, sub-amplexicaul, acute, sparsely and repandly dentate; those on the young branches somewhat entire. *Flowers* in a short, somewhat compact, simple (or sometimes branching) raceme. *Lower pedicels* nearly as long as the mature silicle; the upper ones shorter. *Sepals* ovate, obtuse, with white margins. *Petals* white, broad-ovate, entire, a little more than twice the length of the sepals. *Silicles* oblong, linear, contorted, 6—8 lines long when mature, glabrous, crowned with a distinct but very short style. *Seeds* 10—15 in each cell.

**OBS.** This plant, which I refer to *D. incana* with some hesitation, will perhaps prove to be a distinct species. It much resembles *D. confusa* of Hooker, (specimens of which I have examined in the herbarium of Prof. Torrey,) and which, as Prof. Hooker observes, insensibly passes into *D. incana*. His specimens, however, differ from ours in having shorter styles, a much more dense pubescence and sparingly dentate, or sub-entire leaves, which are somewhat ovate: the radical leaves are not, as in our plant, much attenuated at the base, so as to appear petiolate. In our plant also the silicle is glabrous, and rather linear than oblong. I suspect that the character of *D. glabella*, Pursh, is drawn from dwarf specimens of this plant. It also agrees perfectly with the *D. glabella* of Hooker's Flora, except in the number of cauline leaves, and in the calyx, which in that species is said to be very glabrous. Prof. Hooker, however, has not had an opportunity of examining the fruit.

The habit of our plant is precisely that of *Drabra ramosissima* of Desvaux (*D. arabizans*, Dursh, non Michx. *D. dentata*, Hook. & Arn. in Hooker's Journal of Botany. *Alyssum dentatum*, Nutt.); a species which is well characterized by its lanceolate, deeply dentate leaves, its compound racemose inflorescence, its shorter and pubescent silicles, and longer style.

#### RHAMNÆ.

7. **CEANOTHUS OVALIS**, Bigelow, *Fl. Bost.* ed. 2. p. 92.  
C intermedius, Hook, *Fl. Bor. Am.* I. p. 124, non Pursh.

On rocks and barren grounds, Watertown, Jefferson county.

Obs. A shrub, 2—3 feet high. Flowers in May. This plant is undoubtedly quite distinct from *C. intermedius*, Pursh, which is merely a narrow-leaved form of *C. Americanus*, nearly confined to the Southern States. The specific name of Bigelow is not happily chosen, as the leaves are for the most part oblong-lanceolate.

LEGUMINOSÆ.

8. LATHYRUS PISIFORMIS, Linn. *De Cand. Prodr.* II. p. 371. Hook. *Fl. Bor. Am.* I. p. 158. *L. maritimus*, Bigel. *Fl. Bost. ed. 2.* p. 268. *Pisum maritimum*, Linn. *et aliorum.*

Shore of Lake Ontario. Flowers June—August. It agrees with our sea-shore plant in every respect.

9. L. OCHROLEUCUS, Hook. *Fl. Bor. Am.* 1. p. 158. *L. pisiformis*, Rich. in *Frankl. Jour. app.* p. 28. *L. glaucifolius*, Beck. *Bot. and Middle States*, p. 90.

Gorham, Ontario county, Dr. H. P. Sartwell: Watertown, Jefferson county, Dr. Crawc.

Obs. This species resembles *L. venosus*, Muhl. but differs in its ochroleucous flowers and larger stipules. *L. venosus* also has larger leaves, which, with the segments of the calyx, are much more prominently veined.

10. L. PALUSTRIS, Linn. Pursh, *Fl.* II. p. 147.

Along the banks of rivers and lakes. Its leaves from lanceolate (the ordinary form) to oblong-ovate.

II. L. MYRTIFOLIUS, Muhl. in Willd. *Spec.* III. p. 1091. *De Cand. Prodr.* II. p. 371. Pursh, *Fl.* II. p. 471. *L. stipulaceus*, Le Conte, in *Cat. N. Y. Plants*, p. 92.

Grows in similar situations with the preceding, from which it may not be specifically distinct. Leaves elliptical or oval, in 3—4 pairs, (“*folis quatuor*,” Pursh.) Stem naked or winged; stipules variable in size.



## VALERIANÆ.

12. VALERIANA SYLVATICA, *Rich. in Frankl. Jour. app. p. 42. Hook. Fl. Bor. Am. I. p. 291. Beck, Bot. N. and Middle States, p. 164.*

Very abundant in a sphagnous swamp in Wayne county, near the shore of Lake Ontario; where it was discovered, in the summer of 1833, by Dr. Sartwell. My specimens agree in every respect with those from Prof. Hooker, in Prof. Torrey's herbarium.

## COMPOSITÆ.

13. DIPLOPAPPUS ALBUS, *Hook. Fl. Bor. Am. II. p. 21. Aster albus, (Willd. Herb.) Spreng. Syst. Veg. III. p. 528? Chrysopsis alba, Nutt. Gen. II. p. 152, (v. sp. in Herb. Nutt.) Dœllingeria? ptarmicoides, Nees ab Esenbeck, Ast. p. 183.*

On the rocky banks of Black River, near Watertown, Jefferson county; where it is very abundant, and was first noticed by Dr. Crave. Flowers early in August.

OBS. This interesting species was discovered by Nuttall around Fort Mandan, on the Missouri: it has also been found on the shore of Lake Superior, by Dr. Pitcher, and on the banks of the Saskatchewan, by Dr. Richardson; so that its geographical range is very extensive. I have not been able to find any trace of an outer pappus in the numerous specimens which I have examined. They agree in all respects with a specimen from Prof. Hooker, (in Herb. Torrey,) except that in our plant the hairs of the inner pappus are subclavate at the extremity. Our plant appears to me to differ from Dœllingeria of Nees ab Esenbeck only in wanting the outer pappus. I have no means of determining whether this species is identical with *Aster albus* of Willdenow's herbarium; but as there is a species under this name in the catalogue of Muhlenberg, from whom Willdenow received many North American Asters, it is highly probable that this synonym is correctly referred.

LABIATÆ.

14. DRACOCEPHALUM PARVIFLORUM, *Nutt. Gen.* II. p. 35. (*v. sp. in Herb. Nutt.*) *Benth. Lab.* p. 495.

Barren fields and woods, Watertown, Jefferson county. Flowers from May to August.

OBS. This species, which was found by its discoverer around Fort Mandan, on the Missouri, has since been collected in British N. America by Mr. Drummond.

15. BLEPHILIA HIRSUTA, *Benth. Lab.* p. 320. *Monarda hirsuta. Pursh, Fl.* I. p. 19.

Abundant throughout the northern and western portions of the state of New York.

LENTIBULARIÆ.

16. UTRICULARIA INTERMEDIA, *Hayne. Schrader, Fl. Germ.* I. p. 55. *Rœm. & Schult. Syst.* I. p. 195. *Spreng. Syst.* I. p. 61. *U. media, Wahl. Fl. Succ.* I. p. 15.

In very wet swamps, Watertown, Jefferson county, *Dr. Crawc.* Flowers in June and July.

This species is near *U. vulgaris* and *U. minor*, but is quite distinct from both. My specimens agree in all respects with the foreign plant, of which I have seen Swedish specimens in the herbarium of Dr. Torrey.

17. *U. MINOR, Willd. Sp. Pl.* I. p. 112. *Rœm. & Schult. Syst.* I. p. 166. *Wahl. Fl. Succ.* I. p. 14.

In the same locality as the preceding. *Corolla* dull yellow. Flowers in June. As far as can be determined by the comparison of dried specimens, our plant is identical with the foreign *U. minor*.

18. *U. CORNUTA, Michx. Fl.* I. p. 12. *Rœm. & Schult. I.*

p. 197. *Torrey, Fl. I. p. 19.* *U. personata, Le Conte, Utric. in Ann. Lyc. Nat. Hist. New York, I. p. 77.*

Occurs sparingly throughout the western portion of the state of New York. Very abundant in an extensive sphagnous swamp bordering Perch Lake, Jefferson county. Stem one to six flowered.

#### ORCHIDEÆ.

19. *MICROSTYLIS BRACHYPODA (sp. nov.);* caule unifoliato; racemo subspicato floribus breviter pedicellatis; petalis lateralibus refractis; labello hastato-triangulari, cucullato, acuminato.

*Root* a pseudo-bulb. *Stem* 2—6 inches high, triangular, with two of the angles somewhat winged. *Leaf* solitary, (rarely two,) ovate, sheathing the lower portion of the stem. *Raceme* elongated, somewhat spiked, many (20—40) flowered. *Bractæ* minute, a little shorter than the pedicels. *Pedicels* about a line long, somewhat appressed. *Sepals* spreading, oblong-lanceolate, acute. *Lateral petals* linear, attenuate upwards, refracted and appressed to the ovarium. *Lip* triangular-hastate, with a long recurved acumination; lateral lobes rounded and rolled inwards. *Anther* terminal, two celled. *Polinia* 4, collateral.

*HAB.* In deep shady swamps, Fairfield, Herkimer county, *Prof. Hadley.* Bridgewater, Oneida county. Flowers in July.

*OBS.* This species more nearly resembles *M. monophyllos, Lindl. Gen. & Sp. Orchid. p. 19. (Ophrys monophyllus, Linn.)* than any other with which I am acquainted. That species, however, differs from our plant, in its much longer pedicels and bracts, and also in the form of the lip, the auricles of which, in *M. monophyllos,* are directed forward. I am not certain that these characters are constant.

20. *HABENARIA ORBICULATA, Torrey, Compend. p. 318.*  
*H. macrophylla, Goldie, in Edinb. Phil. Jour. VI. p. 331.*  
*Orchis orbiculata, Pursh, Fl. II. p. 588.*

*Scape* with two orbicular leaves at the base, which spread flat on the ground. *Leaves* large, (5—8 inches in diameter,) fleshy, very smooth

and shining. *Scape* 1—2 feet high, bearing the flowers in a spiciform raceme. *Flowers* 17—20, greenish-white, spreading. *Pedicels* 3—4 lines long. *Bractææ* lanceolate, shorter than the flowers. *Sepals* conspicuously nerved; the upper one nearly orbicular, erect; the lateral ones ovate, and very oblique, so as to appear somewhat semilunar, spreading. *Petals* smaller than the sepals, ovate-lanceolate, oblique, reflexed. *Lip* linear, obtuse, longer than the ovarium, depending and recurved. *Spur* three times the length of the ovarium, incurved, clavate. *Anther* two-horned, two-celled, cells approximate. *Ovarium*  $\frac{1}{2}$ — $\frac{2}{3}$  of an inch long, a little curved.

**HAB.** Woods throughout the Northern states, but somewhat rare. It is seldom found except in the deep shade of the Coniferæ. Flowers in July.

21. *H. HOOKERIANA*, Torrey, *Herb.* *H. orbiculata*, Goldie, l. c. *Hook. Exot. Fl.* 145. non Pursh.

*Scape* 8—12 inches high, bearing at the base two orbicular, oval or obovate leaves. *Leaves* fleshy, smooth and shining, 3—4 inches long. *Spike* 4—6 inches in length, somewhat loosely flowered. *Flowers* 10—20, yellowish-green, erect or a little spreading, subsessile. *Bractææ* lanceolate, nearly as long as the flowers. *Sepals* ovate-lanceolate, acute; the upper one connivent with the petals, erect; the lateral ones deflexed, so as to meet posteriorly. *Petals* a little shorter than the sepals, linear, very acute, dilated at the base. *Lip* lanceolate, acuminate, scarcely as long as the ovarium, standing forward and somewhat incurved. *Spur* straight, acute, depending, about twice the length of the ovarium. Cells of the *anther* linear-clavate, widely separated at the base by the broad stigmatic surface. *Ovarium*  $\frac{1}{2}$ — $\frac{2}{3}$  of an inch in length, straight.

**HAB.** In similar situations with the preceding, but much more abundant in the northern part of the state. I am not aware that it has been found south of the Highlands of the Hudson river, where it occurs sparingly. Flowers in June.

**OBS.** These two very distinct species of *Habenaria* are still generally confounded by our botanists, although they were very clearly distinguished by Mr. Goldie, in his paper on "New and rare Plants detected in Canada during the year 1819," published in the 6th volume of the *Edinburgh Philosophical Journal*. There can, however, be little doubt that *H. macro-*

*phylla*, of Goldie, is the original *Orchis orbiculata*, although the question can only be *positively* decided by referring to Pursh's herbarium. The specific character of Pursh applies minutely to this plant, if we except the expression *petalis 3 superioribus conniventibus*; but he may have drawn his description from very young specimens, in which the perianth had not fully expanded; or, which is not improbable, he may have seen and confounded the two plants. The phrase, *labello lineari integerrimo obtusiusculo*, in no respect applies to *H. orbiculata* of Goldie and Hooker, in which the lip is lanceolate and very acute. The lower sepals in our plant are very oblique, as noted by Pursh; in that of Goldie and Hooker they are slightly so. Our plant has the scape 12 to 15 inches or more in height, and the leaves entirely prostrate, as described by Pursh; in that of Goldie and Hooker, the scape is seldom a foot in height, and the leaves are suberect. To this may be added the habitat, "on the mountains of Pennsylvania and Virginia, July—August;" a region in which the *H. orbiculata* of Goldie and Hooker has not, as far as I am aware, been detected. If this view proves correct, the specific name of Pursh must be restored to the larger species. For the *H. orbiculata* of Goldie, &c. Dr. Torrey has proposed the name *H. Hookeriana*, in honour of Wm. Jackson Hooker, LL.D. whose name is identified with North American botany, by his splendid *Flora Boreali-Americana*, and other publications on the plants of this country.

22. *H. CILIARIS*, *R. Brown in Hort. Kew.* *Orchis ciliaris*, *Willd. Sp. Pl. IV. p. 8.* Ontario county, *Dr. Sartwell.*

Flowers bright golden yellow.

23. *H. BLEPHARIGLOTTIS*, *Hook. Exot. Fl. 87.* *Orchis blephariglottis*, *Willd. Sp. Pl. IV. p. 9.* Watertown, Jefferson county; Utica, Oneida county. Flowers pure white.

This species and the preceding grow in similar situations



and frequently in company, and are not readily distinguished, except by the colour of the flowers. But, as Prof. Hooker justly remarks, in *H. ciliaris*, the lip is more thickly fringed, and the upper petals are likewise fringed; whereas in *H. blephariglottis* these are quite naked.

24. *H. BRACTEATA*, R. *Brown in Hort. Kew.* *Orchis bracteata*, Willd. *Sp. Pl.* IV. p. 34.

In deep woods, Fairfield, Herkimer county.

25. *H. DILATATA*, Hook. *Exot. Fl.* 95? non Torrey, *Compend*, &c. *Orchis dilatata*, Pursh, *Fl.* II. p. 588.

Root fasciculated. Stem 1—2 feet high, multangular, leafy. Leaves lanceolate, upper ones shorter. Spike 2—4 inches long, somewhat sparsely flowered. Bractæ linear-lanceolate; the lower ones equal to the flowers, the uppermost shorter. Flowers white. Sepals ovate obtuse, the lateral ones somewhat oblique, spreading or reflexed; the upper one connivent with the linear-lanceolate petals, and somewhat arched over the column. Lip linear, entire obtuse, dilated at the base. Spur as long as the lip, a little shorter than the ovarium; obtuse, somewhat incurved. Cells of the anther subdistant at the base. Glands of the pollinia distinct.

HAB. In deep sphagnous swamps, not uncommon in the northern part of the state. I have also seen specimens from Quebec, and from Sault St. Marie. Flowers June—July.

OBS. The plant described above agrees entirely with *Orchis dilatata* of Pursh, but is not the plant commonly known to our botanists under that name. The true *O. dilatata*, as I consider it, has white flowers with the lip linear and distinctly dilated at the base. The plant referred to this species in Torrey's Compendium, Beck's Flora, &c. has greenish flowers, with the lip lanceolate, acutish, not distinctly dilated at the base, and cannot be distinguished from *O. hyperborca* of Pursh. I have seen no specimens corresponding in all respects with the figure and detailed description of the *Habenaria dilatata* of Hooker, *Exot. Fl. l. c.* His plant appears to connect this with the succeeding species.

26. *H. HYPERBOREA* *R. Brown in Hort. Kew. V. p. 193. Rich. in Frankl. Jour. App. p. 33. (v. sp. in Herb. Torr.) Orchis hyperborea, Willd. sp. Pl. IV. p. 37? Pursh, Fl. II. p. 588.*

Throughout the Northern states, in similar situations with the preceding : not uncommon. Flowers in July.

Obs. This species differs from the preceding principally in having greenish-yellow flowers, with a lanceolate lip which is not dilated at the base. The spur is about one half the length of the ovarium, obtuse or somewhat acute and incurved. The size of the plant is quite variable. It often occurs 6—12 inches in height, with a somewhat ovate or oblong spike of flowers. In this state it agrees entirely with specimens of *H. hyperborea* collected in the arctic regions of America by Dr. Richardson. In favourable situations it not unfrequently attains the height of 2 or 3 feet, with a virgate spike 6—8 inches in length, and in this state is the *H. dilatata* of most American botanists.

27. *H. HERBIOLA*, *R. Brown, in Hort. Kew. V. p. 193. Orchis herbiola, Pursh. Fl. II. App. p. 743.*

Watertown, Jefferson county. Flowers in June.

Obs. Flowers greenish-yellow. Lip oblong, obtuse, bidentate at the base, with a projecting tooth on the palate.

28. *CYPRIPEDIUM ARIETINUM*, *R. Brown in Hort. Kew. Pursh, Fl. II. p. 595. Arietinum Americanum, Beck, Fl. N. & Middle States, p. 352.*

Near Oneida Lake.

#### SMILACEÆ.

29. *STREPTOPUS AMPLEXIFOLIUS*, *De Cand. Fl. Fran III. p. 174.*

β. *AMERICANUS* (*Ræm. & Schult. VII. p. 311.*); *stigmatifere integro; pedunculis supra medium geniculatis. S. distortus, Michx. Fl. I. p. 200. Torrey, Fl. I. p. 353.*

In deep swamps near Utica.

JUNCEÆ.

30. *JUNCUS STYGIUS*, *Linn. Willd. Sp. Pl.* II. p. 215.  
*Wahl. Fl. Suec.* 1. p. 213.

In an extensive sphagnous swamp bordering Perch Lake, Jefferson county: August. This species has not previously been known as a native of North America.

31. *J. SETACEUS*, *Rostkow, Junc.* p. 13. *tab.* 1. *Torrey, Fl.* 1. p. 360.

Shore of Lake Ontario, near Sackett's Harbour.

32. *J. ECHINATUS*, *Muhl. Gram.* p. 207. *Ell. Bot. S. Car. & Georgia*, I. p. 410.

With the preceding; perhaps not distinct from *J. polycephalus*, *Michx.*

PODOSTEMEÆ.

33. *PODOSTEMON CERATOPHYLLUM*, *Michx. Fl.* II. p. 165. *tab.* 44.

In flowing water, Watertown, Jefferson county, *Dr. Crawe.*

GRAMINEÆ.

34. *VILFA HETEROLEPIS*, (*sp. nov.*); foliis setaceis; panícula pyramidata, sparsiflora; gluma inferiore subuliformi, superiore ovata, cuspidata, subduplo breviori; valvulis perianthio subæqualibus, muticis, gluma extima paulo minori.

*Root* perennial. *Culm* 1—2 feet in height, smooth. *Leaves* convolute-setaceous, with the margins hispidly scabrous upward; the lower ones equalling the culm; the upper ones much shorter. *Lower sheaths* pilose; upper ones smooth. *Panicle* pyramidal, spreading or subcontracted; branches solitary, nearly simple, few and loosely flowered. *Glumes* purplish; the outer one reduced to a subula, about one half the length of the inner one, which is strikingly membranaceous in texture, ovate or ovate-oblong, one-nerved, with the nerve produced into a short cusp. *Valves of the perianth* oblong-lanceolate, rather obtuse, thin and membranaceous, a little shorter than the superior glume. *Inferior valve*, obscurely one-

nerved, slightly apiculate. *Superior valve* two-nerved, a little shorter than the other one. *Stamens* 3. *Anthers* large, linear, orange-red. *Stigmas* 2, hairy. *Styles* very short. *Caryopsis* subglobose, coriaceous, smooth and shining.

HAB. On rocks, Watertown, Jefferson county, *Dr. Craue*. Flowers Aug.—Sept. I have also specimens collected near New Haven, Connecticut, by Mr. J. D. Dana. In Muhlenberg's herbarium there is a fragment of this grass with a specimen of *V. juncea*, from the late Dr. Baldwin. The locality is not noted on the label, but it was most probably collected in Delaware. Dr. Torrey has also received specimens from the vicinity of Montreal.

35. *V. VAGINIFLORA*, *Torrey, in Gray's Gram. & Cyp. I.* n. 3. *Agrostis virginica*, *Muhl. Gram.* p. 74. *Torrey, Fl. I.* p. 89. *non Linn.*

Watertown, Jefferson county.

36. *PANICUM XANTHOPHYSUM*, *Gray, Gram. & Cyp. I.* n. 28.

Whole plant light green, becoming yellowish in drying. *Root* perennial. *Culm* simple or branching from the base, 12—15 inches high, glabrous. *Leaves* broad-lanceolate, 3—6 inches in length, 4—6 lines broad, acute, strongly nerved, nearly smooth, ciliate at the base. *Sheaths* villose, shorter than the joints. *Peduncles* elongated when old. *Panicle* sub-simple, few-flowered, with the branches appressed, nearly smooth, *Spikelets* globose-obovate, as large as in *P. latifolium*. *Glumes* pubescent; the inferior one oblong, acutish, 3-nerved, about half the length of the 9-nerved superior one. *Abortive floret* stamiferous, 2-valved; inferior valve equalling the superior glume; superior valve shorter membranaceous. *Perfect floret* cartilaginous, rather obtuse, smooth and shining, equalling the superior glume.

HAB. In dry pine barrens, near Oneida Lake; and Hamilton, Madison county, *Dr. J. S. Douglas*. Flowers June and July. This interesting species has also been found at Conway,

Maine, and on the White Mountains of New Hampshire by *Dr. Pickering*, and at Burlington, Vermont by *J. Carey, Esq.* also near Lake Winnipeg, by *Dr. Richardson*.

CYPERACEÆ.

37. *CAREX CHORDORRHIZA*, *Willd. Sp. Pl. IV. p. 219. Wahl. Fl. Suec. II. p. 588.*

In an elevated sphagnous swamp, Bridgewater, Oneida county. I have recently received this plant, hitherto unknown in this country, from Seneca county, *Dr. Sartwell*, and St. Lawrence county, *Dr. Cruve*.

38. *C. LIVIDA*, *Willd. Sp. Pl. IV. p. 28. Wahl. Fl. Suec. II. p. 601. Schk. Car. tab. ssss. fig. 211. C. limosa, var. livida, Wahl. Act. Holm. 1803, p. 162. C. Grayana, Dewey, Caricog. in Am. Jour. Sc. XXV. p. 141. tab. S. fig. 59.*

In a sphagnous swamp near Utica. This species has also been detected on the Rocky Mountains by *Mr. Drummond*; and at Hudson's Bay by *Dr. Richardson*. My specimens agree in every respect with an European specimen of *C. livida* in the herbarium of the late *Rev. Mr. Schweinitz*; but I have never, except in a single specimen, noticed the distant or sub-radical peduncles, as in *Schkuhr's* figure. *Wahlenberg*, however, in his *Flora Suecica*, remarks that the disposition of the pistillate spikes upon the culm is variable.—Whole plant glaucous. Culm 4—10 inches in height. Glumes of the pistillate spike for the most part obtuse, but sometimes a little acute. Flowers in June.

39. *C. FOLLICULATA*, *Linn. Sp. Pl. n. 1387. Rudge, in Linn. Trans. VII. p. 98. tab. 9. f. 4. non Schkuhr et Auct. C. xanthophysa, Wahl. Car. n. 73. Dewey, Caricog. l. c. VII. p. 274, & X. tab. D. f. 15. Schw. & Torr. Carr. in Ann. Lyc. Nat. Hist. New York, I. p. 339. Spreng. Syst. Veg. III. p. 824. C. folliculata,  $\beta$ . xanthophysa, *Muhl. Gram. p. 244. C. rostrata, Mich. Fl. II. p. 173. (vide Torrey.)**



In cedar swamps, &c. not uncommon in the western part of the state. Flowers in June and July.

OBS. It appears, by a letter from the late Sir James E. Smith to Prof. Torrey, that the plant well known to American botanists as *C. xanthophysa*, is *C. folliculata* of the Linnæan herbarium. The specific character of Linnæus, "spicis terminalibus *pedunculatis*, mascula fœmineaque, capsulis *subulatis* longitudine spicæ," would at once be noticed as inapplicable to *C. folliculata* of Schkuhr and succeeding botanists. The figure of Rudge, in the Linnean Transactions, well represents our *C. xanthophysa*, with only two (sub-approximate) pistillate spikes; a form which is by no means uncommon. The specimen from which the figure of Rudge was taken, is said to be the same as one under the name of *C. folliculata* in the Banksian herbarium. It is evident, therefore, that the original name of Linnæus must be restored to this species.

40. *C. INTUMESCENS*, Rudge, in *Linn. Trans.* VII. p. 97. *tab. 9. f. 3.* *C. folliculata*, Schk. *Car. f. 52. Michx. Fl.* II. p. 172. *Willd. Sp. Pl.* IV. p. 281. *Schw. & Torr. Car.* p. 338. *non Linn.*

In wet meadows and swamps; common. Flowers early in June.

OBS. This plant, the *C. folliculata* of Schkuhr, Willdenow, and all American botanists, is well figured by Rudge, in the Transactions of the Linnean Society as above quoted. It not unfrequently bears a single pistillate spike, as figured by Schkuhr.

*β. GLOBULARIS*; culmo crassiore; spicis fertilibus globosis, multi- (20—30) floris.

HAB. In meadows; Utica. Flowers in July.

OBS. This variety is characterized by its larger and coarser habit, and by its globose, many-flowered pistillate spikes. It flowers a month later than the ordinary form of the species, and when young might readily be mistaken for *C. lupulina*.

41. *C. BLEPHAROPHORA*, (*sp. nov.*); spica mascula solitaria, erecta; femineis ternis vel quaternis, oblongo-cylindræis, nutantibus; stigmatibus tribus; perigyniis ovatis, rostratis, bidentatis, glumam ciliolatam, obtusiusculam; æquantibus; foliis bracteisque ciliatis.

*Culm* 12—18 inches in height, smooth and slender, leafy at the base. *Leaves* linear, much shorter than the culm, ciliate, and with the sheaths pubescent on the nerves. *Bracteæ* minute, squamaceous, not sheathing the peduncles, cuspidate, with the cusps somewhat hispidly ciliate; the lower one nearly an inch in length. *Stam. spike* oblong, obscurely trigonous, on an erect peduncle about an inch long. *Glumes* oblong, membranaceous. *Pist. spikes* 3—4, oblong-cylindric, rather densely flowered, on filiform, nodding peduncles about their own length; the upper spikes often more or less sterile (not staminiferous), the lowest sometimes remote. *Perigynium* (fruit) ovate, obsolete triquetrous when young, smooth, attenuated into a straight beak nearly as long as itself; orifice bidentate. *Glumes* ovate, rather obtuse, one-nerved, membranaceous, ciliate, equalling the fruit. *Caryopsis* triquetrous.

HAB. In moist shady places, Bridgewater, Oneida county, in company with *C. aurca* and *C. flava*. Flowers in June.

OBS. This species should be placed between *C. sylvatica* and *C. miliacea*. It somewhat resembles *C. patula*, *De Cand. Syn. Fl. Gall.* p. 144; which differs, however, in having foliaceous bracteæ, trigonous fruit, and naked glumes.

42. *C. ARISTATA*, *R. Brown*, in *Rich. App. Frankl. Jour.* p. 36. *C. atherodes*, *Spreng. Syst.* III. p. 828.

Watertown, Jefferson county, *Dr. Craue*.

Our plant agrees entirely with specimens in the herbarium of Dr. Torrey, collected at Cumberland House, &c. by Dr. Richardson.

43. *C. HITCHCOCKIANA*, *Dewey, Caricog. l. c. X.* p. 274, *tab. E. fig. 17.*

Watertown, Jefferson county, *Dr. Crowe*; Penn-Yan, Yates county, *Dr. Sartwell*, Cayuga county, *J. Carey*.

#### FILICES.

44. *ASPIDIUM ACROSTICHOIDES*, *Willd. Sp. Pl. V. p. 225.*

*β. INCISUM*; pinnis inequaliter inciso-dentatis: soris plerumque distinctis. *A. Schweinitzii*, *Beck, Bot. N. and Middle States*, p. 449.

*HAB.* In woods and shady ravines, near Hamilton College; growing with, and insensibly passing into, the ordinary form of the species.

*OBS.* *Dr. Beck* suggests that this plant may be identical with a species brought from the North West coast of America by *Menzies*, and mentioned by *J. E. Smith*, under *A. auriculatum*. *Dr. Torrey's* herbarium contains a specimen of this plant, collected by *Dr. Sconler*. It differs widely from our plant, and is without doubt a distinct species.

45. *PTERIS GRACILIS*, *Michx. Fl. II. p. 262. Pursh, Fl. II. p. 668.*

Penn-Yan, Ontario county, *Dr. Sartwell*.

MONOGRAPH of *North American CYPERACEÆ*,  
By JOHN TORREY.

*Read August 8th, 1836.*

THE natural family CYPERACEÆ comprehends at least 1600 recorded species, and about 100 genera. It belongs to the great class Endogenæ, and the cohort Glumaceæ. On the one hand it is nearly related to Gramineæ, and on the other to Restiaceæ. From the former it is distinguished by its solid, and mostly angular culms, entire leaf-sheaths, and embryo partly included in the albumen; and from the latter by its nucamentaceous fruit, entire leaf-sheaths, and the position of the embryo. The genera of this order were very imperfectly characterized until the appearance of Dr. Brown's incomparable *Prodromus Floræ Novæ Hollandiæ* in 1810, in which work a great number of Cyperaceous genera are described with the precision for which this author is so celebrated. Before the publication of that work, Richard, in *Persoon's Synopsis*, (1805) described several new genera of Cyperaceæ, and characterized them in a perspicuous manner. Vahl, also, in his *Enumeratio Plantarum*, vol. 2. (1806) revised that part of the order belonging to Triandria Monogynia of the sexual system, and described some new genera. In 1819, Lestiboudois published his *Essai sur la Famille des Cypéracées*, in which he gave a good account of its organography, and a brief description of all the genera, including several new ones. He appears to have adopted the views of Palisot de Beauvois, which he frequently quotes. It is much to be regretted that the work on Cyperaceæ promised by that celebrated agrostographer has never been published. A memoir containing some valuable observations on this order was communicated to the Institute of France, by M. Kunth, and printed in the *Annales du Muséum* (1809).

Agardh, in his *Aphorismi Botanici*, (1823) gave a good description of the characters of the family, together with a list of the genera, and the number of species belonging to each genus. Lindley, in his *Introduction to the Natural System of Botany*, (1830) has given, in a clear but succinct manner, the characters, affinities, geography and properties of the Cyperaceæ. He states, in a note, that Mr. Prescott of St. Petersburg has long been making these plants an especial study, but the botanical world has not yet been favored with the results of his labours. The botanist who has lately directed his attention to the Cyperaceæ with the greatest success is Professor Nees ab Esenbeck of Breslau. This accomplished and indefatigable cultivator of our science, prepared about the same time two valuable memoirs on the Cyperaceæ, one of which, inserted in the ninth volume of the *Linnaea*, (for 1834) is entitled *Uebersicht der Cyperaceengattungen*: the other under the title of *Cyperaceæ Indicæ*, forms a large part of Dr. Wight's "Contributions to the Botany of India," which appeared in the same year. The former, besides a synopsis of all the genera of the order, and a list of the species examined by the author, contains some profound observations on the structure of the floral organs. He considers the hypogynous bristles, hairs, squamulæ, and petaloid bodies which occur in most of these plants, as metamorphosed stamens, and not divisions of a perianth.\* Respecting the position of the embryo he gives no opinion. He announces his intention to publish at some future day a full monograph of this immense family.

The Cyperaceæ of North America have been studied with considerable care by many botanists. In the time of Linnæus very little was known concerning even the European species; and in his last edition of the *Species plantarum* (1764)

\* *Linnaea* 8, p. 277 et seq. But in his *Cyp. Ind.* (p. 93.) he seems to take another view of these organs. "*Fuirena Vaginata* flos e tribus verticillis constat; scil. 1mo, Calyce trisepalo, sepalis setaceis. 2do, Corolla tripetala, petalis unguiculatis cum sepalis alternis. 3tio, Staminibus tribus sepalis oppositis angulisque ovarii respondentibus. Igitur, 4to, Carpellis tribus petalis oppositis planis valvatis connatis," &c.



we find only eleven species (belonging to five genera) recorded as natives of North America. In the *Species Plantarum* of Willdenow, (vol. 1. part 1, 1797, and vol. 4, part 1, 1805, which contain all the *Cyperaceæ*) we find 60 North American species, 42 of which belong to the genus *Carex*, and were mostly communicated to the author by Muhlenberg. The *Flora Boreali-Americana* of Michaux, (1803) edited in part by the elder Richard, contains only 54 species of *Cyperaceæ*, which are, however, very accurately described. The second volume of Vahl's *Enumeratio Plantarum*, published in 1806, contains much original information respecting these plants. He described some important new genera, and a great number of new species, but his work contains comparatively few North American *Cyperaceæ*. Persoon, in his *Synopsis Plantarum* (1805—6,) added very little to our knowledge of the *Cyperaceæ*, except the materials contributed by Richard. He described no new N. American species. Pursh was evidently not familiar with the plants of this order, although he records in his *Flora* (1814) most of the species described by preceding writers. His list comprises 119, only three or four of which are new. Nuttall does not profess to have studied the *Cyperaceæ* with particular care, and in his *Genera of North American plants*, (1818) he merely gives a catalogue of the species enumerated in botanical works, amounting to 174. He, however, described two new species of *Carex*. The late Dr. Muhlenberg devoted much attention to the *Cyperaceous* plants and Grasses of this country, and his posthumous work entitled *Descriptio uberior Graminum et Plantarum calamariarum, &c.* contains faithful detailed descriptions, without diagnostic characters, of 138 *Cyperaceæ*. The latest general enumeration of this family is that of Sprengel, in his *Systema Vegetabilium*, (vol. 1, 1825, and vol. 3, 1826,) where we find recorded 178 species as inhabiting North America. In my catalogue of the genera of North American plants published in the appendix to the American Edition of Lindley's *Introduction to the Natural System*, (1831) the number of *Cyperaceæ* is 247, or one fif-

teenth part of the phænogamous vegetation. The list in the present monograph is increased to 326, but the proportion which they bear to the whole number of phænogamous plants remains about the same, owing to the great additions which have been made to our Flora within a few years past.

It affords me great pleasure to record the labours of some of our own botanists in this field. The late excellent Mr. Elliott, in his work modestly entitled *A Sketch of the Botany of South Carolina and Georgia* (1817—1824,) accurately described a great number of Cyperaceæ, among which are many new species. Prof. Dewey's *Caricography*, published in *Silliman's Journal*, (vol. 7—30, 1824—1836,) is an exceedingly valuable account of our native species of *Carex*. The first volume of the *Annals of the Lyceum of Natural History* contains an Analytical table of North American Carices, communicated in 1823 by the late lamented Dr. L. D. von Schweinitz, in which the essential characters of the species known at that time are given in a perspicuous manner, and several new species are indicated, most of which have been subsequently confirmed. The *Monograph of North American Carices* by Mr. Schweinitz and myself, was published the following year in the second volume of the same work. The monograph of North American Rhynchosporæ, published in the present volume of the *Annals of the Lyceum*, and the volumes of North American Gramineæ and Cyperaceæ by my esteemed friend Dr. Gray, are most valuable contributions to the Flora of this country. In the difficult genus *Rhynchospora* the author has doubled the list of indigenous species before recorded, and has described them with such clearness that hereafter their determination will be comparatively easy.

A paper, entitled "*Cyperaceæ novæ*," &c. by Dr. C. A. Meyer, (published in the *Mémoires présentés à l'acad. St. Petersb.* 1830) contains excellent descriptions and figures of several Cyperaceæ, mostly from Russian America, many of which have been identified by means of a suite of specimens from Sitcha and Unalashka, communicated by M. Bongard of the St. Petersburg Imperial Academy.

In arranging the Cyperaceæ described in the following pages, I have adopted the classification of Nees ab Esenbeck, as given in the 9th volume of the *Linnæa* already quoted, without, however, agreeing with the learned author in all his views, particularly in the extent to which he has divided some of the older genera. The characters of his tribes and genera are so brief, that I have thought it expedient to enlarge, and in many cases to modify them materially. In framing the diagnoses of the species, it may be thought by some botanists that I have employed characters which are too microscopic, but this course was absolutely necessary, since the most certain marks of discrimination in this family exist in the minute and highly organized parts of fructification, which until lately have been very little regarded by botanical writers. The form, texture, relative size, position, &c. of the scales, perianth, nut, and style, afford characters on which we can place the most reliance in the Cyperaceæ.

The accompanying table exhibits a view of the North American genera of this family, arranged according to the Synopsis of Nees ab Esenbeck, with the number of species belonging to each genus, and the proportion which the endemic species bear to those which also inhabit Europe, or other parts of the world.

Of the Tribe Cyperæ the greatest proportion belong to the Southern States. The genus *Cyperus* itself scarcely extends into Canada, and in all New England not more than 7 or 8 species have been found. Proceeding south they become more frequent, and the maximum is attained in the regions bordering the Gulf of Mexico. *Kyllingia* does not occur north of Pennsylvania. *Mariscus* is found throughout the United States, and *Dulichium*, a doubtful member of this tribe, has an equally extensive range.

*Hypolytrææ* constitute a small tribe. *Lipocarpha* is peculiarly southern, and *Fuirena* is rarely found as far north as Boston; and, in the northern and middle states, only in the vicinity of the ocean.

*Scirpææ* are widely distributed, but at least two thirds of the species occur south of Virginia. *Abildgaardia* and *Elytrospermum* have only been observed on the Pacific coast of America. The genuine species of *Scirpus* range from the Arctic regions to Florida, and from the Atlantic to the Pacific; and *Eleocharis*

has a similar range. *Eriophorum* is a northern genus, only one of its species extending beyond Pennsylvania. *Chætocyperus* is peculiar to the south. *Fimbristylis* does not reach the northern limits of the United States. *Isolepis* is chiefly southern. Our solitary species of *Trichlostylis* occurs in nearly all parts of North America south of Canada.

Rhynchosporæ are, with few exceptions, southern plants. *Dichromena* is not found north of Virginia nor far from the ocean. Two *Psilocaryæ* are southern, and a third has been observed only in Massachusetts. Of the 28 species of *Rhynchospora* but four are found as far north as Boston, and only eight belong to the middle states; the remainder are mostly peculiar to the southern states, but many of them extend west to Texas. Of the two species of *Ceratoschœnus*, one inhabits a large part of the United States south of Delaware and west to the Mississippi; the other is found only in New England.

The tribe *Cladiæ* is represented by two species of the genus *Cladium*, one of which is northern, the other southern.

Of *Scleriæ* we have but two genera and eleven species, two or three of which have an extensive range in latitude and longitude, but most of them are southern and are confined to the vicinity of the ocean.

A solitary species of the small tribe *Elyneæ* inhabits the boreal regions of the continent.

The vast genus *Carex*, which almost exclusively constitutes the tribe *Cariceæ*, predominates in the northern parts of the continent, and many of its species are peculiar to the boreal and arctic regions; but a large number inhabit almost every part of North America. Of *Uncinia* we have but a single species, a native of British America.

It remains for me to state the sources from whence I obtained a large portion of the materials used in the preparation of this monograph.

To my much valued friend Sir William J. Hooker I am greatly indebted, not only for free access to his unrivalled herbarium, but for a liberal supply of specimens from the collections made by Dr. Richardson, T. Drummond and other travel-



fers in British America, for many specimens from the North West Coast, and for a set of Mr. Drummond's plants collected in Louisiana and Texas, containing many rare species of this family. To my excellent friend G. W. Arnott, Esq. of Scotland, I am under many obligations for a good set of the Cyperaceæ collected by Dr. Wight in the Peninsula of India, which have been of great use to me in the examination of our native species, as they are duplicates of the collection from which N. ab Esenbeck prepared his *Cyperaceæ Indicæ*. I have also received many other exotic Cyperaceæ from Mr. Arnott and Dr. Lindley. Major Le Conte, Rev. M. A. Curtis of North Carolina, H. B. Croom, Esq. of Tallahassee, Dr. Chapman of Middle Florida, Dr. Ingalls of New Orleans, and Dr. Loomis of Georgia have supplied me with numerous specimens of southern Cyperaceæ. Dr. Pitcher of the Army, has contributed some valuable materials from Arkansas, and from the borders of the great lakes. The late estimable Stephen Elliott, Esq. supplied my herbarium with several of the Cyperaceæ described in his excellent *Flora*; and I only regret that I have not been able, by an examination of his own herbarium, to verify all the species which he has described. Prof. Dewey has sent me most of the Carices described in his valuable *Caricography*. My valued friend B. D. Greene, Esq. of Boston has supplied me with New England and southern Cyperaceæ, and likewise loaned me his entire set of Texan plants collected by the late Mr. Drummond. T. A. Greene, Esq. and Prof. Hitchcock of Amherst, have contributed several interesting plants of this family, from Massachusetts. To my highly esteemed correspondent, Dr. Short of Kentucky, as also to Dr. Peter, I am greatly indebted for large supplies of the Cyperaceæ of that state. My excellent friend, J. Carey, Esq. has greatly obliged me by the communication of many valuable observations on the subjects of this monograph, as well as by supplying me with specimens from various localities. Some interesting Cyperaceæ have been obligingly sent to me by Dr. Darlington, from Chester County, Pennsylvania. My lamented friend the late Rev. Dr. Schweinitz was a large contributor to my herbarium,



and some rare southern Cyperaceæ were received through his liberality. After his decease, I obtained from his amiable widow a portion of the herbarium of the late Dr. Baldwin, which is particularly rich in the Cyperaceæ of the southern states. My friend Dr. Barratt, of Connecticut, has sent me several extensive collections of Carices and other plants of this order, from the Highlands of New York, Vermont, the White Hills of New Hampshire, and Connecticut. Most valuable aid has been afforded me, not only in the communication of specimens, but in every part of this work by my friend Dr. Gray. The revision of the Rhynchosporæ is entirely his own; and the Synopsis of North American Carices, I wish to have considered as our joint performance. It was thought unnecessary to prepare descriptions of these plants, except of the new species, as they have so recently been made the subjects of monography by Prof. Dewey, and also by Dr. Schweinitz and myself. To Charles Pickering, M. D., curator of the Herbarium of the Academy of Natural Sciences in Philadelphia, my best thanks are due for the valuable aid he has afforded me in examining the extensive collection under his charge. This herbarium contains all Mr. Schweinitz's plants, a full set of Dr. Baldwin's, most of Nuttall's, besides a vast number of specimens from all parts of the world. The herbarium of Dr. Muhlenberg has been repeatedly examined, and nearly all his Cyperaceæ identified. Michaux's herbarium in the Jardin des Plantes of Paris was carefully examined in the summer of 1833, and most of his Cyperaceæ satisfactorily determined. The herbarium of Pursh, now incorporated in the immense collection of A. B. Lambert, Esq. of London, was, with the characteristic liberality of that gentleman, placed under my inspection; but I found it very deficient in Cyperaceæ.

It is, perhaps, hardly necessary to state that the exclamation point used in the succeeding pages is employed in accordance with the practice of De Candolle and other recent botanical writers. When affixed to the name of an author or correspondent it indicates that an original or authentic specimen has been examined or received by myself. Localities from which I have seen specimens are designated by the same sign.

**T A B L E**



**TABLE**  
 EXHIBITING THE GEOGRAPHICAL DISTRIBUTION OF  
 NORTH AMERICAN CYPERACEÆ.

TRIBES AND GENERA.	Whole number of Species.	Geographical Distribution										Native also of the E. Indies.	Common to N. America and Europe.	
		Exclusively N. American.	Common to most parts of the U. S. east of the Mississippi.	Exclusively Southern.	United States north of Virginia.	Northwest Coast and Russian Possessions.	Texas.	British America and Arctic Regions.	Common to N. and S. America, or to N. America & W. Indies.	Common to N. America and S. America.				
<b>Tribe I. CYPEREÆ.</b>														
Gen. 1. Dulichium - - -	1	1	1	0	0	0	0	0	0	0	1	0	0	0
Gen. 2. Cyperus - - -	44	35	12	16	2	1	16	0	0	0	2	4	2	1
Gen. 3. Mariscus - - -	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Gen. 4. Kyllingia - - -	3	2	1	2	0	0	0	0	0	0	0	0	0	1?
<b>Tribe II. HYPOLYTREÆ.</b>														
Gen. 5. Lipocarpa - - -	1	1	0	1	0	0	0	0	0	0	0	0	0	0
Gen. 6. Fuirena - - -	3	3	1	2	0	0	0	0	0	0	0	0	0	0
<b>Tribe III. SCIRPEÆ.</b>														
Gen. 7. Abildgaardia - -	1	1	0	0	1	1	0	1	0	0	0	0	0	0
Gen. 8. Chætocyperus - -	1	1	0	1	0	0	0	0	0	0	0	0	0	0
Gen. 9. Eleocharis - - -	19	15	7	8	2	1	1	1	1	1	1	1	1	3
Gen. 10. Scirpus - - -	15	10	7	1	5	3	0	2	1	1	2	1	1	4
Gen. 11. Eriophorum - -	10	2	1	0	4	2	0	2	0	0	7	0	0	7
Gen. 12. Elytrospermum -	1	1	0	0	0	1	0	1	0	0	0	0	0	0
Gen. 13. Fimbristylis - -	3	3	2	1	0	0	0	0	0	0	0	0	0	0
Gen. 14. Isolepis - - -	8	8	1	5	1	0	1	0	0	1	0	0	0	0
Gen. 15. Trichelostylis -	1	1	1	0	0	0	0	0	0	0	0	0	0	0
<b>Tribe IV. RHYNCHOSPOREÆ.</b>														
Gen. 16. Dichromena - -	2	2	0	2	0	0	0	0	0	0	0	0	0	0
Gen. 17. Psilocarya - -	3	3	0	1	1	0	1	0	0	1	0	0	0	0
Gen. 18. Rhynchospora -	28	26	5	19	3	0	4	0	0	4	0	0	0	2
Gen. 19. Ceratoschoenus -	2	2	1	0	1	0	0	0	0	0	0	0	0	0
<b>Tribe V. CLADIEÆ.</b>														
Gen. 20. Cladium - - -	2	2	0	1	1	0	0	0	0	0	0	0	0	0
<b>Tribe VI. SCLERIEÆ.</b>														
Gen. 21. Scleria - - -	7	7	4	3	0	0	0	0	0	0	0	0	0	0
Gen. 22. Hypoporum - - -	4	4	0	3	1	0	0	0	0	0	0	0	0	0
<b>Tribe VII. ELYNEÆ.</b>														
Gen. 23. Elyna - - -	1	0	0	0	0	0	0	0	0	0	1	0	0	1
<b>Tribe VIII. CARICEÆ.</b>														
Gen. 24. Carex - - -	164	120	40	10	59	18	7	99	0	7	99	0	0	46
Gen. 25. Uncinia - - -	1	1	0	0	0	0	0	1	0	0	1	0	0	0
<b>TOTAL</b>	<b>326</b>	<b>252</b>	<b>85</b>	<b>76</b>	<b>81</b>	<b>27</b>	<b>30</b>	<b>114</b>	<b>6</b>	<b>5</b>	<b>64</b>	<b>5</b>	<b>64</b>	





## TRIBE I. CYPEREÆ.

FLOWERS perfect. SPIKELETS distichously imbricated (rarely in a spike imbricated on all sides), mostly naked, one or many-flowered. PERIGYNIUM none, or setaceous, or cup-shaped. INTERIOR SCALES growing to the rachis of the spikelet, sometimes becoming free, or altogether wanting. NUT compressed or triangular, rarely rostrate or crowned with the persistent base of the style.

A. *With a Perigynium.*1. DULICHIMUM, *Richard.*

SPIKELETS compressed, distichously imbricated, many-flowered. BRISTLES of the perigynium 6—9, rigid, retrorsely hispid. STAMENS 3. STYLE very long, bifid at the summit. NUT compressed, linear-oblong, acuminate by the long persistent style.—Culm terete, leafy; leaves short and spreading; spikes axillary, compound, with the spikelets distichously arranged on a common rachis.—*Richard in Pers. syn.* 1. p. 65; *Nutt. gen.* 1. p. 35; *Lestib. ess. fam. Cyp.* p. 37. no. 40; *N. ab Esenb. in Linnaea*, 9. p. 283. SCHÆNI sp. *Vahl, &c.* CYPERI sp. *Linn.*

DULICHIMUM SPATHACEUM, *Persoon.*

*Pers. syn. l. c.*; *Pursh, fl.* 1. p. 53; *Elliott, sk.* 1. p. 73. t. 2. f. 3; *Torr.! fl.* 1. p. 58; *Darlingt.! fl. Cest.* p. 9. ed. 2. p. 17; *Beck! bot. N. & M. St.* p. 422; *Gray! N. Amer. Gram. & Cyp. part 2. no.* 131; *Spreng. syst.* 1. p. 194.

Schœnus spathaceus, *Linn. sp.* ed. 2. p. 63.

S. angustifolius, *Vahl, enum.* 2. p. 225; *Ram. & Schult. syst.* 2. p. 71.

Scirpus spathaceus, *Michx.! fl.* 1. p. 32.

Cyperus spathaceus, *Linn. syst.* p. 84; *Willd. sp.* 1, p. 289; *Muhl.! gram.* p. 26; *Big. fl. Bost.* ed. 2. p. 19.

CYP. racemis simplicibus lateralibus, &c. *Gron. Virg. ed.* 1. p. 131.

CYP. culmo tereti, &c. *Cron. Virg.* ed. 2. p. 9.

GRAM. junceum, elatius, &c. *Pluk. alm.* 279. t. 301. f. 1.

*Culm* about 18 inches high, terete below, obscurely triangular above, smooth. *Leaves* linear, flat, 2—3 inches long, 2—3 lines wide, acute, spreading almost horizontally in three directions; *sheaths* rather loose, truncate, brownish and naked at the throat. *Spikes* or racemes on short exerted peduncles, growing from the sheaths of the leaves, each bearing from 8 to 14 lanceolate-linear, distichously spreading spikelets, about three-fourths of an inch long. *Partial rachis* flexuous, 6—10-flowered, articulated, easily separating at the joints, which are excavated by the pressure of the nuts. *Scales* lanceolate, very acute, appressed, yellow-ferruginous with a green keel. *Bristles* seldom less than 7, and often 9, (16 *Vahl!*) strong and rigid, persistent, projecting a little beyond the scale when mature, longer than the nut without the style. *Stamens* 3; *filaments* very slender, longer than the bristles, and inserted within them at their base. *Style* attenuated into a long point, bifid at the extremity, smooth. *Nut* about a line and a half long, smooth and dull, light brown, contracted into a short pedicel at the base, flat at the back, and a little convex in front, the summit tapering into a long, straight point, formed of the inarticulate, persistent, undivided style.

HAB. Borders of ponds, and in swamps, from Canada! to Georgia and Pennsylvania! and west to the Mississippi.—August to September.

I have seen in the herbarium of my friend John Carey, Esq. a specimen of this plant, in which most of the nuts were in the state of *Ergot*; a disease which very rarely occurs in this natural order.

OBS. The genus *Dulichium* is very distinct in habit from any other Cyperaceous plant growing within the limits of our Flora, and there is considerable difficulty in determining the true section to which it belongs. In many respects it agrees with the *Scirpeæ*, in others with the *Rhynchosporeæ*. It resembles the *Cypereæ* in the distichous arrangement of the scales; and the spikelets long on the common rachis; but it differs from most of them in its rostrate fruit and rigid perigynous bristles.

The *D. Canadense* of Persoon is probably identical with this species, the number of florets in the spikelet being variable.

B. *Without a Perigynium.*† *Spikelets many-flowered.*2. CYPERUS, *Linn.*

SPIKELETS with the scales distichously imbricated. RACHIS generally margined with the adnate persistent interior scales. STAMENS 2—3, deciduous. STYLE 2—3-cleft, deciduous. NUT compressed or triangular.—Culms mostly triangular (rarely terete), simple, leafy at the base; corymb terminal, simple or compound; rays more or less elongated, ochreate at the base.

*Cyperus*, *Linn.*; *Juss. gen.* p. 27; *Lam. ill. t.* 38; *Rœm. & Schult. gen.* 183; *R. Brown, prodr.* 1. p. 212; *Lestib. ess.* p. 30. no. 23; *N. ab Esenb. in Linnæa*, 9. p. 283; *Nutt. gen.* 1. p. 34.

*Pycrus*, *P. de Beauv. in Lestib. ess.* p. 28. no. 17; *N. ab Esenb. in Linnæa*, l. c.

*Papyrus*, *A. du Petit-Thouars*; *Kunth, syn.* 1. p. 148; *Lestib. ess.* p. 31. no. 25; *N. ab Esenb. in Wight's contrib.* p. 69, & *in Linnæa*, 9. p. 286.

*Torrey*, *Rafin. nov. gen. in jour. de phys.* 89. p. 105.

The genera *Pycrus* and *Papyrus* of several late writers on Cyperaceæ appear to differ too little from *Cyperus* to be separated from that genus. The diagnostic character of the former is the compressed nut and 2-cleft style, the genuine *Cyperus* having a triangular nut and trifold style; but the difference can hardly be regarded as of generic importance. *Papyrus* has the two interior scales (appendices, *Meyer*; perianthium bipaleaceum, *Lestib.*) separated from the rachis, either throughout their whole length or at their tips; but this character exists in several genuine species of *Cyperus*, especially in the mature spikelet; and in many others, the interior scales are very conspicuous, though inseparably united with the rachis. C. A. Meyer, (in the *Mem. de l'Acad. Imp. de St. Petersb.* VI. sér. t. 1. p. 202. t. 3. ff.

1—S, 1830) has, in our opinion, clearly shown that the characters usually assigned to *Papyrus*, are insufficient for removing that genus from *Cyperus*. This excellent botanist, however, considers the “interior scales” of *N. ab Esenbeck*, as appendages of the glume immediately above them on the opposite side of the rachis, from which they proceed obliquely downward, and are inserted on each side of the rachis at the base of the sub-jacent glume, the stamens and ovary of which they closely embrace. In most of our species of *Cyperus* these scales or appendages can be more or less distinctly seen, and it must be allowed that they *appear* to constitute a part of the glume above them; but it may be doubted whether they are not mere winged margins of the rachis, (from which they sometimes split off, as in *C. erythrorhizos*,) rather than inner scales or bracteæ cohering with the rachis.

§ 1. *Style 2-cleft; nut compressed-lenticular.* PYCREUS.

### 1. CYPERUS FLAVESCENS, *Linn.*

Umbel of 2—4 short rays; spikelets linear, 14—20-flowered, rather obtuse, fasciculate and solitary on the common rachis; flowers triandrous; scales obtuse, one-nerved; nut minutely wrinkled transversely, suborbicular, slightly mucronate, shining.

*C. flavescens*, *Linn. sp.* 1. p. 68; *Muhl.! gram.* p. 16; *Elliott, sk.* 1. p. 67?; *Torr.! fl.* 1. p. 60; *Big.! fl. Bost.* ed. 2. p. 18; *Beck! bot.* p. 421; *Willd. sp.* 1. p. 279; *Ram. & Schult. syst.* 2. p. 191; *Spreng. syst.* 1. p. 220.

Perennial. *Culm* 4—10 inches high, triquetrous, leafy near the base. *Leaves* about a line and a half broad, as tall as the culm. *Involucral leaves* 3, spreading thrice as long as the umbel. *Rays* of the umbel often very short, so that the spikes appear fasciculate; the longer ones seldom more than an inch in length, each bearing from 4 to 10 spikelets, which are crowded mostly in fascicles of 3—4 on the common rachis. *Spikes* half an inch or more in length, slightly tapering towards the summit, which is rather obtuse than acute, of a yellowish colour, sometimes 30-flowered. *Scales* broadly ovate, thin and membranaceous except on

the keel. *Stamens* always 3, often remaining attached to the rachis after the fall of the scale. *Style* deeply 2-cleft. *Nut* dark-brown, exactly lenticular, finely striate longitudinally, with distinct transverse wrinkles.

**HAB.** Low boggy places, particularly near salt water. Massachusetts! to Florida! and west to Kentucky! Not common. August—September.

**OBS.** Our plant differs in no essential character from the European *C. flavescens*.

*C. poæformis* of Pursh appears to be nothing but *C. flavescens* in an immature and imperfect state. His specimens in Lambert's Herbarium are scarcely sufficient to determine the species with certainty.

The synonym of Elliott may possibly belong to the next species.

## 2. CYPERUS DIANDRUS, Torrey.

Umbel of 2—5 short rays; spikelets lanceolate-oblong, much compressed, acute, many-flowered (14—24), alternate and subfasciculate on the common rachis; flowers diandrous; scales rather obtuse, one-nerved, membranaceous; nut oblong-obovate, somewhat scabrous, dull; style much exerted; culm obtusely triangular.

*C. diandrus*, Torr.! *cat. pl. N. York*, p. 90; & *fl.* 1. p. 61, *Schult. mant.* 2. p. 103; *Spreng. ! syst.* 1. p. 217; *Beck! bot.* p. 421; *Darlington! fl. Cest.* ed. 2. p. 15; *Gray! Gram. and Cyp.* part 1. no. 70.

Perennial. *Culm* slender, 8—10 inches high, often bearing leaves half its length, frequently reclining, or decumbent, and generally solitary. *Leaves* few, bright green. *Involucre* of three very unequal leaves, two of which are 6—7 inches long. *Umbel* of few rays, which are sometimes so short that the spikelets are nearly sessile; rays when elongated, very unequal, each bearing towards its extremity 6—12 sessile spikelets. *Spikelets* spreading or reflexed, much compressed, so as to appear thin and flat. *Scales* ovate, with a broad light-brown margin and a green keel. *Stamens* sometimes three in the upper florets. *Style* 2-cleft nearly to the base, the divisions 3—4 times the length of the nut, and much exerted, so as to give the spikelets a woolly appearance. *Nut* gray or light-brown, mucronate, never shining.



HAB. In wet places, particularly near salt water, Massachusetts! to Pennsylvania!—September.

OBS. Nearly allied to *C. flavescens*, but differing in the form and colour of the spikelets, the diandrous flowers, and larger dull nuts, &c. It is easily recognised by its handsome, compressed, light-brown spikelets.

*β. ? castaneus.*

Culms cespitose; rays mostly very short; scales subcoriaceous, shining, closely imbricated; style scarcely exerted.

*C. castaneus*, *Big. ! fl. Bost.* ed. 2. (not of *Willd.*)

*C. flavescens β. castaneus*, *Pursh, fl.* 1. p. 52.

*C. bicolor*, *Bart. fl. Phil.* 1. p. 27, (not of *Vahl.*)

Plant about 3—4 inches high. Culms numerous, tough, and rather rigid, often prostrate. Spikelets oblong-lanceolate. Scales very closely imbricated, and of a firm texture, dark-chestnut on the sides, with a green keel. Stamens frequently 3 in the upper florets. Style scarcely twice the length of the nut, and generally making a short curve before emerging from the scale. Nut gray or light-brown, dull, somewhat scabrous.

HAB. On the muddy and sandy banks of rivers; Massachusetts! to Pennsylvania! Very common in New England! and in the western parts of the state of New York!—August, September.

OBS. The peculiar characters of this variety may be owing to the situations in which it grows. Its appearance, however, is very distinct from *C. diandrus*, as described above. Muhlenberg notices it in his *Desc. uber. gram.* as a “co-species” of *C. flavescens*.

### 3. CYPERUS NUTTALLII, *Torrey.*

Rays few, short or nearly sessile, loose; spikelets linear-lanceolate, compressed, acute; scales oblong-lanceolate, acute; stamens 2; nut oblong-obovate, very obtuse, dull; culms cespitose, acutely triangular; involucre 4-leaved, two of the leaves very long.

*C. Nuttallii*, *Torr. ! in Spreng. neue entd.* 1. p. 240; *Torr. ! fl.* 1. p. 60; *Schult. mant.* 2. p. 109; *Spreng. ! syst.* 1. p. 222; *Beck ! bot.* p. 142; *Gray ! Gram. and Cyp. part 1. no.* 69.

*C. cæspitosus*, Torr.! *cat. pl. N. York*, p. 89, (not of Poiret); Spreng.! *syst.* 1. p. 224.

*C. Torreyanus*, Schult *mar t* 2. p. 101.

*C. tenuis*, Muhl.! *gram.* p. 22. (in part.)

Perennial. Culms 4—12 inches high, forming dense tufts. Leaves narrow, nearly as tall as the culm. Umbel sometimes very distinctly rayed, the rays 3—4 in number, usually very short. Involucre of two short and two very long leaves. Spikelets alternate, sometimes compound, closely approximated on the rachis, nearly an inch in length, and a line and a half broad, much compressed, very acute. Scales loosely imbricated, especially when the spikes are mature, rather cartilaginous, very minutely three-toothed at the tip; the sides of a yellowish-brown colour, the keel green. Stamens always 2. Style deeply two-parted. Nut gray or light-brown, narrow-obovate, and almost truncated at the apex; under a strong lens somewhat roughened with minute elevated dots.

HAB. On the borders of salt marshes; very abundant in the vicinity of New York! and along the coast of New Jersey! North Carolina, Mr. Curtis!; Charleston, South Carolina, B. D. Greene, Esq.!; Alabama, Dr. Gates!; New Orleans, Dr. Ingalls!

#### 4. CYPERUS FLAVICOMUS, Michx.

Umbel many-rayed, somewhat compound; spikelets lanceolate-linear, numerous, many- (12—30)-flowered, spreading; scales oblong, very obtuse, with a broad scarious margin, when mature distinct, and somewhat spreading; stamens 3; nut obovate, with a short abrupt point.

*C. flavicomus*, Michx.! *fl.* 1. p. 27; Pursh, *fl.* 1. p. 53; Elliott! *sk.* 1. p. 71; Muhl.! *gram.* p. 24; Vahl, *enum.* 2. p. 260; Ræm. & Schult. *syst.* 2. p. 215.

Annual? Culm 1-3 feet high, triangular. Involucre 3—5-leaved, very long, somewhat glaucous. Umbel spreading; rays about five, 2—3 inches long. Spikelets three-fourths of an inch long, and one and a half line wide; on the lower part of the rachis compound, spreading horizontally or even reflexed, when old. Scales somewhat emarginate, the sides light yellowish-brown, with a green three-nerved keel, and a conspicuous white

scarious margin. *Stamens* commonly 3. *Style* short, two-cleft. *Nut* punctulate, dark-brown, or black.

**HAB.** In bogs, and also in dry soils; South Carolina and Georgia, *Muhlenberg!* and *Elliott!*—May to September.

**OBS.** This species appears to be confined to the southern states, and I doubt whether it has been found north of South Carolina. It is easily distinguished by its remotely-flowered spikelets, and very obtuse, almost truncated scales, with broad scarious margins. In a specimen, received from Mr. Elliott, the spikelets are from twenty to thirty-flowered. Mr. E. remarks, that "In bogs it becomes a large plant, 2—3 feet high, thick and succulent; in dry soils, even where not sandy, it rarely exceeds 12—15 inches in height."

#### 5. CYPERUS ELLIOTTIANUS, *Schultes.*

"Spikelets ovate-oblong, many-flowered, in terminal fascicles; involucrem two-leaved, and with the leaves linear and very narrow."

*C. Elliottianus*, *Schult. mant. syst. veg.* 2. p. 101.

*C. fasciculatus*, *Elliott, sk.* 1. p. 63, (not of Lamarck.)

"Culm 6 inches high, triangular. *Leaves* 1—2, very narrow and almost setaceous, shorter than the culm. *Involucrem* 2-leaved, one of the leaves scarcely longer than the spikelets, the other very long. *Spikelets* 5—7, all sessile, 12—24-flowered. *Scales* rather obtuse: the keel deep green, the margins membranaceous." *Elliott.*

**HAB.** Near Milledgeville, Georgia. *Dr. Boykin*, fide *Elliott.*

Mr. Elliott's plant may be some larger species in a dwarf state, but his description is too incomplete to distinguish it from several other Cyperi. Nees, however, refers it, in his *Synops. gen. Cyp.* to the genus *Pycreus* of P. de Beauvois, but unless he has seen a specimen from Elliott himself (which is hardly probable) I suspect that he has examined a different species, perhaps the *C. diandrus* of this monograph.

## 6. CYPERUS MICRODONTUS.

Umbel with short crowded rays, or sessile; spikes numerous, lanceolate-linear, about 14-flowered; scales deciduous, ovate, rather acute, submembranaceous; stamens 2; style deeply 2-cleft; nut oblong-obovate, obtuse; rachis denticulate with the inner scales.

“*C. brizæus*?” *Schweinitz!* *in litt.*

Annual. *Culm* caespitose, 2—4 inches high, triangular. *Leaves* a line and a half broad. *Umbel* sessile, or with several rays scarcely half an inch long. *Involucre* 4—5-leaved. *Spikelets* half an inch in length, 12—16-flowered, alternate on the common rachis. *Scales* spreading but closely imbricated, indistinctly striate; the keel narrow and rather obtuse, green; the sides pale yellowish-brown; margin not scarious. *Interior scales* persistent, giving the rachis a denticulate appearance when the primary scales have fallen. *Stamens* always 2. *Style* cleft more than half way down. *Nut* rather tumid, dark-gray, dull, minutely dotted under a strong lens.

HAB. Salem, North Carolina, *Schweinitz!*

OBS. This species does not appear to have been hitherto described. It cannot be the *C. brizæus* of Richard, which has oblong-ovate spikelets. I have only received it from Mr. *Schweinitz*.

## 7. CYPERUS GATESII.

Umbel of many (6—8) distinct rays; spikelets somewhat distant, alternate (with the lower ones fasciculately compound), linear-lanceolate, 10—12-flowered; scales oblong-lanceolate, rather acute, loosely imbricate, submembranaceous; stamens 2; style deeply 2-cleft; nut oblong-obovate, obtuse; rachis with a narrow margin.

Perennial. *Culm* nearly a foot high, slender, obtusely-triangular. *Leaves* narrow, pale green; those of the *involucre* about three in number. *Rays* of the umbel very unequal, 4 or 5 of the longer ones about 2 inches

in length, and somewhat erect. *Spikelets* acute, 6—8 lines long and one line broad, of a pale-yellowish colour; the lowest ones on the common rachis a little compound: *Partial rachis* flexuous, the narrow winged margin formed of the confluent and persistent inner scales. *Nut* as in the preceding species.

HAB. Near Mobile, Alabama, *Dr. H. Gates!*

OBS. This species resembles *C. microdontus* in the spikelets and nut, but is otherwise very distinct. I have only received it from the above-named locality.

§ 2. *STYLE 3-cleft; nut triangular; interior scales membranaceous and adnate to the rachis, not separating in the mature spikelet, sometimes almost wanting.*—CYPERUS.

a. *Culm subterete, nodose.*

### 8. CYPERUS ARTICULATUS, Linn.

Umbel compound, loose; spikelets long, linear, alternate, approximate; culm with leafless sheaths towards the base.

*C. articulatus*, Willd. *sp.* 1. p. 270; *Michx.*! *fl.* 1. p. 27; *Pursh*, *fl.* 1. p. 50; *Muhl.*! *gram.* p. 18; *Vahl*, *enum.* 2. p. 301; *Kunth*, *syn.* 1. p. 137; *Ræm. & Schult.* *syst.* 2. p. 163; *N. ab Esenb. Cyp. Ind. in Wight's contrib.* p. 80.

*Rhizoma* creeping, clothed with large lanceolate scales. *Culm* 2—6 feet high, the middle part about as thick as a goose-quill, filled with dry pith, which is condensed at intervals of about an inch, producing false nodes, very conspicuous in the dried plant. *Sheaths* 2—3, clothing the lower part of the culm, and terminating in large, acute, erect scales, rather than leaves. *Umbel* of five or more primary rays, 2—4 inches in length; the rays simple or compound, each division bearing about 10 spikelets. *Involucre* very short, 2—3-leaved. *Spikelets* an inch long, 15—20-flowered, convex on the sides. *Rachis* distinctly margined. *Scales* ovate-lanceolate, rather obtuse, membranaceous on the margin; midrib green; the sides whitish mixed with red. *Stamens* 3; *anthers*



linear, very long. *Style* slender, 3-cleft. *Nut* acutely triangular, punctate.

HAB. In wet places, particularly in river swamps of the Southern States; South Carolina, *Elliott!*; Georgia, *Muhlenberg!*; New Orleans, *T. Drummond!* and *Dr. Ingalls!*

OBS. This species is also a native of South America, the East and West Indies, and Africa.

#### 9. CYPERUS BIPARTITUS.

Spikelet solitary, appearing lateral, ovate-oblong, many-flowered; involucre mostly one-leaved, or with an additional short setaceous bract; scales ovate, rather obtuse and coriaceous; stamens 2; style cleft nearly to the base; nut biconvex, obovate, obtuse, with a papillose surface.

Annual. *Culm* triquetrous, 4—6 inches high, with two setaceous leaves at the base. *Spikelet* about 14-flowered, half an inch long,  $2\frac{1}{2}$  lines wide, appearing to grow from the side of the culm about an inch and a half below the summit, but really terminal and subtended by the involucre, which is commonly one-leaved and erect, sometimes two-leaved, the second leaf being short and subulate. *Rachis* naked. *Scales* closely imbricated with appressed points, a sharp keel and 5 pale ferruginous sides. *Style*, in the mature flower, cleft nearly to the base, the divisions thicker than in most Cyperi. *Nut* tumid, dark-brown, dull, covered with minute papillæ.

HAB. Near New Orleans, *Dr. Ingalls!*

OBS. This species resembles *C. mucronatus*, *Linn.* in many respects, but the latter is distinguished by having usually several spikelets on each culm, a smooth plano-convex nut, and long compressed style bifid only at the summit. It is not improbable, however, that our plant sometimes bears more than one spikelet.

#### 10. CYPERUS TENELLUS, *Linn.?*

*Culm* and leaves setaceous; spikelet solitary, appearing lateral, lanceolate-linear, 10—12-flowered; involucre mostly

one-leaved; scales linear-oblong, loosely imbricate, rather acute, membranaceous, 3-nerved on the keel; stamen 1; style two-cleft; nut oblong-obovate, much compressed, puncticulate.

*C. tenellus*, *Linn. sup.* p. 103?; *Vahl, enum.* 2. p. 305?

*C. minimus*? *Nutt. ! gen.* 1. p. 35, not of *Thunb.*; *Bart. ! prodr. fl. Phil.* 1. p. 26.

*Culm* triquetrous, scarcely as thick as a bristle, about 4 inches high. *Involucre* of one erect setaceous leaf, about an inch long, and a minute bract 2—3 lines in length. *Spikelet* half an inch long, and one line broad, much compressed, rather loosely imbricated. *Rachis* slightly margined. *Style* filiform, cleft half way down. *Nut* brown, dull, obtuse, with a minute point.

**HAB.** Monmouth county, New Jersey, *Dr. Isaac Cleaver!*

**OBS.** This interesting species appears to be extremely rare, as it has not been found since its discovery in New Jersey by the late *Dr. Cleaver* of Philadelphia. Whether our plant is the *C. tenellus* of Linnæus and Vahl, (which seems to be the *C. minimus* of Thunberg) cannot be certainly determined from the imperfect descriptions of those authors. It is probable, however, that our species is distinct, and should it prove to be so, I propose to call it *C. Cleaverii*, in honor of its discoverer. *C. minimus* is described by Vahl as bearing from one to three oblong spikelets, with ovate acute scales, while our plant has a solitary lanceolate-linear spikelet and linear-oblong scales.

b. *Culm triangular; umbel simple or compound.*

† *Spikelets alternate, or disposed towards the extremity of the rays in a distichous or spiciform manner, the lowest ones often compound.*

## 11. CYPERUS OCCIDENTALIS.

Culms densely cespitose, thick and very short; leaves flat; rays of the umbel short, crowded; spikelets closely aggregated into ovate heads; the lowest ones compound, 8—10-flowered; scales ovate, rather acute, membranaceous; style 3-cleft at the summit; nut ovate, compressed-triangular.

Annual? *Culms* acutely triangular, numerous, forming dense tufts about two inches high. *Leaves* broad for the size of the plant. *Umbel* large, of 3—4 short rays. *Involucre* about 3-leaved, much longer than the umbel; the leaflets  $1\frac{1}{2}$  line broad. *Spikelets* very numerous, 3 lines long, those on the lower part of the rays more or less compound. *Scales* rather loosely imbricated, not scarious on the margin, with a broad deep-green keel and ferruginous sides. *Interior scales* very conspicuous. *Stamens* 3. *Style* long, slightly cleft. *Nut* smooth, short, ovate.

**HAB.** On the North-west coast of America, near the mouth of the Oregon river!

**OBS.** This humble species, for which I am indebted to my excellent friend, Dr. Hooker, resembles, at first sight, the *C. inflexus* of Muhlenberg, but a slight examination shows it to be totally distinct.

12. CYPERUS MICHAUXIANUS, *Schultes*.

Culm acutely triangular; umbel compound, the rays short; involuclcs 1—2-leaved, setaceous, or wanting; spikelets somewhat terete when mature, 6-8-flowered, the lower ones compound; rachis very broad, easily separating at the joints; scales ovate, rather obtuse; interior scales herbaceous, obovate, folded round the ovate, triquetrous nut.

*C. Michauxianus*, *Schult. mant.* 2. p. 123.

*C. strigosus*, *Lam. ill.* 1. no. 726. (not of *Linn.*); *Michx.* ! *fl.* 1. p. 28; *Pers. syn.* 1. p. 64.

*C. erythrorhizos*, *Torr.* ! *fl.* 1. p. 61; *Beck!* *bot.* p. 421; *Gray!* *Gram.* & *Cyp.* part 1. no. 72.

Annual. *Culm* 12—15 inches high, firm and erect, thickened and reddish towards the root. *Leaves* commonly shorter than the culm, 3—4 lines wide. *Involucre* 5—6-leaved, many times longer than the umbel. *Rays* of the umbel 4—6, the naked part scarcely more than an inch in length, mostly divided at the summit, and sometimes bearing short setaceous involucels. *Spikelets* much crowded on the rays, the lower ones compound, about three-fourths of an inch long, at first compressed, but nearly terete when mature. *Scales* of a rather firm texture, not scarious on the margin, loosely imbricated, somewhat indistinctly striate. *Rachis* very broad and thick, separating at the joints when mature. *Interior scales* adnate, persistent, appearing like obtuse auricles, folding round the nut and firmly embracing its base. *Stamens* 3. *Style* 3-cleft more than half-way down. *Nut* whitish, somewhat acute, flattened on the back, obtusely angled in front, punctulate.

**HAB.** Borders of salt marshes. Common in New Jersey, particularly in the neighbourhood of Hoboken; Salina, New York, *J. Carey!*; Carolina, *Michaux!*; Wilmington, North Carolina, *Mr. Curtis!*; Georgia and Delaware, *Dr. Baldwin!*; New Orleans, *Dr. Ingalls!*

**OBS.** This plant probably grows in many parts of the Atlantic States, being confounded either with *C. strigosus* or *C. erythrorhizos*. It is clearly the *C. strigosus* of Michaux, as I have ascertained by examining his herbarium; and he correctly describes the plant as having *subterete* spikelets. To the *C. pennatus* of Lamarck (of which I possess a specimen from A. de Jussieu,) it is very nearly allied, not only in general appearance, but in the structure of the spikelets. That species, however, has a loose corymb, longer spikelets, slightly mucronate glumes, and an oblong nut.

### 13. CYPERUS TETRAGONUS, *Elliott.*

Umbels many-rayed, without involucels; spikes oblong, cylindrical; spikelets 3—5-flowered, somewhat quadrangular; scales slightly mucronate; nut oblong.

*C. tetragonus*, *Elliott, sk.* 1. p. 71; *Schult. mant.* 2. p. 130.

*Culm* 2—3 feet high, the angles a little scabrous near the umbel. *Leaves* 12—18 inches long, 3 lines wide, channelled; the margins and midrib serrulate. *Spikes* about an inch long, disposed at the extremity of the rays. *Spikelets* distinctly 4-angled in consequence of the width of the rachis. *Scales* compressed. *Stamens* 3. *Style* 2-cleft [?] *Nut* triangular.—*Elliott*.

**HAB.** On Eding's Island, near Charleston, South Carolina, *Elliott*; and near St. Mary's, Georgia, *Dr. Baldwin*. "A rare plant in South Carolina and Georgia, but becomes predominant in the live-oak forests south of St. John's river, in Florida." *Baldw. MS.*

**OBS.** This plant has not fallen under my notice. It does not exist in that portion of *Dr. Baldwin's* herbarium which has come into my possession. *Mr. Elliott's* description is brief and incomplete, but sufficient to show that the plant is a very distinct species.

#### 14. CYPERUS STRIGOSUS, *Linn.*

Umbel simple, or rather compound; rays numerous, elongated; involucels mostly wanting, or setaceous; ochreæ 2-bristled; spikes ovate; spikelets 8—10-flowered, much crowded, spreading horizontally or somewhat reflexed, linear-lanceolate, flattened rachis subterete, slender; scales oblong-lanceolate; approximate, strongly nerved, subacute and slightly mucronate; interior scales lanceolate, narrow, hyaline; nut oblong-triquetrous.

*C. strigosus*, *Linn. sp. pl.* p. 69? (excl. syn.); *Vahl, enum.* 2. p. 253; *Pursh, fl.* 1. p. 52; *Elliott, sk.* 1. p. 70; *Muhl. ! gram.* p. 21; *Torr. ! fl.* 1. p. 62, (excl. syn. *Michx.*); *Big. fl. Bost.* ed. 2. p. 19; *Beck ! bot.* p. 421; *Darling. ! fl. Cest.* ed. 2. p. 15; *Ram. & Schult.* 2. p. 214; *C. A. Meyer, in Mem. Acad. St. Petersb. (VI. sér.)* 1. p. 201. t. 3.

*C. Ensenii*, *Pursh ! fl.* 1. p. 53; *Schult. mant.* 2. p. 123; *Elliott, sk.* 1. p. 73.

*Culm* triquetrous, 1—3 feet high, the base somewhat swollen. *Umbel* 5—9 rayed, somewhat spreading. *Rays* 2—6 inches in length, sometimes with one or two short partial rays. *Ochreæ* terminating in 2 bristles



a fourth of an inch in length. *Involucre* 5—9-leaved, very long. *Spikes* 1—2 inches long, and more than an inch in diameter, formed by numerous (20—80) spikelets, which spread on all sides, and in a mature state are a little reflexed on the common rachis. *Spikelets*  $\frac{3}{4}$  of an inch long, much compressed, acute, deciduous when old. *Scales* somewhat loosely imbricate, many-striate, with a narrow scarious margin; the sides yellowish. *Interior scales* hyaline, confluent with the next scale above. *Stamens* 3. *Style* entire the greater part of its length. *Nut* not half the length of the scale, grayish brown, acute, the surface marked with elevated dots arranged in longitudinal lines.

**HAB.** Wet meadows and low grounds; common. Massachusetts! to New Orleans!

$\beta$ ?— umbel compound, many-rayed, with setaceous involucels; ochreæ 2-awned; spikes cylindrical-oblong, 3—5 on each ray; spikelets linear-subulate, 4—5-flowered; very numerous, somewhat reflexed; scales narrow-oblong, indistinctly striate; nut oblong, triquetrous.

*Culm* a foot and a half high, triquetrous. *Umbel* about 7-rayed; the rays 3—4 inches long, terminating in several short branches which bear spikelets their whole length. *Involucels* consisting of several very slender leaves, about as long as the spikes. *Spikelets* one-third of an inch long, acute, compressed. *Scales* acute, appressed. *Interior scales* narrow, hyaline. *Stamens* 3. *Style* 3-cleft about one-third of the way down. *Nut* somewhat attenuated downward.

**HAB.** Burke county, North Carolina, *Mr. Curtis!*

**OBS.** The original *C. strigosus* of Linnæus appears to have been a Virginian plant. The synonyms of Sloane quoted by Willdenow and Rottbœll belong to two other species, the former to *C. torosus* of Vahl, and the latter to *C. planifolius* of Richard. It is uncertain, whether the *detailed* description of Willdenow refers to one of these, or to the *C. strigosus*, but probably to the latter.

I have never seen the spikelets so many flowered as they are said to be by Mr. Elliott (14-24); in my specimens very few of them have as many as 10.

The variety  $\beta$ . is referred to this species with some hesitation. My specimen of it is not sufficiently mature to exhibit the character of the fruit. It resembles *C. speciosus*, but wants the distinct foliaceous involucels.

#### 15. CYPERUS STENOLEPIS.

Umbel simple; rays 3-4, elongated; ochrea truncate, pointless; spikes ovate; spikelets much crowded, spreading horizontally or somewhat reflexed, linear, compressed, 5-8-flowered, the florets distant and free nearly to their base; rachis subterete, slender, flexuous; scales narrowly linear, nerved, involute towards the summit when old; interior scales very narrow, adnate; nut oblong-linear, triangular.

*C. distans*, Pursh, fl. 1. p. 53? (not of Linn.)

Culm about 3 feet high, triquetrous, rather slender. Leaves 12-18 inches long, 2-3 lines wide. Umbel somewhat spreading; rays 3-5 inches long. Involucre 3-4-leaved. Spikes nearly 2 inches long and an inch in diameter, composed of numerous (40-60) spikelets which spread on all sides. Spikelets 6-7 lines long. Scales very narrow, and in contact only at their base; dusky yellow, the margins, particularly in the mature spikelet, involute. Interior scales hyaline, adnate to the rachis and the scale above. Stamens 3. Style 3-cleft one-third of its length. Nut scarcely one-third the length of the scale, acute, brown, covered with lines of elevated dots.

HAB. Wilmington, North Carolina, Mr. Curtis!

OBS. Nearly allied to *C. strigosus*, but easily distinguished by its loosely flowered spikelets and narrow scales.

Dr. Baldwin in his MS. notes on *Cyperus* remarks that he has seen a species of this genus in Georgia, resembling *C. strigosus*, but differing in its distant expanding florets.

#### 16. CYPERUS SPECIOSUS, Vahl.

Umbel compound, many-rayed, the rays distinctly alternate; partial umbels shorter than the many-leaved involucels; ochrea deeply 2-parted; heads oblong; spikelets spreading horizontally, 5-8-flowered; scales oblong, obtuse, appressed.

*C. speciosus*, *Vahl, enum.* 2. p. 364; *Ram. & Schult.* 2. p. 218; *Pursh, fl.* 1. p. 58; *Elliott, sk.* 1. p. 72.

*Culm* 2—4 feet high, rather acutely angled. *Leaves* 1—2 feet long, 4—6 lines wide, deeply channelled, somewhat glaucous underneath, scabrous on the margin. *Umbel* about 8-rayed; the primary rays 2—3 inches long, and more distinctly alternate than in most other Cyperi. *Ochreae* loose, obliquely truncate, terminating in two lanceolate points nearly an inch long. *Involucre* foliaceous, a little longer than the partial rays; the leaflets alternate like those of the rays. *Spikes* numerous, compound, with setaceous bractæ at the base. *Spikelets* subulate. "*Stamens* 3. *Style* 3-cleft. *Nut* 3-angled, compressed, slightly incurved."—*Elliott*.

**HAB.** In ditches and wet places, South Carolina. *Elliott*. Wilmington, North Carolina, *Mr. Curtis!*; Virginia, *Vahl*; New Orleans, *Dr. Ingalls!*; Middle Florida, *Dr. Chapman!*

**OBS.** My specimens of this plant are too young to exhibit the characters of the spikelet and fruit; yet there can be little doubt of its being the *C. speciosus* of *Elliott*, as it is the only native species bearing conspicuous *partial* as well as *general* involucre. *Vahl's* plant, which was described from specimens preserved in the Herbarium of the Jardin des Plantes in Paris, may be distinct from ours. He describes the spikelets as scarcely half an inch long, terete, 6-flowered, with linear scales.

#### 17. CYPERUS REPENS, *Elliott*.

*Rhizoma* creeping, tuberiferous; *umbel* simple, 4—6-rayed; *involucre* much longer than the rays; *spikes* distichous; *spikelets* 10—14, approximated, somewhat spreading, 12—20-flowered, linear, compressed, obtuse; *scales* oblong, rather acute, slightly mucronate, the margin scarious; *nut* oblong, triquetrous; *style* 3-cleft half-way down.

*C. repens*, *Elliott, sk.* 1. p. 69; *Schult. mant.* 2. p. 112; *Spreng. syst.* p. 224.

*C. phymatodes*, *Muhl.!* *gram.* p. 23; *Torr.!* *fl.* 1. p. 62; *Beck!* *bot.* p. 42; *Gray!* *Gram. & Cyp.* part 1. no. 73; *Link, jahrb.* 3. p. 87. (fide *Schult. mant.* 2. p. 117.)

*C. tuberosus*, *Pursh, fl.* 1. p. 52. (excl. syn.)

*Rhizoma* creeping extensively; the branches often terminating in tubers about the size of a large pea. *Culm* 12—18 inches high; acutely triangular. *Leaves* a little recurved, 2—3 lines broad, strongly carinate, smooth, yellowish. *Umbel* rather erect; the rays 2—4 inches long, without involuclers. *Involucre* mostly 3-leaved. *Spikelets* three-fourths of an inch long, linear, somewhat obtuse when mature, for the most part distichously arranged on the common rachis, the lowest ones frequently geminate or fasciculate. *Scales* yellowish, nerved, at length distinct at the point. *Interior scales* lanceolate, adnate, hyaline. *Stamens* 3. *Style* sometimes unequally 3-cleft. *Nut* acute.

HAB. Wet sandy places, particularly on the banks of rivers, and on the sea shore; western part of New York to New Orleans. Common on the sea coast of Long Island and New Jersey, and on the Hudson as far north as Newburgh!; near Oneida Lake, New York; Pennsylvania, North Carolina, and Georgia, *Muhlenburg!*; S. Carolina, *Elliott* and *Mr. Forbes!*; New Orleans, *Dr. Ingalls!*; Delaware and East Florida, *Dr. Baldwin!*

OBS. The tubers or thickened extremities of the subterranean stems are edible, but are inferior in size to those of the *C. tuberosus* of Vahl, with which Pursh confounded our plant. Dr. Baldwin, in his notes, states that this species is the "Nut-grass" of East Florida, where it covers cultivated fields, and is much more common than *C. Hydra*. He remarks that he found the same plant on the banks of the river Plata, near Buenos Ayres.

Muhlenberg's *Cyperus*, No. 9, is a mere variety of *C. repens*.

#### 18. CYPERUS HYDRA, *Michaux.*

*Rhizoma* creeping, tuberiferous; umbel simple, 3—4-rayed; involucre a little longer than the ray; spike, distichous; spikelets 4—5 on each ray, lanceolate-linear, acute, much compressed, 14—20-flowered; scales ovate, approximated, somewhat spreading, rather acute, appressed, nerveless, not scarious on the margin; nut triquetrous.



*C. Hydra*, *Michx.*! *fl.* 1. p. 27; *Vahl, enum.* 2. p. 344, *Pursh, fl.* 1. p. 52; *Elliott! sk.* 1. p. 68; *Kunth, syn.* 1. p. 140; *Ram. & Schult. syst.* 2. p. 201; *Spreng.! syst.* 1. p. 224.

*C. rotundus*, *Muhl.! gram.* p. 17.

*Rhizoma* creeping extensively, its branches ending in small tubers. *Culm* 6—12 inches high, smooth, triquetrous. *Leaves* about two lines wide, shorter than the culm, often recurved, somewhat glaucous. *Umbel* usually 4-rayed; the rays 2—3 inches long, erect or only a little spreading. *Involucre* 2—3-leaved; the leaves often shorter than the umbel, rarely exceeding it in length. *Ochreæ* truncate, pointless. *Spikelets* nearly an inch long, alternate along the upper part of the rays. *Scales* closely imbricated, bright chesnut and shining, without nerves, slightly mucronate. *Interior scales* narrow, adnate, hyaline. *Stamens* 3. *Style* 3-cleft about half-way down. *Ripe fruit* not seen.

**HAB.** Sandy fields, and in sand-drifts near the sea; Virginia to Florida. Virginia, Carolina and Florida, *Michaux*; Wilmington, N. Carolina, *Mr. Curtis!*; sea shore of S. Carolina, *Elliott!*; St. Mary's, Georgia, *Dr. Bacon!*; Florida, *Dr. Baldwin!*; Arkansas, *Nuttall*; Mexico, *Humboldt*; Bahia, Brazil, *Dr. Baldwin!*; Guadalupe, *Dr. Madiana!*

**OBS.** This species is nearly allied to *C. rotundus*, *Linn.* and also to *C. hexastachyus*, *Rottb.* In the Southern States, it is very troublesome to planters on account of its rapid multiplication by means of its creeping rhizomas and tubers. See *Elliott.*

### 19. CYPERUS DISSITIFLORUS.

*Culms* filiform, cespitose, tumid at the base; *leaves* very narrow; *umbel* simple 3—4-rayed; *involucre* 3-leaved; *spikelets* lanceolate, compressed, very acute, 5—7-flowered, remotely and somewhat distichously inserted along the common rachis; *scales* appressed, oblong-lanceolate, acute; *inner scales* conspicuous; *nut* obovate-oblong, flattened on the back.

*Rhizoma* short and thick. *Culm* 1—2 feet high, the base somewhat swollen, and of a reddish colour. *Leaves* mostly radical, narrow. *Rays*



of the umbel slender, 1—2 inches long, somewhat erect. *Involucre* 2—3 times as long as the umbel. *Ochrea* with a short mucronate tip. *Spikelets* 16—24 on each ray, scattered along its upper half. *Scales* membranaceous, nerved, not mucronate. *Stamens* 3. *Style* 3-cleft nearly to the base. *Nut* light brown, obtusely angular in front.

HAB. Near New Orleans, *Hooker!*

OBS. For specimens of this distinct species of *Cyperus*, I am indebted to my most liberal friend Dr. Hooker, who received them either from Mr. Drummond, or Mr. Teinturier. In its slender and wiry cespitose culms, which are swollen at the base, this species resembles *C. mariscoides* & *C. Grayii*, but in its alternate spikelets it is more nearly related to *C. repens* of Elliott.

*Involucre* mostly 3-leaved. *Spikelets* three-fourths of an inch long, linear, somewhat obtuse when mature, for the most part distichously arranged on the common rachis; the lowest ones frequently geminate or fasciculate. *Scales* yellowish, nerved, at length distinct at the point. *Interior scales* lanceolate, adnate, hyaline, *Stamens* 3. *Style* sometimes unequally 3-cleft. *Nut* acute.

†† *Spikelets aggregated in a capitate or subumbellate manner on the summit of the rays.*

## 20. CYPERUS FILICULMIS, Vahl.

Culm triangular, tuberos at the base, assurgent; leaves linear; umbel simple, of 1—2 divaricate rays, or wanting; ochreae pointless; heads globose, dense, composed of 15 or 20 spikelets; spikelets linear-lanceolate, rather convex, 6—10-flowered; rachis naked; scales loose, ovate, obtuse or emarginate, slightly mucronate, scarious on the margin; nut obovate-triangular, with a short acuminate point.

*C. filiculmis*, *Vahl, enum.* 2. p. 328; *Pursh, fl.* 1. p. 51; *Ram. & Schult. syst.* 2. p. 186; *Spreng. syst.* 1. p. 218.

*C. mariscoides*, *Elliott, sk.* 1. p. 67; *Spreng. ! neue entdeck.* 1. p. 239; *Torr. ! fl.* 1. p. 63, (excl. syn.); *Bigel. fl. Bost.* ed. 2. p. 19; *Beck ! bot.* p. 422; *Gray ! Gram. & Cyp.* part 1. no. 74; *Darlingt. ! fl. Cest.* ed. 2. p. 16; *Schult. mant.* 2. p. 100.

*C. Killingæoides*, *Pursh, fl.* 1. p. 50. (excl. syn.)

*Scirpus cyperiformis*, *Muhl. ! gram.* p. 41.

*S. lupulinus*, *Spreng. mant.* 2. p. 30; *Ram. & Schult. syst.* 2. p. 135.

*Mariscus cyperiformis*, *Torr. ! cat. pl. N. York,* p. 14. (excl. syn. *Pursh.*)

*M. glomeratus*, *Bart. prodr. fl. Phil.* 1. p. 30. (excl. syn. *Vahl, Linn. & Pursh.*)

*Rhizoma* creeping. *Culms* cespitose, about a foot high, forming a cluster of small tubers at the root, the sides striated and rather convex. *Leaves* 1—2 lines broad, carinate, shorter than the culm, of a dull green colour. *Umbel* often wanting, the spikelets being collected in a single dense, globose head; but usually there are one or two widely spreading rays, each bearing a head of spikelets an inch in diameter. *Involucre* 3—4-leaved, twice as long as the umbel. *Spikelets* 5—6 lines long, acute; the florets somewhat distinct. *Scales* subcoriaceous, with a broad scarious margin, strongly nerved, of an obscure yellowish-green colour; the upper ones more acute. *Stamens* 3. *Style* deeply 3-cleft. *Nut* two-thirds the length of the scale, unequally triangular, minutely dotted in lines.

**HAB.** On dry hills, and in sterile fields, Massachusetts! to Florida! and west to Arkansas!—September.

**OBS.** This species, to which I have restored the original name of Vahl, appears to have greatly perplexed botanists. Although it is a genuine *Cyperus*, it has been referred by some to *Mariscus*, and by others to *Scirpus*. It is a very common plant in all parts of the United States, and is easily distinguished by its pale green colour, wiry stems, globose heads of spikelets, and loose, broad, obtuse scales.

## 21. CYPERUS GRAYII.

*Culm* filiform, obtusely triangular, erect, tuberous at the base; *leaves* setaceous; *umbel* 4—6-rayed, somewhat erect; *ochreæ*

truncate, pointless; heads loose, composed of 6—9 spikelets; spikelets linear-lanceolate, compressed, 5—7-flowered; rachis winged with the inner scales; scales ovate, rather obtuse when old, somewhat distinct, hardly scarious on the margin; nut obovate-triquetrous, with a short acuminate point.

*C. mariscoides*, var. *setifolius*, Torr. ! in Gray's *Gram. & Cyp.* part 1. no. 75.

*Rhizoma* creeping. *Culms* 8—12 inches high, growing in tufts, tough and wiry, tuberous at the base. *Leaves* all radical, channelled, scarcely half a line wide, shorter than the culm. Rays of the *umbel* almost capillary, 2—3 inches long, slightly spreading, each bearing a loose head of chestnut-coloured spikelets. *Involucre* about 4-leaved; 2 of the rays a little longer than the umbel; all of them setaceous. *Spikelets* 4—5 lines long, acute, at first slightly convex but flat when mature. *Scales* nerved, not mucronate, closely imbricated in the young spikelet, at length distinct at their tips. *Interior scales* lanceolate, persistent. *Stamens* 3. *Style* 3-cleft half-way down. *Nut* two-thirds the length of the scale, dotted, gray.

**HAB.** Barren sandy fields. Common in the pine-region of New Jersey,—September.

**OBS.** This species, although nearly allied to *C. filiculmis*, differs sufficiently in its still more filiform culm, setaceous leaves, umbel of many rays, and fewer-flowered spikelets, with the rachis winged.

## 22. CYPERUS FORMOSUS, Vahl.

“Umbel compound; spikelets capitate, ovate-lanceolate; involucre about 6-leaved, very long, scabrous on the margin.”

*C. formosus*, Vahl. *enum.* 2. p. 327; Pursh, *fl.* 1. p. 51; Ræm. & Schult. *sys.* 2. p. 184.

*Culm* as thick as a goosequill, acutely triangular, leafy at the base. *Leaves* linear. *Involucels* 2—3-leaved, shorter than the partial umbels. *Ochreae* short, truncate. Rays of the *umbel* about 12, an inch and a half long, terete; partial rays fewer, short. *Spikelets* about 8, half an inch long, 20—30-flowered, yellowish. *Scales* linear-lanceolate, acute, deciduous.—Vahl.

HAB. In Louisiana, *Jussieu*.

OBS. With this plant I am unacquainted.

### 23. CYPERUS BALDWINII.

Culm obtusely triangular; involucre 6—9-leaved; umbel of 6—12 rays; heads globose; spikelets narrow-lanceolate, compressed, acute, 5—8-flowered, spreading; scales ovate-lanceolate, acute, appressed; interior scales conspicuous, hyaline; nut obovate.

*Mariscus echinatus*, *Elliott*, *sk.* 1. p. 75, t. 3. f. 1. (excl. syn.)

*Cyperus globosus*, *Baldw.!* *Ms.* (not of *Allioni*.)

*Culm* 1—2 feet high, smooth, somewhat tumid at the base. *Leaves* shorter than the culm, 2—3 lines wide, scabrous on the margin. *Rays* of the *umbel* somewhat erect, 1—3 inches long. *Ochreae* mucronate. *Involucre* more than twice as long as the umbel. *Heads* 6—8 lines in diameter, depressed, globose, formed of about 40 aggregated spikelets, which spread horizontally but are not refracted. *Spikelets* 3—4 lines long, attenuated to a sharp point. *Rachis* broadly winged with the persistent inner scales. *Scales* membranaceous, somewhat scarious on the margin; the two lowest short, ovate, and empty. *Stamens* 3. *Style* 3-parted. *Nut* narrowed at the base, half the length of the scale.

HAB. In cultivated lands; very common in the Southern States. South Carolina and Georgia, *Dr. Baldwin!* and *Elliott!*; Middle Florida, *Dr. Chapman!*; New Orleans, *Dr. Ingalls!*

OBS. This plant differs from the *C. ovularis*, to which Mr. Elliott referred it, in its more numerous and looser heads, and compressed, many-flowered spikelets. In many respects it resembles *C. Grayii*.

### 24. CYPERUS COMPRESSUS, *Linn.*

Umbel simple (rarely compound,) or wanting; rays spreading; spikelets in a loose head, or aggregated in a somewhat digitate manner, lanceolate, somewhat convex and ancipital, many-(12—40) flowered; rachis winged with the interior scales; scales ovate, acuminate, carinate, indistinctly nerved; nut obovate, triquetrous, polished; root fibrous.



*C. compressus*, Linn. *sp.* p. 68; Willd. *sp.* 1. p. 282, (excl. syn. Gron.); Vahl, *enum.* 2. p. 324; Pursh, *fl.* 1. p. 51; Muhl. *! gram.* p. 15; Elliott *! sk.* 1. p. 65; Ræm. & Schult. *syst.* 2. p. 182; Kunth, *syn.* 1. p. 141; Spreng. *syst.* 1. p. 220, (excl. syn. Muhl.); N. ab Esenb. in *Wight's Contrib.* p. 76; C. A. Meyer, in *Mem. Acad. St. Petersb. VI. sér.* 1. t. 3.

Root fibrous, descending. Culm 3—8 inches high, somewhat tumid at the base, triangular, the sides a little convex. Leaves narrow, carinate, pale green. Umbel often sessile, seldom more than 3-rayed; the rays 1—2 inches long, spreading. Ochreæ cuspidate. Involucre about 3-rayed, twice as long as the umbel. Involucels wanting. Spikelets 3—5 on each ray, in the sessile umbels about 12, from half an inch to nearly an inch in length, remarkably ancipital owing to the acute keel of the scales; the sides rather convex. Scales somewhat coriaceous, pale green, striped with yellow, conspicuously acuminate and almost cuspidate, the points projecting so as to give the spikelets a sharply serrated appearance. Interior scales membranaceous, distinct. Stamens 3. Style 3-cleft half way down. Nut very short for its breadth, obtuse, equally 3-sided, when old smooth and shining.

HAB. Dry sandy soils. North Carolina to Florida, and West to Missouri. Wilmington, N. C. Mr. Curtis!; near Charleston, South Carolina, Elliott!; New Orleans, Dr. Engalls!, T. Drummond!; on the Missouri, Nuttall!

OBS. The *C. compressus* is also a native of Mexico, and in the East and West Indies.

## 25. CYPERUS DENTATUS, Torrey.

Umbel compound, with 4—7 somewhat erect rays; spikelets 3—5 on each partial ray, clustered, ovate-oblong, ancipital, much compressed, many (6—30)-flowered; rachis naked; scales very acute, carinate, membranaceous, nerved; nut obovate, triquetrous; rhizoma creeping, bearing tubers.

*C. dentatus*, Torr. *! fl.* 1. p. 61; Big. *! Bost.* ed. 2. p. 18; Beck. *! Bot.* p. 421; Gray *! Gram. & Cyp.* part 1. no. 71.

*C. parviflorus*, Muhl. *! gram.* p. 19, (not of Vahl.)

*C. micranthus*, Schult. *! mant.* 2. p. 121.

Rhizoma creeping extensively; its branches often bearing small tubers at their extremity. Culm about a foot high; the angles somewhat obtuse. Leaves rather rigid, shorter than the culm, strongly keeled. Rays of the



*umbel* crowded, usually 1—2 inches long; *secondary rays* half an inch long. *Involucre* somewhat erect; one of the leaves longer than the umbel, the others equalling it; the *involucels* are mere short lanceolate bracts. *Ochreæ* obliquely truncate. *Spikelets* 3—7 lines long, varying from ovate to oblong, rather obtuse. *Scales* closely imbricated, but spreading at the points, giving the edge of the spikelets a finely serrated appearance; the side of a bright reddish colour, the keel and part of the back green. *Stamens* 3. *Style* 3-cleft. *Nut* whitish, very obtuse, minute.

**HAB.** Sandy swamps, and in wet places on the banks of rivers, Massachusetts! to Florida! near Boston, and Charleston, South Carolina, *B. D. Greene, Esq.!*; Litchfield, Connecticut, *Mr. Brace!*; New Jersey, from S. Amboy to Cape May!; Pennsylvania, *Muhlenberg!* & *Schweinitz!*—September.

**OBS.** This beautiful species, though resembling *C. compressus* in many respects, can easily be distinguished by the characters above enumerated. It appears to have been overlooked by Elliott, although inhabiting the Southern States. I have found it near South Amboy, in one or two instances growing two feet high, with the umbel decomposed, and the involucels very distinct: but it was evidently in a diseased or unnatural state. It very frequently occurs with the scales and ochreæ foliaceous, giving the spikelets and axils a viviparous appearance. The whole plant, except the spikelets, is of a yellowish green colour.

*β? multiradiatus*: umbel many-rayed, the rays elongated; scales oblong, scarcely acute, 3-nerved.

*Rhizoma* creeping. *Culm* 2 feet high. *Umbel* 10—12-rayed; the primary rays 4—6 inches long; secondary 1—2 inches long, erect. *Ochreæ* cuspidate. *Involucre* about 6-leaved. *Spikelets* 14—24-flowered, obtuse, much compressed, 5—8 lines long, 2 lines broad. *Rachis* naked. *Scales* rather obtuse than acute, greenish, shaded with yellow and brown, closely imbricated, their tips scarcely distinct.

**HAB.** East Florida, *Le Conte!*; New Orleans, *Dr. Ingalls!*

**OBS.** This may prove to be a distinct species from *C. dentatus*, but I have concluded to let it remain as a variety till

I have an opportunity of seeing more specimens of it. If its characters prove to be constant, it may take the name of *C. Lecontii*. My Florida specimen has longer spikelets, and more numerous florets than the plant sent to me by Dr. Ingalls; but in other respects there is no essential difference.

#### 26. CYPERUS LEPTOS, *Schultes*.

Culm triquetrous, fragile; umbel compound or decompound, many-rayed; involucre 2-leaved, one or both of the leaves shorter than the umbel; involucels 0; spikelets 3—5 in a loose head, linear-lanceolate, 12—20-flowered; scales ovate-lanceolate, acute, carinate; nut minute, (white) depressed, triangular, verrucose.

*C. leptos*, *Schult. mant.* 2. p. 105.

*C. gracilis*, *Muhl.! gram.* p. 18. (not of *R. Brown*;) *Elliott, sk.* 1, p. 68; *Spreng. syst.* 1. p. 220.

Root fibrous. Culm 1—2 feet high, tender and herbaceous, often clothed with several leafless sheaths at the base. Leaves radical, shorter than the culm. Umbel of 12—15 filiform rays, generally compound and often decompound. Involucre 2-leaved; the leaves very unequal. *Ochreæ* obliquely truncate. Spikelets 4—5 lines long, very slender, usually about 12-flowered, but sometimes bearing as many as 20 or more florets. Scales reddish brown, yellow on the side, membranaceous, indistinctly 3-nerved, slightly mucronate. Interior scales narrow. Stamens 3. Style 3-cleft a little more than one-third of the way down; the divisions recurved. Nut short and thick, shining, covered with minute warts.

HAB. In damp soils, North Carolina, to Alabama. Near Wilmington, North Carolina, *Mr. Curtis!*; South Carolina, *Elliott!*; Georgia, *Muhlenberg!*, *Le Conte!*; Middle Florida, *Dr. Chapman!*; Alabama, *Dr. Gates!*

OBS. Very near a *Cyperus* from Surinam, in my herbarium, and only to be distinguished by its more acute scales and shorter verrucose nut.

#### 27. CYPERUS INFLEXUS, *Muhl.*

Umbel 1—2-rayed, contracted or sessile; involucre 3-leaved, very long; spikelets collected into ovate heads, oblong-linear,

about 8-flowered; rachis laterally compressed, straight, winged; scales cuspidate, squarrose at the tip, strongly nerved; stamen 1; nut obovate, triquetrous.

*C. inflexus*, *Muhl. ! gram.* p. 16; *Torr. ! fl.* 1. p. 59; *Bigel. fl. Bost.* ed. 2. p. 18; *Beck ! Bot.* p. 421; *Gray ! Gram. & Cyp.* part 1. no. 68; *Darlingt. fl. Cest.* ed. 2. p. 16; *Link, jahrb.* 3. p. 88. (fide *Schult.*)

*C. uncinatus*, *Pursh, fl.* 1. p. 50, (not of *Poiret.*)

*C. Purshii*, *Ræm. & Schult, syst.* 2. p. 177.

*C. pygmaeus*, *Nutt. in Amer. Phil. Trans.* N. Ser. 5. p. 142, (not of *Cavan.* or *Rottb.*)

*Root* fibrous, biennial? *Culms* cespitose, 2—3 inches high, leafy at the base. *Leaves* linear, flat, equalling the culm. *Umbel* often sessile, the inflorescence then consisting of aggregated heads of spikelets; but more commonly there are 2 or 3 short rays. *Involucre* many times longer than the umbel. *Spikelets* in heads of 8—16 or more. *Scales* oblong, gradually attenuated into a remarkably squarrose or recurved point, of a greenish colour, not scarious on the margin. *Stamen* always solitary. *Style* 3-parted. *Nut* gray, triangular, with the sides a little convex.

**HAB.** Banks of rivers from latitude 52° N. to North Carolina. Lake Winnipeg, *Dr. Richardson!*; Lower Canada, *Mr. Benedict!*; banks of the Otter Creek, Vermont, *Dr. James!*; on the Connecticut river, in many places, *Prof. Hitchcock* and *Dr. Cooley!*; near Albany, *Mr. Tracy* and *Mr. H. H. Eaton!*; Cambridge, New York, *Dr. Stevenson!* on Lake Champlain, *Pursh!*; Pennsylvania, *Muhlenberg!*; Salem, North Carolina, *Schucinitz!*; Lincolnton, in the same state, *Mr. Curtis!*; Kentucky, *Dr. Short!*; Arkansas, *Dr. Pitcher* and *Mr. Nuttall!*; upper part of the Platte, *Dr. James!*

**OBS.** This species has a wider range than almost any other of the genus in North America. When dried, it exhales a powerful odour, scarcely to be distinguished from that of *Trifolium cœruleum*. It is nearly related to *C. aristatus*, *Rottb.* and several other species with subaristate squarrose scales, but it differs from all the Cyperi of this section in my herbarium, in its much more cespitose habit, fewer-flowered spikelets, attenuated scales and straight laterally compressed rachis.

28. *CYPERUS VIRENS*, Michx.

Culm acutely triangular; umbel compound; involucre many-leaved, very long; involucels nearly equalling the partial rays; spikelets ovate and ovate-lanceolate, much compressed, collected in dense globose heads, 12—20-flowered; rachis naked; scales oblong-lanceolate, acute; stamen 1; nut oblong, triquetrous, acute at each end.

*C. virens*, Michx.! *fl.* 1. p. 28; *Pursh*, *fl.* 1. p. 52; *Muhl.*! *gram.* p. 24; *Elliott*, *sk.* 1. p. 66; *Vahl*, *enum.* 2. p. 353; *Ræm. & Schult*, *syst.* 2. p. 210; *Spreng.* *syst.* 1. 226.

*C. glomeratus*, *Walt.* *fl. Car.* p. 70?

*Culm* 2—5 feet high, thick and firm, very acutely triquetrous, the angles sharply serrulate near the summit. *Leaves* nearly as long as the culm, 4—5 lines wide, rough on the edges and keel, the sides folded together. *Umbel* with 5—7 very unequal rays; partial rays nearly an inch long, each bearing a dense head of about 20 spikelets. *Ochrea* bifid. *Involucre* 6—8 times as long as the umbel; involucels foliaceous, about as long as the partial umbels. *Spikelets* varying from ovate to lanceolate, rather obtuse, 3—5 lines long, and a line and a half broad. *Scales* carinate, greenish. *Interior scales* entirely wanting. *Stamen* always solitary. *Style* 3-cleft. *Nut* acute at each end, dull yellow.

**HAB.** In swamps: confined to the Southern States. Wilmington, North Carolina, *Mr. Curtis!*; South Carolina, *Elliott!*; Georgia, *Muhlenberg!*; Middle Florida, *Dr. Chapman!*; New Orleans, *Dr. Ingalls!*

29. *CYPERUS VEGETUS*, Willd.?

Culm obtusely triangular, smooth on the angles; umbel compound; involucre 4-leaved; involucels bracteiform, shorter than the partial rays; spikelets ovate, much compressed, collected in dense globose heads, 9—16-flowered; rachis naked; scales oblong, acute, somewhat incurved; stamen 1; nut lanceolate, attenuated to a long point, tumid at the base.



*C. vegetus*, Willd., *sp.* 1. 283?; Vahl, *enum.* 2. p. 326?; Pursh, *fl.* 1. p. 51; Muhl. *! gram.* p. 25; Elliott, *sk.* 1. p. 65.

*Culm* 2—4 feet high, the lower part with the sides convex. *Leaves* 4 lines wide, scabrous on the margin towards the summit. *Umbel* about 5-rayed; the longer rays 2—3 inches in length; partial rays very short, each bearing a head of 10—15 spikelets. *Involucre* much longer than the umbel. *Ochreæ* bifid. *Spikelets* 3—4 lines long, and 2 lines wide, somewhat ancipital. *Scales* closely imbricated, greenish white, 3-nerved. *Stamens* always solitary. *Style* 3-cleft. *Nut* brown, very narrow, gradually tapering to a sharp point, the short pedicel swollen into a kind of bulb.

**HAB.** Ponds and ditches. Wilmington, North Carolina, Mr. Curtis;! South Carolina and Georgia; Elliott, Muhlenberg!; East Florida, Dr. Baldwin!

**OBS.** This species greatly resembles *C. virens*, but it can be distinguished by its smooth, obtusely triangular culm, and long-pointed nut with a remarkable cellular bulbous base. It is probable that our plant is a distinct species from the *C. vegetus* of Vahl and Willdenow.

††† *Spikelets* few, linear, loosely flowered, somewhat convex, inserted in an irregular manner towards the summit of the rays; nut nearly as long as the scales.

### 30. CYPERUS SCHWEINITZII.

*Culm* triquetrous, with scabrous angles; umbel simple; rays elongated; involucre 3—5-leaved; spikelets 6—7, alternate and approximate, somewhat appressed lanceolate, 6—8-flowered, with a setaceous bract at the base of each; scales ovate, acuminate, mucronate, keeled; rachis margined with the narrow interior scales; style 3-cleft to the base; nut triquetrous, ovate, acute.

*C. alterniflorus*, Schweinitz! in Long's 2nd. *exped. append.* 2. p. 381, (not of R. Brown.)



*Rhizoma* tuberous. *Culm* 8 inches to 2 feet high, slender, sharply triangular, the upper part rough on the angles. *Leaves* shorter than the culm, about one line wide. *Umbel* erect, 4—6 rayed; the rays very unequal; the longer ones nearly three inches in length. *Ochrea* truncate, entire. *Involucre* about twice the length of the leaves, scabrous on margin. *Spikelets* irregularly inserted on the summit of the rays in a somewhat imbricate manner, forming a loose oblong head or cluster; the florets distinct. *Rachis* laterally compressed. *Scales* concave, subcoriaceous, somewhat membranaceous on the broad margin, nerved, yellowish; with a short straight mucro a little below the apex. *Interior scales* very narrow, hyaline, firmly united with the rachis. *Stamens* 3. *Style* about as long as the nut; the segments slender, smooth. *Nut* light brown, slightly pointed, smooth, a little shorter than the scale.

HAB. Dry sand on the shore of Lake Ontario, near Greece, Monroe County, New York, *Dr. Samuel B. Bradley!*; on the Arkansas river, *Nuttall!*; on the river St. Peter? *Mr. Say!* (The locality not given in Mr. Schweinitz's list.)

OBS. This very distinct species differs from all the other North American Cyperi in the mode of aggregation of the spikelets. They are inserted on all sides of the common rachis, and stand nearly erect, instead of spreading horizontally, or being in part reflexed, as in most other species.

### 31. CYPERUS HOUGHTONII.

*Culm* somewhat obtusely triangular, smooth on the angles; umbel simple; the rays few, very short; involucre 2—3-leaved; spikelets oblong-linear, few, approximated towards the summit of the rays, 6—8-flowered; scales roundish-ovate, obtuse, slightly mucronate; rachis scarcely margined; nut short, ovate, obtuse.

*Rhizoma* tuberous, short. *Culm* about a span high, the sides somewhat convex. *Leaves* shorter than the culm, narrow, smooth on the margin. *Umbel* subsessile, or with rays scarcely half an inch long. *Ochrea* truncate. *Involucre* about 3 times as long as the umbel. *Spikelets* half an inch in length, somewhat spreading, without setaceous bracts at the base. *Scales* distinct, subcoriaceous, deeply concave, nerved,

scarious on the margin, yellowish on the sides; the keel green. *Stamens* 3. *Style* deeply three-parted. *Nut* nearly as long as the scale, light brown.

**HAB.** Lake of the Isles, North-West Territory, *Dr. Houghton!*

**OBS.** Resembles the spreading species in the disposition and structure of the spikelets, its large nut, and deeply 3-parted style; but the umbel is nearly sessile, the glumes much broader, and scarcely mucronate.

††† *Spikelets subterete or angular, 2—4-flowered, forming dense ovate or globose heads at the summit of the rays; the two lowest scales commonly sterile.*

### 32. CYPERUS OVULARIS.

*Culm* acutely triangular; umbel of 1—6 rays; involucre 3—4-leaved; heads globose, compact; spikelets 2—4-flowered, (only two of the florets fertile) radiated; rachis winged; scales ovate, rather obtuse, the two lowest short and empty; nut obovate, triangular.

*Mariscus ovularis*, *Vahl, enum.* 2. p. 374; *Pursh, fl.* 1. p. 58; *Torr.!* 1. p. 58(excl. syn. *Ell.*); *Beck! Bot.* p. 429; *Gray! Gram. & Cyp.* part 1. no. 76; *Darlingt.!* *fl. Cest.* ed. 2. p. 16; *Ræm. & Schult. syst.* 1. p. 244.

*Kyllingia ovularis*, *Michx.!* *fl.* 1. p. 29; *Pers. syn.* 1. p. 57.

*Scirpus echinatus*, *Linn. fl. Zeyl.* 38!; *Muhl.!* *gram.* p. 40.

*CYPERUS floribus capitatus*, &c. *Gron. fl. Virg.* 12.

**GRAMEN** *Cyperoides Americanum*, &c. *Pluk. alm.* 179. to 91. f. 4.

*Rhizoma* short, tuberous. *Culm* 1—2 feet high, slender, smooth on the angles. *Leaves* all radical, shorter than the culm, 2—3 lines wide. *Rays* of the umbel simple, 1—2 inches long, sometimes contracted, so that the heads appear to be almost sessile. *Ochreae* obtuse. *Involucre* many times longer than the umbel. *Heads* about half an inch in diameter, exactly globose, composed of 50—100 spikelets which radiate in every direction from the common rachis. *Spikelets* commonly about 3-flowered, short and thick, rather quadrangular than terete. *Scales* ap-

pressed, slightly mucronate, nerved, somewhat scarious on the margin; the two lowest much shorter than the others. *Interior scales* persistent, and forming a winged margin to the rachis. *Stamens* 3. *Style* 3-parted. *Nut* flattened on the back, dull grayish brown.

HAB. Boggy grounds, and also in dry soils; common. New York! to Florida! and west to Arkansas!—August to October.

*β. tenellus*; culms cespitose, slender, heads ovate, small. Gray, *Gram. & Cyp.* part 1. no. 77. (excl. syn.) *Culms* 4 inches to a foot high.

HAB. Sandy places in the pine barrens of New Jersey; common.

*γ. cylindricus*; heads oblong, or cylindrical.

*Mariscus cylindricus*, *Elliott, sk.* p. 74; *Schult. mant.* 2. p. 143.

*M. umbellatus*, *Pursh! fl.* 1. p. 59. (excl. syn.)

*M. neglectus*, *Schult. mant.* 2. p. 144 (founded on *Scirpus*, no. 31. (without a name) *Muhl. gram.* p. 46.)

*Culms* 2 feet or more in height. *Umbel* 5—7 rayed, the rays somewhat erect. *Heads* or spikes varying from ovate to cylindrical, compact. *Spikelets* 3—4-flowered. *Scales* and *nut* as in the preceding variety.

HAB. Sandy soils; sometimes in wet situations. Common in the Southern States, as far south as Louisiana.

OBS. I have removed the *Mariscus ovularis* of Vahl to this genus, because I cannot discover it to possess characters sufficient to distinguish it from many undoubted species of *Cyperus*. Indeed all the species of *Mariscus* which have fallen under my observation (with the exception, perhaps, of *M. retrofractus*) resemble, in the structure of their flowers, the plant above described. The 2 valves of the common calyx of *Mariscus* can only be regarded as short abortive scales, such as occur in *Cyperus flavescens*, *dentatus*, *articulatus*, and many others. Little dependence can be placed on the number of florets in the spikelet, as there are six and even eight in the *M. dilutus* of N. ab Esenbeck. R. Brown (*prodr.* 1. p. 218) describes the spikelet as *roundish* (spicula teretiüscula), but this character exists in

*Cyperus Michauxianus, torosus, pennatus, &c.* This profound botanist remarks, that *Mariscus* differs from *Cyperus* only in its few-flowered spikelet, but he does not seem inclined to unite the two genera.\* Nees has more recently† endeavoured to characterize *Mariscus* by the deciduous spikelet, separating at a kind of articulation, immediately above the two lowest scales, which remaining attached to the rachis, give it a chaffy appearance.‡ But the same kind of separation takes place in *C. strigosus*, and probably in many other species.

§ 3. Interior scales herbaceous, free.—PAPYRUS.

### 33. CYPERUS ERYTHORRHIZOS, Muhl.

Umbel compound, many-rayed; involucre 4—5-leaved, very long; involucels setaceous, shorter than the partial rays; spikes cylindrical-oblong, nearly sessile; spikelets very numerous, spreading horizontally, terete-compressed, many-flowered; scales lanceolate, mucronate; interior scales lanceolate, acute, free their whole length.

*C. erythrorrhizos*, Muhl.! *gram.* p. 20; *Schult. mant.* 2. p. 120.

*C. tenuiflorus*, Elliott, *sk.* 1. p. 70. (not of Rottb.)

*Culm* 2—3 feet high, obtusely triangular, very smooth. *Leaves* shorter than the culm, 2—4 lines wide. *Umbel* about 7-rayed; the rays 3—4 inches long, each bearing 3—4 partial rays, which are crowded with spikelets nearly their whole length. *Ochrea* obliquely truncate, entire. *Involucre* three times as long as the umbel. *Spikelets* half an inch long, linear, 10—18-flowered. *Scales* closely imbricated, chestnut-coloured, shining, without nerves: *Interior scales* cuspidate, one third the length of the

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\* "Limites itaque inter *Cyperum*, *Mariscum* et *Kyillingam* omninò artificiales, at genera minimè conjungenda sint." *R. Brown, prodr. l. c.*

† *Synops. gen. Cyp. in Linnæa*, vol. 9, and in *Wight's contrib.* pp. 69 and 89.

‡ "Differt a *Cypero* spiculis a squamis inferioribus articulo solubilibus, rachi residua post lapsum spicularum quasi paleacea remanente." *N. ab E.*

exterior ones, free their whole length in the mature spikelet, and resembling a 2-valved perianth. *Stamens* 3 (2 in the superior florets). *Style* 3-cleft one third of its length; the segments revolute. *Nut* ovate, acute, half as long as the scale, compressed-triangular, flattened on the back, smooth and shining.

**HAB.** Wet places, particularly on the banks of rivers. Pennsylvania, North Carolina and Georgia, *Muhlenberg!*; Delaware, *Dr. Baldwin!*; Middle Florida, *Dr. Chapman!*; New Orleans, *Dr. Ingalls!*

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The following species of *Cyperus*, recorded by Pursh and other writers on North American Botany, are omitted, as they either do not belong to our Flora, or cannot be identified by the imperfect descriptions of the authors who have noticed them.

1. *C. AUTUMNALIS*, *Pursh, fl. 1. p. 51.* (excl. syn.)

Along the margins of ponds and ditches. Virginia and Carolina.—*Pursh.*

This species was founded by Vahl on the *Scirpus autumnalis*, *Rottb.* and *Linn.*, which is a species of *Trichostylis* (*Scirpus L.*) The *Cyperus complanatus*, *Willd.* and *Scirp. foliis pusillus autumnalis, &c. Clayt. 772*, which Vahl refers to his *C. autumnalis*, likewise belong to a species of *Trichostylis* (*T. complanata, N. ab E.*) The *C. juncoides* of Lamk., another of Vahl's synonyms, is an East Indian species. Pursh's plant seems to be *C. articulatus*.

2. *C. TENUIFLORUS*, *Pursh, fl. 1. p. 52.* (not of *Rottb., Vahl, Elliott,* and others.)

In wet fields in Carolina and Georgia, *Pursh.*

Pursh has probably confounded some other species with the *C. tenuiflorus* of Rottbell.

3. *C. FILICINUS*. Spikelets linear-lanceolate, somewhat remote, loosely imbricated; involucre 3-leaved, longer than the umbel, and, as also the leaves, lax. *Culm* half a foot high, filiform, acutely angular, as long as the leaves, lax. Leaflets of the involucre resembling the leaves; involucels wanting. *Ochreae* truncate. *Umbel* somewhat compound, 3—4-rayed; rays an inch or more in length; partial umbels 3-rayed; the rays very short. *Spikelets* 4—8, scarcely half an inch long, 12-flowered,



flat, widely spreading, loosely imbricated, yellow-ferruginous, shining. Scales oblong. Vahl, *enum.* 2. p. 332; Pursh, *fl.* 1. p. 52?

In swamps of Virginia and North Carolina, Vahl, Pursh.—As the characters of the fruit are not given by Vahl, it is impossible to identify this species, or even to point out the section of the genus to which it belongs. I am inclined, however, to believe, that it is one of the *Pycneus* group, and probably *C. diandrus*. Pursh's imperfect specimen in Lambert's herbarium seems to be *C. Nuttallii*. Nees, in the catalogue of Cyperi examined by him (*Linnæa*, l. c.) places *C. filicinus* in the section *Aristati*, but his plant must be distinct from the species above described.

4. *C. ODORATUS*, Linn. ? ; Pursh, *fl.* 1. p. 52, (excl. syn.)

"On the banks of rivers, Pennsylvania to Florida, rare," Pursh.—Linnæus, and Willdenow, under *C. odoratus*, refer to *Gron. fl. Virg.* p. 131, and this is probably the reason why Pursh described this species in his work. It does not appear, however, that the true *C. odoratus* has been found in North America.

5. *C. DISTANS*, Linn. ? ; Pursh, *fl.* 1. p. 53. (excl. syn.)

"In sandy wet woods; Carolina and Georgia," Pursh.—Pursh is the only writer on North American Botany who has introduced this species into our Flora. Can his plant be *C. stenolepis* of this Monograph?

6. *C. FUSCUS*, L.—Sprengel, in his *Systema Vegetabilium*, (1. p. 223.) states that this species inhabits North America, but I consider it a very doubtful native.

7. *C. BRIZÆUS*, Richard ? ; Pursh, *fl.* 1. p. 51.

In swamps of Carolina, Pursh.

The *C. brizæus* of Richard and Vahl, a native of Cayenne and Portorico, seems to be a very distinct plant from Pursh's, which, I am inclined to think, is merely a variety of *C. diandrus*.

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Since the preceding matter was written and mostly printed, I have received from my friend G. A. W. Arnott, Esq. an extract from a MS. of N. ab Esenbeck on some N. American Cyperaceæ, particularly those collected by Drummond in his last expeditions. Among the species found by Drummond near St. Louis, Nees notices *C. Elliottianus*, (my *C. diandrus*?), *C. filicinus* (probably not Vahl's plant), *C. repens*, and *C. Kyllingæoides*, which last, as Mr. Arnott remarks, must be *C. filiculmis*, and not the East Indian *C. Killingæoides*.

†† *Spikelets about one-flowered.*

### 3. MARISCUS, *Vahl.*

**SPIKELETS** subterete, distichously imbricated, rarely bearing more than one fertile floret. **RACHIS** margined with the adnate persistent interior scales. **STAMENS** 3. **STYLE** 3-cleft. **NUT** triangular.—Habit of *Cyperus*; spikelets subulate, mostly collected in dense ovate heads; common rachis appearing chaffy from the persistence of the lower scales of the spikelets.

*Mariscus*, *Vahl, enum.* 2. p. 372 (in part); *R. Brown, prodr.* 1. p. 218; *Ræm. & Schult. gen.* 190; *Lestib. ess.* p. 31, no. 24; *N. ab Esenb. in Wight's contrib.* p. 69, and in *Linnæa*, 9. p. 286; *Nutt. gen.* 1. p. 34.

Species of *Cyperus*, and *Kyllingia*, *Linn.*, *Vahl*, *Willd. &c.*  
Species of *Scirpus*, *Linn. &c.*

The genus *Mariscus*, as here characterized, includes only those species of *Vahl*, *N. ab Esenbeck* and others, which bear 1—2-flowered spikelets; such as *M. cyperinus*, *M. umbellatus*, and *M. retrofractus*. It is so nearly related to *Cyperus*, that it might, perhaps, form a section of that genus.

#### MARISCUS RETROFRACTUS, *Vahl.*

Umbel simple, rays numerous, elongated; heads obovate, retrorsely imbricate; spikelets subulate, 1-flowered; the two lowest scales short, terminal one very narrow, involute.

*M. retrofractus*, *Vahl, enum.* 2. p. 373; *Pursh, fl.* 1. p. 58; *Elliott, sk.* 1. p. 74; *Torr.! fl.* 1. p. 57; *Beck! bot.* p. 429; *Ræm. & Schult, syst.* 2. p. 245.

*Scirpus retrofractus*, *Linn. sp.* 74; *Willd. sp.* 1. p. 304; *Muhl.! gram.* p. 40.

*CYPERI* genus indianum, &c. *Pluk. alm.* 179. t. 91. f. 4.

Root fibrous. *Culm* tumid at the base, 2—3 feet high, nearly leafless, pubescent, obtusely triangular, the sides very convex. *Leaves* mostly radical, half the length of the culm, 3—4 lines wide, flat, pubescent and somewhat glaucous. *Rays* 6—10, unequal, somewhat terete, 2—6 inches long. *Ochreæ* bicuspidate. *Involucre* many-leaved; 3 of the leaves broader and longer than the others, all of them generally shorter than the umbel. *Heads* nearly an inch long, and half an inch in diameter, very obtuse, obovate, or rather turbinate, the base acute. *Spikelets* very slender, and numerous, (about 100); uppermost ones spreading horizontally, the rest bent backwards against the peduncle. *Scales* generally 5 in each spikelet, striate; the two lowest (calyx, *Vahl*.) short, ovate, empty; the fourth lanceolate, fertile; the uppermost one subulate. *Style* 3-cleft. *Nut* linear, triquetrous, minutely papillose.

HAB. Sandy soils, and sometimes in wet places; New York to Florida. In the pine barrens of New Jersey!; not common; Pennsylvania, *Muhlenberg!*; North Carolina, *Mr. Curtis!*; South Carolina, and Georgia, *Elliott, Dr. Baldwin!*; Middle Florida, *Dr. Chapman!*; Alabama, *Dr. Gates!*; Arkansas, *Nuttall.*

OBS. The spikelets, in their earliest state are merely spreading, but immediately after flowering they bend backward and are appressed to the common rachis, as in *M. umbellatus* of the East Indies.

#### KYLLINGIA, *Rottb.*

SPIKELETS compressed, the scales distichously imbricated, usually bearing but one fertile flower. SCALES generally 4; the 2 lowest short and empty (rarely wanting), the others larger, for the most part only the lower one fertile. STAMENS 1—3. STYLE elongated, 2-cleft. NUT lenticular.—Culms triangular; spikelets collected in roundish sessile heads, which are solitary or aggregated; involucre mostly 3-leaved, foliaceous.

*Kyllingia*, *Linn.*; *Lam. ill.* t. 38; *Juss. gen.* p. 27; *Nutt. gen.* 1. p. 30; *R. Brown, prodr.* 1. p. 218; *Rœm. & Schult. gen.* 188; *Kunth, syn.* 1. p. 143; *N. ab Esenb. in Wight's contrib.* p. 69, and in *Linnæa.* 9. p. 286.

Species of *Mariscus*, *Lestib.*

*Hedychloa*, *Rafin. annals of nature*, (1820) p. 16.

*Thryocephalum*, *Forst. gen.* 65.

This genus differs from *Mariscus* in the sessile head, compressed spikelets, lenticular nut, and bifid style.\* Linnæan botanists generally regard the 2 inferior scales of the spikelet as a 2-valved calyx, and the other two scales as constituting a corolla. *Hedychloa*, as characterized by Rafinesque, agrees in all respects with the ordinary species of *Kyllingia*.

#### KYLLINGIA PUMILA, *Michx.*

Heads 1—3; spikelets 1-flowered, diandrous; scales 3—4, the lowest very minute, the two upper ovate, acuminate, smooth on the sides, scabrous on the keel; nut obovate; involucre 3-leaved, very long; leaves linear.

*K. pumila*, *Michx. ! fl.* 1. p. 28; *Pursh, fl.* 1. p. 46; *Elliott, sk.* 1. p. 55; *Muhl. ! gram.* p. 4; *Vahl, enum.* 2. p. 380; *Ræm. & Schult.* 2. p. 237.

*Hedychloa fragrans*, *Rafin. ! ann. nat.* (1820) p. 16.

*Root* fibrous. *Culms* cespitose, 2—12 inches high, triquetrous, slender, smooth. *Leaves* generally shorter, but sometimes as long as the culm, somewhat glaucous. *Heads* one-third of an inch in diameter, mostly solitary, but often 2—3 closely aggregated, varying in form from globose to oblong. *Spikelets* ovate; one or two of lowest scales very small (wanting, *Elliott*); the two upper slightly mucronate, 3-nerved on each side. *Rachis* terete, tuberculated with the short pedicels of the flowers. *Stamens* always 2. *Style* longer than the ovary, 2-cleft nearly half-way down. *Nut* much compressed, obtuse, fulvous.

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\* "Transitus ab hoc genere ad Mariscos, præcipuè ad unifloros, perfacilis; et ex contemplatione specierum flosculo secundo instructarum vera natura partium in unifloris luculenter apparet; in his enim valvula interior (quæ sæpiùs paulò major) uti rachis spiculæ abortivæ considerari debet, e cujus basi v. medio flosculus secundus ejusve rudimentum ortum ducit."—*R. Brown*, l. c.



**HAB.** Wet places, particularly along rivers; North Carolina to Florida. Lincolnton, N. C., *Mr. Curtis!*; Kentucky, *Dr. Short* and *Dr. Peter!*; St. Louis and New Orleans, *Drummond!*; South Carolina and Georgia, *Elliott, Le Conte!*

**OBS.** Mr. Elliott states that the valves of the "calyx" (minute lowest scales) are wanting, but I have generally been able to see at least one of them. This little scale, however, Nees ab Esenbeck (in a MS. account of some N. American Cyperaceæ already alluded to) is inclined to regard rather as a bracteole than one of the scales of the spikelet, as it appeared to stand somewhat remote from the rest; but in the specimens which I examined it was in close contact with the others.

## 2. KYLLINGIA MONOCEPHALA, *Linn.*

Head simple, globose, compact; spikelets 1-flowered, monandrous, ovate, acuminate; the two superior scales striate, nearly equal, smooth on the sides, serrulate, ciliate on the keel; the two inferior minute; nut somewhat orbicular; involucre 3-leaved, one of the leaves erect; the others horizontal.

*K. monocephala*, *Vahl, enum.* 2. p. 379; *Elliott, sk.* 1. p. 54; *Muhl.!* *gram.* p. 3 (in part); *Torr.!* *fl.* 1. p. 43.

*Rhizoma* creeping. *Culm* about a foot high, triquetrous, slender, smooth. *Leaves* much shorter than the culm, one line wide, scabrous on the margin towards the summit, abruptly pointed. *Head* generally inclining to one side, always solitary. *Involucre* sometimes 4-leaved, one of the leaves very short. *Spikelets* very numerous, spreading horizontally. *Scales* 4; the 2 lowest very small and difficult to find, one of them (the inferior) ovate, the other lanceolate; the 2 superior scales much larger, spreading and somewhat recurved at the point, membranaceous, 3-nerved on each side; the keel green and ciliated with a few minute spiculæ. *Stamen* always solitary. *Style* as long as the nut, 2-cleft. *Nut* much compressed, the breadth nearly equalling the length, very obtuse, fulvous.

**HAB.** Low moist places; near Darien, on the Alatamaha, Georgia, *Dr. Baldwin!*; and Sunbury in the same state, *L. Le Conte, Esq.!*; Carolina and New Jersey, *Muhlenberg.*



This species is rare in the United States. It is probably distinct from the *K. monocephala*, Linn. a native of the East Indies and South America, that species having diandrous flowers and an obovate nut. Our plant is perhaps the *K. cruciformis*, Schrad. (in Schult. mant. 2. p. 137; N. ab Esenb. in Wight's contrib. p. 91.), with which it agrees in its monandrous flowers; but the nut is rather orbicular than "obovate." To the *K. pumila*, it has a strong resemblance, but it is generally a much taller plant, the leaves are firmer and more abruptly pointed, the head solitary, and it differs also in the flowers.

The localities quoted from Muhlenberg are rather doubtful; as the specimens in his herbarium are mixed with another species of *Kyllingia*, and also with *Scirpus subsquarrosus*.

### 3. KILLINGIA SESQUIFLORA:

Heads 3, cylindrical-oblong, the intermediate one largest; spikelets ovate-oblong, diandrous, with one perfect, and often one imperfect floret; scales 4—6; the two lowest minute; the third and fourth nearly equal, ovate-lanceolate, acute, membranaceous, 5-nerved, smooth on the keel; the fifth imperfect, concealed in the fourth; style deeply 2-cleft; nut obovate; involucre 4—5-leaved, and with the leaves, broadly linear.

Root creeping. Culm 8—12 inches high; obtusely triangular, smooth. Leaves nearly as tall as the culm, 2—3 lines wide. Heads always 3; the middle one three-fourths of an inch long; the others shorter. Involucre of 4 long leaves and a shorter one. Spikelets spreading, of a whitish colour. Lowest scales closely appressed, one of them ovate, the other lanceolate; the third and fourth whitish, with a green keel. Style one-third longer than the ovary, cleft about two-thirds of the way down. Nut much compressed, very obtuse, fulvous.

HAB. Damp rich soils, Middle Florida, *Dr. Chapman!*

OBS. This species resembles *K. triceps*, Linn., but differs in its longer heads, somewhat 2-flowered spikelets, smooth scales, and obovate nuts. It is distinguished at once from the other North American species of the genus, by the large whitish heads, broad leaves, and thick culm. The whole plant has a strong balsamic odour.

## TRIBE II. HYPOLYTRÆÆ.

FLOWERS perfect. SCALES (bractææ,) of the spike imbricated on all sides. SPIKELETS several-flowered, composed of many distichous scales (squamulæ); or one-flowered with few scales placed in a valvate or circular order, and no perigynium; or one-flowered with a petaloid perigynium (perianth), and no scales.

5. LIPOCARPHA, *R. Brown.*

SCALES of the spike imbricated on all sides, coriaceous. SPIKELETS oblong, composed of two squamulæ (perianthium, *N. ab E.*) parallel with the scale; one of them fertile, one-flowered, the other abortive. PERIGYNIUM wanting.—Habit of *Kyllingia*; heads compact, clustered.

*Lipocarpha*, *R. Brown*,\* fide *N. ab Esenb. in Wight's contrib. p. 70, and in Linnæa, p. 287.*

Species of *Hypolytrum*, *Richard, Kunth, Vahl*, and others.

Species of *Kyllingia*, *Michaux.*

The genus *Lipocarpha* differs from *Hypolytrum* chiefly in the position of the squamulæ of the spikelet. In the latter, they are *contrary* to the scale, in the former they are inserted *parallel* with the scale, one of them (the inferior,) being placed immediately behind the nut, and the other between the nut and the scale.

## LIPOCARPHA MACULATA.

Spikes 3—5, ovate, acute; scales cuneiform-rhombic, acute, narrowed at the base, spotted; spikelet shorter than the scale; squamulæ lanceolate, the interior chartaceous; the exterior membranaceous, convolute; stamen solitary; style 2-parted; nut obscurely 3-sided; leaves narrow; involucre somewhat two-leaved; culm triangular.

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\* I am unable to quote the work in which Mr. Brown published this genus.

*Kyllingia maculata*, Michx.! fl. 1. p. 29; Pursh, fl. 1. p. 47; Elliott, sk. p. 55.

*Mariscus maculatus*, Ræm. & Schult. syst. 2. p. 243.

Root fibrous. Culms 3—8 inches high, cespitose, smooth. Leaves scarcely a line wide, shorter than the culm, often involute. Involucre of 2 long leaves, and one very short one. Spikes usually 3, a little larger than a pepper-corn, closely aggregated. Scales very numerous, rather loosely imbricated, concealing the spikelets, persistent, marked with minute oblong red dots, particularly on the inner side; midrib green. Spikelet composed of 2 squamulæ; the interior obtuse, often dotted like the scales; the exterior (next the scale) very thin and delicate. Stamen always solitary. Style slender, longer than the nut. Nut 3-sided, but the sides and angles are so rounded that it appears nearly cylindrical, contracted into a neck near the base, yellow.

HAB. "Wet springy land, Georgia; common in the vicinity of Savannah," Dr. Baldwin!; Middle Florida, Dr. Chapman!

OBS. To the *L. Humboldtiana* of Nees ab Esenbeck (*Hypocytrium argenteum*, Kunth, syn. 1. p. 149, not of Vahl,) this species bears a strong resemblance, but it differs in the scales, which are acute but not acuminate, and in the style which is bifid, not 3-cleft. Michaux states that our plant resembles *Kyllingia triceps*, but it undoubtedly belongs to the present genus, while *K. triceps* is a true *Kyllingia*. Muhlenberg's *K. triceps* appears to be merely *K. pumila*.

## 6. FUIRENA, Rottb.

SCALES of the spike imbricated on all sides, one-flowered, awned. PERIGYNIUM single or double; the exterior (calyx), when present; consisting of 3 bristles, the interior (corolla) of 3 unguiculate petaloid laminæ, alternating with the bristles. STAMENS 3. STYLE 3-cleft. NUT triquetrous, pointed with the remains of the style, abruptly contracted into a pedicel at the base.—Culms mostly simple, erect, articulated, angular, leafy (rarely with nearly naked sheaths); spikes subumbellate, axillary and terminal, mostly squarrose; external lamina of the scale produced into a short awn or bristle.

*Fuirena*, Rottb. gram. p. 70. t. 19; Juss. gen. p. 26; Lamk. ill. 1. p. 150. t. 39; R. Brown, prodr. 1. p. 220; Kunth, syn.

1. p. 150; *Lestib. ess. fam. Cyp.* p. 44. no. 59; *N. ab Esenb.* in *Wight's contrib.* pp. 70 & 93, & in *Linnæa*, 9. p. 288; *Michx. fl.* 1. p. 37; *Nutt. gen.* 1. p. 37.

*Vaginaria*, *Rich. in Pers. syn.* 1. p. 70; *Nutt. gen.* 1. p. 37.

1. *FUIRENA SQUARROSA*, *Michx.*

Culm obtusely 3-angled, sulcate; leaves ciliate; sheaths hairy; spikes clustered (3—6—12), ovate; awn as long as the scale; petals cordate or ovate.

*α.* Nut twice the length of its stipe; bristles shorter than the claws of the petals, nearly smooth.

*F. squarrosa*, *Michx. fl.* p. 37; *Vahl, enum.* 2. p. 286; *Pursh, fl.* 1. p. 58; *Elliott, sk.* 1. p. 53. t. 2. f. 1; *Muhl.! gram.* p. 50, (in part); *Torr.; fl.* 1. p. 67; *Clayt. fl. Virg.* 173; *Curt.! cat. pl. Wilmingt.* no. 56; *Ræm. & Schult. syst.* 2. p. 234; *Spreng. syst.* 1. p. 236.

Culm 1—2 feet high, leafy. Leaves 6 inches long, 2—4 lines broad, flat, pubescent on both sides and distinctly ciliate on the margin; upper ones smoothish; sheathes sulcate. *Ligula* membranaceous, brown, ciliate. *Umbels* simple or compound, one or two, supported on peduncles which grow from the upper sheaths; the terminal one 2—3-rayed, and composed of 6—20 spikes, subtended by an involucre of 2 or 3 very short narrow leaves. *Spikes* half an inch in length, ovate-oblong, closely aggregated into heads at the summit of the short rays. *Scales* ovate, hairy, obtuse or emarginate, marked with three strong approximated ribs, which uniting towards the summit, form the (upwardly scabrous) awn. *Bristles* of the perianth, (calyx), shorter than the claw of the petals, flat, incurved, nearly smooth. *Petals* with claws longer than the lamina, mucronate, but not awned; lamina of a spongy texture throughout, the breadth nearly equal to the length. *Style* deeply 3-cleft; the segments glandularly pubescent. *Nut* very acutely and equally triangular, with flat sides, distinctly pedicellate.

**HAB.** Swamps; North Carolina to Florida. Wilmington, N. C., *Mr. Curtis!*; South Carolina, *Elliott!*; Georgia, *Le Conte* and *Dr. Baldwin!*; Alabama, *Dr. Gates!*; New Orleans, *T. Drummond!*



β. Nut on a very short stipe; bristles as long as the claws of the petals, somewhat denticulate; petals cordate, with a short acuminate point.

*Culm* 2 feet high, slender; sheaths very hairy. *Umbels* composed of 5—9 spikes. *Awns* of the scales nearly straight.

HAB. Southern States, *Delile!*

γ. Nut twice the length of its stipe; petals ovate, cuspidate, and terminating in a short bristle; the claw shorter than the retrorsely scabrous bristle; leaves and sheaths hairy.

*F. squarrosa*, *Gray!* *Gram. & Cyp.* part 1. 78; *Beck bot.* p. 129.

*Culm* 12—18 inches high, slender. *Leaves* and sheaths hispidly hairy. *Spikes* mostly terminal, 6—12 in an irregular umbel or cluster. *Petals* rounded at the base, the summit attenuated into a long slender point or short bristle.

HAB. Bogs and swamps. New Jersey, particularly in the pine barren region, and along the sea coast!—September.

δ. (*pumila*.) Nut somewhat obovate, gradually attenuated at the base; petals ovate-lanceolate, narrow at each end; bristles longer than the nut, retrorsely scabrous; spikes 2—6, mostly terminal, sessile; leaves smoothish.

*F. squarrosa*, β. *pumila*, *Torr.! fl.* 1. p. 68.

*F. pumila*, *Spreng. syst.* 1. p. 237; *Schult. mant.* 3. p. 546.

*F. Torreyana*, *Beck! bot.* p. 429.

*Culm* 3—6 inches high, pubescent above; lower sheaths pubescent; throat hairy. *Involucre* longer than the spikes; 1—2 leaved. *Spikes* ovate, thick. *Scales* ovate, obtuse, hairy, terminated by a recurved awn nearly the length of the lamina. *Bristles* straight, very scabrous. *Petals* much attenuated at the base, obscurely 3-nerved, the summit tapering into a long cusp, or short bristle. *Nut* broadest near the top abruptly acuminate.

HAB. Sandy wet places. Near Babylon, Long Island, and in the pine barrens of New Jersey!; Tewksbury pond, near Boston, *B. D. Greene, Esq.!*—August—September.

ε. (*aristulata*.) Nut on a short stipe, dilated in the middle;



petals ovate-oblong, obtuse, with a short scabrous awn below the summit, 3-nerved; the upper portion tumid; bristles nearly as long as the nut.

*F. squarrosa*, Torr!. *Rocky mount. plants, in Ann. Lyc. N. York.* 2. p. 252.

Culm about a span high, rather slender, *Leaves* one line broad, flat, somewhat hairy. *Involucre* 1-leaved. *Spikes* about 3, sessile, ovate. *Scales* ovate, obtuse, hairy; awn longer than the lamina. *Bristles* stiff, a little incurved, two thirds the length of the petals, retrorsely scabrous. *Petals* subcordate at the base; lower part of the lamina compressed, the upper part spongy, submarginate, bearing a distinct, abrupt, retrorsely scabrous awn a short distance below the summit. *Nut* abruptly contracted at the base.

HAB. Arkansas? Collected by Dr. James in Long's Expedition to the Rocky Mountains.

Obs. The five forms of *Fuirena* here described are, for the present, referred to *F. squarrosa*, although it is probable they include several distinct species. I have not yet determined to my entire satisfaction what degree of dependence is to be placed on the shape and relative length of the floral envelopes in this genus. If they are liable to variation, we probably have, besides the *F. scirpoides*, but one other species of the genus in the United States.

## 2. *FUIRENA HISPIDA*, Elliott.

“Leaves long, and with the sheaths very hispid; culm hispid above; heads many (5—8) clustered; valves of the corolla ovate, mucronate.”

*F. hispida*, Elliott! *sk.* 1. p. 579.

“Culm 1—2 feet high, erect and decumbent, smooth along the lower joints. *Leaves* narrow, tapering, 4—8 inches long, many-nerved, hispid, particularly on the lower surface. *Scales* oval, the outer ones hispid, the inner ones finely pubescent; awn long, expanding. *Stamens* 3, scarcely longer than the corolla. *Styles* twice as long as the stamens.”

HAB. Borders of ponds in the middle districts of Georgia and Carolina, Elliott!, Dr. Boykin.—July—October.

OBS. I have specimens of this plant which were sent to me by Mr. Elliott, but the inflorescence is not sufficiently advanced for comparing it with the preceding species and varieties. It appears, however, to be almost identical with my variety  $\beta$ .

### 3. FUIRENA SCIRPOIDEA, Mich.

Rhizoma creeping; culm furnished with leafless, subinflated, mucronate sheaths; spikes (1—6,) ovate, terminal; scales ovate, with a short appressed mucro; bristles slender, scabrous, longer than the claws of the ovate, somewhat obtuse petals.

*Fuirena scirpoidea*, Michx.! *fl.* 1. p. 38. t. 7; *Elliott, sk.* 1. p. 54; *Muhl.! gram.* p. 51; *Vahl, enum.* p. 387; *Ræm. & Schult.* 2. p. 235; *Spreng. syst.* 1. p. 237.

*Vaginaria Richardi*, *Pers. syn.* 1. p. 70; *Pursh, fl.* p. 58, *Nutt. gen.* 1. p. 37.

*Rhizoma* creeping, scaly. *Culm* a foot and a half high, smooth and subterete swollen at the joints. *Sheaths* remote, never bearing leaves, but merely a short subulate point. *Spikes* all terminal, often solitary, but sometimes as many as six, 4—5 lines long, pubescent. *Scales* 3-nerved, the nerves confluent at the summit, and terminating in a short straight point. *Bristles* straight, retrorsely scabrous. *Petals* with the claw longer than the lamina, 3-nerved, purplish, thin and subdiaphanous except near the summit, which is cellular and tumid. *Stamens* 3, filaments much longer than the petals. *Style* compressed, dilated upward, 3-parted, the divisions glandular-pubescent. *Nut* acutely triangular, whitish, stipitate, acuminate with the remains of the style.

HAB. Swamps which are dry in summer. Florida, *Michaux!*; Georgia, *Dr. Baldwin!* & *Le Conte!*; New Orleans, *Dr. Ingalls!*

OBS. This interesting plant, as Michaux remarks, has the characters of a *Fuirena*, but its habit is different from that of the other species. In the structure of the flowers, it agrees minutely with *F. squarrosa*, especially the variety which I have called *aristulata* ( $\varepsilon$ .) In one instance, I found the style 3-cleft with one of the divisions again 3-parted.

## TRIBE III. SCIRPEÆ.

FLOWERS perfect. SCALES of the spike imbricated on all sides (rarely bi-trifarious). PERIGYNIUM composed of several bristles, hairs, or linear scales, (sometimes cyathiform and membranaceous) or wanting.

## A. Scales of the spike bi-trifarious.

## 7. ABILDGAARDIA, Vahl.

SPIKES with the scales bifariously imbricated, (by the torsion of the rachis trifarious, *N. ab E.*) PERIGYNIUM 0. STYLE 3-cleft, the base bulbous and articulated to the triquetrous nut. —Culm angular, leafy at the base; spikes solitary, clustered, or umbellate.

Abildgaardia, *Vahl, enum.* 2. p. 296; *R. Brown, prodr.* 1. p. 229; *Lestib. ess. fam. Cyp.* p. 32, no. 26; *N. ab Esenb. in Wight's contrib.* p. 70, & in *Linnaea.* 9. p. 289.

Species of *Cyperus*, *Linn.*, *Kunth.*

*Cyperus* §. *Iria*, *Rich. in Pers. syn.* 1. p. 65.

ABILDGAARDIA CYPEROIDES, *N. ab E. & Meyen.*

“Culm triquetrous, sulcate on one side; leaves linear, obtuse, scabrous on the margin; umbel somewhat decomposed, the rays pubescent; involucre and involucels shorter than the common and partial umbels; spikelets somewhat 2-flowered.”

*A. cyperoides*, *N. ab E. & Meyen in Acad. Nat. Cur.* 16. *supp.* (fide *N. ab E. in Wight's contrib.* p. 95.)

*Gussonea cyperoides*, *Presl. in rel. Haenk.* 3. p. 183, t. 33, (fide *N. ab E.*)

HAB. Monte Rey in California, *Hænke.*

OBS. This species has not come under my observation. It is said by Nees to be allied to his *A. Eragrostis*, & *A. fusca*, described in *Wight's Contributions*, l. c.

S. CHÆTOCYPERUS, *N. ab Esenb.*

SPIKE compressed, few-flowered; the scales somewhat distichously imbricated. PERIGYNIUM of 3—6 cartilaginous retrorsely-hispid bristles. STAMENS 3. STYLE 3-cleft; the base bulbous and articulated to the ovary, persistent. NUT triangular, crowned with the bulb of the style. Culm slender, often procumbent; spikes terminal, solitary, often proliferous.

*Chætocyperus, N. ab Esenb. in Wight's contrib.* pp. 70 and 95, & *in Linnæa*, 9. p. 289.

Species of *Scirpus*, *Vahl, Kunth, & Lam.*

Species of *Eleocharis*, *Rœm. & Schult.*

Species of *Cyperus*, *Retz., Willd.*

## CHÆTOCYPERUS BALDWINII.

Spikes ovate, much compressed, proliferous and rooting at the base; scales lanceolate-linear, somewhat obtuse, loose; nut smooth, with prominent angles; bristles 3—4, half the length of the nut.

*Scirpus sarmentosus, Baldw. MS. & herb!*

Root fibrous, annual. Culms 5—6 inches long, cespitose, of the thickness of a strong bristle, subterete, sulcate, prostrate and rooting at the extremity. Spikes 3—8-flowered, manifestly distichous, about one third of an inch long. Scales somewhat spreading, smooth, slightly keeled. Stamens 3; filaments long and slender; anthers oblong. Ovary linear-oblong. Bristles scarcely half the length of the nut, and appressed to its sides. Style deeply 3-parted; segments glandularly pubescent. Nut oblong, much smaller than the scale, shining, distinctly triangular, with the angles prominent and somewhat margined. Tubercle small, white, set close on the summit of the nut, the base spreading out into three lobes which correspond with the angles of the nut; the apex pointed with a short beak.

HAB. Low wet places. Near St. Mary's, Georgia, *Dr. Baldwin!*—Flowers from July to September.

OBS. This interesting plant is nearly allied to *C. setaceus, N. ab E. in Linnæa*, 9. p. 289, (*C. Linnocharis in Wight's*

contrib. p. 98; *Cyperus setaceus*, Retz.; *Eleocharis setaceus*, R. Brown;\*) but in that species the nut is punctato-striate, and there are six bristles, four of which equal the nut in length.

B. Scales of the spikes imbricated on all sides.

† With a perigynium.

9. ELEOCHARIS, R. Brown.

SCALES of the spike imbricated on all sides. BRISTLES of the perigynium 3—12, (commonly 6,) rigid, persistent. STYLE 2—3 cleft; the base bulbous and persistent, articulated to the ovary. NUT commonly obovate, lenticular, or obtusely triangular, crowned with a tubercle or bulbous base of the style. —Culms simple, leafless, with truncate or mucronate sheaths at the base; spike terminal, solitary, naked.

*Eleocharis*, R. Brown, *prod.* 1. p. 224; *Rœm. & Schult. syst.* 2. p. 3; *Gray's nat. arrang. of Brit. pl.* 2. p. 77.

*Eleocharis*, *Eleogenus*, *Limnochloa* and *Scirpidium*, N. ab *Esenb. in Linnæa*, 9, pp. 293, 294, and in *Wight's contrib.* p. 71.

*Heleocharis*, and *Limnochloa*, *Lestib. ess. fam. Cyp.* p. 41, no. 50 and 52.

Species of *Scirpus*, Linn., Vahl, Kunth.

§ 1. Spike cylindrical; scales rigid, arranged in a spiral order; style 3-cleft; nut biconvex; pericarp thin; tubercle cartilaginous, compressed, colored.—LIMNOCHLOA.

1. ELEOCHARIS EQUISETOIDES.

Culm terete, remotely nodose, papillose; spike cylindrical; scales suborbicular-ovate, very obtuse, or slightly pointed;

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\* " *Cyperus setaceus*, Retz. et Willd. *sp. pl.* 1. p. 269, huc quoque-referendus a reliquis differt, nuce 3-gonâ, et spiculâ distichâ." R. Brown, *prod.* 1. p. 224, in his Observations on the genus *Eleocharis*.



bristles 6, as long as the nut; style 3-cleft; nut obovate, strongly biconvex, smooth; tubercle closely sessile, conical-rostrate, acute.

*Scirpus equisetoides*, *Elliott, sk.* 1. p. 79; *Nutt.! gen.* 1. p. 32; *Ræm. and Schult. mant.* 2. p. 74.

*S. geniculatus*, *Pursh, fl.* 1. p. 55!

*Culm* 1½—2 feet high, of the size of a goose quill; the pith condensed at intervals of about two inches into nodes or false joints; the surface slightly roughened with minute papillæ, which are depressed in the centre. *Sheaths* radical, leafless. *Spike* about an inch long, rather acute. *Scales* cartilaginous, with a narrow scarious margin; the lower ones very obtuse; the upper often somewhat pointed. *Bristles* retrorsely hispid, as long as the nut without the tubercle. *Style* 3-cleft about one-third its length. *Nut* obovate, tumid, brown, shining, towards the base very minutely striate transversely. *Tubercle* one-third the length of the nut, compressed, black.

**HAB.** Bogs, and in water. Near Lewistown, Delaware, *Nuttall!*; Fayetteville, N. Carolina, *Schweinitz!*; St. John's, Georgia, *Dr. Baldwin!*

## 2. ELEOCHARIS QUADRANGULATA, *R. Brown.*

*Culm* acutely and unequally quadrangular, three of the sides concave, the other wider and flat; spike cylindrical; scales broadly ovate, very obtuse, bristles 6, as long as the nut; nut obovate, striate, and minutely reticulate; tubercle conical, compressed, somewhat free at the base.

*E. quadrangulata*, *R. Brown, prodr.* 1. p. 224, (in *Obs.*); *Ræm. & Schult. syst.* 2. p. 155.

*Scirpus quadrangulatus*, *Michx.! fl.* 1. p. 30; (not of *Muhl.*); *Pursh, fl.* 1. p. 55; *Elliott! sk.* 1. p. 76, t. 3. f. 2; *Vahl, enum.* 2. p. 252; *Spreng. syst.* 1. p. 204.

*S. marginatus*, *Muhl.! gram.* p. 28.

*S. albomarginatus*, *Ræm. & Schult. mant.* 2. p. 74.

*Rhizoma* thick and creeping. *Culm* 2—4 feet high and two lines in diameter, clothed at the base with a few purplish sheaths, which some-

times bear short leaves. *Spike* 12—16 lines in length. *Scales* coriaceous, with a narrow scarious margin, sometimes a little pointed, often minutely dotted with purple. *Bristles* retrorsely hispid, four of them equalling the tubercle. *Stamens* 3. *Style* cleft about one-third of its length. *Nut* rather broadly obovate, somewhat tumid, grayish white, not shining; the surface appearing very finely reticulate under a lens. *Tubercle* minute, dark brown, articulated to the nut by a very short neck.

HAB. Swamps and margins of rivers, growing in the water. Near Philadelphia, *Mr. Steinhaur* and *Mr. Z. Collins!*; Pomonkey Creek, Maryland, *Dr. Robbins*; near Wilmington, North Carolina, *Mr. Curtis!*; Carolina, *Michaux!*; near New Orleans, *Dr. Ingalls!*

OBS. This plant, as Michaux correctly remarks, resembles *Scirpus mutatus*, Linn. It has also a strong resemblance to *S. acutangulus*, Roxb. (*Limnochloa*, *N. ab E.*) Mr. Elliott states, that in the rice fields of the South, it is a very injurious intruder; its thick roots occupying the ground, and permitting nothing to grow where they extend.

§. 2. *Spike cylindrical; scales rigid, arranged in a spiral order; style 3-cleft; nut biconvex, tumid; pericarp very thick and spongy; tubercle conical, spongy, confluent.*—SOMPHOCARYA.

### 3. ELEOCHARIS CELLULOSA.

Culm subterete above, obtusely triangular below, with a long truncate sheath; spike cylindrical; bristles longer than the nut, nearly smooth; nut broadly obovate, cellular and reticulated, crowned with a broad conical subacute tubercle.

*Culms* 2 feet high,  $1\frac{1}{2}$  line in diameter, spongy, invested one third of its length with a single sheath, obscurely 3-sided towards the base, but terete near the spike, scarcely striate. *Spike* an inch long, obtuse. *Scales* nearly orbicular, obscurely spiral, pale brown, sometimes dotted with red; margin distinct, scarious, whitish. *Bristles* 6, strong, smooth, with

the exception of a few slight denticulations, most of them overtopping the tubercle. *Stamens* 3; filaments long and slender. *Style* deeply 3-cleft. *Nut* covered with a thick cellular integument, tumid, pale brown and shining, reticulated, and striated longitudinally. *Tubercle* large, of a whitish colour, confluent with the nut, so as to appear blended with it, of a spongy texture like the pericarp.

HAB. Wet sandy marshes. Bay of St. Louis, Dr. Ingalls!

OBS. For this rare plant I am indebted to my friend Dr. Ingalls, who sent it to me under the name of *Scirpus reticulatus*; but there is a *S. reticulatus* of Lamarck, and as the genus *Eleocharis* may possibly be hereafter restored to *Scirpus*, I have not retained the specific name of Dr. Ingalls. In its cylindrical spike and the structure of its scales, it resembles the species of the preceding section; but in its spongy whitish tubercle, it is more nearly allied to the next group. The thick cellular covering of the nut is its most remarkable character.

§ 3. *Spike* ovate or oblong; *scales* membranaceous, (rarely coriaceous) very numerous, irregularly imbricated; *style* mostly 2-cleft; *nut* obovate, biconvex, smooth; *tubercle* somewhat suberose.—ELEOCHARIS.

#### 4. ELEOCHARIS PALUSTRIS, R. Brown,

Culm terete, striate, spongy; spike oblong-lanceolate; scales somewhat obtuse; the two lowest large orbicular and empty; bristles scabrous, longer than the nut; style 2-cleft; nut lenticular, smooth, (fulvous); tubercle conical, acute, distinct.

*Eleocharis palustris*, R. Brown, *prodr.* 1. p. 224. (in Obs.); Ræm. & Schult. *syst.* 2. p. 153; N. ab Esenb. in Wight's *contrib.* p. 113, *Smith, Eng. fl.* 1. p. 63.

*Scirpus palustris*, Linn.; Willd. *sp.* 1. p. 291; Pursh, *fl.* 1. p. 54; Elliott, *sk.* 1. p. 77; Muhl.! *gram.* p. 28; Torr.! *fl.* 1. p. 45; Big. *fl. Bost.* ed. 2. p. 20; Beck! *bot.* p. 425; Darlingt.! *fl. cest.* ed. 2. p. 19.

*S. glaucus*, Torr. ! fl. 1. p. 44.

*S. glaucescens*, Willd.

*Culm* 1—2 feet high, of a soft texture, varying in diameter from filiform to a line and a half. *Spike* 3—5 lines long, many-flowered. *Scales* fuscous in the middle, with a broad scarious and generally lacerated margin. *Bristles* 3—6, overtopping the tubercle, retrorsely scabrous. *Stamens* 3. *Nut* compressed, smooth, but dull. *Tubercle* rostrate-conical, nearly half the length of the nut, which is contracted into a short neck beneath it.

**HAB.** Swamps, and low grounds, from near the Arctic Regions! to Florida! and from the Atlantic! to the Pacific Ocean!

**OBS.** A native also of Europe, Caucasus, the East Indies, and the Sandwich Islands. The nut is incorrectly described by Muhlenberg and in my Flora, as “punctate and rugose.” The *S. glaucus* of the Flora of the Northern and Middle States, I now believe to be only a variety of *S. palustris*.

##### 5. ELEOCHARIS OLIVACEA.

*Culms* filiform, (often diffuse) compressed, sulcate, soft; spike ovate, somewhat obtuse, many-flowered; scales ovate, obtuse, membranaceous; bristles 6, nearly as long as the nut; style bifid; nut obovate, lenticular, dull; tubercle conical, rostrate, distinct.

*Scirpus intermedius*, Gray! Gram. & Cyp. part 1. no. 80, (excl. syn.)

*Culms* cespitose, often (particularly when growing out of water) diffuse, or subdecumbent, generally about a span long, and nearly a line in diameter, but sometimes not more than an inch in length, of a soft flexible texture, (as in *E. palustris*), with mucronate sheaths at the base. *Spikes* 3 lines long, 20—30-flowered. *Scales* rather loosely imbricated, one or two of the lowest shorter, and bracteiform; the others with a narrow scarious margin, reddish sides, and a green midrib. *Bristles* conspicuous, generally 6, retrorsely hispid. *Stamens* 3. *Nut* broadly obovate, distinctly compressed, smooth, but not polished, dark olive when ripe. *Tubercle* rather free round the base, acute, about one third the length of the nut.

**HAB.** Wet sandy places, generally partly under water.

Pine barrens of New Jersey! ; on Long Island near Babylon! ; Tewksbury pond, Massachusetts, *B. D. Greene, Esq.!* Fruit mature in August and September:

OBS. Nearly allied to *E. palustris*, but differs in its shorter ovate and more obtuse spikes, compressed, sulcate culm, more obtuse scales, and dark-olive nut. It is also much shorter than the ordinary form of that species. The upper scales are sometimes rather acute.

#### 6. ELEOCHARIS UNIGLUMIS, *Link.*

Culms stoloniferous at the base, terete, striate; spike oval; scales ovate, rather obtuse, the lowest one large, and embracing nearly the whole base of the spike; style 2-parted, very thick at the base.

*Eleocharis uniglumis*, *Link, hort. Ber.* 1. p. 281, (fide *N. ab Esenb.*) *N. ab E. in Wight's contrib.* p. 113; *Schult. mant.* 2. p. 88.

*Scirpus uniglumis*, *Link. jarb.* 3. p. 77; *Mert & Koch, fl. Germ.* 1. p. 427; *Weihe! deut. grass,* no. 278.

*Culm* with truncated sheaths at the base. *Lowest scale* semicircular, green with a fuscus border; the others with a white margin and a narrow green keel.—*N. ab E.*

HAB. North America, *N. ab E.* Also a native of Germany and Nepal.

OBS. North American specimens of this *Eleocharis* have not come under my observation, but I have examined authentic specimens of the plant in the collection of German grasses by Weihe, quoted above. It strongly resembles depauperate specimens of *E. palustris*, and cannot, I think, be separated from that species. Almost the only differences I have been able to observe, are the more obtuse spike, with the broad clasping scale at its base, and the less distinct tubercle, in *E. uniglumis*. In the works quoted, the fruit is not described; but in Weihe's specimens, which contain mature fruit, the nut is precisely that of *E. palustris*, though the tubercle which crowns it is closely sessile.



7. ELEOCHARIS INTERMEDIA, *Schultes*.

Culms setaceous, diffuse, compressed, angular and sulcate; spike lanceolate-ovate, 8—10-flowered; scales ovate-lanceolate, somewhat acute; bristles longer than the nut; style 3-cleft; nut obovate, compressed, with an obtuse ridge in front, attenuated at the base, longitudinally striated, dull; tubercle distinct, rostrate, slender.

*Eleocharis intermedia*, *Schult. mant.* 2. p. 91.

*Scirpus intermedius*, *Muhl.! gram.* p. 31; *Torr.! fl.* 1. p. 46.

*Culms* cespitose, about a span long, mostly diffuse or prostrate, of a firm wiry texture, conspicuously sulcate and somewhat angular. *Sheaths* cuspidate at the summit. *Spike* 2½ lines long, rather acute. *Scales* membranaceous, not scarious on the margin; midrib narrow, green; the sides reddish brown. *Bristles* 6, strong, whitish, retrorsely hispid, a little overtopping the tubercle. *Stamens* 3. *Nut* of a light brown when mature, very finely striate longitudinally, remarkably attenuated at the base. *Tubercle* quite free around the base, very slender and acute.

**HAB.** Wet places, particularly in shallow running water. New Jersey!; Pennsylvania, *Muhlenberg!*; Oneida county, New York, *Dr. Gray!* and Jefferson county, in the same state, *Dr. Crave!*; Georgia, *Dr. Baldwin!*

**OBS.** A well characterized species, easily distinguished from the three preceding by the slender wiry sulcate culms, the nut attenuated at the base, and the trifid style. In the Muhlenbergian herbarium the specimens are marked "*Scirpus acicularis*, Smith, *Herb. Linn.*," but I can see no resemblance between our plant and that species.

8. ELEOCHARIS OBTUSA, *Schultes*.

Culm terete, or slightly compressed, spongy; spike globose-ovate, or globose-oblong, crowded; scales very obtuse; bristles longer than the nut; style 3-cleft; nut obovate, lenticular, margined, smooth and shining; tubercle much dilated at the base, subacute, compressed.

*Eleocharis obtusa*, *Schult. mant.* 2. p. 89; *Link, enum.* p. 42, (fide *Schult.*); *Gaud. in Freyc. voy.* p. 414, (fide *Hook.*); *Hook. & Arn. in bot. of Beechey's voy.* p. 98.

*Scirpus obtusius*, *Willd. enum. hort. Berol.* 1. p. 76; *Ram. & Schult. syst.* 2. p. 126; *Darlingt. ! fl. Cest. ed. 2.* p. 19; *Gray ! Gram. & Cyp. part 2. no. 132.*

*S. capitatus*, *Walt. Car.* p. 70, (not of *Linn.*); *Pursh ! fl.* 1. p. 55, (excl. syn.); *Elliott, sk.* 1. p. 77; *Muhl. ! gram.* p. 30; *Torr. ! fl.* 1. p. 45, (excl. syn. *Linn., Willd. sp. and R. Brown.*); *Big. fl. Bost. ed. 2.* p. 20; *Beck ! bot.* p. 424.

*S. ovatus*, *Pursh, fl.* 1. p. 54; *Muhl. ! cat.* p. 6.

*S. culmo setaceo nudo, spica subglobosa; Gron. fl. Virg. 12.*

*Culms* cespitose 8—14 inches high, attenuated immediately below the spike, of a soft and spongy texture, clothed with one or more purplish truncate sheaths at the base. *Spike* thick, and obtuse, 50—80-flowered, often subglobose, and sometimes elongated so as to appear subcylindrical. *Scales* membranaceous, with a scarious margin and green midrib. *Bristles* 6, nearly twice as long as the nut, rigid, retrorsely hispid. *Stamens* 3. *Nut* doubly convex, the margin tumid and distinct, light brown. *Tubercle* somewhat axe-form, (the breadth greater than the length) with a short obtuse angled summit.

**HAB.** Bogs, and muddy ditches, particularly near salt water;—Canada to Florida; common.

**OBS.** This species, which is so common in the United States, (though not confined to North America, it having been found in the Sandwich Islands,) has been confounded by most of our botanists with *E. capitata*, *R. Br.* (*Scirpus capitatus*, *Linn.* It is also considered by some as the *E. ovata*, *R. Br.*\* (*S. ovatus*, *Ehr.*) The former is very distinct, as will

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\* *Linnaeus* referred "*Scirpus culmo setaceo nudo, spica subglobosa*," *Gron. fl. Virg. 12*, to *S. capitatus*, and this error having been copied by *Willdenow* and other writers, the *S. capitatus* has obtained a place in our Flora, although the true plant is, for the first time, described as a North American species, in the present Monograph. *Mr. Brown*, long ago, (*prodr.* 1. p. 225) corrected the mistake of *Linnaeus*, and pronounced *Gronovius's* plant to be distinct from *Eleocharis capitata*.

appear by comparing the characters of the two species; the latter differs in its obovate-oblong nut, much smaller and far less dilated tubercle and bifid style. I have specimens of *E. obtusa* from Oahu which agree minutely with the N. American plant. It is very doubtful whether the *E. ovata* has been found within the limits of our Flora.

$\beta$ . spikes elongated, tapering to a blunt point; bristles scarcely longer than the nut.

HAB. Hills, Waltham, Massachusetts, *B. D. Greene, Esq.!*

OBS. In my specimens of this variety, the tubercle is as broad as the summit of the nut, but the plant can by no means be considered specifically distinct from *E. obtusa*.

#### 9. ELEOCHARIS ALBIDUS.

Culm filiform, terete, with a groove on one side; spike globose-ovate, many (20—30)-flowered; scales ovate, mostly obtuse, coriaceous, subcarinate; bristles longer than the nut (red); style 3-cleft; nut broadly obovate, obtusely angular in front, dull.

*Culms* cespitose, rather wiry, finely striate, clothed with cuspidate sheaths at the base. *Spike*  $2\frac{1}{2}$  lines long, thick, mostly obtuse. *Scales* generally whitish, or light brown, when old sometimes rather acute, but in the young state obtuse. *Bristles* 6, of a reddish colour both in the young and the mature state, rigid, densely hispid downward. *Stamens* 3; *anthers* oblong. *Nut* brown when ripe, smooth but not polished. *Tubercle* one-third or one-fourth the length of the nut, quite free round the base; the point rather acute.

HAB. Wet sandy places, particularly near the sea shore. On the coast of East Florida, and on Talbot Island, Georgia, *Dr. Baldwin!*; near New Orleans, and at Barataria, Louisiana, *Dr. Ingalls!*

OBS. This species resembles at first sight, *E. capitata*, but it differs in its somewhat angular and dull nut, 3-cleft style, and much more coriaceous scales.

10. *ELEOCHARIS CAPITATA*, R. Brown.

Culm filiform, sulcate, angular; spike globose-ovate; scales somewhat coriaceous, oblong, obtuse; bristles a little longer than the nut; style 2-cleft; nut broadly obovate, lenticular, (black) shining; tubercle minute, with a very short abrupt point.

*Eleocharis capitata*, R. Brown, *prodr.* 1, p. 225; *Ræm. & Schult. syst.* 2, p. 153, (excl. syn. *Pursh.*)

*Scirpus capitatus*, Linn.; *Willd. sp.* 1, p. 294, (excl. syn. *Gron.*), *Vahl, enum.* 2, p. 250; *Kunth, syn.* 1, p. 155; *Spreng. syst.* 1, p. 204.

S. Caribæus, *Rottb. gram.* p. 46. t. 15, f. 3, (fide *Vahl.*)

*Eleogenus capitatus*, N. ab E. in *Wight's contrib.* p. 112, & in *Linnaea*, 9, p. 294.

*Culms* caespitose 4—6 inches high. *Spike* 2 lines long, of a greenish white colour, 12—16-flowered. *Scales* rather loose, several of the lower ones empty. *Bristles* 6, strong, unequal, retrorsely scabrous, the longest projecting a little above the nut. *Stamens* 3. *Style* deeply 2-cleft. *Nut* when mature almost black, very minutely roughened, but shining, crowned with a very small depressed whitish tubercle.

**HAB.** Wet places, in the vicinity of both salt and fresh water. Georgia and Florida, *Dr. Baldwin!*; near New Orleans, *T. Drummond*, (Mr. Arnott); Middle Florida, *Dr. Chapman!*

**OBS.** This species inhabits many parts of the world, but has not hitherto been introduced into the Flora of North America, the *Scirpus capitatus* of most of our botanical writers being the *Eleocharis obtusa*. Nees ab Esenbeck has constituted of this, and several other species of *Eleocharis*, his genus *Eleogenus*, which is chiefly characterized by the bulbous base of the style or tubercle being of a callous instead of a corky or soft substance. I have not been able to detect the hypogynous bristles in the specimen sent to me from Middle Florida by Dr. Chapman.

β. Spikes ovate-oblong, many-flowered; bristles rather shorter than the nut.



*Culm* 8 inches long, sulcate, rather soft. *Spike* nearly one-third of an inch in length. *Nut* lenticular, black and polished.

HAB. Texas, T. Drummond!

OBS. This variety has much the appearance of *E. obtusa*, but it is easily distinguished by its small black shining nut, and minute tubercle.

§ 4. *Spike* ovate; *glumes* coriaceous; *nut* compressed, sulcate and pitted; *tubercle* rostrate; *bristles* 6, rigid; *style* 3-cleft, — BOTHRICARPA,

#### 11. ELEOCHARIS SIMPLEX.

*Culm* terete, filiform, striate; *spike* ovate, somewhat acute; *scales* ovate, obtuse, whitish, rather loose; *bristles* retrorsely scabrous, as long as the nut; *style* 3-cleft; *nut* obovate, biconvex, longitudinally furrowed; the furrows strongly pitted; *tubercle* conical, compressed, produced into a beak nearly one-third the length of the nut.

*Scirpus simplex*, Elliott! *sk.* 1. p. 76; *Curt.*! *fl. Wilming.* no. 59; *Schult. mant.* 2. p. 74.

*Culm* erect, 12—18 inches high, very slender, clothed at the base with one or two obliquely truncate, mucronate sheaths. *Spike* 3—4 lines long, 15—20-flowered. *Scales* of a firm coriaceous texture, but scabrous on the margin, somewhat shining, the sides of a light chestnut colour. *Bristles* remarkably strong, a little overtopping the nut. *Stamens* 3. *Style* deeply 3-cleft. *Nut* somewhat gibbous in front, nearly as long as the scale, of a light brown colour, marked on each side with 8 or 9 lines and deep pitted grooves, so that it exhibits a reticulated appearance. *Tubercle* somewhat distinct around the base, very acute, of a firm and rather woody texture.

HAB. Wet places. South Carolina, Elliott!; Wilmington, North Carolina, Mr. Curtis!

OBS. A very distinct species, apparently confined to the Southern States.



§ 5, *Spike ovate; scales coriaceous; bristles 6, rigid; nut triangular; tubercle mitriform, nearly as large as the nut, spongy; style 3-cleft.*—MITROCARPA,

12. *ELEOCHARIS TUBERCULOSA, R. Brown.*

Culm terete, filiform, striate; spike globose-ovate, somewhat acute; scales broadly ovate, very obtuse, loose, subcoriaceous; bristles rigid, retrorsely hispid; nut oblong, obtusely triangular, striate and pitted longitudinally; tubercle ovate, obtuse, subcompressed, nearly as large as the nut.

*Eleocharis tuberculosa, R. Brown, prodr.* 1. p. 224. (*in obs.*); *Ram. & Schult. syst.* 2. p. 152.

*Scirpus tuberculosus, Michx.! fl.* 1. p. 30; *Vahl, enum.* 2. p. 248; *Poir. enc. meth.* 6. p. 753; *Pursh, fl.* 1. p. 54; *Beck! bot.* p. 424; *Gray! Gram. & Cyp.* part 1. no. 79; *Spreng. syst.* 1. p. 203.

*S. tuberculatus, Elliott, sk.* 1. p. 78.

*S. no. 7, Muhl.! gram.* p. 29, & *herb.!*

*Culm* 8—12 inches high, slender and wiry, pale green, clothed at the base with one or two obliquely truncated sheaths. *Spike* 3—4 lines long, 12—16-flowered. *Scales* pale green, or whitish, mixed with light brown, of a firm cartilaginous texture. *Bristles* 6, strong, longer than the nut, but not exceeding the tubercle, hispid downward. *Stamens* 3, *Style* 3-cleft. *Nut* large, and bulging out the seale, shining, marked with longitudinal lines with intermediate rows of shallow indentations, and thus appearing somewhat reticulated. *Tubercle* shaped like a cap, mostly obtuse, of a soft spongy texture, whitish, free round the base,

**HAB.** Wet places; particularly in sandy swamps; seldom found far from tide-water; Massachusetts to Florida, *Tewksbury, Massachusetts, B. D. Greene, Esq.!* also near Salem in the same State, *Dr. Pickering!*; pine barrens of New Jersey, abundant!; South Carolina, *Michaux!*, *Elliott!*; East Florida, *Dr. Baldwin!*; West Florida, *Mr. Ware!*; New Orleans, *Dr. Ingalls!*—September,

**OBS.** A species remarkable for its large thick tubercle, by which it is easily distinguished from every other plant of the tribe *Scirpeæ*.

β. spikes ovate-oblong; bristles pubescent-scabrous, the pubescence spreading or pointing upward.

HAB. Florida, *Dr. Chapman!* and *Dr. Baldwin!*

Obs. In this variety the spikes are twice as large as in the common *E. tuberculosa*, and the bristles, instead of being hispid, are rather pubescent. On the upper part of the bristles, the pubescence is directed upward, lower down it is spreading, but it seldom occurs reflexed. The tubercle, also, is larger than the nut. Still I regard the plant as a mere variety of *E. tuberculosa*.

§. 6 *Spike ovate or elongated; scales membranaceous; bristles 1—4, slender, brittle, (rarely 0); nut roundish or triangular, smooth; style 3-cleft.*—SCIRPIDIUM.

### 13. ELEOCHARIS ACICULARIS, *R. Brown.*

Culm setaceous, angular and sulcate; spike ovate, subcompressed, acute, few-flowered; scales oblong, somewhat obtuse; bristles 3—4, short and very slender, (sometimes 0); nut oblong, rather acute at each end, nearly terete, many-ribbed, with fine transverse lines; tubercle minute, triangular, acute.

*Eleocharis acicularis*, *R. Brown, prodr.* 1, p. 224, (in obs.); *Ram. & Schult. syst.* 2, p. 154; *Schult. mant.* 2, p. 90; *Hook. fl. Lond. new ser.* 9, t. 49.

*Scirpus acicularis*, *Linn.*; *Willd. sp.* 1, p. 295; *Vahl, enum.* 2, p. 25; *Pursh, fl.* 1, p. 54; *Torr.! fl.* 1, p. 45; *Beck! bot.* p. 424; *Spreng. syst.* 1, p. 204; *Darlingt. fl. Cest.* ed. 2, p. 20; *Gray! Gram. & Cyp.* part 2, no. 133.

*S. trichodes*, *Muhl.! gram.* p. 30; *Elliott, sk.* 1, p. 76; *Big. fl. Bost.* ed. 2, p. 2.

*S. capillaceus*, *Michx.! fl.* 1, p. 30; *Pers. syn.* 1, p. 65.

*S. Chæta*, *Schult. mant.* 2, p. 72.

*Scirpidium aciculare*, *N. ab Esenb. in Linnæa*, 9, p. 293.

*Culm* 2—8 inches long, generally very slender and hair-like. *Spike*

2—3 lines long, seldom more than 5 or 6-flowered, and sometimes bearing only one or two flowers. *Scales* often barren, seldom more than one or two of them fructiferous, greenish, with a red stripe on each side of the midrib. *Bristles* shorter than the nut, very slender and fragile, sometimes entirely wanting. *Stamens* 3. *Style* 3-cleft about half its length. *Nut* whitish, often contracted at the neck, obscurely triangular; or rather polygonal from the prominent longitudinal ridges which mark its sides, and which are about 15 in number, with very fine transverse lines. *Tubercle* conical-triangular, somewhat free at the base.

**HAB.** Borders of ponds; generally partly under water; Hudson's Bay to Florida.—June—July.

**OBS.** When this plant grows in overflowed situations, its culms are quite capillary, and the spikes seldom produce fruit. In drier situations the culm is much firmer and wiry. Nees ab Esenbeck refers to his *Chaetocyperus polymorphus*, the *Scirpus capillaceus* of Michaux, and also the *Scirpus trichodes*, *H. B. & K.*; but Michaux's plant is surely nothing more than a slender form of *Eleocharis acicularis*.

#### 14. ELEOCHARIS TENUIS, *Schultes*.

Culm filiform, quadrangular, with the sides concave; spike elliptical, somewhat acute at each end; scales ovate, obtuse; bristles 2—3 or none; nut obovate, triangular, with the angles prominent, corrugated transversely, and somewhat papillose, crowned with a minute short triangular tubercle.

*Eleocharis tenuis*, *Schultes, mant.* 2. p. 89.

*Scirpus tenuis*, *Willd. enum. hort. Berol.* 1. p. 76; *Muhl. ! gram.* p. 27; *Ram. & Schult.* 2. p. 127; *Torr. ! fl.* 1. p. 44; *Beck ! bot.* p. 425; *Big. fl. Bost.* ed. 2. p. 21; *Spreng. syst.* 2. p. 205; *Darlingt. ! fl. Cest.* ed. 2. p. 20.

*S. quadrangulatus*, *Muhl. cat.* ed. 2. p. 6. (not of *Michx.*)

*Culms* scarcely thicker than a horse-hair, 8—12 inches long, acutely quadrangular, the base clothed with one or two purple sheaths. *Spike*, when young, rather obtuse. *Scales* dark chestnut-coloured, with a whitish scarious margin; several of the lowest ones larger and empty. *Bristles* 2—3, short, slender and fugacious. *Style* 3-cleft. *Nut* of a

whitish or light brown colour, much shorter than the scale, distinctly triangular, the sides strongly corrugated, and marked likewise by fine longitudinal lines, the summit abruptly contracted into a short neck, on which the minute tubercle stands.

HAB. Bogs, generally growing partly in the water. Common in New York and New Jersey!; Pennsylvania, *Muhlenberg!*, *Dr. Darlington!*; Salem, Massachusetts, *Dr. Pickering!*; Arkansas, *Dr. Pitcher!*

OBS. Nees ab Esenbeck, in the Linnæa, vol. 9, refers *Scirpus tenuis*, Willd. both to *Scirpidium* and *Eleocharis*! It is probable that the latter reference is a mistake, and that he considered the plant as a genuine species of his genus *Scirpidium*.

$\beta$ . nut not wrinkled; bristles 3—4, one-third the length of the nut.

*Culm* a foot high, acutely triangular. *Spike* ovate, acute. *Scales* ovate-oblong, obtuse. *Nut* obovate, minute, whitish, the angles prominent. *Tubercle* short, with a minute abrupt point.

HAB. Near New Orleans, *Dr. Ingalls!*

OBS. This variety resembles the common *E. tenuis* in nearly all respects except in the smooth and less rounded nut. It forms the connecting link between that species and *E. tricostrata*.

### 15. ELEOCHARIS TRICOSTATA.

*Culm* subcompressed, filiform, striate; spike cylindrical-oblong, densely-flowered; scales ovate, obtuse, membranaceous; bristles 0; nut obovate, triangular, the angles very prominent and thickened; sides convex, roughened with very minute wrinkles; tubercle short, conical, acute.

*Culm* 1—2 feet high, half a line in diameter, smooth, not angular. *Spike* 5—9 lines in length, and a line and a half in diameter, somewhat pointed at the summit. *Scales* mostly ovate, very obtuse, ferruginous, with a broad scarious margin; the midrib green. *Bristles* entirely wanting. *Stamens* 3. *Nut* very small, brown, dull, appearing



scabrous under an ordinary lens, but exhibiting minute wrinkles when highly magnified. *Tubercle* distinct, whitish, minute.

HAB. Georgia, *Le Conte!*; Middle Florida, *Dr. Chapman!*; East Florida, *Mr. Ware!*

#### 16. ELEOCHARIS MELANOCARPA:

Culm compressed, sulcate; spike oblong or cylindrical-oblong; scales ovate, obtuse, membranaceous; bristles 3—4, as long as the nut, slender; nut somewhat turbinate, obtusely triangular, (blackish) smooth; tubercle broad, triangular, flat, with a short point in the centre.

*Scirpus melanocarpus*, *Baldw. MSS.!*

*Culms* cespitose, 12—18 inches long, almost filiform, but strong and wiry, distinctly sulcate, clothed with truncate sheaths at the base. *Spike* 4—6 lines long, obtuse, many-flowered. *Scales* scarious on the margin, rufescent, with a yellowish midrib, the lowest broader and empty. *Bristles* commonly 3, one on each side of the nut, which they nearly equal in length, excluding the tubercle; they are very slender, of a dark purple colour, and retrorsely scabrous. *Stamens* 3. *Style* 3-cleft about half-way down. *Nut* half a line long, thick and obscurely 3-sided, appearing (without the tubercle) truncate at the summit, of a brownish black colour, smooth and shining. *Tubercle* very short and dilated; the margin thickened and projecting over the top of the nut, the centre produced into a short triangular point.

HAB. “Pine barrens, generally not far from streams of water—near Savannah, Georgia,” *Dr. Baldwin!*—May and June.

OBS. This well-marked species differs from any other of the genus *Eleocharis*, in its black turbinate nut, crowned with the large spreading triangular tubercle. On account of its slender bristles, trifid style, triangular nut, and membranaceous scales, I have placed it in the section *SCIRPIDIUM*, but it might with propriety be formed into a distinct subgenus.



§. 7. *Spike compressed, often somewhat distichous; scales membranaceous, bristles slender, nut triangular; style three-cleft.*—*CYPEROSCIRPUS.*

17. *ELEOCHARIS MICROCARPA.*

Culm capillary, quadrangular, with three of the sides channelled; spikes oblong, compressed, (often proliferous) 10—20-flowered; scales broadly ovate, rather acute, somewhat carinate, the lowest one much the largest; bristles 3—5, shorter than the nut, slender; fragile; nut minute, obovate, obtusely triangular, smooth; tubercle very minute, closely sessile.

*Culms* 6—8 inches long, a little thicker than a human hair. *Spikes* nearly 2 lines long, frequently proliferous; the axil of one or more of the lowest scales bearing a pedunculate spikelet. *Scales* rather loose, somewhat acuminate but scarcely acute, all of them deciduous, except the lowest one, which may be regarded as a bract or reduced one-leaved involucre; margin whitish; the sides brownish-red. *Bristles* very slender, closely appressed to the sides of the nut, and not half its length. *Stamens* 3. *Nut* scarcely one-third of a line long, grayish white, very smooth. *Tubercle* triangular, apiculate, scarcely free round the base.

*HAB.* Wet places. Near Orleans, *Dr. Ingalls!*

*OBS.* The species of this section resemble in their compressed and somewhat distichous spikes the genus *Chætocyperus*, but in other respects they have all the characters of *Eleocharis*. In some of the spikes of the present species, the axil of the lower scales bears a slender peduncle instead of a flower, supporting a spike at its summit, as in *Chætocyperus Baldwinii*.

$\beta?$  *fili culmis.* Culms cespitose, capillary or filiform, quadrangular, wiry; spikes oblong; bristles nearly as long as the nut without the tubercle; nut obovate-oblong.

*Culms* 3—4 inches high. *Spikes* more than two lines long. *Scales* dark chestnut-coloured.

*HAB.* Wet places in the pine barrens of New Jersey.

**OBS.** Differs from the southern variety in the thicker culm, longer and firmer bristles and more oblong nut, but resembles it in the tendency to become proliferous. I have seen it with spikes bearing more than 25 flowers, but the usual number is from 15 to 20. The taller specimens resemble *E. intermedia*, but it is easily distinguished from that plant by the form of the nut.

### 18. ELEOCHARIS PYGMÆA.

Culms setaceous, much compressed and sulcate (dwarf); spike ovate, compressed, 3—6-flowered; scales ovate; bristles longer than the nut, retrorsely scabrous; nut ovate, acutely triangular, smooth and shining; tubercle very minute, confluent.

*Scirpus pusillus*, *Vahl, enum.* 2. p. 246?; *Pursh, fl.* 1. p. 54; *Torr. ! fl.* p. 46; *Ram. & Schult. syst.* 2. p. 124! (excluding the synonym of *Michx.* erroneously quoted "*S. capillaris.*")

*S. capillaceus*, *Elliott, sk.* 1. p. 75. (excl. syn. *Michx.*)

*Culms* 1—2 inches high, often destitute of spikes at the summit, and then appearing like subulate leaves. *Spike* a line and a half in length, broadly ovate, seldom perfecting more than one or two nuts. *Lowest scale* empty, very obtuse; the others more or less acute, especially when old. *Bristles* 6, whitish, slender. *Nut* acute at each end, grayish white. *Tubercle* extremely minute, forming merely a triangular apex to the nut.

**HAB.** Salt marshes, and along the banks of rivers where the salt water reaches; growing in patches. Near New York, and on the sea coast of New Jersey. September.

**OBS.** This species is frequently confounded with *E. acicularis*, a dwarf variety of which it greatly resembles; but it differs entirely from that species in its triquetrous, smooth (not oblong and ribbed) nut. Some of our botanists have supposed it to be the *Scirpus capillaceus* of Michaux, but I have ascertained his plant to be *E. acicularis*. Whether the synonym of

Vahl is correct or not, can hardly be determined from his brief description, but we have no other *Eleocharis* that so nearly agrees with it. *Scirpus nanus*, Spreng. *syst.* 1. p. 205, (*S. parvulus*, Ræm. & Schult. 2. p. 124), of which I possess specimens from the author himself, is closely related to our plant, but differs in its terete culm and more obtuse carinate scales. It is, however, a true *Eleocharis*; for the tubercle, though extremely minute, can be distinguished with an ordinary lens.

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The following species of *Eleocharis* are omitted for reasons given at page 281.

1. *E. GENICULATA*, R. Brown?—*Scirpus geniculatus*, Pursh, fl. 1. p. 55, not of Vahl.

This species, which is a native of Cayenne, Surinam, and Jamaica, is said by Pursh to inhabit the sea shore of Virginia and Carolina, but it was not known to Muhlenberg, Elliott or Baldwin, neither has it to my knowledge been found by any other American botanist, and Pursh may have mistaken for it, the *E. equisetoides*. There is no specimen of it among his plants, now incorporated in the Lambertian Herbarium.

2. *E. OVATA*, R. Brown?—*Scirpus ovatus*, Pursh, not of Vahl.

Pursh states that he found this species in Pennsylvania, but his specimens, named *S. ovatus*, in Lambert's Herb. seem to belong to *Eleocharis intermedia*. The *S. ovatus* of most other writers on N. American botany is *Eleocharis obtusa*.

3. *E. GLAUCESCENS*, Schult. *mant.* 2, p. 89;—*Scirpus glaucescens*, Willd. *enum. hort. Berol.* 1. p. 76; Ræm. & Schult, *syst.* 2. p. 126.

Willdenow says he received his *S. glaucescens* from N. America, but the description which he has given of it is so imperfect, that the plant can only be identified by consulting his herbarium.

4. *E. TORTILIS*, Schult. *mant.* 2. p. 92; *Scirpus tortilis*, Bosc, apud Link, *jahrb.* 3. p. 78. (fide Schult.)

North America, Link.

I have received from my estimable friend, B. D. Greene, Esq. of Boston, specimens of an *Eleocharis* in an immature state, collected by

him in a pond at Tewksbury, Massachusetts, which may belong to this species; but Link's description will apply almost equally well to *E. mutata* and *E. media*.

5. *E. BÆOTHRYON*, Schult. mant. 2. p. 92.

This is founded on *Scirpus*, no. 7, *Muhl. gram.* p. 29, which is the *S. tuberculosus*, Michx. and the description is copied without alteration from Muhlenberg.

6. *E. MUHLENBERGIANA*, Schult. mant. 2. p. 74.

This very imperfectly characterized species is the *Scirpus* (anon.) no. 4, *Muhl. gram.* p. 28. I did not find specimens of the plant when I examined the Muhlenbergian herbarium.

7. *E. ACUMINATA*, N. ab Esenb. in Linnæa. 9. p. 294.

Nees does not describe this species in the work here quoted, but as he quotes as a synonym "*Scirpus*, *Muhl.*" he probably refers to *S. acuminatus*, *Muhl. gram.* p. 27. Muhlenberg's description of the plant is very brief and imperfect, and I could find no specimens to correspond with it in his herbarium.

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Among my undetermined Cyperaceæ, is a species of *Eleocharis* from the Southern States, which I have never been able to obtain with mature fruit. It grows in shallow water, and is not uncommon in North and South Carolina, Georgia and Florida. The culm is filiform, 4—12 inches in length, compressed and sulcate. The spike is ovate, and compressed, but instead of producing flowers, it throws out a tuft of long filiform peduncles, or rather culms, one from the axil of each scale, which strike root into the mud, or float on the surface of the water, and likewise bear proliferous spikes.\* In these characters the plant resembles *E. microcarpa* and *Chatocyperus Baldwinii*. It differs from the latter in the spike, which, though compressed, is not distichous; and from the former in its obtuse and more membranaceous scales. In some of the spikelets I observed immature flowers, in which there were several retrorsely scabrous bristles, three stamens, and a 3-cleft

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\* See Gray's Elements of Botany, page 250.



style. I am inclined to consider the species as distinct from any other described in this monograph. It may be distinguished by the name of *E. prolifera*.

### 9. SCIRPUS, *R. Brown*.

SCALES imbricated on all sides. BRISTLES of the perigynium 3—6, rigid, persistent, for the most part retrorsely denticulate. STYLE 2—3-cleft, simple at the base, deciduous. NUT biconvex or triangular.—Culms mostly triangular, simple, often with leafless sheaths; spikes solitary, conglomerated or corymbose, terminal or lateral.

*Scirpus*, *R. Brown*, *prodr.* 1. p. 223; *Lestib. ess. fam. Cyp.* p. 42. no 53; *Nees ab Esenb. in Wight's contrib.* p. 71, and in *Linnæa*, 9. p. 293.

*Heliophylax*, *Lestib. l. c.* no. 51.

Species of *Scirpus*, *Linn.*, *Kunth*, *Spreng.*, *Nutt. &c.*

#### §. 1. *Spike solitary, terminal.*

#### 1. SCIRPUS PLANIFOLIUS, *Muhl.*

Culm triquetrous; leaves flat, linear, nearly equalling the culm; spike oblong, compressed; scales carinate, cuspidate, the lowest one longer than the spike; nut triangular.

*Scirpus planifolius*, *Muhl.!* *gram.* p. 32; *Torr.!* *fl.* 1. p. 46; *Big. fl. Bost.* ed. 2. p. 20; *Beck!* *bot.* p. 424; *Bart. prodr. fl. Phil.* 1. p. 33; *Darlingt.!* *fl. Cest.* ed. 2. p. 20; *Schult. mant.* 2. p. 72; *Spreng. syst.* 1. p. 206.

*Isolepis planifolia*, *Spreng.!* *neue entd.* 3. p. 10.

*Eleocharis planifolia*, *N. ab Esenb. in Linnæa.* 9. p. 294.

*Culms* cespitose, about a span high, acutely triangular, scabrous on the angles. *Leaves* gramineous, tapering to a long, rather obtuse point, carinate, scabrous on the margin; the lowest ones shorter and broader. *Spike* at first lanceolate, but at length somewhat ovate, 6—7-flowered. *Scales* somewhat trifarious, ovate-lanceolate, yellowish, with a green



keel, which is continued beyond the summit into a sharp cusp; the lowest one terminating in a bristle, and usually projecting beyond the spike. *Bristles* 4—6, slender, nearly as long as the nut, hairy rather than denticulate, the hairs pointing upward. *Stamens* 3. *Nut* oblong, triquetrous, of a light brown colour, dull, minutely punctulate, scarcely pointed. *Style* compressed, pubescent or ciliate, 3-cleft, separating entirely from the nut.

**HAB.** Woods, often in dry stony situations; also in bogs. Near New York, not uncommon!; New Brunswick and Princeton, New Jersey!; Deerfield, Massachusetts, *Dr. Cooley!* and *Prof. Hitchcock!*; near Boston, *Dr. Bigelow!*; Washington county, New York, *Dr. M. Stevenson!*; Pennsylvania and Delaware, *Muhlenberg!* and *Dr. Baldwin!*—June.

**OBS.** This species differs so much from all our *Scirpi*, that it may yet be removed to some other genus. It is remarkable that N. ab Esenbeck should have referred it to *Eleocharis*, since it has not the least trace of a tubercle; and Sprengel, to whom I sent specimens many years ago, placed it in *Isolepis*, (which genus he reduced to a section of *Scirpus* in his *Syst. Veg.*) notwithstanding its manifest bristles.

## 2. SCIRPUS SUBTERMINALIS, *Torrey.*

Culm (immersed) filiform, terete, leafy at the base; spike oblong-lanceolate, (emersed) shorter than the bract at the base; scales ovate-lanceolate; nut triangular, abruptly acuminate; style 3-cleft.

*Scirpus subterminalis*, *Torr.!* *fl.* 1. p. 47; *Beck!* *bot.* p. 425; *Gray!* *Gram. & Cyp.* part 2. no. 81

*Culm* 1—3 feet long, growing under water, often roughened when dry by the irregular contraction of the pith. *Leaves* 6—18 inches long, filiform, channelled. *Spike* 3—4 lines long, with a narrow straight bract at the base extending beyond the spike, and appearing like a continuation of the culm. *Scales* membranaceous, somewhat mucronate, pale brown, with a green midrib. *Bristles* 6, rigid, retrorsely scabrous, nearly as long as the nut. *Stamens* 3. *Style* cleft nearly half-way down into three smooth divisions. *Nut* large for the size of the spike, triquetrous,

dark brown, smooth and somewhat shining, pointed with the sharp base of the style.

HAB. Slow-flowing streams, and ponds, both in fresh and brackish water. Salem, Massachusetts, *Dr. Pickering*; Tewksbury pond, near Boston, *B. D. Greene, Esq.!*; Leverett pond, near Amherst, and Deersfield, Massachusetts, *Dr. Cooley & Prof. Hitchcock!*; Sand-Lake, near Troy, *Mr. H. H. Eaton!*; Princeton, Batsto, and Tom's River, New Jersey!; Rocky mountains, *T. Drummond!*—August—September.

Obs. I first received this plant many years ago from Dr. Cooley, of Deerfield, Massachusetts, and described it in the work above quoted. It appears to have a wide range to the north and west, but it has not, to my knowledge, been found south of New Jersey.

### 3. SCIRPUS ROSTELLATUS.

Culm compressed, filiform, sulcate; spike ovate-lanceolate, acute; scales ovate, obtuse, loose, somewhat cartilaginous, with a scarious margin; nut biconvex, very minutely roughened with dots; the apex discoloured, conical-rostrate, rather obtuse; bristles 4—6, longer than the nut.

*Culm* 12—15 inches high, firm and tough, distinctly compressed and deeply striate or sulcate. *Spike* 3—4 lines long, 12—15-flowered. *Scales* a little spreading by the protrusion of the ripe fruit, light brown. *Bristles* strong and conspicuously scabrous. *Stamens* 3; *filaments* as long as the nut and unusually broad; *anthers* linear-oblong. *Style* 3-cleft. *Nut* very convex in front, light brown, shining, but somewhat uneven and roughened under a lens; the apex discoloured, and at first view appearing like a tubercle.

HAB. Penn-Yan, Yates county, New-York, *Dr. Sartwell!*; South Carolina, *Dr. Walsh!*

Obs. Nearly allied to *S. multicaulis*, *Eng. bot. t. 1187*, which Smith (in *Engl. Flora*, 1. p. 64) and N. ab Esenb. (in *Linnaea*, 9. p. 294) refer to *Eleocharis*, and which some European bo-

tanists even consider a variety of *E. palustris* notwithstanding it is a genuine *Scirpus*, the tubercle being entirely wanting. Moreover the *S. multicaulis* has a 3-cleft style and a triangular nut with a long cuspidate point; which characters do not belong to *Eleocharis palustris*.

#### 4. SCIRPUS CÆSPITOSUS, Linn.

Culms cespitose, filiform, terete; sheaths furnished with rudiments of leaves; spike ovate, few-flowered; the two lowest scales bracteiform, as long as the spike; bristles smooth; style 3-cleft; nut triquetrous.

*S. cæspitosus*, Linn. *sp. pl.* 71; Willd. *sp. 1.* p. 292; Vahl, *enum.* 2. p. 243; Eng. *bot. t.* 1029; Ræm. & Schult. *syst.* 2. p. 122; Spreng. *syst.* 1. p. 205; Torr.! *fl.* 1. p. 47; Big. *fl. Bost.* ed. 2. p. 20; Beck! *bot.* p. 424.

*Eleocharis cæspitosa*, N. ab Esenb. in *Linnæa*, 9. p. 294.

Culms 2—10 inches high, rather rigid, finely striate, towards the base densely clothed with imbricated sheaths, of which the upper ones bear rudimentary leaves. Spikes 2 lines long, 4—5-flowered, somewhat compressed. Scales of a yellowish brown colour; the lowest one narrow and generally overtopping the spike; the next a little shorter; the others ovate, obtuse. Bristles 6, longer than the nut, quite smooth. Nut acute.

HAB. Sphagnous and boggy places. Canada! and throughout British America to the Arctic regions, Dr. Richardson; Labrador, v. s. in herb. Le Conte!; Sault Ste. Marie, Dr. Pitcher!; Rocky Mountains, T. Drummond!; Sitcha, Russian America, Mertens; White Hills of New Hampshire, Dr. Bigelow and Dr. Boott!—July,

§. 2. *Culm many-spiked.*†. *Spikes lateral.*

## 5. SCIRPUS DEBILIS, Pursh.

Culm terete, with naked sheaths at the base, striate; spikes 3—5, ovate, closely sessile, the culm continued far beyond them; scales broadly ovate, obtuse, mucronulate; style 2-cleft; nut broadly obovate, plano-convex, slightly punctate and obscurely rugulose, (dark brown and shining,) shorter than the rigid bristles.

*S. debilis*, Pursh, *fl.* 1. p. 55; Muhl.! *gram.* p. 34; Big.! *fl. Bost.* ed. 2. p. 21; Torr.! *fl.* 1. p. 48; Beck, *bot.* p. 425; Gray! *Gram. & Cyp.* part 2. no. 135; *Darlingt.! fl. Cest.* ed. 2. p. 21; Ræm. & Schult. *system.* 2. p. 128; Spreng. *syst.* 1. p. 206.

*Culms* 6—18 inches high, cespitose, with a few subulate leaves at the base. *Sheaths* sometimes mucronate. *Spikes* often solitary, but generally 3, (rarely 5—6) growing from the side of the culm several inches below its summit, 3—5 lines in length. *Scales* roundish-ovate, concave, membranaceous, mostly obtuse, with a minute mucronate point, smooth, yellowish on the sides, the centre green. *Bristles* 4—6, strong, overtopping the nut, retrorsely hispid: but sometimes, instead of bristles, there are only rudimentary processes at the base of the nut. *Stamens* 3. *Style* mostly 3-cleft; one of the divisions is sometimes forked above the trifurcation. *Nut* much compressed, very obtuse, the breadth nearly equal to the length, slightly pointed with the minute remains of the style, when mature of a dark brown or nearly black colour, and shining; the surface, when highly magnified, appearing a little waved or rugulose.

HAB. Borders of lakes and rivulets, particularly in sandy soils, Massachusetts to North Carolina. Williamstown, Massachusetts, Prof. Dewey!; near Boston, B. D. Greene!; banks of the Connecticut, Prof. Hitchcock!; shore of Lake Ontario, Dr. Gray!; Long Island!; West Chester, Pennsylvania, Dr. Darlington!; Lincolnton, North Carolina, Mr. Curtis!; Georgia? Dr. Baldwin.



**OBS.** This species was first described by Pursh, but it is undoubtedly the *S. debilis* of Muhlenberg, and was so named by him many years before Pursh's Flora was published. Mr. Arnott in a note under *S. junciformis* of N. ab Esenbeck, (in *Wight's contrib.* p. 112) states that our *S. debilis*, which he received from B. D. Greene, Esq. and myself, is identical with the East India species; but on comparing my specimen of *S. junciformis* given to me by Mr. Arnott, and named by Nees himself, with our *S. debilis*, I observed sufficient differences to induce me to think them distinct. The former has a much larger, pale (not blackish brown) nut, and the bristles are much more slender and scarcely as long as the nut. The *S. Wallichii*, N. ab E. (l. c.), of which I also have a specimen from Mr. Arnott, seems to be scarcely distinct from *S. junciformis*.

In my southern specimens of *S. debilis* from Dr. Baldwin's herbarium, there are sometimes seven spikes in a cluster upon one culm. The spikes are longer, and the nut also blacker and with deeper punctures than in the northern plant.

#### 6. SCIRPUS LACUSTRIS, Linn.

Culm terete, leafless; umbel compound, growing from the side of the culm near its summit; spikes ovate or ovate-oblong; scales ovate, mucronulate, ciliate; style bifid; nut obovate, plano-convex, shorter than the bristles.

*S. lacustris*, Linn.; Willd. *sp.* 1. p. 296; R. Brown, *prodr.* 1. p. 223; Smith, *Eng. fl.* 1. p. 56; Ræm. & Schult. *syst.* 2. p. 138; Michx. ! *fl.* 1. p. 31; Pursh, *fl.* 1. p. 55; Elliott, *sk.* 1. p. 31; Muhl. ! *gram.* p. 32; Torr. ! *fl.* 1. p. 48; Beck, *bot.* p. 425; Gray ! *Gram. & Cyp.* part 2. no. 136; Darlingt. ! *fl. Cest.* ed. 2. p. 21.

*S. acutus*, Muhl. ! *gram.* p. 33; Big. *fl. Bost.* ed. 2. p. 31; Torr. ! *fl.* 1. p. 49; Beck, *bot.* p. 425.

*S. validus*, Vahl, *enum.* 2. p. 268; Pursh ! *fl.* 1. p. 56; Ræm. & Schult. *syst.* 2. p. 138; Spreng. *syst.* 1. p. 209.

Culm 3—8 feet high, gradually tapering upward, smooth, tough, filled with a spongy pith, sometimes marked with oblong dark brown spots;



the base clothed with several sheaths which occasionally bear short leaves. *Umbel* (or rather cyme) growing from one to three inches below the summit of the culm; or the inflorescence may be regarded as terminal, with a single-leaved straight involucre or bract at its base. *Spikes* nearly one third of an inch long, mostly ovate, but sometimes oblong, aggregated in threes at the summit of the peduncles or divisions of the umbel. *Scales* broadly ovate or obovate, obtuse, and frequently emarginate, mucronate, distinctly ciliate and clothed with a minute pubescence, generally marked with two or more curved wrinkles; the sides ferruginous and dotted when young; the keel green. *Bristles* 4—6, very thick, a little longer than the nut, retrorsely hispid. *Stamens* 3. *Nut* broadly obovate, dark brown, very minutely papillose, strongly convex in front, flat on the back.

**HAB.** Lakes, fresh water ponds and swamps, from latitude 60° north to the Gulf of Mexico, and from the Atlantic to the Pacific Ocean.

#### 7. SCIRPUS TRIQUETER, *Linn.*

Culm triquetrous, nearly leafless, (the base bearing one or two short leaves); spikes 1—5, aggregated, sessile, ovate-oblong; scales orbicular-ovate, mucronate; bristles slender, shorter than the nut; style 2-cleft; nut unequally doubly convex, acuminate.

*S. triquetus*, *Linn.*; *Willd. sp.* 1. p. 302; *R. Brown, prodr.* 1. p. 223; *Ram. & Schult. syst.* 2. p. 141; *Smith, Eng. fl.* 1. p. 60; *Kunth, syn.* 1. p. 156; *Michx.!* *fl.* 1. p. 47; *Muhl.!* *gram.* p. 33.

*S. Americanus*, *Pers. syn.* 1. p. 68; *Pursh, fl.* 1. p. 56; *Elliott, sk.* 1. p. 80; *Big. fl. Bost.* ed. 2. p. 21; *Torr.!* *fl.* 1. p. 47; *Beck, bot.* p. 425; *Gray! Gram. & Cyp.* 2. p. 135; *Ram. & Schult. syst.* 2. p. 129.

*S. pungens*, *Vahl, enum.* 2. p. 255; *Ram. & Schult. syst.* 2. p. 128.

*S. mucronatus*, *Pursh! fl.* 1. p. 55; *Elliott, sk.* 1. p. 80.

*Culm* 3—5 feet high, slender, mucronate at the extremity, very acutely triangular, two of the sides concave, the other side flat; sheaths at the base often bearing one or more leaves several inches in length. *Spikes* in a dense cluster near the summit, or some distance down the culm. *Scales* often emarginate, with the midrib produced into a point nearly a line in length; the sides ferruginous; margin scarious and somewhat

pubescent. *Bristles* 3—5, slender, fragile, retrorsely scabrous. *Stamens* 3. *Nut* dark brown and rather dull, even, very convex in front, abruptly pointed.

**HAB.** Swamps and wet meadows, both salt and fresh; throughout North America, to the Arctic regions. A native also of South America, Europe and New Holland.

**OBS.** This species varies in the thickness of its culm, the size and number of the spikes, and their distance below the summit, &c. but it always preserves its essential characters. It does not appear to differ materially from the *S. triquetus* of Europe. Whether the *S. mucronatus*, *Linn.* is really a native of this country, I know not; but the plant which Pursh has described under that name is a mere variety of *S. triquetus*.

††. *Spikes terminal.*

#### 8. SCIRPUS MARITIMUS, *Linn.*

Culm triquetrous, leafy; umbel simple or compound, often of few spikes and sessile, shorter than the involucre; spikes oblong, (large and thick, rather obtuse); scales ovate, lacerately 3-toothed, the midrib produced into a short recurved bristle; style 3-cleft; nut broadly obovate, lenticular, smooth and shining, much longer than the slender bristles.

*S. maritimus*, *Willd. sp.* 306; *Ræm. & Schult. syst.* 2. p. 138; *R. Brown, prodr.* 1. p. 224; *N. ab Esenb. in Wight's contrib.* p. 111; *Big. fl. Bost.* ed. 2 p. 21; *Beck! bot.* p. 426; *Gray! Gram. & Cyp.* part 1 no. 82. (in part.)

*S. macrostachyos*, *Muhl.! gram.* p. 45, (in part); *Torr.! fl.* 1. p. 50 (in part.)

*S. maritimus*,  $\beta$  *macrostachyos*, *Michx.! fl.* 1. p. 32. (in part.)

*S. robustus*, *Pursh! fl.* 1. p. 56 (in part.)

*Culm* 1—4 feet high, thick, smooth, leafy below. *Leaves* 2—5 lines broad, carinate, as tall as the culm, smooth. *Involucre* foliaceous, about 2-leaved, much longer than the umbel. *Spikes* 3—20, nearly an inch in length and very thick, sometimes aggregated and sessile, but generally

forming somewhat compound corymbs. *Scales* membranaceous, somewhat pubescent, chestnut coloured; the summit a little cleft each side of the midrib, which is produced into an awn-like cusp or bristle about 2 lines long and recurved so as to give the spikes a squarrose appearance. *Bristles* 3—4, very slender, about two-thirds the length of the nut, retrorsely scabrous. *Nut* large, nearly orbicular, much compressed, dark brown, and polished, tipped with the minute base of the style.

**HAB.** Salt marshes, and ditches near salt water; not found far from the sea shore; Maine to Florida.

**OBS.** Mr. Arnott thinks that the *Scirpus affinis* of Roth and N. ab Esenb. (l. c.) approaches so near *S. maritimus*, that the two species cannot always be distinguished, and in this opinion I agree.

$\beta$ ? *fluviatilis*. Culm triquetrous, leafy; umbel somewhat compound, shorter than the involucre; spikes ovate, (large and thick,) acute; scales ovate, lacerately 3-toothed; the midrib produced into a bristle; nut obovate, triangular, narrowed downward, (dull,) acuminate, as long as the (6) rigid bristles.

*S. maritimus*, Elliott, sk. 1. p. 86?; Gray! *Gram. & Cyp.* part 1, no. 82, (in part).

*S. macrostachyos*, Muhl.! *gram.* p. 45, (in part.)

*Culm* 2—4 feet high, acutely triangular, smooth, leafy below. *Leaves* as tall as the culm, more than half an inch broad, smooth on the margin and keel. *Umbel* composed of 10—20 spikes; the principal rays about 5, 1—3 inches long, semiterete; the subdivisions bearing at their extremity 2—3 or more spikes in a dense cluster. *Involucre* 3—5-leaved, much longer than the umbel. *Spikes* nearly an inch long and about half an inch in diameter, rather acute even in fruit. *Scales* thin and scarious, pubescent, rarely emarginate, of a pale brown colour, lacerately 1-toothed each side of the midrib, which is produced into a flat recurved cusp or short bristle. *Bristles* mostly 6, straight and stiff, unequal; the longest somewhat exceeding the point of the nut. *Style* unequally 3-cleft, rarely 4-cleft. *Nut* more than 2 lines long, triangular with the sides equal and nearly plane, gradually narrowed downward, abruptly acuminate, of a dull grayish colour, very minutely papillose.

**HAB.** Swamps along the borders of rivers and lakes, always in fresh or only slightly brackish water. Common in

the western parts of the State of New York, *Dr. Gray!*; on the Missouri above St. Louis, *Dr. Baldwin!*

γ. *cylindricus*. Spikes cylindrical-oblong, somewhat acute; scales ovate, somewhat pubescent, aristately mucronate; bristles about 4, rigid, nearly as long as the nut; style 3-cleft; nut obovate, abruptly acuminate, narrowed below, obtusely angular in front, flat on the back, smooth.

*Culm* and *umbel* as in the preceding variety. *Spikes* an inch long, and only one-third of an inch in diameter.

HAB. Georgia, *Dr. Baldwin!*

OBS. The variety β. differs so much from the common *S. maritimus* of our salt marshes in the appearance of the ripe spike and in the form of the nut, as well as in the length of the bristles, that I should have proposed it as a distinct species, did not the succeeding variety connect the two, and seem to show that they are all forms of one species. Which of the three is the *S. maritimus* of Europe I am unable to say, as my foreign specimens are not sufficiently mature to exhibit the ripe fruit. The first variety seems by its lenticular smooth nut, to be exactly *S. maritimus* of N. ab Esenb. (l. c.); but Rœmer and Schultes, in their detailed description of the same species, state that the nut is triquetrous, and the bristles equalling it in length. Smith, (in *Eng. fl.* 1. p. 61) describes the nut as “roundish, shining brown, with 3 blunt angles, and from one to five or six rough bristles.” Perhaps both varieties occur in Europe, as they do in this country; the one being confined to the neighbourhood of salt water, and the other inhabiting the borders of fresh water rivers and lakes.

#### 9. SCIRPUS ATROVIRENS, *Muhl.*

*Culm* triangular, leafy; *umbel* compound, proliferous; *involucre* about 3-leaved; *spikes* ovate, acute, glomerated in dense heads of 15—20; *scales* ovate, mucronate, pubescent; *bristles* as long as the nut; *style* 3-cleft; *nut* obovate, minute, compressed-triangular, tapering towards the base, acuminate, dull.



*S. atrovirens*, *Muhl.*! *gram.* p. 43; *Willd. enum. hort. Ber.* 1. p. 79; *Ram. & Schult. syst.* 2. p. 143; *Spreng. syst.* 1. p. 211; *Schult. mant.* 2. p. 80; *Link, enum.* p. 43, (fide *Schult.*); *Torr.*! *fl.* 1. p. 49; *Beck!* *bot.* 1. p. 426; *Gray!* *Gram. & Cyp.* part 2. no. 137; *Darlingt.*! *fl. Cest.* ed. 2. p. 22.

*S. polyphyllus*, *Vahl, enum.* 2. p. 274; *Pursh, fl.* 1. p. 57, (excl. syn.); *Spreng. syst.* 1. p. 211.

*Culm* obtusely triangular, about 2 feet high, leafy nearly to the summit, smooth. *Leaves* one third of an inch broad, shorter than the culm, scabrous on the margin. *Involucre* mostly of 3 unequal leaves, the two exterior a little longer than the umbel, resembling those of the culm. *Umbel* very unequal, one or more of the rays elongated and erect, the others shorter, and several so short that the heads of spikes appear almost sessile. *Spikes* aggregated into heads of about 15 or 20 each, nearly 2 lines long, many-flowered. *Scales* broadly ovate, carinate, abruptly acuminate and mucronate, at first olive-green and somewhat pubescent, but when old, fuscous and nearly smooth. *Bristles* 6, slender, retrorsely hispid, generally about as long, but sometimes one or two of them a little longer than the nut. *Stamens* 3. *Style* moderately 3-cleft. *Nut* of a whitish colour, sharply acuminate, flat on the back, very convex and obtusely angular in front.

HAB. Wet meadows and swamps. Common in New York! New Jersey! and Pennsylvania!; Kentucky, *Dr. Short!*

OBS. I have never received specimens of this plant from the Southern States, nor from any place west of the Mississippi.

#### 10. SCIRPUS BRUNNEUS, *Muhl.*

*Culm* triangular, leafy; umbel decomposed; involucre 3—4-leaved; spikes short-ovate and ovate-oblong, somewhat loosely clustered in heads of 5 to 8; scales broadly ovate, rather obtuse, slightly mucronate; style 3-cleft; nut minute, obovate, plano-convex, with a short acumination, dull, shorter than the tortuous bristles.

*S. brunneus*, *Muhl.*! *gram.* p. 43; *Torr.*! *fl.* 1. p. 49; *Beck!* *bot.* p. 426; *Darlingt.*! *fl. Cest.* ed. 2. p. 22; *Spreng. syst.* 1. p. 211.



*S. exaltatus*, *Pursh! fl.* 1. p. 56; *Elliott, sk.* 1. p. 87; *Ram. & Schult. syst.* 2. p. 143.

*Culm* 2—4 feet high, obtusely triangular below, acutely angular above. *Leaves* nearly half an inch broad, as tall as the umbel, scabrous on the margin. *Umbel* twice, and sometimes thrice, compounded; the principal rays about 5, three inches or more in length, compressed and angular, with truncate ochreæ at the base. *Spikes* rather longer than in the preceding species. *Scales* carinate, generally of a brownish colour, when old slightly acute and mucronate. *Bristles* 6, slender, flexuous and somewhat crisped, retrorsely pubescent, nearly twice as long as the nut. *Stamens* 3. *Nut* obovate, abruptly acuminate, the point very short, whitish, flat on the back, convex, or very obtusely angular in front, minutely papillose.

**HAB.** Swamps, and borders of ponds; mostly in shady places. Near New York, and in New Jersey!; Deerfield, Massachusetts, *Prof. Hitchcock* and *Dr. Cooley!*; Pennsylvania, *Muhlenberg!*

*β. viviparus.* *Culm* very tall and somewhat climbing; umbels viviparous, bearing flowers at the base of the branches.

*S. exaltatus, β. viviparus, Pursh, l. c.*

**OBS.** This variety I have not met with. *Pursh* remarks that it frequently attains the height of ten feet and upwards.

*γ. crispus.* *Spike* ovate; scales orbicular-ovate, with a very short and abrupt point, somewhat mucronate; bristles much crisped and contorted, but (when extended) three times as long as the nut, scabrous above, smooth below; nut obovate, short pointed, compressed, obtusely angular in front.

**HAB.** Near New York? (The precise locality not recorded.)

**OBS.** I am by no means certain that I have described the *S. atrovirens* and *S. brunneus* so accurately that they can always be distinguished; neither am I positive that they are really distinct. The former is generally known by the dark green colour of its foliage and spikes, its more simple umbel with one or two of the rays elongated and nearly erect, and its denser

heads of spikes. The latter has a larger and decomposed umbel with the spikes longer, brownish, fewer in a head and not so closely aggregated.

#### 11. SCIRPUS LENTICULARIS.

Culm obscurely triangular, leafy; umbel doubly compound; involucre 3-leaved; spikes oblong-ovate, in heads of 5 to 8; scales ovate, scarcely mucronate, smooth; style 2-cleft; nut orbicular, lenticular, with the edges acute, shorter than the 4 straight bristles.

*Culm* 3 feet or more in height, smooth, very obtusely triangular below. *Leaves* 4—5 lines wide, overtopping the culm, somewhat scabrous on the margin. *Umbel* spreading, twice or even thrice compounded; principal rays 3—5, nearly as long as the involucre; secondary rays slender, about an inch long, each bearing 5 to 8 sessile, but not closely aggregated spikes. *Spikes* 3 lines long, rather acute. *Scales* broadly ovate, of a dark olive-green colour, rather obtuse; midrib somewhat prominent. *Bristles* retrorsely scabrous, one-third longer than the nut. *Stamens* constantly 2. *Nut* whitish, nearly orbicular, with a short abrupt acumination, much compressed, the edges thin.

HAB. North-West Coast of America, near Observatory Inlet, *Dr. Scouler!*

OBS. Nearly related to *S. sylvaticus* but differs in its larger spikes, lenticular nut, diandrous flowers, and bifid style; that species having shorter spikes, a triangular nut, triandrous flowers, and a 3-cleft style.

#### 12. SCIRPUS SYLVATICUS, Linn.

Culm triangular, leafy; umbel doubly compound; involucre many-leaved; spikes ovate, crowded; scales mucronate; stamens 3; style 3-cleft; nut triangular, compressed.

*S. sylvaticus*, Linn.; Willd. *sp.* 1. p. 307; Ræm. & Schult. *sys.* 2. p. 142; Michx. *fl.* 1. p. 33; Pursh, *fl.* 1. p. 56; Richardson, *app. to Frank. narr.* ed. 2. p. 2.

HAB. Canada, *Michaux!*; Hudson's Bay Country, *Dr. Richardson*; Island of Sitcha, Russian America, *Mertens*.

OBS. I have seen no North American specimens of this plant except those in Michaux's herbarium, which I did not examine with sufficient accuracy for determining whether they are identical with the *S. sylvaticus* of Europe.

### 13. SCIRPUS DIVARICATUS, *Elliott*.

Culm obtusely triangular; umbel decomposed; the rays spreading and pendulous; spikes oblong-ovate; scales ovate, rather acute, carinate; style 3-cleft; nut triquetrous, acute at each end, as long as the flexuous smoothish bristles.

*S. divaricatus*, *Elliott! sk.* 1. p. 88, t. 2. f. 4; *Spreng. syst.* 1. p. 213; *Schult. mant.* 2. p. 85.

*S. lineatus*, *Muhl.! gram.* p. 45, (excl. syn.).

*S. ambiguus*, *Schult. mant.* 2. p. 85.

*Culm* 3—4 feet high, smooth. *Leaves* 6—14 inches long, 3—4 lines wide, flat, smooth, scabrous on the margin. *Involucre* 1—2-leaved, much shorter than the rays. *Umbel* large, and thrice or more compound; the rays numerous, spreading, pendulous, filiform, with two or three short involucellate leaves at the base. *Spikes* 2—3 lines long, 10—20-flowered; the florets rather loosely imbricated. *Scales* broadly ovate; the sides greenish, spotted with red; margin scarious. *Bristles* 6, flexuous and somewhat crisped, in their natural position nearly as long as the nut, but when extended one third longer, slightly pubescent and knotted, but not retrorsely scabrous. *Stamens* 3. *Nut* acutely triangular, with the sides flat, greenish white, dull.

HAB. Pine barrens South Carolina, *Elliott!* May—June.

OBS. A well-marked species, which, however, does not appear to be widely diffused. My specimen of it was received from Mr. Elliott, who also probably supplied Dr. Muhlenberg with the plant, which he described under the name of *S. lineatus*. It has not hitherto been found except in the state of South Carolina.

## SUBGENUS TRICHOPHORUM.

BRISTLES 6, much longer than the nut, capillary, tortuous, smooth or merely pubescent, (not hispid). STYLE 3-cleft, simple at the base, deciduous. NUT compressed, triangular.—Culm leafy; umbel decomposed; scales of the spikes membranaceous.

*Trichophorum*, *Rich. in Pers. syn.* 1. p. 69; *Nees ab Escnb. in Linnæa*, 9, p. 293; *Lestib. ess. fum. Cyp.* p. 42, no. 54; *Nutt. gen.* 1. p. 36.

Species of *Scirpus*, *Vahl, Michx, &c.*

The genus *Trichophorum* of Richard differs from *Scirpus* only in its longer capillary bristles, which in the mature spikes project beyond the scales. In *S. brunneus* and *S. divaricatus*, the bristles are long, rather pubescent than scabrous, slender, but shorter than the scales; so that they connect *Scirpus* with *Trichophorum*, and show that the latter can at the most rank only as a subgenus.

14. SCIRPUS (TRICHOPHORUM) ERIOPHORUM, *Michx.*

Culm obtusely triangular; umbel terminal, much decomposed; involucre many-leaved, very long; spikes ovate; scales lanceolate, appressed; bristles much exerted and investing the mature spike; nut smooth.

*S. Eriophorum*, *Michx.! fl.* 1. p. 33; *Torr.! fl.* 1. p. 50; *Big.! fl. Bost.* ed. p. 22; *Darlingt.! fl. Cest.* ed. 2. p. 23.

*S eriophorus*, *Vahl, enum.* 2. p. 282; *Ræm. & Schult. syst.* 2. p. 147; *Schult. mant.* 2. p. 83.

*S. thyrsoflorus*, *Willd. enum. hort. Berol.* 1. p. 78.

*Trichophorum cyperinum*, *Pers. syn.* 1. p. 69; *Spreng. syst.* 1. p. 214; *Pursh, fl.* 1. p. 57; *Muhl.! gram.* p. 47; *Elliott, sk.* 1. p. 91. t. 3. f. 4; *Beck, bot.* p. 426.

*Eriophorum cyperinum*, *Linñ. sp.* p. 77; *Willd. sp.* 313.

*SCIRPUS paniculatus*, *foliis floralibus paniculam superantibus*, *Gron. fl. Virg.* p. 12.



$\alpha$ . Culm 4—5 feet high, umbel very large, supradecomposed and proliferous, patulous, nodding, shorter than the involucre; spikes all pedunculate; nut white.

$\beta$ . Like the preceding, but the spikes aggregated 3—5 together at the extremity of the ultimate rays.

$\gamma$ . With the characters of ( $\alpha$ ), but the nut brown.

$\delta$ . Culm slender, 18 inches high; umbel contracted, somewhat erect.

$\epsilon$ . Resembling the last, with the spikes all pedicellate.

$\zeta$ . Umbel much crowded, somewhat capitate.

$\eta$ . Umbel somewhat patulous, longer than the involucre, blackish at the base; spikes oblong, pedicellate.

*Culm* nearly terete below, obtusely triangular above, leafy nearly to the summit. *Leaves* 1—2 feet long, flat, 2—4 lines wide, scabrous on the margin; sheaths smooth, close, brownish and scarious at the throat. *Involucre* of 3—4 long leaves resembling those of the culm, and several shorter ones, their sheathing bases brownish or nearly black. *Umbel* consisting of numerous primary rays, which are many times divided. *Spikes* 2—3 lines long, obtuse. *Scales* acute, of a ferruginous colour when mature, with a green keel. *Bristles*, when extended, 8—10 times as long as the nut, brownish, completely covering the mature spike, giving it a woolly appearance. *Stamens* 3. *Nut* flat on the back, obtuse-angled in fruit, long, acuminate, dull.

**HAB.** Borders of swamps and wet meadows; Hudson's Bay! to the Gulf of Mexico! and west to Kentucky!

**OBS.** This species varies much in size and in the appearance of its umbel, but the different forms which it assumes pass into one another so gradually, that it is extremely difficult to mark their limits. Along the sea coast, and a short distance in the interior the first two varieties are almost exclusively found, but they rarely occur far inland, while the remaining forms are never seen in the neighbourhood of salt water, nor, as far as my observations have extended, south of the Hudson and west of the Alleghany mountains.



## 15. SCIRPUS (TRICHOPHORUM) LINEATUS, Michx.

Culm triangular; umbels terminal and lateral, decomposed, at length nodding; involucre 1—2-leaved, shorter than the umbels; spikes oblong, pedunculate; scales ovate, acuminate, somewhat patulous at the tip, carinate.

*S. lineatus*, Michx. ! *fl.* 1. p. 32; *Vahl, enum.* 2. p. 73; *Pursh, fl.* 1. p. 56; *Elliott, sk.* 1. p. 87; *Torr. fl.* 1. p. 51.

*S. pendulus*, Muhl. ! *gram.* p. 44.

*S. brizoides*, Willd. (fide Muhl.); *Schult. mant.* 2. p. 84.

*Trichophorum lineatum*, Pers. *syn.* 1. p. 69; *Beck ! bot.* p. 427.

*Isolepis lineata*, Ram. & Schult. *syst.* 2. p. 117.

*Culm* 1—2½ feet high, very leafy, distinctly triangular. *Leaves* 2—4 lines wide, flat, scabrous on the margin; sheaths open at the throat, several of the upper ones bearing umbels. Terminal *umbel* somewhat paniculate, loose, at first erect, but at length more or less pendulous, twice or thrice compound; lateral umbels much smaller, sometimes wanting; ultimate divisions 3—6 lines long. *Involucre* of one principal leaf, which is shorter than the umbel. *Spikes* 3—4 lines in length, oblong, or ovate-oblong. *Scales* loosely imbricated at the tip so as to appear sometimes squarrose, ferruginous, with a very distinct and rather prominent keel. *Bristles* very slender, smooth, crisped and entangled, projecting a little beyond the scale in the mature spike. *Stamens* 3. *Style* somewhat unequally 3-cleft, smooth. *Nut* obovate, acuminate, obtusely angular in front, flat on the back, minutely papillose, pale brown when ripe.

HAB. Boggy places. Plainfield, Massachusetts, *Dr. Porter!*; near Poughkeepsie, New York, *Mr. Dudgeon!*; near Fort Gratiot, Michigan Territory, *Dr. Pitcher!*; Banks of the Ohio, *Dr. Baldwin!*; Kentucky, *Dr. Short!*; Pennsylvania, *Muhlenberg!*; New Orleans, *Dr. Ingalls!*; South Carolina, *Elliott!*; Texas, *T. Drummond!*

OBS. Pursh's specimens of *Scirpus lineatus* in Lambert's Herbarium agrees exactly with the plant here described, and yet he states that it is destitute of bristles; in consequence of which remark Rœmer and Schultes, in their *Systema Vegetabilium*, have removed it to the genus *Isolepis*. Afterwards, as if

to increase the confusion, Schultes, finding that Muhlenberg had described a *S. lineatus* with bristles, considered it a new species, and named it *S. ambiguus*, but I have ascertained Muhlenberg's plant to be identical with the *S. divaricatus* of Elliott.

North American species of *Scirpus* which are little known.

1. *S. RETICULATUS*, *Lam. ill.* 1. p. 142; *Ræm. & Schult. syst.* 2. p. 148; *Poir. enc. meth.* 6. p. 771.

"*S. culmo gladiato nudo, aspero, umbella composita foliacea, involucri foliis reticulatis. E Carolina, D. Fraser.*" *Lam.* 1. c.

OBS. To this very brief and imperfect specific character of Lamark, the following description is added by Poiret: "*Culmus basi foliosus subtrigonus substriatus, angulis acutis asperis. Pedunculæ inæquales rigidi angulosi; spiculæ in umbellis partialibus fasciculatæ, tenues, parvulæ oblongæ acutæ pedunculatæ, subfulvæ. Glumæ angustæ, lanceolatæ acutæ. Involucrum universale foliolis 6—8 amplis, inæqualibus, floribus multo longioribus, margine asperis; partiale e foliolis duobus oppositis lanceolatis acutis longioribus spiculis.—S. sylvatico proximus.*" *Enc. meth.*—Even this description is insufficient for determining either the species or the proper genus of the plant, as no notice is taken of the bristles, style or nut.

2. *S. CAROLINIANUS*, *Lam. ill.* 6. p. 142.

"*S. culmo subtriquetro filiformi, umbella composita involucri 2-phylo longuisculo. E Carolina, D. Fraser.*"—*Lam.* 1. c.

OBS. Vahl refers Lamark's plant to *Fimbristylis castanea*, but with some doubt whether it might not belong to *Scirpus autumnalis*. It is impossible to identify the species by the brief character here quoted.

3. *S. NITENS*, *Vahl, enum.* 2. p. 272; *Pursh, fl.* 1. p. 56; *Isolepis nitens*, *Ræm. & Schult.* 2. p. 117.

"*S. spicis ovatis pedicellatis, corymbis subcompositis axillaribus terminalibusque, culmo tereti.*

"*Culmus semipedalis, articulatis, tectis vaginis foliorum; folia radicalia culmo breviora, laxa, linearia; involucri foliola alterna subulata, inferiora vix unguicularia. Ochreæ breves, oblique truncatæ. Corymbus pedunculis 6, axillares, simplex, pedunculis 4—5 unguicularibus, totidem pedicellis 1—2-stachyis. Spicæ magnitudine seminis Coriandri, totæ fusco-ferruginæ, nitidæ; squamis ovatis, acutis. Stylus bifidus basi*

dilatatus. Semen rubrotundum, transversim rugulosum. Setæ 0.—In Virginia et Carolina.”—*Vahl*, l. c.

Obs. In consequence of the absence of bristles in this species, Rœmer and Schultes have placed it in the genus *Isolepis*. It has not been recognized by any American botanist, and I suspect it will prove to be a species of *Rhynchospora*.

## 11. ERIOPHORUM, *Linn.*

SCALES of the spike imbricated on all sides, mostly membranaceous, numerous. BRISTLES (hairs) of the perigynium numerous, (rarely as few as six,) capillary, flat, very long, collected in fascicles at the base of the nut and forming a silky or woolly tuft. STAMENS 3. STYLE 3-cleft, simple at the base, deciduous. — Culm generally leafy; spikes rarely solitary, growing at the summit of the culm, mostly in a more or less compound umbel or cyme; when mature, clothed with the long silky bristles.

*Eriophorum*, *Linn. gen.* p. 30; *Juss. gen.* p. 27; *Lam. ill.* t. 39; *Rœm. & Schult. gen.* 180; *Lestib. ess. fam. Cyp.* p. 42, no. 55; *Nees ab Esenb. in Wight's contrib.* p. 110, and in *Linnæa*, 9. p. 293; *Nutt. gen.* 1. p. 36.

### §. 1. *Spike solitary.*

#### 1. ERIOPHORUM ALPINUM, *Linn.*

Culm acutely triangular, filiform, somewhat scabrous, with short subulate leaves at the base; scales somewhat coriaceous, keeled; spike oblong; hairs 6, crisped.

*E. alpinum*, *Linn.*; *Willd. sp.* 1. p. 314; *Vahl, enum.* 2. p. 388; *Wahl. fl. Lapp.* p. 16; *Smith, Eng. fl.* 1. p. 67; *Eng. bot.* t. 311; *Rœm. & Schult. syst.* 2. p. 156; *Spreng. syst.* 1. p. 214; *Torr. ! fl.* 1. p. 65; *Big. ! fl. Bost.* ed. 2. p. 23; *Beck, bot.* p. 427; *Gray ! Gram. & Cyp.* part 1, no. 87.

*E. Hudsonianum*, *Michx. ! fl.* 1. p. 34.

*Trichophorum alpinum*, *Pursh, fl.* 1. p. 57; *Muhl. cat.* p. 7; *Link, enum. alt.* p. 47, (fide *Schult.*).

*T. alpinum*,  $\beta$ . *Hudsonianum*, *Pers. syn.* 1. p. 70.

*T. Hudsonianum*, *Nutt. gen.* 1. p. 36.

*Rhizoma* creeping. *Culms* numerous, growing in a row, 8—10 inches high, scarcely thicker than a packthread, with very acute scabrous angles and concave sides, naked except near the base. *Leaves* 3—8 lines long, pungent, erect, triangular, channelled; sheaths close, purplish; the lowest ones nearly naked, or with merely cuspidate rudimentary leaves. *Spike* 3 lines long, somewhat compressed. *Scales* oblong-lanceolate, obtuse, yellowish-brown; the lowest one bracteiform, submucronate, nearly as long as the spike. *Bristles* 4—5 times as long as the scale, constantly 6, flat and membranaceous, white, more or less crisped, fragile. *Stamens* 3?; filaments capillary, long. *Style* filiform, 3-cleft half-way down. *Nut* triangular, compressed, acuminate with the base of the style, pale brown, dull.

HAB. Sphagnous swamps, particularly on mountains. Danville, Vermont, *J. Carey, Esq!*; Stockbridge, Wenham, and other parts of Massachusetts, *Dr. Emmons!* and *W. Oakes, Esq!*; bogs on the mountains of Pennsylvania, *Pursh*; White Hills of New Hampshire, *Dr. Bigelow!*; Northern and Western parts of the State of New York, *Dr. Gray!*—May—June.

OBS. This *Eriophorum* differs from all the other single-spiked species of the genus in the rigid scales of the spike, and in the definite crisped bristles. From the subgenus *Trichophorum* it also differs in the texture of the scales, and in the flat, less crisped and white bristles. The North American plant resembles the European *E. alpinum* in almost every respect.

## 2. ERIOPHORUM VAGINATUM, *Linn.*

*Culm* terete below, obtusely triangular above, somewhat rigid; sheaths inflated; spike oblong-ovate; scales scarious; hairs straight, dense; anthers linear, elongated.

*E. vaginatum*, *Linn.*; *Willd. sp.* 4. p. 312; *Vahl, enum.* 2. p. 388; *Ræm. & Schult. syst.* 2. p. 157; *Wahl. fl. Lapp.* p. 17; *Spreng. syst.* 1. p. 214; *Smith, Eng. fl.* 1. p. 66; *Eng. bot.* t. 873; *Torr. fl.* 1. p. 65; *Beck! bot.* p. 427; *Gray! Gram. & Cyp.* part. 1. no. 88.



*E. cespitosum*, *Host. gram. t.* 39; *Pursh! fl.* 1. p. 57.

*Rhizoma* creeping. *Culms* densely cespitose, about a foot high, the lower part clothed with two or three ventricose sheaths, which are mucronate, or bear only rudimentary (and often discoloured) leaves. Radical *leaves* long, often overtopping the culm (especially when the spike is in fruit), very narrow and almost setaceous. *Spike* about three-fourths of an inch long. *Scales* ovate-lanceolate, acuminate, with a broad white scarios margin of silver-gray in the young spike, but of a dark livid colour when mature; several of the lower ones empty and at length reflexed. *Hairs* about 40 to each nut, 3—4 times the length of the scale, collected at the base in fascicles of 5—7 each, white with a tinge of yellow. *Stamens* 3; *anthers* yellow. *Style* 3-cleft. *Nut* obovate, narrowed below, brown, dull, very obtuse, flattened on the back, convex in front.

HAB. Deep sphagnous swamps. Near Quebec, Upper Canada, *Mrs. Percival!*; Arctic America and the Hudson's Bay Country, *Dr. Richardson*; on the Rocky mountains, *T. Drummond!*; near Williams College, Massachusetts, *Prof. Dewey!*; Litchfield, Connecticut, *Mr. Brace!*; Watertown and Utica, New-York, *Dr. Gray!*

OBŒ. As the normal number of hypogynous processes in Cyperaceæ is six, the great number in most of the species of *Eriophorum* may be accounted for by supposing the spike to be compound, each scale covering a spikelet of several florets, only one of which arrives at perfection, the fascicles of hairs thus belonging to a number of abortive florets.

### 3. ERIOPHORUM CAPITATUM, *Host.*

*Culm* terete, soft; sheathes a little inflated; spike almost spherical; *anthers* cordate-ovate, short.

*E. capitatum*, *Host, gram. Aust.* 1. p. 30. t. 36; *Ræm. & Schult. syst.* 2. p. 157; *Smith, Eng. fl.* 1. p. 66; *Eng. bot. t.* 2387; *Hook.! fl. Scot.* p. 20, and in *app. to Parry's 2nd voy.* p. 27; *R. Brown, in app. to Parry's 1st voy.* p. 284.

*E. Scheuchzeri*, *Roth, in Sims & Kon. ann. bot.* 1. p. 149; *Pers. syn.* 1. p. 70; *Vahl, enum.* 2. p. 388.



*E. callithrix*, Cham. in Mey. Cyp. nov. in Mém. Acad. St. Petersb. (6 ser.) 1. p. 203. t. 2?

HAB. Melville Island, Arctic America, Capt. Parry; Kotzebue's Sound, Capt. Beechey; Greenland, Capt. Sabine. A native also of the northern parts and high mountains of Europe.

OBS. I have seen no North American specimens of this plant, which it is very difficult to distinguish from *E. vaginatum*, except by the shorter anthers and hairs.

The *E. callithrix* of Chamisso, described at full length and figured in the work quoted above, was found on the Island of St. Lawrence, near Behring's Strait. Except in the leaves being scabrous, it appears to differ so little from *E. vaginatum*, that it can hardly be regarded as a distinct species.

#### 4. ERIOPHORUM CHAMISSONIS, C. A. Meyer.

*Culms* solitary, terete, smooth; leaves compressed, smooth; sheathes somewhat inflated; spike oblong; anthers linear.

*E. Chamissonis*, C. A. Meyer in Mém. Acad. St. Pet. (6. sér.) 1. p. 204. t. 3.

*Root* (rhizoma) creeping extensively. *Culm* 6—12 inches high, about as thick as a packthread, soft, smooth, leafy below, naked above. *Leaves* linear, channelled, obtuse, very smooth. *Spike* (without the hairs) about 6 lines long. *Scales* lanceolate, acute, blackish, with a white scarious margin. *Hairs* numerous, reddish, more than an inch long in the mature spike. *Stamens* 3; *anthers* about a line in length, yellow. *Styles* 3—4-cleft. *Nut* oblong, mucronate, compressed, quadrangular or triangular, attenuate at the base, smooth.—*Meyer*.

HAB. Unalashka; also in Kamtschatka and on the Alps of Altai, Chamisso.

OBS. I have not seen this plant, but it appears to be scarcely distinct from *E. vaginatum*.

§ 2. *Spikes numerous.*5. ERIOPHORUM VIRGINICUM, *Linn.*

Culm nearly terete below, obtusely triangular above; leaves flat, very long; spikes clustered, erect, nearly sessile; involucre 2—3-leaved.

*E. Virginicum*, *Linn. sp.* 77; *Willd. sp.* 313; *Vahl, enum.* 2. p. 390; *Ræm. & Schult. syst.* 2. p. 159; *Spreng. syst.* 1. p. 214; *Walt. fl. Car.* p. 71; *Michx.!* *fl.* 1. p. 34; *Pursh, fl.* 1. p. 58; *Elliott, sk.* 1. p. 92; *Muhl.!* *gram.* p. 49; *Torr.!* *fl.* 1. p. 66; *Big. fl. Bost.* ed. 2. p. 24; *Beck! bot.* p. 437; *Gray! Gram. & Cyp.* part 1. no 89; *Darlingt. fl. C'est.* ed. 2. p. 23.

*E. spica compacta erecta, &c. Gron. fl. Virg.* p. 132.

*Culm* 2—4 feet high, leafy, smooth. *Leaves* 10—18 inches long, 1—3 lines wide, scabrous on the margin, somewhat triangular at the point; sheaths closely investing the culm. *Involucre* mostly of two unequal leaves, the longer 3—6 inches in length. *Peduncles* 3—4, short, somewhat umbellate, each bearing several nearly sessile crowded spikes. *Spikes* ovate, (when young acute,) about 3 lines long. *Scales* ovate, acute, striate, the inferior ones empty, the sides pale ferruginous, the keel green. *Hairs* 40—50 in each flower, of a reddish colour, in the mature spike 3 times as long as the scale. *Stamen* solitary; *anther* oblong. *Nut* oblong, triangular, compressed, attenuated downward, the summit abruptly pointed.

**HAB.** Swamps and bog meadows; Hudson's Bay to Florida! and west to the Mississippi!—July—August.

**OBS.** In shady situations this plant grows very slender, with long narrow leaves, in which state it is the *E. angustifolium*, *Muhl.!* *gram.* p. 48, but not of Roth and other botanists. The erect subsessile spikes, monandrous flowers and reddish hairs of this plant readily distinguish it from all the other North American species of *Eriophorum*.

6. ERIOPHORUM POLYSTACHYUM, *Linn.*

Culm nearly terete; leaves flat, acutely triangular at the point; involucre about 2-leaved; peduncles scabrous; spikes nodding; scales ovate, acute; nut obovate, obtuse.

*E. polystachyum*, *Linn.*; *Willd. sp.* 1. p. 312; *Vahl, enum.* 2. p. 390, *Walt. fl. Car.* p. 71; *Pursh, fl.* 1. p. 58; *Elliott, sk.* 1. p. 92; *Muhl. ! gram.* 1. p. 49; *Torr. ! fl.* 1. p. 66; *Big. fl. Bost.* ed. 2. p. 23; *Beck, bot.* p. 427; *Gray, ! Gram. & Cyp.* part 1. no. 90; *Hook. in app. Parry's 2nd voy.* p. 27; *Smith, Eng. fl.* 1. p. 67, and *Eng. bot.* t. 563.

*E. polystachyum*,  $\beta$ . *Michx. ! fl.* 1. p. 34.

*E. latifolium*, *Hoppe*; *Ræm. & Schult. syst.* 2. 149.

*E. vulgare*, *Pers. syn.* 1. p. 70.

*Root* fibrous. *Culm* 1—2 feet high, somewhat compressed towards the base, leafy; sheaths rather loose. *Leaves* 3—6 inches long, 2—4 lines wide, pale green, flat except towards the point, which is sharply triangular and generally of a dark brown colour. *Involucre* mostly 2-leaved, rather shorter than the umbel; the leaves channelled, and triangular at the point. *Peduncles* often simple, unequal, at first erect, but at length nodding, scabrous upward. *Spikes* 4—12, ovate, 3—4 lines long. *Scales* ovate, acute, scarious, of a livid green colour, at length becoming dark brown; the midrib somewhat prominent. *Hairs* 40—50 in each flower, three-fourths of an inch long, flat, white, with a slight reddish tinge. *Stamens* 3! *Style* 3-(rarely 4-) cleft; the divisions downy. *Nut* narrowed downward, obtuse, flat on the back, angular in front.

**HAB.** Boggy meadows; Canada! to Georgia! and west to the Rocky Mountains!

7. ERIOPHORUM ANGUSTIFOLIUM, *Reichard.*

Culm somewhat triangular; leaves triquetrous, channelled; involucre mostly 1-leaved; peduncles mostly smoothish, nodding; scales broadly ovate, somewhat obtuse, with a strong midrib; nut elliptical, narrowed at each end, acutely triangular.

*E. angustifolium*, Schrad. *fl.* 1. p. 153; Smith, *Eng. fl.* 1. p. 69, and *Eng. bot.* 56!; Hook. *fl. Scot.* p. 21; Willd. *sp.* 1. p. 313; Rom. & Schult. *syst.* 2. p. 158; Pursh, *fl.* 1. p. 58; Torr. *fl.* 1. p. 67; Big. *fl. Bost.* ed. 2. p. 23; Beck, *bot.* p. 427; R. Brown! in *app. Parry's 1st. voy.* p. 274; Hook. in *app. Parry's 2nd voy.* p. 27; Richardson in *app. Frank. 1st jour.* ed. 2. p. 2; Darlingt. *fl. Cest.* ed. 2. p. 24.

*E. tenellum*, Nutt. *gen. supp.*; Schult. *mant.* 2. p. 93.

*E. polystachyon*, var. *tenellum*, Gray! *Gram. & Cyp.* part 1. no. 91.

*E. angustifolium*, Schweinitz! in Long's *2nd exped.* 2. p. 381.

*Culm* 1½ feet high, very slender, leafy; the upper part somewhat scabrous. *Leaves* scarcely a line wide, the sides folded together so as to form a triangular channel, and an inch or more of the upper extremity sharply triangular; the lowest ones 6—12 inches long; those of the culm 3—6 inches in length. *Involucre* generally of one leaf, which is scarcely longer than the shortest spike. *Spikes* 4—10, ovate, one or two nearly sessile; the rest on simple or divided peduncles, which are sometimes 2—4 inches long, not always smoothish, but sometimes rather scabrous or pubescent. *Scales* brown, obtuse at the tip, sometimes obscurely 3-nerved. *Hairs* 50—60 in each flower, scarcely flattened (narrower than in the preceding species), nearly an inch long when mature. *Stamens* 3; *anthers* linear, elongated. *Style* filiform, deeply 3-cleft; the divisions showy. *Nut* linear-elliptical, (scarcely half as broad as in *E. polystachyum*,) broadest a little above the middle.

**HAB.** Sphagnous swamps. Arctic America!, Canada! and the New England States; Western and Northern parts of the State of New York, Dr. Gray!; Danville, Vermont, J. Carey, Esq.!—June—July.

**Obs.** Easily distinguished from *E. polystachyum* by its narrow triangular leaves, one-leaved involucre, and narrow nut. Mr. Brown thinks that the Arctic plant collected in Parry's 1st voyage may prove a distinct species, between *E. angustifolium* and *E. polystachyum*. He notices two varieties of it; one with smooth, the other with *scabrous* peduncles.

$\beta?$  *brevifolium*. Cauline leaves very short, triquetrous; involucre much shorter than the spikes, lanceolate, (discolored); hairs somewhat crisped.

*Culm* 12—18 inches high, obtusely triangular, slender, very smooth the whole length. *Leaves* acutely triangular throughout, channelled on the upper side; those of the culm very narrow, scarcely an inch long, erect and somewhat pungent; radical ones longer and broader (1—1½). *Involucre* formed of a bracteiform dark-coloured leaf 5 to 8 inches in length, and another much smaller one. *Umbel* contracted. *Peduncles* somewhat pubescent and slightly scabrous, 3—10 lines long. *Spikes* 3—6, short ovate. *Scales* ovate, of a deep livid colour, rather obtuse. *Hairs* a little more than half an inch in length, white. *Nut* as in the common variety.

HAB. Sphagnous swamps. Plainfield, Massachusetts, *Dr. Porter!*; Utica, New York, *Dr. Gray!*

OBS. This variety agrees pretty well with a plant which I received from *Dr. Hooker*, under the name of *E. triquetrum*, (*E. gracile*, *Roth*, & *Smith*, *Eng. fl.*) but I think that it cannot be separated from *E. angustifolium*.

#### 9. ERIOPHORUM GRACILE, *Roth*.

*Culm* triangular; leaves triquetrous, somewhat filiform; peduncles scabrous; flowering spikes erect; nut linear.

*E. gracile*, *Roth*, in *Sims & Konig's ann. of bot.* 2. p. 150; *Smith*, *Eng. fl.* p. 69; *Eng. bot.* t. 2402; *Hook. ! fl. Scot.* p. 20, and in *app. to Parry's 2nd. voyage*, p. 27.

*E. triquetrum*, *Hoppe*; *Ræm. & Schult. syst.* 2. p. 157; *Spreng. syst.* 1. p. 214.

HAB. Arctic America, *Capt. Parry*.

OBS. I have seen no undoubted N. American specimens of this *Eriophorum*, unless I have confounded it with my variety  $\beta$ . of *E. angustifolium*.

#### 10. ERIOPHORUM STRICTUM, *R. Brown*.

*Culm* somewhat terete; leaves straight, flat, triquetrous at



the point; spikes pedunculate, shorter than the involucre; scales somewhat acute, very finely ciliate.

*E. strictum*, *R. Brown in Richardson's app. Franklin's 1st. journ.* ed. 2. p. 3.

HAB. Subarctic America, *Dr. Richardson.*

OBS. I am unacquainted with this plant. Mr. Brown remarks that it is a doubtful species, near *E. tenellum* of Nuttall.

### 11. ELYTROSPERMUM, *C. A. Meyer.*

SPIKE many-flowered. SCALES imbricated on every side, all of them fertile. PERIGYNIUM consisting of two lateral, ovate, membranaceous scales. STYLE simple at the base, 2-cleft. NUT plano-convex, with a conical point, surrounded with the persistent filaments and perigynium.—Habit of *Scirpus lacustris*.

Elytrospermum, *C. A. Meyer*, in *Mém. imp. acad. St. Petersb.* (5 sér.) 1. p. 200. (1830.) t. 2.

*Culm* 3—4 feet high, about as thick as a goose quill, leafless, very obtusely triangular, attenuated upward, smooth, yellowish, green and somewhat glaucous. *Involucre* of three unequal lanceolate rigid leaves, mucronate and pungent; the largest about an inch and a half long. *Umbel* terminal, decomposed; the rays about 20, unequal, semiterete, smooth; partial umbels consisting of 2—5 spikes, which are sessile or pedunculate. *Spike* oblong, many-flowered, 2—3 lines long. *Scales* ovate, obtuse, smooth, ferruginous, scarious and obscurely lacerated on the margin, tipped with a scabrous green point. *Perigynium* compressed, linear, somewhat dilated at the base, dark purple, finbriately ciliate, a little longer than the ovary. *Stamens* 2—3; filaments white, linear, flat, membranaceous. *Stigmas* 2. *Nut* obovate, oblong, attenuated at the base, somewhat compressed, yellowish, smooth, punctulate.

HAB. California, *C. A. Meyer.*

Obs. I have not had an opportunity of examining this plant. If it really belongs to the tribe Scirpeæ, its place is next to *Mulachochæte*, *N. ab E.*, which differs in the scales of the perigynium being 5 or 6, instead of 2. It may, however, be more nearly related to the Hypolytrææ, if not a species of *Hypolytrum*\* itself.

†† Without a Perigynium.

## 12. FIMBRISTYLIS, *Vahl.*

SCALES imbricated on all sides. BRISTLES 0. STYLE compressed, 2-cleft, bulbous at the base, deciduous, often ciliate on the margin.—Habit of *Scirpus*.

*Fimbristylis*, *Vahl, Enum.* 2. p. 285; *R. Brown, Prodr.* 1. p. 225; *Roem. & Schult. gen.* 175; *Lestib. ess. fam. Cyp.* p. 39. no. 45; *N. ab Esenb. in Wight's contrib.* p. 70, and in *Linnæa*, 9. p. 290; *Nutt. gen.* 1. p. 33.

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\* The genus *Hypolytrum*, as characterized by Richard, included also what is now called *Lipocarpa*. Indeed two of his three species belong to the latter genus; so that the name *Hypolytrum* ought to have been applied to the species in which the squamulæ are *parallel* to the scale. *Hypælyptum* of *Vahl (Enum.* 2. p. 283†) appears to be identical with Richard's genus, including both *Hypolytrum* and *Lipocarpa*. *Hypælyptum* of *R. Brown, Prodr.* 1. p. 219, (who quotes *Vahl, l. c.*) is precisely *Lipocarpa* of *Nees ab Esenbeck*, and this most profound botanist expressly states that *Schænus nemorum, Vahl, Scirpus anomalus, Retz., S. bromeliæfolius, Rudge*, and other unpublished species, having the squamulæ ("valvulæ perianthii") lateral, with a very different habit from *Hypælyptum*, constitute a proper genus. This genus is the present *Hypolytrum*, from which we must exclude, however, *S. bromeliæfolius, Rudge*, which is the *Diplasia Keratæfolia, Rich.* *Beera* of *P. de Beavois*, (in *Lestib. ess. fam. Cyp.* p. 43. no. 57) seems to be scarcely distinct from *Hypolytrum* of *N. ab Esenb.* Indeed the two genera are united by the latter botanist.

† "Hypælyptum, *Vahl*, qui in Herb. Richardiano nomen haud rectè transcripsit." *Lestib. ess.*

Species of *Isolepis*, *Vahl*.

Species of *Scirpus*, *Linn.*, *Willd.*

### I. FIMBRISTYLIS BALDWINIANA.

Culm sulcate and somewhat compressed; leaves mostly radical, channelled, serrulate, nearly as long as the culm; umbel few-spiked, simple or somewhat compound, shorter than the involucre; spikes ovate, acute; scales broadly ovate, somewhat mucronate; nut marked with tuberculated ribs and transverse striæ; style somewhat ciliate.

*Scirpus sulcatus*, *Elliott! sk.* 1. p. 86, (not of A. de P. Thouars); *Spreng. syst.* 1. p. 212.

*S. Baldwinianus*, *Schult. mant.* 2. p. 85; *Darlingt.! fl. Cest.* ed. 2. p. 18.

*S. ferrugineus*, *Darlingt.! fl. Cest.* ed. 2. p. 7.

*Culms* cespitose, deeply sulcate, 2—12 inches high, smooth. *Leaves* narrow, channelled on the upper surface, sometimes overtopping the culm, slightly ciliated with very minute teeth or serratures, sometimes hairy. *Involucre* about 3-leaved; one of the leaves longer than the umbel, all of them denticulate like those of the culm. *Umbel* mostly simple; rays 2—4, seldom more than three-fourths of an inch long, sometimes divided. *Spikes* 3 lines long, acute or somewhat acuminate. *Scales* membranaceous, with a short abrupt mucronate point; the sides yellowish brown; keel green. *Stamen* solitary. *Style* dilated at the base into a roundish bulb, the whole at length separating from the nut; the divisions spreading and recurved. *Nut* obovate, whitish, marked on each sides with 6—8 prominent ridges, sometimes with a number of warts towards the summit.

**HAB.** Damp clayey soils, Pennsylvania to the Gulf of Mexico, and west to the Mississippi. West Chester, Pennsylvania, *Dr. Darlington!*; near Charleston, South Carolina, *Elliott!*; Riceborough, Georgia, *L. Le Conte, Esq.!*; St. Louis and New Orleans, *T. Drummond!*

**OBS.** Allied to *F. laxa*, *Vahl*, and also to *F. annua*, *R. & S.* My St. Louis and New Orleans specimens have the

leaves and sheaths a little hairy. I have specimens of a *Fimbristylis* scarcely distinct from this, collected by the late Dr. Baldwin in Bahia, Brazil.

## 2. FIMBRISTYLIS CONGESTA.

Densely cespitose; culms and leaves setaceous, scabrous; spikes cylindrical-oblong, in a terminal head, much shorter than the 3—4-leaved involucre; scales lanceolate, very acute; stamen 1; style smooth; nut minute, lenticular, broadly obovate, longitudinally striate, and transversely rugose.

*Culms* forming dense tufts, 2—4 inches high, compressed, striate, with a channel on one side. *Leaves* channelled, as long as the culm; sheaths loose, naked at the throat. *Involucral leaves* unequal, 4—10 times as long as the spikes, setaceous and scabrous. *Spikes* 5—8, in a close head, 3—4 lines long, nearly cylindrical, 50—60-flowered. *Scales* of an obscure green and brown colour, slightly mucronate and subsquarrose. *Stamen* solitary. *Style* long, filiform, somewhat compressed, 2-cleft one-third of the way down; the divisions recurved, nearly smooth; the bulbous base about one fifth the diameter of the nut. *Nut* exceedingly minute, yellowish, strongly rugose transversely, and marked with several longitudinal lines on each side.

HAB. Near New Orleans, *T. Drummond!*; Wilmington, North Carolina, *Mr. Curtis?*

OBS. This species strongly resembles *F. argentea* of Vahl, and also, *N. ab Esenbeck* (*in Wight's contrib.* p. 100); but the latter differs in the ovate scales, and in the deep angular membranaceous alveolæ of the rachis. I have seen a specimen of this plant in the Herbarium of the Academy of Sciences in Philadelphia, labelled "*Scirpus minimus*, New Jersey." I am somewhat uncertain respecting the N. Carolina locality, as the plant which I supposed was received from Mr. Curtis was unfortunately placed in my herbarium before its name and station were recorded.



## 3. FIMBRISTYLIS SPADICEA, Vahl.

Culm somewhat compressed, nearly naked; leaves semiterete, filiform, naked at the throat, nearly smooth; umbel of few rays, simple or compound; spikes ovate-oblong or cylindrical; involucre of 2—3 subulate leaves; stamens 3; style broad, fimbriate, slightly bulbous at the base; nut obovate, compressed, punctato-striate.

*F. spadicea*, Vahl, *enum.* 2. p. 294; Pursh, *fl.* 1. p. 49; Ræm. & Schult. *syst.* 2. p. 101; Beck, *bot.* p. 423; Spreng. *syst.* 1. p. 201.

*F. castanea*, Vahl, *enum.* 2. p. 92; Pursh! *fl.* 1. p. 49.

*Scirpus spadiceus*, Linn. *sp.* p. 74; Willd. *sp.* 1. p. 305; Walt. *fl. Car.* p. 30; Elliott, *sk.* 1. p. 84; Muhl.! *gram.* p. 36; Torr.! *fl.* 1. p. 53; Gray! *Gram. & Cyp.* part 1. no. 86.

*S. Carolinianus*, Lam. *ill.* 1. p. 142?

*S. ferrugineus*, Muhl.! *gram.* p. 31, (in part).

*S. castaneus*, Michx.! *fl.* 1. p. 31, (not of Muhl.).

*S. culmo triquetro nudo, panicula laxa, &c.* Gron.! *fl. Virg.* 132.

*Culms* 1—2 feet high, nearly terete towards the base, compressed and striate above, strong and rigid, smooth. *Leaves* 6—8 inches high, very narrow, somewhat scabrous on the margin towards the summit, channelled; *sheaths* loose and distichously arranged, the lower ones ferruginous. *Umbel* patulous, simple, or with the rays a little divided. *Involucre* generally shorter than the umbel; leaves subulate, rather rigid, scabrous on the margin. *Spikes* 3—6 lines long, at first ovate, or ovate-oblong, but when old, often cylindrical, about two lines in diameter. *Scalcs* rigid, much dilated, somewhat mucronate, in the young state pale ferruginous, and minutely pubescent, but at length quite smooth and shining, and of a dark chestnut colour; many of the lower ones sterile. *Stamens* 3, (rarely 2); filaments broad. *Style* conspicuously ciliate, particularly about the bifurcation, divided about one-third of the way down, the segments recurved. *Nut* obtuse, somewhat lenticular, whitish, thin on the margin, marked with fine striæ and lines of impressed dots.

**HAB.** Wet meadows, generally in brackish places, but not confined to the immediate vicinity of salt water. New York! to Florida! and west to Texas! Not uncommon in the salt



marshes near New York, and along the sea-coast of New Jersey. —August to September.

Obs. This species is somewhat variable in its appearance. When it grows in salt marshes, the scales, especially in the mature spikes, are of a dark chestnut colour and polished; while in fresh water swamps, they are much paler and more or less pubescent. Frequently the umbel is compound, and the rays elongated. In northern specimens, I always find three stamens, but in a variety from Florida the flowers seem to be diandrous.

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Species of *Fimbristylis* which are little known.

1. *F. CYLINDRICA*, *Vahl*. “*F. spicis cylindricis obtusissimis, involucri submonophyllo rigido umbellam simplicem æquante, Vahl, enum. 2. p. 293, (excl. syn.); Pursh, fl. 1. p. 49; Ræm. & Schult. syst. 2. p. 101.*

“*Culmi bipedales et ultra, apice triquetri; folia culmo breviora, convoluta-filiformia, glaucescentia; vaginis fusco-nigricantibus. Involucrum umbellâ parum brevius, lineare, planum. Umbella quinque-radiata, radiis setaceis, longior bipollicaris. Spicæ fere unguiculares, pennâ columbinâ parum crassiores, arcte imbricatæ, spadiceæ; squamæ subrotundæ; foliola duo setacea sub spiculâ longius pedunculatâ. Semen subrotundum, subcompressum, læve.*”

“*In America septentrionali.*” *Bosc.*—From the description of this plant, it appears to differ very little from *F. spadicea*.

2. *F. MUCRONATA*, *Vahl; Spreng. syst. 1. p. 199; Ræm. & Schult. syst. 2. p. 102.* Richard, the discoverer of this species, found it in the island of Mahon. According to Sprengel it is also a native of North America, but this botanist considered the *F. mucronata* and *F. cylindrica* as one species, and indeed, they appear to differ very little.

3. *F. PUBERULA*, *Vahl*. *F. spicis ovatis pubescentibus, involucri involucellisque diphyllis; umbellâ compositâ umbellulisque longioribus, Vahl, enum. 2. p. 289; Pursh, fl. 1. p. 49; Ræm. & Schult. syst. 2. p. 97; Scirpus puberulus, Michx.! fl. p. 31; S. pubescens, Pers. syn. 1. p. 68; S. ferrugineus, Elliott, sk. 1. p. 85?*

In Carolina and Georgia, *Michaux*; Virginia to Florida, *Pursh*.

Obs. The *Fimbristylis (Scirp.) puberulus* in *Michaux's* herbarium appears to be merely *F. spadiceus* in an immature state. *Scirpus ferru-*

*gineus* of Elliott, is probably distinct from Michaux's plant, for he describes the leaves as 3 lines wide, while in the original *S. puberulus* (which Elliott considers identical with his species) they are "*angustissimus*."

### 13. ISOLEPIS, *R. Brown.*

SCALES of the spike imbricated on all sides. BRISTLES 0. STYLE 2—3-cleft, simple at the base, deciduous. NUT compressed or triangular.—Habit of *Scirpus*.

*Isolepis*, *R. Brown, prodr.* 1. p. 221; *Lestib. ess. fam. Cyp.* p. 40. no. 49; *Nees ab Esenb. in Wight's contrib.* p. 70, and in *Linnæa*, 9. p. 291.

Species of *Isolepis*, *Kunth.*

Species of *Scirpus*, *Linn., Willd., Vahl.*

#### §. 1. *Flowers lateral.*

#### 1. ISOLEPIS SUBSQUARROSA, *Schrad.*

Culm setaceous, compressed and sulcate; involucre two-leaved, very long, unequal, spikes 2—3, ovate, sessile, growing from the side of the culm near the summit; scales rhombic-obovate, with a short mucronate recurved point; style 2-cleft; nut obovate-oblong, somewhat compressed.

*I. subsquarrosa*, *Schrad. in Schult. mant.* 2. p. 64.

*Scirpus subsquarrosus*, *Muhl.! gram.* p. 39; *Torr.! fl.* p. 51; *Gray! Gram. & Cyp.* part 1. p. 83.

*S. minimus*, *Pursh, fl.* 1. p. 55, (excl. syn.); *Elliott, sk.* 1. p. 82.

*Culms* in dense tufts, almost capillary, generally about 2 inches high, but sometimes taller, leafy at the base. *Leaves* setaceous. *Involucre* of 2 leaves, one of which is short and appears like a continuation of the culm, the other much longer, setaceous. *Spikes* 2—3, or solitary, ovate, obtuse, about a line in diameter, closely sessile near the summit of the culm, many-flowered. *Scales* closely imbricate, somewhat coriaceous. *Stamens* solitary. *Style* short, 2-cleft, the divisions recurved. *Nut* obtuse, of a whitish or pale brown colour, smooth, dull, tipped with the minute base of the style.

HAB. Sandy banks of rivers, Massachusetts to Pennsylvania, and west to Kentucky. Deerfield, Massachusetts, *Prof. Hitchcock* and *Dr. Cooley!*; banks of the Connecticut, near Middletown and elsewhere!; Northern parts of the State of New York, *Dr. M. Stevenson!*; western parts of the same State, *Dr. Gray!*; Lexington, Kentucky, *Dr. Short!*

OBS. Nearly related to *I. setacea* of *R. Brown* and *N. ab Esenb.* and *I. squarrosa*, *Rœm. & Schult.*, (*Scirpus squarrosus*), but is distinguished from both by its bifid (not 3-cleft) style, as well as by other characters. It has much the habit and characters of *Lipocarpa maculata*, except that it wants the interior scales, and Vahl long ago made a similar remark of his *Scirpus squarrosus*,\* now referred to *Isølepis*; and Nees ab Esenbeck seems to think that it may be a *Lipocarpa* with the interior scales abortive. According to Vahl, the *S. squarrosus* has the style 2-cleft, but *N. ab Esenb.* states distinctly that it is 3-cleft.

## 2. ISOLEPIS CARINATA, *Hook. & Arn.*

Culm somewhat compressed, sulcate, setaceous, with a single leaf near the base; spike ovate, solitary, growing from the side of the culm near the summit, without an involucre, few (6—8)-flowered; scales boat-shaped, carinate, abruptly acuminate; style 3-cleft; nut short, acutely triangular, roughened with papillæ.

*I. carinata*, *Hook. & Arn. Mss.!*

*Culms* cespitose, 3—4 inches high, smooth. *Leaves* setaceous, channelled, half the length of the culm, sheathed at the base. *Spike* rather obtuse, few-flowered, situated about half an inch below the summit of the culm. *Scales* remarkably concave and gibbous, with several curved narrow wrinkles on each side towards the keel. *Stamens* 2? *Style* short,

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\* "Facies HYPÆLYPTI, sed deficient corolla et tubercula." *Vahl, enum.* 2. p. 259. Vahl, whose *Hypælyptum* included the modern *Lipocarpa*, was incorrect, however, in stating that the nut, in his genus, is furnished with a tubercle.

deeply 3-cleft. *Nut* nearly half the length of the scale, brownish, roughened with small papillæ, very acutely triangular, the sides concave, the summit without any remains of the style.

HAB. Near New Orleans, *T. Drummond!*; on the Arkansas river, *Nuttall!*

OBS. A well-characterized species which I received (without a name) from *Mr. Nuttall*, in 1820, who collected it during his journey in Arkansas Territory.

§ 2. *Spikes terminal, umbelled.*

3. *SOLEPIS DRUMMONDII, Torr. & Hook.*

Culm compressed and somewhat 3-sided, deeply sulcate; leaves very narrow, channelled; umbel compound; rays 4—6 longer than the involucre; spikes oblong-ovate, acute; scales coriaceous, broadly ovate, smooth, with a short abrupt acuminate point, somewhat carinate towards the summit; style two-parted, smooth; nut lenticular, acute.

*Culm* 3 feet high, slender but firm, very smooth, one side deeply channelled. *Leaves* half as long as the culm, scarcely a line wide, convex on the under surface, smooth. *Umbel* erect, rays 1—2 inches long. *Involucre* of 2—3 narrow-channelled leaves, all of which are shorter than the rays. *Spikes* half an inch long. *Scales* closely appressed, smooth, of a light brown colour. *Stamens* 3; filaments very broad, obtuse. *Style* deeply 2-parted, persistent. *Nut* much compressed, somewhat margined, dotted.

HAB. Texas, *T. Drummond!*

OBS. A very distinct species, with the habit of *Fimbristylis spadicea*. It is, however, a genuine *Isolepis*, as the style is formed by the gradual attenuation of the nut, without any appearance of tubercle or articulation.

4. *SOLEPIS CAPILLARIS, Rœm. & Schult.*

Culm angular and sulcate, capillary, nearly naked; leaves setaceous, serrulate-ciliate, much shorter than the culm; spikes

Obs. I have not had an opportunity of examining this plant. If it really belongs to the tribe Scirpeæ, its place is next to *Mulachochæte*, *N. ab E.*, which differs in the scales of the perigynium being 5 or 6, instead of 2. It may, however, be more nearly related to the Hypolytrææ, if not a species of *Hypolytrum*\* itself.

†† Without a Perigynium.

## 12. FIMBRISTYLIS, Vahl.

SCALES imbricated on all sides. BRISTLES 0. STYLE compressed, 2-cleft, bulbous at the base, deciduous, often ciliate on the margin.—Habit of Scirpus.

*Fimbristylis*; *Vahl, enum.* 2. p. 285; *R. Brown, prodr.* 1. p. 225; *Rœm. & Schult. gen.* 175; *Lestib. ess. fam. Cyp.* p. 39. no. 45; *N. ab Esenb. in Wight's contrib.* p. 70, and in *Linneæ*, 9. p. 290; *Nutt. gen.* 1. p. 33.

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\* The genus *Hypolytrum*, as characterized by Richard, included also what is now called *Lipocarpha*. Indeed two of his three species belong to the latter genus; so that the name *Hypolytrum* ought to have been applied to the species in which the squamulæ are parallel to the scale. *Hypælyptum* of Vahl (*Enum.* 2. p. 283†) appears to be identical with Richard's genus, including both *Hypolytrum* and *Lipocarpha*. *Hypælyptum* of *R. Brown, prodr.* 1. p. 219, (who quotes Vahl, l. c.) is precisely *Lipocarpha* of Nees ab Esenbeck, and this most profound botanist expressly states that *Schænus nemorum*, *Vahl*, *Scirpus anomalus*, *Retz.*, *S. bromeliæfolius*, *Rudge*, and other unpublished species, having the squamulæ ("valvulæ perianthii") lateral, with a very different habit from *Hypælyptum*, constitute a proper genus. This genus is the present *Hypolytrum*, from which we must exclude, however, *S. bromeliæfolius*, *Rudge*, which is the *Diplasia Keratæfolia*, *Rich.* Beera of P. de Beavois, (in *Lestib. ess. fam. Cyp.* p. 43. no. 57) seems to be scarcely distinct from *Hypolytrum* of *N. ab Esenb.* Indeed the two genera are united by the latter botanist.

† "Hypælyptum, *Vahl*, qui in Herb. Richardiano nomen haud rectè transcripsit." *Lestib. ess.*



Species of *Isolepis*, *Vahl*.

Species of *Scirpus*, *Linn.*, *Willd.*

### 1. FIMBRISTYLIS BALDWINIANA.

Culm sulcate and somewhat compressed; leaves mostly radical, channelled, serrulate, nearly as long as the culm; umbel few-spiked, simple or somewhat compound, shorter than the involucre; spikes ovate, acute; scales broadly ovate, somewhat mucronate; nut marked with tuberculated ribs and transverse striæ; style somewhat ciliate.

*Scirpus sulcatus*, *Elliott! sk.* 1. p. 86, (not of A. de P. Thouars); *Spreng. syst.* 1. p. 212.

*S. Baldwinianus*, *Schult. mant.* 2. p. 85; *Darlingt. ! fl. Cest.* ed. 2. p. 18.

*S. ferrugineus*, *Darlingt. ! fl. Cest.* ed. 2. p. 7.

*Culms* cespitose, deeply sulcate, 2—12 inches high, smooth. *Leaves* narrow, channelled on the upper surface, sometimes overtopping the culm, slightly ciliated with very minute teeth or serratures, sometimes hairy. *Involucre* about 3-leaved; one of the leaves longer than the umbel, all of them denticulate like those of the culm. *Umbel* mostly simple; rays 2—4, seldom more than three-fourths of an inch long, sometimes divided. *Spikes* 3 lines long, acute or somewhat acuminate. *Scales* membranaceous, with a short abrupt mucronate point; the sides yellowish brown; keel green. *Stamen* solitary. *Style* dilated at the base into a roundish bulb, the whole at length separating from the nut; the divisions spreading and recurved. *Nut* obovate, whitish, marked on each sides with 6—8 prominent ridges, sometimes with a number of warts towards the summit.

**HAB.** Damp clayey soils, Pennsylvania to the Gulf of Mexico, and west to the Mississippi. West Chester, Pennsylvania, *Dr. Darlington!*; near Charleston, South Carolina, *Elliott!*; Riceborough, Georgia, *L. Le Conte, Esq.!*; St. Louis and New Orleans, *T. Drummond!*

**OBS.** Allied to *F. laxa*, *Vahl*, and also to *F. annua*, *R. & S.* My St. Louis and New Orleans specimens have the

leaves and sheaths a little hairy. I have specimens of a *Fimbristylis* scarcely distinct from this, collected by the late Dr. Baldwin in Bahia, Brazil.

## 2. FIMBRISTYLIS CONGESTA.

Densely cespitose; culms and leaves setaceous, scabrous; spikes cylindrical-oblong, in a terminal head, much shorter than the 3—4-leaved involucre; scales lanceolate, very acute; stamen 1; style smooth; nut minute, lenticular, broadly obovate, longitudinally striate, and transversely rugose.

*Culms* forming dense tufts, 2—4 inches high, compressed, striate, with a channel on one side. *Leaves* channelled, as long as the culm; sheaths loose, naked at the throat. *Involucral leaves* unequal, 4—10 times as long as the spikes, setaceous and scabrous. *Spikes* 5—8, in a close head, 3—4 lines long, nearly cylindrical, 50—60-flowered. *Scales* of an obscure green and brown colour, slightly mucronate and subsquarrose. *Stamen* solitary. *Style* long, filiform, somewhat compressed, 2-cleft one-third of the way down; the divisions recurved, nearly smooth; the bulbous base about one fifth the diameter of the nut. *Nut* exceedingly minute, yellowish, strongly rugose transversely, and marked with several longitudinal lines on each side.

HAB. Near New Orleans, *T. Drummond!*; Wilmington, North Carolina, *Mr. Curtis?*

OBS. This species strongly resembles *F. argentea* of Vahl, and also, *N. ab Esenbeck* (*in Wight's contrib.* p. 100); but the latter differs in the ovate scales, and in the deep angular membranaceous alveolæ of the rachis. I have seen a specimen of this plant in the Herbarium of the Academy of Sciences in Philadelphia, labelled "*Scirpus minimus*, New Jersey." I am somewhat uncertain respecting the N. Carolina locality, as the plant which I supposed was received from Mr. Curtis was unfortunately placed in my herbarium before its name and station were recorded.

## 3. FIMBRISTYLIS SPADICEA, Vahl.

Culm somewhat compressed, nearly naked; leaves semiterete, filiform, naked at the throat, nearly smooth; umbel of few rays, simple or compound; spikes ovate-oblong or cylindrical; involucre of 2—3 subulate leaves; stamens 3; style broad, fimbriate, slightly bulbous at the base; nut obovate, compressed, punctato-striate.

*F. spadicea*, Vahl, *enum.* 2. p. 294; Pursh, *fl.* 1. p. 49; Ræm. & Schult. *syst.* 2. p. 101; Beck, *bot.* p. 423; Spreng. *syst.* 1. p. 201.

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*S. culmo triquetro nudo*, panicula laxa, &c. Gron.! *fl. Virg.* 132.

*Culms* 1—2 feet high, nearly terete towards the base, compressed and striate above, strong and rigid, smooth. *Leaves* 6—8 inches high, very narrow, somewhat scabrous on the margin towards the summit, channelled; *sheaths* loose and distichously arranged, the lower ones ferruginous. *Umbel* patulous, simple, or with the rays a little divided. *Involucre* generally shorter than the umbel; leaves subulate, rather rigid, scabrous on the margin. *Spikes* 3—6 lines long, at first ovate, or ovate-oblong, but when old, often cylindrical, about two lines in diameter. *Scales* rigid, much dilated, somewhat mucronate, in the young state pale ferruginous, and minutely pubescent, but at length quite smooth and shining, and of a dark chestnut colour; many of the lower ones sterile. *Stamens* 3, (rarely 2); filaments broad. *Style* conspicuously ciliate, particularly about the bifurcation, divided about one-third of the way down, the segments recurved. *Nut* obtuse, somewhat lenticular, whitish, thin on the margin, marked with fine striæ and lines of impressed dots.

**HAB.** Wet meadows, generally in brackish places, but not confined to the immediate vicinity of salt water. New York! to Florida! and west to Texas! Not uncommon in the salt

marshes near New York, and along the sea-coast of New Jersey.  
—August to September.

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“*Culmi bipedales et ultra, apice triquetri; folia culmo breviora, convoluta-filiformia, glaucescentia; vaginis fusco-nigricantibus. Involucrum umbellâ parum brevius, lineare, planum. Umbella quinque-radiata, radiis setaceis, longior bipollicaris. Spicæ fere unguiculares, pennâ columbinâ parum crassiores, arcte imbricatæ, spadiceæ; squamæ subrotundæ; foliola duo setacea sub spiculâ longius pedunculatâ. Semen subrotundum, subcompressum, læve.*”

“*In America septentrionali.*” *Bosc.*—From the description of this plant, it appears to differ very little from *F. spadicea*.

2. *F. MUCRONATA*, *Vahl; Spreng. syst. 1. p. 199; Rœm. & Schult. syst. 2. p. 102.* Richard, the discoverer of this species, found it in the island of Mahon. According to Sprengel it is also a native of North America, but this botanist considered the *F. mucronata* and *F. cylindrica* as one species, and indeed, they appear to differ very little.

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In Carolina and Georgia, *Michaux*; Virginia to Florida, *Pursh*.

OBS. The *Fimbristylis (Scirp.) puberulus* in *Michaux's* herbarium appears to be merely *F. spadiceus* in an immature state. *Scirpus ferru-*

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SCALES of the spike imbricated on all sides. BRISTLES 0. STYLE 2—3-cleft, simple at the base, deciduous. NUT compressed or triangular.—Habit of *Scirpus*.

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Species of *Isolepis*, *Kunth.*

Species of *Scirpus*, *Linn., Willd., Vahl.*

#### §. 1. *Flowers lateral.*

#### 1. ISOLEPIS SUBSQUARROSA, *Schrad.*

Culm setaceous, compressed and sulcate; involucre two-leaved, very long, unequal, spikes 2—3, ovate, sessile, growing from the side of the culm near the summit; scales rhombic-obovate, with a short mucronate recurved point; style 2-cleft; nut obovate-oblong, somewhat compressed.

*I. subsquarrosa*, *Schrad. in Schult. mant.* 2. p. 64.

*Scirpus subsquarrosus*, *Muhl. ! gram.* p. 39; *Torr. ! fl.* p. 51; *Gray ! Gram. & Cyp.* part 1. p. 83.

*S. minimus*, *Pursh, fl.* 1. p. 55, (excl. syn.); *Elliott, sk.* 1. p. 82.

*Culms* in dense tufts, almost capillary, generally about 2 inches high, but sometimes taller, leafy at the base. *Leaves* setaceous. *Involucre* of 2 leaves, one of which is short and appears like a continuation of the culm, the other much longer, setaceous. *Spikes* 2—3, or solitary, ovate, obtuse, about a line in diameter, closely sessile near the summit of the culm, many-flowered. *Scales* closely imbricate, somewhat coriaceous. *Stamens* solitary. *Style* short, 2-cleft, the divisions recurved. *Nut* obtuse, of a whitish or pale brown colour, smooth, dull, tipped with the minute base of the style.



HAB. Sandy banks of rivers, Massachusetts to Pennsylvania, and west to Kentucky. Deerfield, Massachusetts, Prof. Hitchcock and Dr. Coolcy!; banks of the Connecticut, near Middletown and elsewhere!; Northern parts of the State of New York, Dr. M. Stevenson!; western parts of the same State, Dr. Gray!; Lexington, Kentucky, Dr. Short!

OBS. Nearly related to *I. setacea* of R. Brown and N. ab Esenb. and *I. squarrosa*, Rœm. & Schult., (*Scirpus squarrosus*), but is distinguished from both by its bifid (not 3-cleft) style, as well as by other characters. It has much the habit and characters of *Lipocarpa maculata*, except that it wants the interior scales, and Vahl long ago made a similar remark of his *Scirpus squarrosus*,\* now referred to *Isolepis*; and Nees ab Esenbeck seems to think that it may be a *Lipocarpa* with the interior scales abortive. According to Vahl, the *S. squarrosus* has the style 2-cleft, but N. ab Esenb. states distinctly that it is 3-cleft.

## 2. ISOLEPIS CARINATA, Hook. & Arn.

Culm somewhat compressed, sulcate, setaceous, with a single leaf near the base; spike ovate, solitary, growing from the side of the culm near the summit, without an involucre, few (6—8)-flowered; scales boat-shaped, carinate, abruptly acuminate; style 3-cleft; nut short, acutely triangular, roughened with papillæ.

### I. carinata, Hook. & Arn. Mss.!

Culms cespitose, 3—4 inches high, smooth. Leaves setaceous, channelled, half the length of the culm, sheathed at the base. Spike rather obtuse, few-flowered, situated about half an inch below the summit of the culm. Scales remarkably concave and gibbous, with several curved narrow wrinkles on each side towards the keel. Stamens 2? Style short,

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\* "Facies HYPÆLYPTI, sed deficient corolla et tubercula." Vahl, *enum.* 2. p. 259. Vahl, whose *Hypælyptum* included the modern *Lipocarpa*, was incorrect, however, in stating that the nut, in his genus, is furnished with a tubercle.

deeply 3-cleft. *Nut* nearly half the length of the scale, brownish, roughened with small papillæ, very acutely triangular, the sides concave, the summit without any remains of the style.

HAB. Near New Orleans, *T. Drummond!*; on the Arkansas river, *Nuttall!*

OBS. A well-characterized species which I received (without a name) from *Mr. Nuttall*, in 1820, who collected it during his journey in Arkansas Territory.

§ 2. *Spikes terminal, umbelled.*

### 3. ISOLEPIS DRUMMONDII, *Torr. & Hook.*

Culm compressed and somewhat 3-sided, deeply sulcate; leaves very narrow, channelled; umbel compound; rays 4—6 longer than the involucre; spikes oblong-ovate, acute; scales coriaceous, broadly ovate, smooth, with a short abrupt acuminate point, somewhat carinate towards the summit; style two-parted, smooth; nut lenticular, acute.

*Culm* 3 feet high, slender but firm, very smooth, one side deeply channelled. *Leaves* half as long as the culm, scarcely a line wide, convex on the under surface, smooth. *Umbel* erect, rays 1—2 inches long. *Involucre* of 2—3 narrow-channelled leaves, all of which are shorter than the rays. *Spikes* half an inch long. *Scales* closely appressed, smooth, of a light brown colour. *Stamens* 3; filaments very broad, obtuse. *Style* deeply 2-parted, persistent. *Nut* much compressed, somewhat margined, dotted.

HAB. Texas, *T. Drummond!*

OBS. A very distinct species, with the habit of *Fimbristylis spadicca*. It is, however, a genuine *Isolepis*, as the style is formed by the gradual attenuation of the nut, without any appearance of tubercle or articulation.

### 4. ISOLEPIS CAPILLARIS, *Racm. & Schult.*

Culm angular and sulcate, capillary, nearly naked; leaves setaceous, serrulate-ciliate, much shorter than the culm; spikes

about 4, ovate-oblong, one sessile, the others on short rays, 6—8-flowered; scales somewhat 4-ranked, oblong, obtuse, slightly pubescent; nut triangular, undulately corrugated transversely; stamens 2; style 3-cleft.

*Isolepis capillaris*, *Ræm. & Schult. syst.* 2. p. 118; *Schult. mant.* 2. p. 68; *N. ab Esenb. in Linnæa*, 9. p. 291.

*Scirpus capillaris*, *Linn.*; *Willd. sp.* 1. p. 302; *Vahl, enum.* 2. p. 272; *Pursh, fl.* 1. p. 37; *Muhl.! gram.* p. 36; *Torr.! fl.* 1. p. 52, (excl. syn. *Ell.*); *Big.! fl. Bost.* ed. 2. p. 23; *Beck, bot.* p. 426; *Gray! Gram. & Cyp.* part 1, no. 84; *Darlingt.! fl. Cest.* ed. 2. p. 18.

*S. ciliatifolius*, *Darlingt.! fl. Cest.* ed. 1. p. 7. (not of *Elliott.*)

*S. Muhlenbergii*, *Spreng. syst.* 1. p. 207.

*SCIRPUS culmo angulato, sulcato, &c. Gron.! fl. virg.* p. 11.

*Root* fibrous annual. *Culms* densely cespitose, very slender, 3—8 inches high, somewhat quadrangular. *Leaves* mostly radical, 2—3 inches long, channelled, minutely serrulate or denticulate towards the extremity; sheaths rather loose and membranaceous. *Involucre* 2—3-leaved, setaceous, one of the leaves a little longer than the spikes. *Rays* of the *umbel* about half an inch long. *Spikes* 2 lines long, somewhat quadrangular, rather obtuse, 1 or sometimes 2 of them sessile. *Scales* ferruginous, with a green keel, a little pubescent, especially on the margin, obtuse and often slightly emarginate. *Stamens* 2. *Style* filiform; the divisions downy. *Nut* short, acutely triangular, whitish or brown, very obtuse, but apiculate with the remains of the style, abruptly contracted at the base, the sides flat or somewhat concave, undulately rugulose.

**HAB.** Sandy fields; Massachusetts to North Carolina. Near Boston, *Dr. Bigelow!*; near New Haven, Connecticut, *Dr. Tully!*; abundant in the sandy districts of New Jersey!; Western parts of the State of New York, *Dr. Gray!*; Pennsylvania, *Muhlenberg! & Dr. Darlington!*; Wilmington, North Carolina, *Mr. Curtis!*, and Salem, in the same State, *Schweinitz!*

## 5. ISOLEPIS CILIATIFOLIUS.

Culm angular and somewhat compressed, striate; leaves setaceous, shorter than the culm, serrulate-ciliate; umbel compound, diverging; rays mostly longer than the involucre; spikes ovate, 5—6-flowered; scales ovate, somewhat acute; stamens 2; nut obovate, triangular, obtuse, roughened with minute papillæ.

*Scirpus ciliatifolius*, *Elliott! sk.* 1. p. 82, (excl. syn.).

*Culm* 6—12 inches high, very slender, a little scabrous towards the summit. *Leaves* setaceous, channelled, mostly radical, fringed with minute rigid processes. *Umbel* terminal, 3—4-rayed; the primary rays nearly an inch long; partial umbels of 3—4 spikes. *Involucre* 2—3-leaved, setaceous, one of the leaves about as long as the umbel, the others very short. *Spikes* a line in length, rather acute. *Scales* with a short abrupt point, ferruginous, ciliate towards the summit. *Stamens* 2. *Style* filiform, equally 3-cleft; the divisions glandularly pubescent. *Nut* acutely triangular, of an obscure bluish colour, roughened with minute elevated dots and very obscurely rugose transversely.

**HAB.** Damp soils in the Southern States. Wilmington, North Carolina, *Mr. Curtis!*; South Carolina, *Elliott!*; Alabama, *Dr. Gates!*; Middle Florida, *Dr. Chapman!*

**OBS.** Easily distinguished from *I. capillaris* by its larger size, compound umbel, much smaller spikes and papillose nut.

Sprengel refers, with a mark of doubt, *Scirp. ciliatifolius* of Elliott to *Fimb. pilosa*, *Vahl*, but the two plants are totally distinct.

## 6. ISOLEPIS COARCTATA.

Culm filiform, somewhat terete, nearly naked; leaves setaceous, with bearded sheaths; umbel compound, contracted, a little shorter than the longest leaf of the involucre; spikes linear-oblong, angular, 10—15-flowered; scales ovate, somewhat acute; stamens 2; nut triangular, subcompressed, depressed at the summit, obscurely papillose, shining.

*Scirpus coarctatus*, *Elliott! sk.* 1. p. 83.

*S. castaneus*, *Muhl.! gram.* p. 38, (in part).

*Culm* about a foot high, smooth, a little thicker than a bristle "generally bending." *Ell.* *Leaves* chiefly seated on the lower part of the culm, smooth, the orifice of the sheaths bearded with long hairs. *Umbel* consisting of from 15 to 20 spikes; the rays short and crowded, none of them more than half an inch in length. *Involucre* of many short setaceous leaves; one of the leaves somewhat longer than the umbel. *Spikes* 3 lines long, some of them sessile, or on very short peduncles. *Scales* pretty distinctly 4-ranked, ferruginous, with a narrow green keel, slightly fringed towards the summit. *Stamens* uniformly 2, of a bluish colour when ripe. *Style* 3-parted; the divisions glandularly pubescent. *Nut* unequally triangular, the back broadest, the front rather obtusely angular; the summit very obtuse and crowned with a minute dark point, which is the persistent base of the style; the sides appearing papillose under a high magnifier.

**HAB.** Very dry sandy soils. South Carolina, *Elliott!*; near Savannah, Georgia, *Dr. Baldwin!*

**OBS.** Nearly related to the two preceding species, but readily distinguished by its taller and firmer culm, smooth leaves, and dense umbels. It has a strong resemblance also to *I. gracilis*, *N. ab E.*, a native of the peninsula of India.

#### 7. *ISOLEPIS STENOPHYLLA.*

*Culms* filiform, cespitose, angular and sulcate; leaves setaceous; involucre many-leaved, 4 of the leaves very long; spikes in a terminal capitate cluster; scales strongly carinate; the keel prominent and scabrous; the summit produced into a long cuspidate point; nut triquetrous, depressed at the summit, transversely rugulose.

*Scirpus stenophyllus*, *Elliott! sk.* 1. p. 83.

*Dichroma cespitosa*, *Muhl.! gram.* p. 14.

*Dichromena cespitosa*, *Spreng. syst.* 1. p. 202.

*Culms* densely cespitose, dry and wiry, 3—5 inches high, scabrous towards the summit. *Leaves* angular, two-thirds as long as the culm; very scabrous; sheaths loose and bearded. *Involucre* consisting of many



setaceous leaves which are much dilated at the base; 4 of them much longer than the rest. *Spikes* 4—8, in dense terminal heads, about 3 lines long, mostly 6-flowered. *Scales* loosely imbricated, gradually increasing in length from the summit down, the lowest resembling the interior leaves of the involucre, pale brown and yellow on the sides, green on the keel, the summit produced into a long cuspidate, and somewhat spreading point. *Stamen* solitary. *Style* long, 3-cleft. *Nut* equally triangular, whitish, distinctly rugulose transversely, crowned with a minute persistent tubercle.

**HAB.** Dry sandy soils. Wilmington, North Carolina, *Mr. Curtis!*; South Carolina, *Elliott!*; Georgia, *Muhlenberg!*;—July—September.

**OBS.** A very distinct species, but resembling in many respects, an unnamed East Indian *Isolepis* in my herbarium. It is a little remarkable that Muhlenberg should have referred it to *Dichromena*.

#### 8. ISOLEPIS WAREI.

Culm somewhat terete, filiform, deeply sulcate; spikes 6—12, ovate, in a crowded terminal head; base of the involucre leaves dilated and cut into capillary segments; scales ovate, obtuse, ciliate; nut triquetrous, depressed at the summit, transversely rugose.

*Culm* about a foot high, very slender, leafy below, slightly compressed, smooth, dotted with red in the furrows. *Leaves* 2—3 inches long, setaceous, channelled, smooth; sheaths loose, membranaceous, pectinately fringed at the orifice. *Head* of spikes about half an inch in diameter. *Leaves* of the *involucre* 3—4, setaceous, longer than the head; the base dilated and ciliate cut nearly to the base. *Spikes* 3 lines long, many-(10—15)-flowered, obtuse. *Scales* broadly ovate or oblong, pale brown, nerved, pubescent externally and distinctly ciliate on the margin. *Stamens* constantly 3. *Style* filiform, with 3 long recurved pubescent segments. *Nut* white, very broad at the summit, crowned with a very minute black point.

**HAB.** West Florida, *N. A. Ware, Esq.!*

**OBS.** This remarkable species differs from every other North American Cyperaceous plant in its fimbriate involucre.

14. TRICHELOSTYLIS, *Lestib.*

SCALES mostly 4—8-ranked, carinate. PERIGYNIUM 0. STYLE 3-cleft, bulbous at the base, deciduous below the bulb. NUT triangular.—Culms simple, leafy at the base, often flattened; leaves mostly very narrow and channelled; spikes usually in terminal umbels or heads, rarely solitary.

*Trichelostylis*, *Lestib. ess. fam. Cyp.* p. 40, no 48; *N. a Esenb.* in *Wight's contrib.* p. 70, and in *Linnaea*, 9, p. 290.

Species of *Fimbristylis*, *Vahl*, *R. Brown.*

Species of *Scirpus*, *Linn.*

This genus includes all the species of *Fimbristylis* of *Vahl* which have a triangular nut and a 3-cleft style. Some of them are difficult to distinguish from *Isolepis*, except by a careful examination of the style, which in *Trichelostylis* is swollen at the base, and separates entirely from the nut; while in *Isolepis* the style is nearly equal, or only furnished with an extremely minute tubercle which remains attached to the nut after the separation of the style.

## TRICHELOSTYLIS MUCRONULATUS.

Culm compressed, somewhat ancipital; umbel decomposed, divaricate; involucre two-leaved; spikes oblong-lanceolate, mostly pedicellate, acute; scales ovate-lanceolate, about four-ranked, mucronate, the point a little spreading; stamens 2; nut obtusely triangular, (white) very obtuse, tuberculate.

*T. geminata*, *N. ab Esenb.* in *Linnaea*, 9, p. 90.

*Fimbristylis autumnalis*, *Ræm. & Schult. syst.* 2. p. 97, (in part.) *Spreng. syst.* 1. p. 201, (in part.)

*Scirpus mucronulatus*, *Michx.! fl.* 1. p. 31; *Ræm. & Schult. syst.* 2, p. 145.

*S. Michauxii*, *Pers. syn.* 1. p. 68.

*S. autumnalis*, *Pursh! fl.* 1. p. 57; *Elliott, sk.* 1. p. 82; *Muhl.! gram.* p. 37; *Big.! fl. Bost.* ed. 2. p. 23; *Gray! Gram. & Cyp.* part 1. no. 85; *Beck, bot.* p. 426; *Darlingt.! fl. Cest.* ed. 2. p. 19.

SCIRPUS culmo ancipito, &c. Gron. ! fl. virg. p. 10.

*Culms* caespitose, 6—12 inches high, often spreading or procumbent, much compressed, scabrous on the edges. *Leaves* flat, very acute, nearly a line in breadth, shorter than the culm, smooth; *sheaths* slightly bearded at the throat. *Umbel* mostly decomposed; the rays about an inch long, compressed; secondary rays bearing 1—3 pedunculate spikes with a sessile one in the fork. *Involucre* foliaceous, one of the leaves generally longer than the umbel, the other shorter. *Spikes* 1½ line long. *Scales* ferruginous, prominently keeled, with the mucronate point somewhat spreading. *Stamens* 2. *Style* equally 3-cleft. *Nut* minute, convex on the sides, generally covered with depressed capitate warts, especially towards the base and summit.

HAB. Bogs and low grounds, particularly along rivers; rarely in dry situations; Massachusetts to Florida. Near Boston, *Bigelow*; near the city of New York, and in New Jersey!; District of Columbia, *Dr. Baldwin!*; Kentucky, *Dr. Short!*; near St. Louis, Missouri, *T. Drummond!*; Alabama, *Dr. Gates!*

OBS. Nearly allied to *T. complanata*, *N. ab Esenb. in Wight's contrib.* p. 103 (*Scirp. complanatus*, *Vahl*.) but that species is a much larger plant, the culm is far more ancipital, the scales broader and not mucronate, and the nut triquetrous. In my specimens from New Jersey, the nut is covered with singular, somewhat stipitate tubercles, having a depression at the top. They are less conspicuous, (being chiefly situated near the base of the nut) in a dwarf autumnal form of the plant found by *Dr. Baldwin* in the district of Columbia. In some fine specimens collected in Alabama by *Dr. Gates*, they are very distinct, while in a variety for which I am indebted to *Dr. Short*, the nuts are nearly smooth. The plant here described is now regarded as a distinct species from *T. autumnalis* (*Sc. autumnalis*, *Rottb.*), as *Willdenow* long since suspected it to be, and as *Michaux* considered it: I have therefore adopted the specific name of the latter botanist, in preference to that of *N. ab Esenbeck*.

## TRIBE IV. RHYNCHOSPOREÆ.

FLOWERS perfect or polygamous. SPIKES mostly few-flowered. SCALES irregularly imbricated, obscurely distichous or trifarious. PERIGYNIUM usually setiform, or cup-shaped, rarely wanting. NUT conspicuously beaked with the persistent base of the style, or crowned with an articulated tubercle, mostly corrugated or sculptured.

## A. Style 2—3-cleft.

15. DICHROMENA, *Richard.*

SPIKES compressed. SCALES irregularly imbricated on all sides, or fasciculate, many of them abortive. STAMENS 3. STYLE 2-cleft. NUT somewhat lenticular, crowned with the broad tuberculate persistent base of the style. BRISTLES 0. —Spikes sessile, aggregated in a terminal head; involucre coloured (mostly white) at the base; culm leafy.

*Dichromena*, *Richard in Michx. fl.* 1. p. 37; *Lestib. ess. fam. Cyp.* p. 40, no. 47; *Vahl, enum.* 2. p. 240; *N. ab Esenb. in Linnæa*, 9. p. 291.

*Dichroma*, *Pers. syn.* 1. p. 57; *Muhl. gram.* p. 13; *Nutt. gen.* 1. p. 31.

Species of *Schœnus*, *Linn.*, *Kunth.*

1. DICHROMENA LEUCOCEPHALA, *Michx.*

Culm triangular; leaves somewhat concave, narrow; involucre about 5-leaved, yellowish-white at the base; nut truncate at the summit, tranversely rugose; tubercle compressed, conical, acute, distinct, straight at the base.

*D. leucocephala*, *Michx.*! *fl.* 1 p. 37; *Vahl, enum.* 2. p. 240; *Pursh, fl.* 1. p. 47; *Elliott! sk.* 1. p. 89. t. 3. f. 3; *Ræm. & Schult. syst.* 2. p. 89; *Schult. mant.* 2. p. 5.

*Dichroma leucocephala*, *Pers. syn.* 1. p. 57; *Muhl.! gram.* p. 13.

*Scirpus cephalotes*, *Walt. fl. Car.* p. 71.

*Rhynchospora ochroleuca*, *Baldw.! Mss.*

*Culm* 12—18 inches high, smooth, slender. *Leaves* scarcely a line wide, 3—6 inches long, with close naked sheaths, somewhat scabrous on the margin. *Involucre* 4—7-leaved; the leaves dilated and often undulate at the base, spreading, 2—4 inches long. *Spikes* 8—20, compressed, whitish, composed of 8—12 scales, most of which are sterile or empty, seldom more than three perfecting their fruit. *Scales* lanceolate, somewhat compressed, but not carinate, rather obtuse. *Stamens* always 3; *anthers* linear, very long. *Style* filiform above the tubercle, slender, smooth, cleft about one-third of the way down. *Nut* semi-ovate, somewhat margined, distinctly rugose transversely, brown, a little shining. *Tubercle* gray or brown, compressed, covering the whole summit of the nut, but not extending down its edges.

**HAB.** Damp soils, North Carolina to Florida. Newbern, North Carolina, *Mr. Croom!*; Wilmington to the same State, *Mr. Curtis!*; South Carolina, *Elliott!*; Macon, Georgia, *Dr. Loomis!*; Florida, *Dr. Baldwin!*; New Orleans, *T. Drummond!*—July—October.

**OBS.** The *Schænus stellatus* of Swartz (*prodr.* p. 19.) is commonly referred to this species, but it differs in the base of the involucre being white on both sides, and the tubercle straight (not concave) at the base.

## 2. DICHROMENA LATIFOLIA, *Baldw.*

*Culm* somewhat terete; leaves broadly linear, slightly concave, very long; involucre 8—10-leaved, at length of a reddish colour at the base; nut suborbicular, dull, roughened with minute oblong papillæ in interrupted lines; tubercle compressed, conical, somewhat obtuse, semilunar at the base, with the points decurrent on the margin of the nut.



*D. latifolia*, *Baldw.!* in *Elliott, sk.* 1. p. 90; *Schult. mant.* 2. p. 51; *Nutt. gen.* 1. p. 32.

*Rhynchospora lateritia*, *Baldw.!* *Mss.*

*Culm* 9—18 inches high, generally much thicker than in the preceding species, slightly compressed, but scarcely angular. *Leaves* often overtopping the culm; those towards the base longer than the others, 2—3 lines wide; the radical ones short, numerous. *Involucere* at first whitish, at length of a dull red colour; the leaflets 3—4 lines wide, tapering to a long sharp point. *Spikes* 8—12, in a subglobose head. *Scales* whitish, ovate; rather obtuse. *Stamens* always 3. *Style* filiform, smooth, 2-cleft one-third of the way down. *Nut* (exclusive of the tubercle) somewhat orbicular in the outline, of a pale brown colour, a little roughened with linear-oblong papillæ placed in irregular longitudinal lines, and marked also with exceedingly narrow transverse wrinkles. *Tubercle* blackish, with a broad concave base, its horns embracing the edges of the nut and extending downward.

**HAB.** Margin of ponds in low pine barrens of the Southern States. Wilmington, North Carolina, *Delile!*, *Nuttall*; common in Mackintosh county, Georgia, and in East Florida, *Dr. Baldwin!*

**OBS.** Easily distinguished from the preceding species by its thicker culm and numerous involucreal leaves which turn reddish when old, or in drying.

*D. ciliata* is said by Vahl and Pursh to be a native of Florida and Georgia, but I have never seen a North American *Dichromena* with the leaves ciliate at the base, and I greatly doubt whether the species has been found in this country. No such plant is noticed by Elliott, Muhlenberg or Baldwin.

## 16. PSILOCARYA.

**FLOWERS** perfect. **SPIKES** many-flowered. **SCALES** imbricated on all sides, membranaceous or chartaceous, all fertile. **PERIGYNIUM** 0. **STAMENS** 2; filaments long and per-

sistent. STYLE 2-cleft, compressed, dilated or tuberculate at the base. NUT biconvex, crowned with the broad persistent tubercle, or rostrate with the persistent style.—Culms leafy; spikes in lateral and terminal compound cymes; rays and peduncles alternate, with leafy sheaths at the base.

1. PSILOCARYA SCIRPOIDES.

Spikes oblong-ovate, many-flowered; scales lanceolate-ovate, acute, membranaceous; nut tumid, obscurely rugose; style long, rostrate, persistent, much dilated at the base, and decurrent at the edges of the nut.

*Culm* obtusely triangular, leafy, smooth. *Leaves* gramineous, 6—8 inches long, 1—1½ line wide, smooth; *sheaths* naked at the throat. *Cymes* pedunculate, one terminal and one from the sheath of each leaf, spreading; rays 1—2 inches long, alternate, diverging, with loose, somewhat foliaceous sheaths, dividing towards the summit into 3 or 4 short branches, or compoundly branched; all the subdivisions alternate and sheathed at the base. *Spikes* 3—4 lines long, 20—30-flowered, somewhat acute, equally imbricated on every side. *Scales* very thin, chestnut-coloured, marked with a narrow central nerve, all bearing fertile flowers. *Bristles* entirely wanting. *Stamens* constantly 2; *filaments* slender, firmly attached one on each side of the base of the torus. *Ovary* oblong, attenuated above into a flat smooth ensiform style, which is 2-cleft one-third of the way down. *Nut* very tumid and somewhat hemispherical on each side, dark brown, obscurely rugose transversely; the base abruptly contracted, and surrounded with a short torus; the summit crowned with a large, flat, rostrate, persistent style, which is much dilated at the base, and decurrent at the edges of the nut, so as nearly to surround it with a pale narrow margin.

HAB. Borders of a pond near North Providence, Rhode Island, T. A. Greene, Esq. !; Massachusetts (the precise locality not recorded), collected by the late Dr. H. Little of Boston; v. s. in Herb. Acad. Nat. Sc. of Philadelphia.

OBS. I received specimens of this rare and interesting plant about six years ago, from my intelligent friend Mr. Greene of New Bedford, who has shown much zeal in examining the

vegetable productions of Massachusetts. In the form and structure of its spikes it resembles a *Scirpus*, but it differs from any of the *Scirpæ* in habit, and is undoubtedly nearly related to the *Rhynchosporæ*. The flowers are frequently affected with a species of *Uredo*, insomuch that during one season Mr. Greene was unable to find a single specimen that was not diseased.

## 2. PSILOCARYA RHYNCHOSPOROIDES.

Spikes ovate, 8—10-flowered; scales membranaceous, roundish-ovate; nut lenticular, suborbicular, strongly rugose transversely; tubercle distinct, short, dilated, obtuse.

*Culm* about a foot high. *Leaves* two lines broad, overtopping the culm. *Cyme* few-flowered. *Spikes* 2—3 lines long, all of them pedunculate. *Scales* pale brown, one-nerved, mostly very obtuse. *Nut* a little convex on each side, whitish, margined. *Tubercle* gray, somewhat 2-lobed at the base, but not decurrent on the sides of the nut. *Style* separating at the summit of the tubercle.

HAB. Quincy, Gadsden County, Middle Florida, *Dr. Chapman!*

OBS. This species is very distinct from the last, although entirely similar in habit.

## 3. PSILOCARYA TEXENSIS, Torr. & Hook.

Cymes decom pound; spikes ovate, acute, many-flowered; scales roundish-ovate, rather acute and mucronulate, somewhat coriaceous, with a prominent midrib; nut suborbicular, lenticular, strongly rugose transversely; tubercle distinct, short, dilated, very obtuse.

*Culm* 2 feet high, obtusely triangular. *Leaves* shorter than the culm, about 2 lines long, slightly scabrous on the margin. *Cymes* axillary and terminal; the terminal one decom pound. *Primary rays* about five, 3—4 inches long, nearly erect, with long foliaceous bracts at the base, semiterete; ultimate divisions bearing 2—3 approximated spikes. *Spikes*

about 3 lines long, ovate, terete, 16—20-flowered. Scales ferruginous, of a pretty firm and somewhat coriaceous texture, minutely and pulverulently pubescent, strongly 1-nerved so as to appear almost carinate. Stamens constantly 2. Style (above the tubercle) filiform, equal, 2-cleft half-way down, separating early and completely from the tubercle. Nut orbicular, moderately convex on each side, marked with strong undulate transverse wrinkles, of a light brown colour, margined. Tubercle gray, much dilated, closely sessile, somewhat 2-lobed at the base; the apex very blunt.

HAB. Texas, *T. Drummond!*

OBS. This species resembles the preceding, but it differs in its much larger size, decomposed cyme, many-flowered spikes, subcoriaceous scales, and in some other respects. It was distributed in the first collection of Mr. Drummond's Texian plants, under the No. 279. The last two species differ so much from *P. scirpoides*, that they might almost be referred to a separate genus. They are nearly related to *Rhynchospora*, but want the hypogynous bristles, and bear the same relation to that genus that *Isolepis* bears to *Scirpus*. In *P. scirpoides* the style is almost wholly persistent, compressed and subulate, without any distinct tubercle; while in *P. rhynchosporoides* and *P. Texensis* it is very caducous, with the exception of the base, which is enlarged into a tubercle of an entirely different texture from the nut. To the latter section belongs another species of which I have had two varieties in my herbarium; one from St. Vincent, sent to me without a name by Dr. Lindley, the other received from Mr. Arnott, under the name of *Schaenus Teneriffæ*, *Vent. Mss.* The culm is very slender, the branches of the cyme filiform and divaricate; the spike 2—3-flowered, minute; the nut lenticular, corrugated, and crowned with a short apiculate tubercle.

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The following revision of the North American species of *Rhynchospora* and *Ceratoschœnus* was prepared by Dr. Gray. His valuable Monograph contained in the present volume of

the Annals, is so full that it was quite unnecessary to describe the plants anew: I have therefore merely given his list of the species with some alterations, which he has thought it advisable to make, together with some valuable additional matter which has been received since his monograph was written.

### 17. RHYNCHOSPORA, Vahl.

FLOWERS perfect or polygamous. SPIKELETS few-flowered. SCALES loosely imbricated, or obscurely bi-trifarious; the lowermost smaller and empty; one, two, or three of the others bearing a perfect flower; the remainder being staminate or empty, or sometimes (as in *R. miliacca* & *caduca*.) all except the outermost scales fertile. PERIGYNIUM composed of 6 (sometimes 10 or 12) plumose or naked, retrorsely or antrorsely denticulate or scabrous bristles. STAMENS 3 (rarely 2, 6, or 12). STYLE bifid. NUT crustaceous, lenticular or subglobose, smooth or transversely rugose, crowned with the dilated, persistent and distinct base of the style.—Culms more or less triangular, simple, leafy; inflorescence terminal and axillary, corymbose, paniculate or fasciated, loosely or densely clustered.

Rhynchospora, *Vahl, enum.* 2, p. 229; *R. Brown, prodr.* 1. p. 229; *Nutt. gen.* 1. p. 33; *Lestib. ess. fam. Cyp.* p. 37; *Elliott, sk.* 1. p. 57; *Gray, monogr. in ann. lyc. nat. hist. New York*, 3. p. 191. (excl. *R. corniculata* & *macrostachya*); *Nees ab Esenb. in Wight's contrib.* p. 71. and in *Linnæa*, 9. p. 297.

Species of Schœnus, *Linn., Lam'k., Michx., Muhl., &c.*

Chætopora (partly), *Humb. Bonpl. and Kunth, syn. pl. equinoc. orb. nov.* 1. p. 157.

§ 1. Nut subglobose-ovate; bristles of the perigynium densely woolly.—ERIOCHÆTE.

OBS. The species of this section are allied to *Chætopora*, *R. Brown*, from which they are distinguished by their bifid



styles, and distinct persistent tubercles. They are distinguished from *Carpha*, *R. Brown*, by the distinct tubercle and globose nut.

1. *R. PLUMOSA*, *Elliott! sk.* 1. p. 58; *Spreng. syst.* 1. p. 195; *Gray! monogr. l. c.* p. 203.

*Schœnus ciliaris*, *Muhl. gram.* (not of *Michx.*)

2. *R. SEMIPLUMOSA*, *Gray! monogr. l. c.* p. 213.

Specimens of this plant collected near New Orleans by Mr. Drummond, have recently been received, exactly resembling those formerly sent by Dr. Ingalls. They are, however, not sufficiently mature to enable us to pronounce with certainty that the plant is not a variety of the preceding species.

3. *R. OLIGANTHA*, *Gray! monogr. l. c.* p. 212.

*R. triflora*, *Curtis! in Bost. jour. nat. hist.* 1. p. 140. (not of *Vahl.*)

Fine specimens of this interesting species were collected in Texas by the late Mr. Drummond (Texas collection I. no. 282). The leaves are mostly radical, almost capillary, and equalling or overtopping the filiform culms. The bristles are a little shorter than the nut; but on referring to the description of Mr. Curtis, the same is found to be the case in the North Carolina plant. The specimens on which the species was originally founded were not, perhaps, sufficiently mature.

§ 2. *Nut lenticular, or more or less compressed; bristles of the perigynium naked, scabrous or denticulate-hispid.—*

TRUE RHYNCHOSPORÆ.

A. *Nut rugose.*

4. *R. CYMOSA*, *Nutt. gen.* 1. p. 33, (not of *Elliott*); *Torr.! fl.* 1. p. 56, (excl. syn. *Elliott & Pursh*); *Gray! monogr. l. c.* p. 196.

*Schœnus cymosus*, *Willd. sp.* 1. p. 265; *Muhl.! gram.* p. 9.

5. *R. TORREYANA*, *Gray! monogr. l. c.* p. 197.

*R. micrantha*, *Gray! Gram. & Cyp. part 1. no.* 96. (excl. syn.)

6. *R. RARIFLORA*, *Elliott, sk.* 1. p. 58, (excl. syn.); *Gray! monogr. l. c.* p. 197.

*Schœnus rariflorus*, *Michx.! fl.* 1. p. 36; *Muhl. gram.* p. 10.

7. *R. MILIACEA*, *Gray! monogr. l. c.* p. 198.

*R. sparsa*, *Vahl, enum.* 2. p. 230; *Pursh! fl.* 1. p. 48; *Elliott, sk.* 1. p. 62, t. 2; *Torr.! fl.* 1. p. 56.

*Schœnus miliaceus*, *Lamarck, ill. gen.* 1. p. 137.

*S. sparsus*, *Michx.! fl.* 1. p. 35; *Muhl.! gram.* p. 7.

Nearly all the florets of this species are perfect, and each spikelet frequently perfects as many as 8 or 10 nuts; which, being persistent long after the scales have fallen, present a remarkable appearance.

8. *R. CADUCA*, *Elliott! sk.* 1. p. 52; *Gray! monogr. l. c.* p. 199.

This species also perfects a greater number of nuts in each spikelet than is usual in the genus.

9. *R. MULTIFLORA*, *Gray, monogr. l. c.* p. 200.

*Scirpus schœnoides*, *Elliott! sk.* 1. p. 89.

10. *R. PATULA*, *Gray! monogr. l. c.* p. 201.

11. *R. INEXPANSA*, *Vahl, enum.* 2. p. 233; *Elliott! sk.* 1. p. 61; *Gray! monogr. l. c.* p. 200.

*Schœnus inexpansus*, *Michx.! fl.* 1. p. 35; *Muhl.! gram.* 1. p. 9.

12. *R. MICROCARPA*, *Baldwin!; Gray! monogr. l. c.* p. 202.

13. *R. PUNCTATA*, *Elliott! sk.* 1. p. 60; *Gray! monogr. l. c.* p. 203.

14. *R. ELLIOTTII*, *Gray! monogr. l. c.* p. 204.

*R. distans*, *Elliott, sk.* 1. p. 49. (not of *Vahl.*)

*Schœnus distans*, *Muhl.!* *gram.* p. 10.

*S. fuscus*, *Muhl. gram.* p. 6.

B. Nut smooth, mostly lenticular.

15. *R. ALBA*, *Vahl, enum.* 2. p. 236; *Elliott, sk.* 1. p. 57; *Torr.!* *fl.* 1. p. 54; *Gray!* *Gram. & Cyp.* part 1. no. 92, and *monogr. l. c.* p. 213.

*Schœnus albus*, *Linn.*

This species was collected by Drummond in Texas.

16. *R. CAPILLACEA*, *Torr.!* *fl.* 1. p. 55; *Gray!* *Gram. & Cyp.* part 1. no. 95, and *monogr. l. c.* p. 214.

*Schœnus setaceus*, *Muhl. gram.* p. 6.

17. *R. FUSCA*, *Rœm. & Schult. syst.* 2. p. 81; *Gray!* *monogr. l. c.* p. 215.

*R. alba. var. fusca*, *Vahl, enum.* 2. p. 236.

*Schœnus fuscus*, *Linn.*

Massachusetts, *W. Oakes!* and *B. D. Greene!* Esqrs. Those European authors who still consider this species as a variety of *R. alba*, cannot have examined the plant with sufficient care. As regards the English plants, Mr. W. A. Leighton has well indicated their characteristic differences in the London and Edinb. Jour. Science for Dec. 1835.

#### 18. *R. FILIFOLIA.*

Culm very slender; leaves filiform or capillary; corymbs very small, rather crowded; spikelets (minute) ovate-oblong; nut smooth, ovate-orbicular, lenticular, crowned with a lenticular, much compressed, hispid-scabrous tubercle; bristles antorsely scabrous-hispid, as long as the nut and tubercle.

*Culm* 6—12 inches high, obscurely trigonous. *Leaves* numerous, shorter than the culm. *Corymbs*, or *fascicles*, few-flowered, clustered; the lateral ones on short exsert peduncles. *Scales* mucronate, fuscous.

*Bristles* 6, slender. *Nut* much compressed, as in *R. gracilentata*, but smaller; the whole surface of the tubercle minutely hispid-scabrous upward. *Style* 2-parted quite to the place where it separates in falling.

HAB. North Carolina, *Mr. Curtis!*; Middle Florida, *Dr. Chapman!*

OBS. In the *Monograph of N. American Rhynchosporæ*, no. 26, this plant is referred to as having been sent to us by Mr. Curtis. More perfect specimens recently received from Dr. Chapman satisfactorily prove that this plant, although allied to *R. fusca* and *R. gracilentata*, is distinct from either. The capillary leaves (like those of *Scirpus capillaris*), and the roughened tubercle, are characteristic of our plant. It is much more delicate and smaller in all its parts than *R. fusca*, and the nut is more flat, in which particular it nearly agrees with *R. gracilentata*. The smaller spikelets, the form of the nut, and the direction and degree of the hispidness of the bristles at once distinguish this species from *R. capillacea*.

19. *R. GRACILENTA*, *Gray! monogr. l. c. p. 216.*

*R. fusca*, *Gray! Gram. & Cyp. part 1. no. 93. (excl. syn.)*

Mr. Drummond collected this species in Texas.

20. *R. DISTANS*, *Nutt. gen. 1. p. 93, (not of Vahl?); Gray! monogr. l. c. p. 216.*

*Schœnus distans*, *Michx.! fl. 1. p. 36.*

A variety of this species with a single terminal fascicle, and with bristles longer than the nut, occurs among the plants collected in Texas by the late Mr. Drummond.

21. *R. GLOMERATA*, *Vahl, enum. 2. p. 234; Gray! Gram. & Cyp. part 1. no. 94, and monogr. l. c. 1. p. 217.*

*R. capitellata*, *Vahl, l. c.*

*Schœnus glomeratus*, *Linn.*

*S. capitellatus*, *Michx.! fl. 1. p. 36.*

22. *R. CEPHALANTHA*, Gray! *monogr. l. c.* p. 218.
23. *R. PANICULATA*, Gray! *monogr. l. c.* p. 211.
24. *R. FASCICULARIS*, Nutt. *gen.* 1. p. 23; Vahl, *enum.* 2. p. 224?; Gray! *monogr. l. c.* p. 210.  
*R. cymosa*, Ell. *sk.* 1. p. 58?  
*Schœnus fascicularis*, Michx.! *fl.* 1. p. 37.
25. *R. BALDWINII*, Gray! *monogr. l. c.* p. 210.
26. *R. CILIATA*, Vahl, *enum.* p. 238; Gray! *monogr. l. c.* p. 209.  
*Schœnus ciliaris*, Michx.! *fl.* 1. p. 36.

27. *R. MEGALOCARPA.*

Corymbs (3—6) few and loosely flowered; spikelets large, ovate, turgid; nut smooth, somewhat tumid, flattened toward the base, broad and thickened at the summit, crowned with a very broad, short and conical tubercle; stamens usually 12; bristles 6—10, nearly as long as the nut.

*R. megalocarpa*, Gray! *monogr. l. c.* p. 208, and *R. pycnocarpa*, Gray, *l. c.*

More perfect specimens, communicated by Mr. Curtis and Dr. Chapman, have enabled us satisfactorily to ascertain that *R. megalocarpa* and *R. pycnocarpa* of the *Monograph of North American Rhynchosporæ* are different states of the same species. The nut becomes dark-coloured with age, when the tubercle appears to be confluent with the body of the nut. It approaches *R. dodecandra*, with which it also agrees in the prevalent number of its stamens. This species has a somewhat extensive range, being found from Wilmington in N. Carolina to Apalachicola.

28. *R. DODECANDRA*, Balduc.! *Ms. & herb*; Gray! *monogr. l. c.* p. 207.

The mature fruit of this rare and interesting species has not yet come under our notice. The number of its stamens is very



remarkable, as also its somewhat peculiar habit. Each spikelet, as in the preceding species, produces a single perfect flower at the summit, and all the scales are empty except the uppermost. Were it not for its distinctly bifid style, this plant might perhaps be properly referred to *Cephaloschœnus* of Nees ab Esenbeck.

### 18. CERATOSCHÆNUS, *N. ab E.*

**SPIKELETS** producing a single perfect, and 1—4 staminate flowers. **SCALES** loosely and somewhat bifariously imbricated, the lower ones empty, the uppermost staminate or abortive. **PERIGYNIUM** composed of 5 or 6 compressed, rigid or cartilaginous, antrorsely hispid or scabrous bristles, which are dilated and somewhat connate at the base. **STAMENS** 3. **STYLE** simple, or minutely bidentate. **NUT** coriaceous, compressed, smooth, crowned with the very long, distinct, indurated and persistent, upwardly scabrous style.—Culms triangular, leafy; corymbs mostly compound or decomposed; spikelets large, clustered.

#### 1. *C. LONGIROSTRIS.*

*Schœnus longirostris*, *Michx.! fl.* 1. p. 87; *Muhl.! gram.* p. 7.

*S. corniculatus*, *Lam'k. ill. gen.* 1. p. 137.

*Rhynchospora laxa*, *Vahl, enum.* 2. p. 231; *Torr.! fl.* 1. p. 58.

*R. longirostris*, *Ell. sk.* 1. p. 59.

*R. corniculata*, *Gray! monogr. l. c.* p. 205.

#### 2. *C. MACROSTACHYS.*

*Rhynchospora macrostachya*, *Torr.! in Gray, monogr. l. c.* p. 206.

**OBS.** These two plants, in accordance with the views now generally adopted in the construction of genera in Cyperaceæ, cannot be allowed to remain in the genus *Rhynchospora*, from which they also differ remarkably in habit. It was suggested in the Monograph of N. American *Rhynchosporæ*, that they

might possibly be referred to *Cephaloschœnus*, with some modification of the generic character; but the habit of several species of that genus is very different from our plants. Since the publication of that paper, we have received the *Uebersicht der Cyperaceengattungen* of Nees ab Esenbeck, published in the 9th volume of the *Linnaea*, and are surprised to find that the common *Schœnus corniculatus* of *Lamarck* appears not to have come under his observation. He has, however, established the genus *Ceratoschœnus* upon a new plant (the country it inhabits is not mentioned), which, although differing in some respects, exhibits a striking accordance with these plants. It has therefore been thought proper to modify the character of *Ceratoschœnus*, *N. ab. E.*\* so as to include our two species, rather than to propose a new genus for their reception, especially as it is not unlikely that the species comprised in *Cephaloschœnus* and *Ceratoschœnus*, with our two species, will ultimately be referred to a single genus. Nees having already employed the specific name *corniculatus*, that of our *Rhynchospora corniculata* (*Schœnus corniculatus*, *Lamarck*) must be changed: we therefore adopt that of Michaux, which has the priority over that of Vahl.

The attenuated beak of the fruit in these plants is formed by the induration of nearly the whole style: it is not, however, incurved as in *C. corniculatus*, *N. ab. E.* In our species the lowest flower is perfect, the inferior scales being wholly empty: in *C. longirostris* each spikelet is terminated by 3 or 4 staminate flowers, while in *C. macrostachys* only a single abortive staminate flower is usually found.

Should future examination prove our species to be wholly distinct from *Ceratoschœnus* as originally established, the name *LONCHOSTYLIS* might be applied to them.

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\* *CERATOSCHÆNUS*, *N. ab. E.* Spiculæ hermaphroditæ, basi apiceque steriles. Stylus simplex. Perigynii squamæ quinque, cartilagineæ, angustæ, fructui appressæ, basi connatæ. Caryopsis compressa, basi styli articulo insertâ, prælongâ, incurvâque coronata.—*Ueber. Cyperac. in Linnaea*, 9. p. 296.

*Rhynchosporæ inquirendæ.*

1. *SCHÆNUS HISPIDULUS*, Lam.; Vahl, *enum.* 2. p. 220; *Ram. & Schult. syst.* 2. p. 69; *Pursh, fl.* 1. p. 47.

“*S.* pedunculis axillaribus et terminalibus tristachyis, spicis subglobosis, pedicellatis, foliis filiformibus, hispidulis.

“Culmi palmares, spithamæi, angulata. Folia distantia 2—4 in culmo, superiora culmo longiora. Pedunculi axillares solitarii, ut terminales interdum, qui gemini plerumque, pollicares vel minores, monostachyi laxi. Spicæ magnitudinæ seminis Coriandri, squamis subrotundis fuscis. Flosculi 3. Stylus bifidus, purpureus. Semem globosum undulato-rugosum.—In Carolina? *Herb. Lamarck.*”—Vahl.

OBS. This plant has not been found by any N. American botanist, and it is somewhat doubtful whether Lamarck’s specimen was received from this country. It cannot be a *Schœnus*, as that genus is now restricted, but is rather a species of *Rhynchospora*, or perhaps of *Psilocarya*.

2. *SCHÆNUS SETACEUS*, Vahl, *enum.* 2. p. 219? (not of *Muhl.*); *Pursh, fl.* 1. p. 46.

“*S.* pedunculis axillaribus terminalibusque subtrifloris, culmo trigono folliisque setaceis.

“Culmi pedales, vel minores, 1—2-nodosi. Folia 2—3, culmo breviora remotissima. Pedunculi ex axilla superiore solitarii, terminalis plerumque gemini cum folio setaceo. Spicæ 2—6, subulatæ pallide fuscæ, squamis iufimis ovatis mucronatis. Stamina 2. Stylus bifidus. Semina subrotunda, rugosa, bidentata.—In Surinamo, Caribæis, Carolina.”—Vahl.

OBS. This species was introduced into the North American Flora by Pursh, on the authority of Vahl, but none of our botanists have found the plant. The description here quoted was probably taken from West Indian or Surinam specimens. *Schœnus setaceus* is the type of the genus *Spermodon* of P. de Beauvois and N. ab Esenbeck, the character of which is thus given by the latter writer: “Spiculæ polygamæ aut hermaphroditæ, plurifloræ. Stylus bifidus, basi bulbosus. Perigynium tubulosum, truncatum, cum basi fructus concreescens.

Caryopsis apice bidentata, inter dentes bulbo styli sutura recta discreto brevirostris.”\* This genus was, however, long since pointed out by Richard under the name of Triodont†, although he described the “seed” (nut) as 3-toothed. It is probable that he considered the persistent bulb of the style as one of the teeth.—*Schœnus setaceus* of Muhlenberg is *Rhynchospora capillacea*, Torr.

#### TRIBE V. CLADIEÆ.

FLOWERS perfect (rarely diclinous). SCALES of the spikes imbricated in a trifarious or quadrifarious order, one or few-flowered; the inferior scales sterile. PERIGYNIUM 0, or cup-shaped, or in the form of bristles. NUT with a hard thick shell, smooth or irregularly wrinkled, pointless or attenuated into a beak.

#### 19. CLADIUM, *Browne*.

SPIKES few-flowered; flowers polygamous. SCALES imbricated in a somewhat trifarious order; the lower ones empty. BRISTLES 0. STAMENS 2. STYLE 2—3-cleft, deciduous; the divisions often bifid or trifid. NUT subglobose; the pericarp thickened and corky towards the summit. SEED smooth.—Culm leafy; spikes mostly in compound axillary and terminal panicles or corymbs.

Cladium, *Browne*, *Jam.* p. 114; *R. Brown*, *prodr.* 1. p. 236; *Lestib. ess. fam. Cyp.* p. 35; *Ram. & Schult. gen.* 114; *N. ab Esenb. in Linnæa*, 9. p. 301.

Species of *Schœnus*, *Linn.*, *Muhl.*, *Nutt.*, &c.

#### 1. CLADIUM MARISCOIDES.

Culm somewhat terete; leaves nearly smooth on the margin; corymb compound, 2—4-rayed, nearly naked; rays elongated;

\* *Linnæa*, 9. p. 296.

† *Pers. syn.* 1. p. 60.

spikelets aggregated in heads of 3—8 together; style 3-cleft, the divisions entire.

*Schœnus mariscoides*, *Muhl.!* *gram.* p. 5; *Torr.!* *fl.* 1. p. 54; *Big.!* *fl. Bosl.* ed. 2. p. 17; *Beck, bot.* p. 428; *Gray!* *Gram. and Cyp.* part 1. no. 97.

*Culm* about 2 feet high, scarcely angular, nearly smooth, about a line and a half in diameter towards the base. *Leaves* very narrow, concave, with a long compressed point. *Umbels* 2—3, erect; the lateral ones on long exserted peduncles; primary rays 2—4, with several shorter ones. *Spikes* about 3 lines long, ovate-oblong when mature. *Scales* about 6, chestnut colour, the 4 lower ones usually empty, the fifth bearing two stamens and an abortive ovary, the uppermost hermaphrodite, diandrous. *Style* filiform, 3-cleft, deciduous; the divisions mostly equal, but sometimes two of them are united towards the base. *Nut* about one line in length, ovate, with a short abrupt acute point somewhat wrinkled longitudinally; the upper half of the pericarp much thickened and of a corky texture.

HAB. Bog meadows and borders of ponds, Canada to Pennsylvania. Near Montreal, Lower Canada, *Dr. Holmes!*; near Boston, *Dr. Bigelow!* & *B. D. Greene, Esq.!*; Litchfield, Connecticut, *Mr. Brace!* Highlands of New York, *Dr. Barratt!*; Western parts of the State of New York, *Dr. Gray!* near New York, and in many parts of the State of New Jersey, particularly in the Newark meadows, and in the pine barrens!; Pennsylvania, *Muhlenberg!*

OBS. Although this species deviates from the character of *Cladium* as laid down by N. ab Esenbeck, there can be no doubt of its being a congener of *C. Mariscus* of R. Brown, as was long ago shown by Muhlenberg. It differs from that species in its much more slender habit, nearly smooth and narrow leaves, less crowded umbel with elongated rays, a nut of one half the size, and a 3-cleft style. I have not received specimens from any place south of Pennsylvania or West of the Alleghany mountains. The specific name of Muhlenberg is retained, although not altogether appropriate.



## 2. CLADIUM EFFUSUM.

Culm obtusely triangular; leaves sharply serrate upward; corymbs numerous, decomposed, diffuse, approximated and forming an elongated panicle; style 3—4-cleft.

*Schœnus effusus*, Swartz, *prodr.* p. 19?; *Muhl.!* *gram.* p. 13; *Elliott*, *sk.* 1. p. 57.

*S. Mariscus*,  $\beta.$  *effusus*, *Pers. syn.* 1. p. 58.

*Culm* 6—10 feet high. *Leaves* 1—3 feet long, 4—10 lines wide, smooth, except on the margin and midrib which are very acutely serrate upward, the extremity tapering to a long triangular point. *Corymbs* proceeding from the sheaths of the leaves on the upper part of the culm, forming a large oblong panicle. *Spikes* 3—4 together, about two lines long, ovate, acute. *Scales* about 6, brown, the uppermost only producing a perfect flower, the one below it bearing only stamens; in both the number of stamens constantly 2. *Nut* ovate, abruptly pointed, finely wrinkled longitudinally, upper part of the pericarp corky.

**HAB.** Ponds and fresh marshes. Wilmington and Newbern, North Carolina, *Mr. Curtis!* & *Mr. Croom!*; South Carolina, *Elliott!*; New Orleans and Texas, *T. Drummond!*—Aug.—September.

**OBS.** A tall rank sedge, known at the South by the name of *Saw-grass*. R. Brown (*prodr.* p. 236) refers to his *C. Mariscus*, *Schœnus Mariscus*, *Linn.*, *S. Cladium* and *S. effusus*, *Swartz*, and if his plant is identical with *C. Germanicum*, *Schrad.*, (to which *Schœnus Mariscus*, *Linn.* is generally referred) it must be distinct from ours. The description of *S. effusus* in the Prodrômus of Swartz is so brief that we cannot satisfactorily determine whether it is the same as our *C. effusum*. Sprengel refers it to *C. occidentale*, *Schrad.*, but that is described as having bristles at the base of the nut, a character which does not belong to any genuine *Cladium*.

## TRIBE VI. SCLERIEÆ.

FLOWERS diclinous. FERTILE SPIKELETS 1-flowered. SCALES fasciculate; the lower ones empty. NUT with a thick bony shell, naked, or seated in a cup-shaped lobed perigynium.

20. SCLERIA, *Bergius*.

NUT globose, ovate, or triangular; the base surrounded with a lobed, repand, or annular perigynium. STYLE 3-cleft, deciduous.—Culms leafy; spikelets fasciculate, racemose, paniculate, or verticellately spiked.

*Scleria*, *Berg. act. Holm.* 1765, p. 144; *Schreb. gen. pl.* no. 1408; *Kunth, syn.* 1. p. 160; *N. ab Esenb. in Wight's contrib.* p. 116, and in *Linnæa*, 9. p. 302.

1. SCLERIA RETICULARIS, *Michx.*

Culm erect, retrorsely scabrous on the angles towards the base; fascicles lateral and terminal, very remote, sessile, somewhat branched, loosely flowered; scales and bracts smooth; nut globose, conspicuously reticulated with elevated lines, deeply pitted between the lines; perigynium 3-lobed; the lobes ovate, appressed.

*S. reticularis*, *Michx. fl.* 2. p. 167, (not of *Pursh*, *Elliott*, and *Muhl.*); *Willd.* p. 4. p. 314.

Culm 2 feet high, triangular, somewhat compressed and slender. Leaves  $1\frac{1}{2}$  line wide, smooth, flat. Fascicles of spikelets about an inch long, the lateral ones 2 or 3 in number, and very remote, standing on short nearly included peduncles. Spikelets in pairs: the sterile lanceolate, on a short stipe at the base of the fertile spikelet, many-flowered; the scales somewhat distichously arranged, lanceolate, each bearing two stamens, the filaments of which project a little beyond the scale: fertile spikelets mostly of 3 ovate, mucronate and carinate scales; the two interior embracing the nut at its base. Style 3-cleft nearly

to the base. *Nut* exactly globose, whitish, dull; the surface strongly reticulated; the interstices oblong and deeply pitted. *Perigynium* conspicuous and resembling a calyx, of a pale greenish colour, equally 3-lobed, closely appressed, and partly adnate; the lobes rather acute.

HAB. South Carolina, *Michaux*; Middle Florida, *Dr. Chapman!*

OBS. This plant, which seems to be nearly related to *S. tessellata*, *Willd.* agrees so minutely with *Michaux's S. reticularis*, with the exception of the roughness on the lower part of the culm, that I have no doubt of its identity with that species. It is the only N. American *Scleria* in which I have found the nut truly reticulated. The species described under the same name by *Muhlenberg* and others is my *S. laxa*, a very distinct plant.

## 2. SCLERIA LAXA.

Culm weak, diffuse, nearly smooth; fascicles lateral and terminal, very remote, on long slender peduncles, somewhat branched, loosely flowered; scales and bracts smooth; nut globose, pitted, and marked in a somewhat spiral manner with transverse hairy rugæ; perigynium 3-lobed; the lobes ovate, appressed.

*S. reticularis* *Muhl.!* *gram.* p. 266; *Pursh!* *fl.* 1. p. 45; *Elliott, sk.* 2. p. 601?; *Gray!* *Gram. & Cyp.* part 1. no. 99.

*Culm* 12—18 inches high, slender, acutely triangular, with the angles somewhat winged and slightly scabrous. *Leaves* 2 lines broad, flat, smooth. *Fascicles* usually 3, one of which is terminal, the others lateral and very remote. *Peduncles* 2—6 inches long, compressed, slender, and often recurved. *Spikelets* distant, in pairs, disposed as in the preceding species. *Stamens* 2. *Nut* about a line in diameter, whitish, with narrow, brown wrinkles, which are more or less hairy, pitted in an obscurely reticulate manner. *Perigynium* deeply 3-lobed; the lobes rather acute.

## 3. SCLERIA OLIGANTHA.

Culm erect, smooth, the angles somewhat winged; leaves flat, smooth; fascicles 2, one lateral on a long exerted peduncle, the other terminal; sterile spikelets elongated, sessile; bracts somewhat ciliate; nut ovate, smooth and polished; perigynium a narrow ring, bearing 8 minute tubercles.

*S. oligantha*, Michx. fl. 2. p. 167?; Elliott, sk. p. 557.

*Culm* about 2 feet high, slender, triquetrous. *Leaves* 2 lines wide, smooth, except on the margin near the summit. *Fascicles* of spikes scarcely an inch long; the lateral one often barren, remote, supported on a slender peduncle about 6 inches in length. *Spikelets* in 3—4 pairs; the *sterile* one-third of an inch long; scales lanceolate, somewhat rigid, dark purple. *Stamens* 3. *Style* deeply 3-parted. *Nut* a line and a half in length, exactly ovate, obtuse, white. *Perigynium* consisting of 8 small white cellular processes, approximated in pairs, and forming a circle under the base of the nut.

**HAB.** Wet pastures and pine barrens. South Carolina, Elliott; Middle Florida, Dr. Chapman!

**Obs.** I am not quite satisfied respecting the synonyms quoted under this species. The specimens in Michaux's herbarium are without fruit, and Elliott, who quotes Michaux with a mark of doubt, describes the leaves as narrow; whereas in our plant, they are broader than in many other species. Willdenow (and Pursh copying him) referred *S. oligantha* to the succeeding species, which is, however, a totally distinct plant.

## 4. SCLERIA PAUCIFLORA, Muhl.

Culm slender, smoothish; leaves narrow, with pubescent sheaths; fascicles lateral and terminal, few-flowered; the lateral ones remote, on long peduncles; bracts ciliate; nut globose-ovate, verrucose; the warts at the base stipitate; perigynium a narrow ring supporting 6 minute tubercles.

*S. pauciflora*, Muhl! gram. p. 267, (in part); Willd. sp. 4: p. 318,

(excl. syn. *Michx.*); *Pursh*, *fl.* 1. p. 46. (excl. syn. *Michx.*); *Elliott*, *sk.* 2. p. 559; *Darlingt!* *fl. Cest.* ed. 2. p. 26; *Beck. bot.* p. 430.

*Culm* erect, 9—18 inches high, triquetrous, striate, slightly scabrous toward the summit. *Leaves* scarcely a line wide, nearly smooth; the sheaths clothed with a short pubescence. *Fascicles* 2—3, composed of about three pairs of spikelets; the lateral ones on long slender peduncles. *Bracts* foliaceous; the inner ones ciliate. *Spikelets* in pairs; the *sterile* few-flowered, sessile in the second scale of the fertile spikelet; the scales membranaceous, acute, each covering three filaments: *fertile spikelet* of 3 coriaceous, ovate, mucronate scales, which are somewhat ciliate on the keel. Between the sterile spikelet and the fertile scale which embraces it is a filiform process, or abortive pedicel. *Style* 3-cleft. *Nut* white, shining, roughened with minute prominences. At the base there are a number of capitate stipitate warts, or processes, projecting downward; the little heads appearing pulverulent under a strong lens. *Perigynium* a narrow somewhat undulate ring, upon which, and between it and the base of the nut, are 6 roundish cellular bodies like those of *S. oligantha*.

**HAB.** Serpentine hills, near west Chester, Pennsylvania, *Dr. Darlington!*; swamps, in the same state, *Muhlenberg!*; Walpole, New Hampshire, *J. Carey, Esq.!*; damp pastures and pine barrens, South Carolina, *Elliott*.

**Obs.** In my New Hampshire specimens, the little rounded bodies of the perigynium are closely approximated in pairs, so that they seem to be 2-lobed.

**β.** Leaves, sheaths and bracts smooth; nut somewhat wrinkled transversely, faintly marked with longitudinal lines; processés of the perigynium 3, dilated, obscurely 2-lobed.

**HAB.** Southern States, *Dr. Baldwin!*; North Carolina, *Mr. Curtis!*

##### 5. SCLERIA CILIATA, *Michx.*

*Culm* erect, nearly naked; leaves channelled, pubescent above; fascicle subsolitary, terminal; bracts and scales ciliate; nut subglobose, verrucose; the warts at the base stipitate; perigynium a narrow ring supporting 3 tubercles.



*S. ciliata*, Michx. ! fl. 2. p. 167 ; Willd. sp. 4. p. 318 ; Pursh, fl. 1. p. 46 ; Elliott, sk. 2. p. 559.

*Culm* 1—2 feet high, acutely triangular ; the angles scabrous toward the summit. *Leaves* about a line in breadth, hairy, scabrous on the margin, strongly channelled ; sheaths retrosely pubescent, particularly on the angles. *Fascicle* of spikes mostly solitary at the summit of the culm ; sometimes there is a remote abortive cluster on a long peduncle. *Bracts* fringed with long whitish hairs ; the terminal fascicle consists of about 5 pairs of spikelets : *sterile spikelet* large, many-flowered, sessile within the superior fertile scale ; *stamens* 3. *Nut* obscurely 3-sided, somewhat shining, white, roughened with remote warts, not wrinkled or pitted ; stipitate prominences at the base very few. *Perigynium* a thickened obtusely triangular border, supporting 3 hemispherical cellular bodies, like those in the two preceding species.

**HAB.** Damp soils. South Carolina, Elliott ; Southern States, Dr. Baldwin ! ; Georgia, Le Conte !

**OBS.** Darlington refers *S. ciliate* to his *S. pauciflora* ; but the plant described above is quite distinct from the latter species, which I received from the author himself.

#### 6. SCLERIA CAROLINIANA, Willd.

“Culm erect, slender, and with the leaves and bracts slightly hairy ; fascicles terminal and axillary ; scales pubescent ; nut transversely wrinkled.”

*S. Caroliniana*, Willd., sp. 4. p. 318.

*S. hirtella*, Michx. fl. 2. p. 168, (not of Swartz) ; Elliott, sk. 2. p. 560, (excl. syn. Pursh & Willd.).

*Culm* about 18 inches high, triquetrous, hairy, particularly along the margins. *Leaves* narrow, channelled, shorter than the culms, hairy. *Spikelets* 2—3, near the summit of the culm, distinct, not fasciculated ; sometimes a small axillary spike near the base of the culm. *Bracteal leaves* much longer than the spikes, hairy, and conspicuously fringed. *Scales* ovate, acuminate, unequal, pubescent. *Nut* globular, roughened chiefly by irregular transverse elevated lines.—Elliott.

**HAB.** Damp soils. South Carolina, Elliott.

**OBS.** I have not been able to identify this plant among my

numerous specimens of *Scleria*. Michaux does not notice the fruit, and I did not particularly examine his specimens. He states that it grows in the woods of Carolina. Elliott has a variety of this species, which he calls *strigosa*, and which differs from the ordinary form in being "less hairy, excepting along the angles of the culm and margin and midrib of the leaves; its spikes also are larger and more numerous; its glumes fringed, of a light chestnut colour; and the nut rather roughened by distinct tubercles than by transverse lines." It was collected by Dr. Baldwin on the confines of Georgia and Florida; and Mr. Elliott thinks it may be a distinct species.

#### 7. *SCLERIA TRIGLOMERATA, Michx.*

Culm scabrous; leaves broadly linear, smoothish, sometimes a little hairy; fascicles lateral and terminal, triglomerate; the lateral one remote, pedunculate; bracts slightly ciliate; scales cuspidate; nut ovate-globose, smooth and polished; perigynium annular, whitish, invested with a cellular crust.

*S. triglomerata, Michx. ! fl. 2. p. 168; Muhl. ! gram. p. 260; Elliott, sk. 2. p. 558; Beck, bot. p. 430; Darlingt. ! fl. Cest. ed. 2. p. 26; Gray ! Gram. & Cyp. part 1, no. 98.*

*Culm* about 3 feet high, leafy, triquetrous, with the angles almost winged. *Leaves* 2—4 lines wide, scabrous on the margin, the under surface a little hairy. *Terminal fascicle* consisting of three distinct clusters of spikelets, each with a foliaceous bract at the base; lateral fascicle composed of few spikelets, remote, usually supported on a long peduncle; sometimes it is wanting. *Sterile spikelet* seated within the upper fertile scale, many-flowered; the scales lanceolate, purplish, and marked with deeper lines. *Stamens* 3. *Nut* bluish when young, at length nearly two lines in diameter, sometimes a little uneven. *Perigynium* annular, or rather obtusely triangular, entire, covered with a cellular, or minutely vesicular, whitish crust.

**HAB.** Low grounds and moist thickets. Vermont! to Florida! and west to Arkansas!

**OBS.** N. ab Esenbeck (in *Linnæa* 9. 301.) refers *S. tri-*

*glomerata*, Michx. to Cladium ; but he surely must have mistaken some other plant for ours. I suspect he meant *Schænus mariscoides* of Muhlenberg.

## 21. HYPOPORUM, *N. ab Esenb.*

PERIGYNIUM O. NUT naked, triangular at the base ; the sides porous, punctate, or sulcate.—Habit of *Scleria*.

Hypoporum, *N. ab Esenb. in Wight's contrib.* p. 70, and in *Linnæa* 9. p. 303.

Species of *Scleria*, *Willd., Nutt., Muhl., &c.*

### 1. HYPOPORUM GRACILE.

Culm filiform, and with the leaves, smooth ; spikelets few, in a terminal fascicle ; bracts and scales glabrous ; nut ovate, obtuse, obscurely triangular, smooth, indistinctly ribbed, with two pores on each side of the triangular base.

*Scleria gracilis*, *Elliott ! sk. 2. p. 557.*

Culm 1—2 feet high, very slender, triquetrous, nearly naked. *Leaves* scarcely half a line wide, 2—4 inches long. *Spikelets* 3—5 pairs, closely aggregated, subtended by an erect bracteal leaf 3—4 inches long, appearing like a continuation of the culm. *Sterile spikelet*, sessile within the fertile scales. *Stamens* 3. *Nut* about a line and a half long, white, dull ; the sides marked with obtuse longitudinal ribs (which are sometimes rather obscure) and two oblong pits or pores on each side near the base.

HAB. Middle Florida, *Dr. Chapman !* ; near St. Mary's, Georgia, *Dr. Baldwin !* ; Texas, *T. Drummond !*

OBS. Mr. Elliott remarks that the nut is polished, and showing in "some specimens" slight longitudinal ribs ; but I find it to be dull, and almost always distinctly ribbed ; and yet the plant which I have described must be identical with his, since it agrees with specimens collected by Dr. Baldwin himself.

## HYPOPORUM BALDWINII.

Culm triquetrous, smooth ; leaves linear, carinate ; spikelets about 3, in a terminal fascicle ; bracts and scales glabrous ; nut ovate, obscurely 3-sided, smooth, apiculate ; the base triangular, destitute of pores.

*Culm* 2—3 feet high, smooth, or slightly scabrous on the angles towards the summit. *Leaves* long, narrowly linear, smooth and rather rigid ; the margins minutely scabrous upward. *Spikelets* about 3, sessile, glomerate in a terminal fascicle, each subtended by a foliaceous bract. *Sterile spikelet* sessile in the upper fertile scale, many-flowered. *Stamens* 3. *Nut* (larger than in *Scleria triglomerata*) white, smooth but dull, obscurely 3-angled, conspicuously apiculate, raised on a very short triangular base.

HAB. Georgia, *Dr. Baldwin!*

OBS. This species has the habit and general appearance of *Scleria triglomerata* ; from which, however, it is at once distinguished by its apiculate nut with a dull white surface, the absence of a hypogynium, narrower leaves, fewer and larger spikelets, &c. The particular locality in which Dr. Baldwin found this species is not recorded. It seems to have been confounded with *Scleria triglomerata*.

HYPOPORUM INTERRUPTUM, *N. ab E.*

Culm triquetrous, and with the leaves, sparsely and minutely hirsute ; fascicles 4—6, alternate, sessile, and somewhat distant so as to form an interrupted spike ; scales of the fertile flowers oval or lanceolate, cuspidate, hispid ; nut smooth, subglobose, triangular below, each side furnished with a row of very minute pores.

*H. interruptum*, *N. ab Esenb. in Linnæa* 9. p. 303.

*Scleria interrupta*, *Michx. ! fl.* 2. p. 167, (not of *Willd.?*) ; *Richard in act. soc. nat. hist. Paris* (1792), 1. p. 113.

Whole plant pale green, minutely and sparsely hairy. *Culm* 10—20 inches high, slender. *Leaves* linear, flat, subacute. *Fascicles* closely sessile, somewhat remotely and alternately disposed at the summit of the culm, reflexed when old. *Bracts* minute and setaceous, sometimes none; that of the lowest fascicle occasionally somewhat foliaceous. *Spikelets* 4—6 in each fascicle, stamiferous above. *Scales* of the fertile flowers hispid, scarious, tawny or purplish, with a green keel, which is produced into a long and firm cusp; those of the staminate flowers fascicled, lanceolate or linear, obtuse and pointless, glabrous. *Stamens* 3. *Nut* about half a line in diameter, smooth and shining, minutely apiculate with the base of the style, slightly raised upon a 3-sided base, each side furnished at its junction with the spherical portion with about 7 very minute pores or dots.

HAB. Carolina to Florida, *Michaux*; New Orleans, *T. Drummond!* and *Dr. Ingalls!*; Middle Florida, *Dr. Chapman!*

Obs. There is some confusion about the synonymy of this plant, which I have not the means of reconciling. Our plant is the *S. interrupta* of Michaux, as I have ascertained by examining the specimens in his herbarium; and in a note appended to the specific character, that author states his plant to be identical with a species collected in French Guyana by L. C. Richard. He does not, however, quote Richard's paper in the Transactions of the Nat. Hist. Society of Paris, where *S. interrupta* was originally established (which I regret that I am unable to consult); but inasmuch as it is well known that the collections of Michaux were studied, and in a good degree described, by Richard himself, who may be supposed to know his own species, we might rest satisfied of the identity of the North American and the Guyana plant, were it not that Willdenow, who seems to know the latter plant, describes it as having a transversely rugose-verrucose nut, and as very closely resembling *S. verticillata*. It is possible, therefore, that Michaux may have been mistaken, and that our plant is not the original *S. interrupta*. Pursh and Elliott both copy the



specific phrase of Willendow unaltered, neither of them having seen the plant.

HYPOPORUM VERTICILLATUM, *N. ab E.*

Culm filiform, triquetrous, and, with the leaves, glabrous; fascicles 4—6, alternate, sessile, rather distant, forming an interrupted spike; bracts minute, setaceous; nut globose, with a somewhat triangular base, rugose-verrucose, abruptly apiculate.

*H. verticillatum*, *N. ab Esenb. in Linnæa*, 9. p. 303

*Scleria verticillata*, *Muhl. in Willd. sp.* 4. p. 317. (excl. syn.) and *gram.*! p. 266. (excl. syn.); *Elliott, sk.* 2. p. 261; *Gray! Gram. & Cyp.* part 2. no. 100.

*Culm* 6—8 inches high, very slender. *Leaves* linear, very narrow, flat, shorter than the culm. *Fascicles* composed of 4—5 very few-flowered, sessile spikelets, rather distant, alternate, sometimes appearing as if verticillate. *Bracts* setaceous, about as long as the fascicles, minutely scabrous upward. *Scales* of the fertile flowers ovate, glabrous, purple, with a strong, upwardly scabrous, green keel, which is produced into a short cusp. *Nut* a little more than half a line in diameter, strongly and somewhat rugosely papillose, with a short abrupt mucronation, and an indistinctly 3-sided base, destitute of pores.

**HAB.** Pennsylvania and Carolina, *Muhlenberg* and *Elliott*; Penn-Yan, New York, *Dr. Sartwell!*

**OBS.** This beautiful little species resembles *H. pergracile*, *N. ab E.*, an East Indian species, but is distinguished by its setaceous bracts, &c.

## TRIBE VII. ELYNEÆ.

FLOWERS diclinous. SPIKES compound; scales distichously or every way imbricated, each covering a single unisexual or two diclinous florets. No proper PERIGYNIUM. NUT commonly rostrate. STYLE 3-cleft.

## ELYNA, Schrader.

SPIKE solitary, terminal. SCALES two-flowered, androgynous. SCALES of the FLORETS (*squamulæ*) one to each; the lower or pistillate one next the scale of the spike, enclosing the base of the narrow and oblique staminate squamula.—Habit of *Carex*. Leaves radical, setaceous.

*Elyna*, Schrader, *fl. Germ.* 1. p. 155; *Lestib. ess. fam. Cyp.* p. 25, no. 10; *N. ab Esenb. in Linnæa*, 9. p. 304.

Species of *Kobresia*, Willd., Persoon, Schkuhr, &c.

## ELYNA SPICATA, Schrader, l. c.

*Kobresia scirpina*, Willd. *sp.* 4. p. 205; Schkuhr, *car.* 2. p. 1; Pers. *syn.* 2. p. 534; Wahl. *fl. Suec.* 2. p. 583; Rich. *app. Frankl. journ.* ed. 2. p. 34.

*K. filiformis*, Dewey! in *Sill. jour.* 19, p. 253.

*Carex Bellardi*, Schkuhr, *car.* 1. p. 12. t. D. f. 16; Wahl, *act. Holm.* (1803), p. 141.

Cespitose. Stems 4 to 12 inches high, erect, smooth. Leaves mostly radical, scarcely as long as the culm, setaceous. Spike from half an inch to an inch long, cylindrical, rather loosely flowered below. Scales of the spike ovate, fuscous; the lowest one usually produced into a short cusp. Scale of the pistillate floret ovate-lanceolate, loosely enclosing the nut and the base of the linear-lanceolate staminate scale. Stamens 3. Style 3-cleft. Nut ovate-oblong, obscurely trigonous, somewhat flattened on one side and angular on the other, abruptly acuminate into the style.

HAB. Rocky mountains, and barren grounds between lat. 64° and the Arctic sea, *Dr. Richardson!*

OBS. I can perceive no essential difference between European specimens of *E. spicata* and those from the Rocky Mountains, from which Prof. Dewey drew his description of *Kobresia filiformis*, except that in very mature specimens of the American plant the spike is somewhat more loosely flowered. The name under which the plant is described in Silliman's Journal is credited to Dr. Torrey by some mistake.

### TRIBE VIII. CARICEÆ.

FLOWERS diclinous. SCALES of the spikes imbricated on all sides. NUT wholly enclosed in an urceolate or bottle-shaped perigynium.\*

#### CAREX, *Linn.*

SPIKES one or several, androgynous or unisexual, rarely diœcious. *Stam. Fl.* STAMENS 3. *Pist. Fl.* PERIGYNIUM bidentate, emarginate or truncate at the apex. STYLE 2 or 3-cleft. NUT lenticular, plano-convex, or triangular, crowned with the lower portion of the persistent and continuous, or rarely articulated, style.—Culms triangular, leafy throughout, or only at the base; spikes terminal or axillary, distant or approximate, or variously aggregated.

*Carex*, *Linn. gen. pl.* no. 1946; *Juss. gen.* p. 36; *Lam'k. ill.* t. 752; *Schkuhr, car.* 1. p. 1. *et tab. mult.*; *R. Brown,*

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\* The urceolate perigynium of *Carex*, *Uncinia*, &c. is considered as resulting from the union of two scales, like those which enclose the flowers of *Elyna* and *Kobresia*, and not as analogous to the setiform perigynium of *Scirpeæ* and *Rhynchosporaæ*. In the former case it represents bracts of the second order; in the latter it may be viewed as a rudimentary perianth.

*prodr.* 1. p. 203; *Schw. & Torr. car. in ann. lyc. nat. hist. New York*, 1. p. 284; *Dewey, car. in Sill. jour.* 7, et seq.; *N. ab Esenb. in Linnæa*, 9. p. 305.

*Carex & Vignea P. de Beauv.*; *Lestib. ess. fam. Cyp.* p. 22, no. 1. and 2.

A. *Style 2-cleft; nut lenticular, or more or less compressed.*  
—VIGNEA, P. de Beauv.

1. *Spike single.*

\* Mostly diœcious.

1. *C. DIOICA*, *Linn.*; *Schkuhr, car.* 1. p. 5; *Fl. Dan.* t. 369.

*C. Linnæana*, *Schkuhr, car.* 2. p. 3. f. 1.

*C. parallela*, *Læstæd.*

*C. Redowskiana*, *Meyer? Cyp. nov. in mem. acad. St. Petersb.* (6. ser.) 1. p. 207. t. 4; *Dewey! in Sill. jour.* 29. p. 260.

*C. nigricans*, *Dewey! l. c.* p. 249, not of *Meyer.*

HAB. Cumberland House, and Rocky Mountains, *Dr. Richardson!*—The form of the fruit varies from ovate to lanceolate, and the hispidness of the margins of the beak is sometimes very slight.

2. *C. EXILIS*, *Dewey! car. l. c.* 14. p. 351. f. 53, and  $\beta$ . *squamacea*, *l. c.*

HAB. Massachusetts! and New Jersey!

3. *C. LEIOCARPA*, *Meyer, l. c.* p. 208, t. 5; *Bongard! veg. Sitcha, in mem. acad. St. Petersb. l. c.* 2. p. 168.

HAB. Unalashka, *Meyer*; Sitcha, *Bongard!*—A 3-cleft style is observed in some of our specimens.

\*\* Androgynous.

4. *C. CAPITATA*, *Linn.*; *Schkuhr, car.* f. 80.

HAB. Rocky mountains and Hudson's Bay, *Dr. Richardson!*

5. *C. MICROPODA*, Meyer, *l. c.* p. 210. t. 6.

HAB. Unalashka, Meyer.—Allied to *C. pulicaris*, and also to *C. Pyrenaica* and *nigricans*, from which it differs in the 3-cleft style, &c.—Meyer.

2. Spikes two or more.

\* All androgynous.

† Staminiiferous at the summit.

6. *C. CHORDORRHIZA*, Ehrhart; Schkuhr, *car. f.* 31; Gray! *Gram. & Cyp.* part 2. no. 143.

HAB. British America! Southern shore of Lake Superior! and western part of the State of New York!

7. *C. FULVICOMA*, Dewey! *car. l. c.* 29. p. 249.

HAB. Sea coast of Arctic America, Dr. Richardson!—The specimen in my possession from which Prof. Dewey's description was drawn does not exhibit the fruit. It appears very like *C. incurva* in a young state.

8. *C. STENOPHYLLA*, Wahl. *act. Holm.*; Schkuhr, *car. f.* 32; Dewey! *car. l. c.* 29. p. 249.

HAB. British America! and Rocky Mountains!—Our specimens are too young for determining this species satisfactorily.

9. *C. INCURVA*, Lightfoot, *fl. Scot.* t. 24; Schkuhr, *car. f.* 95; Dewey! *car. l. c.* 26, p. 276,

HAB. Rocky Mountains, T. Drummond!

10. *C. DISPERMA*, Dewey! *car. l. c.* 8. p. 266. f. 3; Schw. & Torr.! *car. l. c.* p. 303,

HAB. Massachusetts! and middle parts of the State of New York! to sub-Arctic America! and the Rocky Mountains!



11. *C. ROSEA*, Schkuhr, *car.* 2. p. 15. f. 179.

*β. retroflexa.*

*C. retroflexa*, Muhl. in Willd. *sp.* 4. p. 235; Schkuhr, *car.* f. 140.

? *γ. Texensis.*

HAB. *α* and *β*. Throughout the United States and British America! *γ*. Texas, T. Drummond!

12. *C. CEPHALOPHORA*, Muhl. in Willd. *sp.* 4. p. 220; Schkuhr, *car.* f. 133.

? *β*. Spikes 4—8, aggregated into an oblong or cylindrical head; scales muticous.

*C. muricata β. cephaloidea*, Dewey! *car.* l. c. 11. p. 308.

HAB. Northern and Middle States! *β*. abounds in New York and Massachusetts!—The plant here placed with some hesitation as a variety of *C. cephalophora*, is apparently intermediate between that species and *C. sparganioides*, and is perhaps a distinct species. It certainly is not *C. muricata*.

13. *C. MURICATA*, Linn., Schkuhr, *car.* f. 22; Willd. *sp.* 4. p. 234.

*C. Hookeriana*, Dewey! *car.* l. c. 29. p. 248.

HAB. Near Boston, B. D. Greene, Esq.!!; Carlton House, Dr. Richardson!—This species is by no means common in North America, although *C. muricata, β. cephaloidea* (here referred to *C. cephalophora*) is abundant in the Northern States. *C. divulsa*, Good. seems, as remarked by Wahlenberg and Hooker, to be a mere variety of the present species, differing in having its spikelets more remote. *C. Hookeriana*, Dewey, although a more slender plant, seems not to be a distinct species.

14. *C. SPARGANIOIDES*, Muhl. in Willd. *sp.* 4. p. 237; Schkuhr, *car.* f. 142.

*C. Boscii*, Spreng. *syst.* 3. p. 812.

HAB. Throughout the United States.

15. *C. MUHLENBERGII*, *Schkuhr, car. f. 178; Willd. sp. 4. p. 231.*

HAB. Hudson's Bay to Kentucky!; also in Texas, *T. Drummond!*

16. *C. VULPINOIDEA*, *Michx. ! fl. 2. p. 169.*

*C. stipata*, *Muhl. in Willd., sp. 4. p. 233; Schkuhr, car. f. 132.*

HAB. Throughout the United States and British America!—The specific name of Michaux, being first published, must of necessity be restored to this species.

17. *C. SETACEA*, *Dewey! car. l. c. p. 61; t. 2. f. 5. (bad).*

HAB. Massachusetts! and New York!—Nearly resembling *C. multiflora*, from which it differs in its rigid and setaceous bracts, and ovate-lanceolate fruit, with very strongly serrulate-ciliate margins.

18. *C. MULTIFLORA*, *Muhl. in Willd. sp. 4. p. 243; Schkuhr, car. f. 144.*

*C. bracteosa* and polymorpha, *Schw. ! anal. tab. car. in ann. lyc. nat. hist. New-York.*

*C. microsperma*, *Wahl.*

HAB. Throughout the United States.

19. *C. PANICULATA*, *Linn.; Schkuhr, car. f. 20.*

*β. teretiuscula*, *Wahl.; Hook. fl. Scot. p. 263; Gray! Gram. & Cyp. part 2. no. 150.*

*C. teretiuscula*, *Good.*

? *γ. decomposita*, *Dewey! car. 10. p. 276.*

*C. decomposita*, *Muhl. ! gram. p. 264; Dewey! car. l. c. 25. p. 140. t. S. f. 58.*

HAB.  $\beta$ . throughout the Northern and Middle States! and British America!  $\gamma$ . Cherokee country, *Muhlenberg*; Michigan, *Dr. Folwell*!—The var.  $\beta$ . is by far the most common form in this country; and we have even met with no specimens exactly corresponding with *C. paniculata* of Europe. Our specimens of the var.  $\gamma$ . are not mature; but it seems hardly to be a distinct species.

†† *Staminate and pistillate flowers variously situated.*

20. *C. SICCATA*, *Dewey!* *car. l. c.* 10. p. 268; t. F. f. 18.

HAB. Connecticut! Massachusetts! Columbia river! and Cumberland House!—Near *C. intermedia*, *Good.*, but distinct. The nut of this species is flat on one side, and obtusely angled on the other.

21. *C. BROMOIDES*, *Schkuhr*, *car.* 2. p. 8. f. 176.

HAB. Throughout the United States and British America! west to the Rocky Mountains!—Nut flat on one side, obscurely angled on the other.

††† *Pistilliferous at the summit.*

22. *C. LOLIACEA*, *Linn.*; *Willd. sp.* 4. p. 337.

*C. tenella* *Schkuhr*, *car.* f. 104.

HAB. British America!

23. *C. TRISPERMA*, *Dewey!* *car. l. c.* 9. p. 63. t. f. 12.

*C. quaternaria*, *Spreng. syst.* 3. p. 330.

HAB. Northern States and British America! Rocky Mountains!

24. *C. DEWEYANA*, *Schw! anal. tab. l. c.*; *Schw. & Torr.! car. l. c. p. 310.*

*C. remota*, *Richardson, in app. Frankl. journ. ed. 2. p. 35.*

HAB. Northern States and British America!; west to the Rocky Mountains!

25. *C. TENUIFLORA*, *Wahl.*; *Schukhr, car. f. 187*; *Dewey! car. l. c. 28. p. 273.*

HAB. British America!

26. *C. ELONGATA*, *Linn.*; *Schukhr, car. f. 25*; *Bongard! veg. Sitcha, l. c. p. 168.*

HAB. Sitcha, *Bongard!*

27. *C. STELLULATA*, *Good.*; *Schukhr, car. f. 14.*

β. Inflorescence more or less diœcious; the pistillate spikes bearing very few staminate flowers, the staminate spikes more or less pistilliferous.

*C. sterilis*, *Willd. sp. 4. p. 208*; *Schkuhr, car. f. 146*; *Muhl.! gram. p. 217.*

γ. Somewhat smaller; spikes (especially the uppermost) with numerous staminate flowers, thus becoming clavate.

*C. scirpoides*, *Schkuhr, car. f. 180*; *Muhl.! gram. p. 225.*

HAB. Northern and Middle States! to Arctic America! west to the Rocky Mountains!; Sitcha, *Bongard!*—*C. stellulata*, *sterilis* and *scirpoides* are not distinguished from each other by any essential and constant characters; numerous intermediate forms being every where found. *C. sterilis* certainly differs from the others in its prevailing diœcious habit, or rather in its tendency to become diœcious; but the pistillate specimens usually bear more or less staminate flowers at the base

of the spikelets, and agree very well with the European *C. stellulata*.

28. *C. CANESCENS*, *Linn. fl. Succ.* (fide *Wahl.*); *Fl. Dan.* t. 285.

*C. curta*, *Good.*; *Schkuhr, car.* f. 13.

*C. Richardi*, *Michx. ! fl.* 2. p. 170.

α. Spikes large; the whole plant silvery-glaucous when young.

β. Spikes small, few-flowered; culm and leaves slender.

HAB. Northern States and British America!; west to the Rocky Mountains!

29. *C. MARINA*, *Dewey! car. l. c.* 29. p. 248.

HAB. Sea coast of the Arctic Regions, *Dr. Richardson!* Very near *C. lagopina*, *Wahl.*; but the fruit is not acuminate.

30. *C. CARLTONIA*, *Dewey! car. l. c.* 56. p. 239.

HAB. British America near Carlton House!—This species is characterised by Prof. Dewey as tristigmatic, with the upper spike only androgynous, and is accordingly referred to the same section with *C. hirsuta*, &c.: we find, however, only two stigmas, a lenticular nut, and staminate flowers at the base of at least two of the spikelets. The habit of the plant, moreover, is entirely that of the present group; and indeed though a taller plant, it is exceedingly near *C. marina*. The fruit of *C. Carltonia* is, however, somewhat broader and minutely striolate.

31. *C. LAGOPINA*, *Wahl. fl. Lapp., § fl. Succ.* 2. p. 591.

*C. leporina*, *Willd.* (not of *Linn.*).

*C. Lachenalii*, *Schkuhr, car.* f. 79.

HAB. Rocky Mountains, *T. Drummond!*—This species, not previously known as a native of North America, occurs in



my set of the Carices collected in the several expeditions in British America. The specimens are mixed with *C. petasata*, *Dewey*, and were apparently obtained at the same locality.

32. *C. PETASATA*, *Dewey*, *car. l. c.* 29. p. 246.

HAB. Rocky Mountains and sub-Arctic America! *Dr. Richardson!*

33. *C. FESTIVA*, *Dewey*, *car. l. c.* 29; p. 246.

HAB. Rocky Mountains and sub-Arctic America, *Dr. Richardson!*

34. *C. LEPORINA*, *Linn. fl. Suec.*, not of *Michx. & Pursh*, nor of the *flora Danica*.

*C. ovalis*, *Good.*; *Schkuhr*, *car. f.* 8.

HAB. Rocky Mountains and sub-Arctic America!

35. *C. SCOPARIA*, *Schkuhr*, *car. f.* 175; *Willd. sp.* 4. p. 230.

*C. leporina*, *Michx.!* *fl.* 2. p. 170.

*C. Muskingumensis*, *Schw.!* *anal. tab. l. c.*

*C. arida*, *Schw. & Torr.!* *car. l. c.* p. 312; t. 24. f. 2.

*β. lagopodioides*; spikes 10—15, crowded; the lowest usually subtended by a long setaceous or foliaceous bract.

*C. lagopodioides*, *Schkuhr*, *car. f.* 177.

HAB. Throughout the United States and British America! The lanceolate fruit characterizes all the forms of this species.

36. *C. FESTUCACEA*, *Schkuhr*, *car. f.* 173; *Willd. sp.* 4. p. 242.

HAB. Throughout the United States and British America! —*C. miralibis*, *Dewey*, *car. l. c.* 30. p. 63. seems to differ from *C. festucacea* chiefly in the spikelets not being club-shaped, or in other words, in having very few staminate flowers

at the base of the spikes ; a character which we fear cannot be implicitly trusted in this group of Carices, since we observe considerable diversity in this respect. We have at present no specimens of *C. mirabilis* from the author, and therefore are unable to decide whether it be entitled to rank as a species. We have, however, several specimens which correspond with Prof. Dewey's description ; but they appear to connect *C. festucacea* with the succeeding species.

37. *C. CRISTATA*, Schw.! *anal. tab. l. c. Schw. & Torr.!* *car. l. c. p. 315. t. 25. f. 1.*

HAB. Northern and Middle States, and British America !

38. *C. STRAMINEA*, Schkuhr, *car. 1. p. 49, f. 34. & 157 ; Dewey, car. l. c. 11. p. 157.*

*β. minor* ; slender ; spikes smaller ; fruit with an ovate circumscription, narrowly winged.

*C. straminea β. minor, Dewey! l. c.*

*C. tenera, Dewey! car. l. c. 8. p. 97 ; & 9, t. C. f. 9.*

*γ. fœnea* ; spikes more or less approximate (green) ; fruit broadly ovate, with a somewhat narrower wing.

*C. fœnea, Muhl.!* *gram. p. 227 ; Schw. & Torr.!* *car. l. c. p. 318 ; Dewey! car. l. c. 36, p. 142.*

HAB. United States and British America. *β.* Northern States and British America ! *γ.* New Jersey ! Pennsylvania and Southern States !—We are not wholly satisfied with the present arrangement of the perplexing group which comprises this and the 3 preceding species. The number should, perhaps, be still further diminished, since, notwithstanding, the apparent distinctness of these several forms, a suite of intermediate specimens may readily be collected so as to exhibit a regular gradation from the narrow fruit of *C. scoparia* to the almost orbicular and broadly-winged fruit of *C. straminea*. No dependence can be placed on the presence or

absence of a foliaceous bract at the base of the lowest spike, since both forms are frequently met with in the same clump.

The following species, although nearly allied to *C. straminea*, seems wholly distinct. It is singular that it has been so long overlooked.

### 39. CAREX ALATA.

Spikes (large) 4—7, somewhat globose-ovate, approximate, many (80—100) flowered; fruit suborbicular, with a short abrupt acumination, very broadly winged, minutely serrulate-ciliate on the margin, one-third longer than the lanceolate mucronate scale; nut oval, acute at each end, long stipitate.

*Culm* 3—4 feet high, stout, glabrous. *Leaves* dark green, flat, 2—3 lines wide. *Spikes* light green, nearly three-fourths of an inch long, thick, ovate or subglobose, somewhat attenuate or turbinate at the base owing to the rather numerous staminate flowers. *Fruit* nearly 2 lines broad. *Nut* elevated on a distinct slender stipe.

HAB. Newbern, North Carolina, *Mr. Croom!*; Macon, Georgia, *Dr. Loomis!*

40. *C. BICOLOR*, *Allioni*; *Schukhr, car. f. 181*; *Schw. & Torr. ! car. l. c. p. 311.*

HAB. Labrador, *Schweinitz!*

\*\* Terminal spike androgynous, the others wholly pistillate.

41. *C. GLAREOSA*, *Wahl.*; *Schukhr. car. f. 97.*

HAB. Greenland, *Prof. Hornemann!*

\*\*\* Stamiferous and pistilliferous spikes distinct.

† *Staminate spike mostly single.*

42. *C. AUREA*, *Nutt. gen. 2. p. 205*; *Schw. & Torr. ! car. l. c. p. 238, t. 25. f. 2.*

*C. pyriformis*, *Schw. ! anal. tab. l. c.*

HAB. Northern States and British America! W. to the Rocky Mountains!

43. *C. SAXATILIS*, *Linn. fl. Suec.*; *fl. Dan.* t. 159; *Schkuhr, car.* f. 40.

$\beta$ . Fertile spikes 2—4, approximate or somewhat remote, rather loosely flowered; stigmas sometimes 3.

*C. Bigelowii*, *Torrey! in Schw. anal. tab. l. c.*

*C. Washingtoniana*, *Dewey! car. l. c.* 10. p. 272.

*C. saxatilis*, *Pursh, fl.* 1. p. 38.

*C. nigra*, *Schw. & Torr.! car. l. c.* p. 336.

HAB. Arctic America!; Kotzebue's Sound!  $\beta$ . in hemlock woods of Vermont and New Hampshire, *Pursh*; on Mount Washington, New Hampshire, *Bigelow* and *Dr. Barratt!*—After a most careful examination, we find but two stigmas in all the flowers of our fine suite of specimens of *C. Washingtoniana*, collected by Dr. Barratt, on whose specimens the species was founded. The fruit seems to us rather obtuse than acute; and the scales, although somewhat variable, are mostly as obtuse as in our European forms of *C. saxatilis*. We do not hesitate, therefore, to consider the plant a variety of *C. saxatilis*. This view is wholly confirmed by an examination of our numerous specimens of that species from the North of Europe: those from Norway, Silesia, &c., so closely resemble the plant from Mount Washington that they can scarcely be distinguished; while, on the other hand, specimens from Lapland, &c., which differ in being somewhat smaller, in their shorter and more clustered spikes and dark-coloured fruit, are in all respects similar to those from Arctic America. These last have much of the aspect of *C. nigra*. It cannot now be doubted that our  $\beta$  of this species was really seen by Pursh, and correctly referred to *C. saxatilis*; and it is highly probable that it will hereafter be found in other localities in the northern portion of New England besides Mount Washington.

On account of its immaturity, little dependence can be placed on the single specimen upon which *C. Bigelowii* was originally established. It was collected many years since by Dr. Bigelow upon the same mountain, and seems to be a more slender form of the same plant.

44. *C. COMPACTA*, *R. Brown in Ross. voj. ; Rich. app. Frankl. journ. ed. 2. p. 35 ; Dewey! car. l. c. 27. p. 237. t. 5. f. 63.*

HAB. Arctic America and Rocky Mountains!—We have never met with the original description of this species.

45. *C. MUTICA*, *R. Brown in Rich. app, Frankl. journ. ed. 2. p. 35.*

HAB. Arctic America, *Dr. Richardson!*—We have seen no original specimen of this species. The plant which Prof. Dewey refers to *C. mutica* has 3 stigmas in one flower at least, and appears to us to be *C. limosa* var. *rariflora*.

#### 46. CAREX JAMESII.

Staminate spikes 2, approximate; the lower one much smaller; fertile spikes 3, thick, oblong-cylindrical, densely flowered; the two upper approximate, on short peduncles not sheathed at the base; the lowest one arising near the base of the culm, long peduncled; fruit about 8-rowed; perigynium ovate, inflated, with a very short, abrupt, bidentate beak, somewhat exceeding the ovate acute scale.

Whole plant glabrous. *Culm* about 6 inches high, stout, obtusely angled. *Leaves* rigid, broadly linear, shorter than the culm. *Stam. spikes* thick; the upper nearly an inch long, densely flowered, the lower closely sessile at its base; scales oblong, mostly rather obtuse, reddish brown, with a whitish midrib. *Pist. spikes* about an inch in length, very thick, densely flowered. *Perigynium* light brown, globose-ovate, smooth, indistinctly ribbed, much larger than the obovate, lenticular nut. *Scales* brown, with a pale keel.



HAB. Rocky Mountains, *Dr. James!* collected in Long's first expedition. This species, which is somewhat related to *C. pulla*, is very different from every other with which we are acquainted; and we have therefore given it the present name in honour of its discoverer, Dr. Edwin James. The stigmas have wholly fallen in the single specimen collected by Dr. James; but the lenticular nut indicates it to belong to the distigmatic section. It should be observed here, that we have not been able to consult the description of *C. compacta* of R. Brown, which is placed in this group. The *C. Jamesii* in the analytical table of Schweinitz, is *C. Willdenovii*.

## 47. CAREX SCOULERI.

Spikes all on filiform peduncles destitute of sheaths; fertile ones 3, oblong-cylindrical; staminate ones 2, short, attenuate at each extremity; fruit exactly orbicular, plano-convex or lenticular, regularly and minutely striate, erostrate, minutely apiculate, broader and a little shorter than the dark purple, ovate scale; orifice minute, entire.

Whole plant smooth and glabrous. *Culm* slender, about 18 inches high. *Cauline leaves* 2—4 inches long, and scarcely a line wide. *Spikes* all somewhat approximate. *Bracts* setaceous, about the length of the spikes, not sheathing at the base. *Peduncles* of the staminate and upper, pistillate spikes about an inch long; the lower one longer. *Stam. spikes* 6—8 lines long; scales obtuse, tawny, with a whitish keel. *Pist. spikes* about an inch long, rather densely flowered; the uppermost bearing a few staminate flowers at the summit. *Scales* ovate, acute. *Fruit* light brown, about a line in diameter, very lightly and regularly striate longitudinally, convex on one side, nearly flat on the other. *Nut* roundish, flat. *Stigmas* 2.

HAB. Observatory Inlet, on the western shore of America, *Dr. Scouler!* (under the name of *C. frigida*).

OBS. A very distinct species from every other of this group, and manifestly allied to *C. limosa*, from which it is clearly distinguished by the characters given above.

48. *C. CONCOLOR*, *R. Brown, app. Parry's 1st voy.* p. 284 & 309; *Hook. app. Parry's 2nd voy.* p. 26.

HAB. Arctic America! and White Mountains, New Hampshire, *Dr. Boott.* (fide *Hook.*)—Our specimens, collected at Bear Lake and Norway House by *Dr. Richardson*, pertain to the variety thus noticed by *Brown* on page 209 of the work above cited.—“Specimina proceriora, spicis femineis longioribus, axi squamarum pallido, ad *C. cæspitosam* proprius accedunt, et culmo lævi præcipue distingui possunt.” The plant certainly appears to be only a variety of *C. cæspitosa*.

†† *Staminate spikes commonly two or more.*

49. *C. CÆSPITOSA*, *Linn.*; *Schkuhr, car.* f. 85.

HAB. Northern and Middle States to Arctic America!; *Kotzebue's Sound, Capt. Beechey!*; *Sitcha, Bongard!*

50. *C. ACUTA*, *Linn.*; *Schkuhr, car.* f. 92.

HAB. Georgia to Arctic America! W. to Columbia river! A polymorphous plant. *C. verrucosa* of *Schweinitz* (but not of *Muhlenberg*) is a variety of this species. See *C. glaucescens*.

51. *C. STRICTA*, *Good.*; *Schkuhr, car.* f. 73; *Dewey! car. l. c. 10.* p. 269.

HAB. Northern States!—We cannot scarcely distinguish our specimens from *C. acuta*.

52. *C. AQUATILIS*, *Wahl.*; *Willd. sp.* 4. p. 304; *Dewey! car. l. c. 10.* p. 207.

HAB. Northern States to sub-Arctic America!

53. *C. CRINITA*, *Lamarck*; *Schkuhr, car.* f. 135 & 164; *Muhl.! gram.* p. 239.

*β. gynandra*, Schw. & Torr. ! *car. l. c.* p. 360.

*C. gynandra*, Schw. ! *anal. tab. l. c.*

*γ. paleacea*, Dewey ! *car. l. c.* 10. p. 270.

*C. paleacea*, Wahlenberg.

HAB. Hudson's Bay ! to Georgia !

54. *C. MARITIMA*, Muller, *fl. Dan.* 4. t. 703 ; Schkuhr, *car. f.* 74 ; Wahl. *fl. Suec.* 2. p. 612.

HAB. Hudson's Bay, Dr. Richardson !—It strongly resembles the form of *C. crinita* with very long cuspidate scales ; but is quite distinct.

55. *C. SITCHENSIS*, Prescott ! in Bongard, *veg. Sitcha.* *l. c.* p. 169.

*C. cryptocarpa*, Dewey ! *car. l. c.* 29. p. 243, not of Meyer.

HAB. Sitcha, Bongard ! ; Columbia river, Dr. Scouler !

56. *C. CRYPTOCARPA*, Meyer, in *mem. acad. St. Petersb.* *l. c.* p. 226. t. 14 ; Bongard ! *veg. Sitcha, l. c.* p. 160.

HAB. Unalashka, Meyer ; Sitcha, Bongard !—This species nearly resembles the preceding ; but the two are nevertheless distinct. The specimen from which Prof. Dewey drew the description of his *C. cryptocarpa* approaches this species in form of its scales, and in the somewhat shorter fertile spikes ; but wholly accords with *C. Sitchensis* in the rough leaves and culm, and in the fruit having a short but distinct beak ; whereas *C. cryptocarpa* has perfectly smooth leaves and culms, and the much broader fruit is somewhat acuminate, but not distinctly beaked.

B. *Style 3-cleft; nut trigonous.*—CAREX, P. de Beauv.

1. *Spike single.*

\* Mostly diœceous.

57. C. SCIRPOIDEA, *Michx.!* fl. 2. p. 171.

C. Wormskioldiana, *Hornemann!* fl. Dan. t. 1528; *Schw. & Torr.!*  
car. l. c. p. 294.

C. Michauxii, *Schw.!* anal. tab. l. c.

HAB. Arctic America! Greenland, *Prof. Hornemann!*; Rocky Mountains, *Dr. Richardson!*; on the White Mountains of New Hampshire, *Mr. Oakes!*—All our specimens, even the Greenland one from Hornemann, have a 3-cleft style. The name given by Michaux to this species has been dropped on account of its too great resemblance to *C. scirpoides*; but the latter should have been changed, since *C. scirpoidea* of Michaux was first published. *C. scirpoides*, *Schkuhr*, moreover, is only a variety of *C. stellulata*.

58. C. DRUMMONDIANA, *Dewey!* car. l. c. 29. p. 251.  
(excl. syn.)

HAB. Arctic America! and Rocky Mountains!

\*\* Androgynous.

† *Staminiferous at the summit.*

59. C. NIGRICANS, *Meyer, in mem. acad. St. Petersb. l. c.*  
p. 211. t. 7.

C. Backana, *Dewey!* car. l. c. 29. p. 250.

HAB. Unalashka, *Meyer*; Arctic America! and Rocky Mountains!

60. *C. PYRENAICA*, *Wahl, act. Holm.* 1803. p. 139 ; *Meyer, in mem. acad. St. Petersb. l. c.* p. 212. t. 7.

*C. Davalliana*, *Dewey! car. l. c.* 28. p. 271.

HAB. Rocky Mountains, *T. Drummond!*—A little larger than the specimens from the Pyrenees.

61. *C. CIRCINATA*, *Meyer! in mem. acad. St. Petersb. l. c.* p. 209. t. 6.

HAB. Unalashka, *Meyer!* ; Sitcha, *Bongard!*—Stigmas 2 or 3. This plant bears no resemblance to *C. polytrichoides*, with which Meyer contrasts it.

61. *C. AFFINIS*, *R. Brown! in Rich. app. Frankl. journ.* 2. p. 35, not of *Dewey*.

HAB. Sub-Arctic America, *Dr. Richardson!*—This plant has probably never been collected in fruit, since the fruit is not described by Brown in Richardson's appendix : the specimen from Dr. Richardson is very immature.—The observation, "Prope *C. polytrichoidi*," subjoined to the character of this species in the work above referred to, seems to have been misplaced. Was it not intended to follow the succeeding species? viz : *C. attenuata*, which is *C. polytrichoides*.

62. *C. OBTUSATA*, *Liljeb. ; Willd. sp.* 4. p. 12 ; *Schkuhr, car. f.* 149.

*C. affinis*, *Dewey! car. l. c.* 28. p. 273, not of *R. Brown*.

HAB. Carlton House, *Dr. Richardson!*

62. *C. GYNOCRATES*, *Wormskiöld.*

HAB. Greenland, *Prof. Hornemann!*—We have a single immature specimen with this name from Prof. Hornemann : we know not where the species is described.



63. *C. LEUCOGLOCHIN*, Ehrhart; *Linn. supp.* p. 413; Dewey! *car. l. c.* 10. p. 42.

*C. pauciflora*, Willd. *sp.* 4. p. 211; Schw. & Torr.! *car. l. c.* p. 298.

HAB. Northern States to Arctic America!; Sitcha, *Bongard!*

64. *C. POLYTRICHOIDES*, Muhl. in Willd. *sp.* 4. p. 223; Schkuhr, *car. f.* 139.

*C. microstachya*, Michx.! *fl.* 2. p. 169.

*C. attenuata*, R. Brown! in Rich. *app. Frankl. journ.* ed. 2. p. 35.

HAB. North Carolina! to Arctic America!—Prof. Dewey in his critical catalogue of the Carices of the Northern regions of America, in Silliman's journal, vol. 28, pronounces *C. attenuata* of R. Brown to be a distinct species. We know not on what specimens this opinion is founded; but a specimen from Dr. Richardson under this name, collected at Mackenzie river, is certainly *C. polytrichoides*.

66. *C. WILLDENOVII*, Schkuhr, *car.* 2. p. 33, f. 145.

*C. Jamesii*, Schw.! *anal. tab. l. c.*

HAB. Northern and Western States! to sub-Arctic America! and the Rocky Mountains!—This species is remarkable for its peculiar habit, its foliaceous scales, and the distinctly articulated base of the style; it should, perhaps, be placed in a separate genus, to which the name *Phyllostachys* would be appropriate. In its foliaceous scales it agrees with *C. phyllostachys* of C. A. Meyer, a native of the country adjacent to the Caspian sea. The latter species, however, has a continuous style, not separating by an articulation from the summit of the nut; and, moreover, we find in our specimen some remarkable peculiarities not noticed by the founder of the species, viz: the perigynium of the lowest flower encloses the peduncle of a separate staminate spike, and the two remaining pistillate flowers have within the perigynium, in place of a staminate spike, a

green squamaceous rudiment about the length of the nut. This curious plant, therefore, seems in a manner to connect *Schœnoxyphium*, *N. ab E.* with *Uncinia*, and to explain the nature of the setaceous body in the latter genus.

67. *C. FRASERI*, *Sims, bot. mag.* t. 1391; *Pursh, fl.* 1. p. 39.

*C. Lagopus*, *Muhl.! gram.* p. 265.

HAB. On mountains of North Carolina, *Fraser*. This is the only locality which is certainly known. Muhlenberg's specimens were obtained from a German travelling collector of plants, and are merely labelled—"Deigher walli in der wilternus."

68. *C. FILIFOLIA*, *Nuttall, gen.* 2. p. 204; *Dewey! car. l. c.* 12. p. 106, t. P. f. 50, not of *Richardson, Schw. & Torr., &c.*

HAB. Banks of the Missouri, *Nuttall*.—This species we have never seen.

†† *Pistilliferous at the summit.*

69. *C. URSINA*, *Dewey! car. l. c.* 27. p. 241, t. 5. f. 8. (excl. syn. *C. filifolia*, *Richardson*.)

HAB. Sea coast of Arctic America, *Dr. Richardson!*—The stigmas have fallen in our specimen; but from the lenticular fruit it may be inferred that it had only 2 stigmas. Prof. Dewey, however, describes the plant as tristigmatic. It is not *C. filifolia* of *Richardson*, as Prof. Dewey supposes. See *Uncinia*.

2. *Spikes two or more.*

\* All androgynous.

† *Staminiiferous at the summit.*

70. *C. PEDUNCULATA*, *Muhl. in Willd. sp.* 4. p. 222; *Schkuhr, car. f.* 131.

HAB. Pennsylvania to Arctic America! and Rocky Mountains!

71. *C. OVATA*, *Rudge*, in *Linn. trans.* 8. p. 96. t. g. f. 1; *Dewey! car. l. c.* 28. p. 273.

HAB. Newfoundland, *Rudge*; Rocky Mountains, *T. Drummond!*

++ *Pistilliferous at the summit.*

72. *C. SQUARROSA*, *Linn.*; *Willd. sp.* 4. p. 215; *Schw. & Torr.! car. l. c.* p. 209. t. 24. f. 2.

*C. typhina*, *Michx.! fl.* 2. p. 169.

HAB. Canada? to Georgia!—This species frequently occurs with a single spike.

73. *C. ATRATA*, *Linn.*; *Schkuhr, car.* f. 77; *Schw. & Torr.! car. l. c.* p. 320.

HAB. Rocky Mountains, *Dr. James!* & *T. Drummond!*; Arctic America, *Capt. Parry*; White Mountains of New Hampshire, *Nuttall*.—The specimens from the Rocky Mountains differ slightly from the European plant in having a more distinct beak to the fruit, with a more evidently bidentate orifice. They approach *C. Magellanica*, but seem to be only a variety of the former species.

74. *C. MEDIA*, *R. Brown*, in *Rich. app. to Frankl. journ.* ed. 2. p. 35.

HAB. Woody region of Arctic America, *Dr. Richardson*.—This species we have not seen.

75. *C. MERTENSII*, *Prescott!* in *Bongard, veg. Sitcha*, in *mem. acad. St. Petersb. l. c.* p. 168; *Dewey! car. l. c.* 30. p. 62.

*C. Columbiana*, *Dewey! car. l. c.*

HAB. Sitcha. *Bongard!*; Columbia river, *Dr. Scouler!*—Having had the good fortune to receive an original specimen of *C. Mertensii*, we are enabled to satisfy ourselves of its identity with *C. Columbiانا*. We find, indeed, that although *C. Mertensii* is described as distigmatic, at least half the fertile flowers in our specimen are furnished with 3 stigmas.

76. *C. SHORTII*, *Torr. Mss.; Dewey! car. l. c. 30. p. 60.*

HAB. Lexington, Kentucky, *Dr. Short!*; Columbus, Ohio, *Mr. J. A. Lapham!*—A very distinct and beautiful species, belonging to the same group as the preceding.

\*\* Terminal spikes androgynous (staminate below); the others wholly pistillate.

77. *C. VAHLII*, *Schkuhr, car. 1. p. 87. f. 94.*

*C. alpina; Vahl, fl. Dan. t. 403.*

HAB. Arctic America! and Rocky Mountains!

78. *C. BUXBAUMII*, *Wahl. fl. Lapp.; Willd. sp. 4. p. 252.*

HAB. Sitcha! and N. W. coast of America! to South Carolina.

79. *C. GMELINI*, *Hook. & Arn. bot. Beechey's voy. p. 118 & 131. t. 27.*

HAB. Kotzebue's Sound, *Capt. Beechey.*

80. *C. FULIGINOSA*, *Sternb. & Hopp. in act. bot. soc. Ratisbon, 1. p. 162. t. 3; Rich. app. Frankl. journ. ed. 2. p. 35.*

*C. misandra, R. Brown, app. Parry's 1st voy. p. 283 & 309.*

HAB. Arctic America!—Stigmas 2 or 3.

81. *C. HIRSUTA*, Willd. *sp.* 4. p. 252; *Schkuhr, car. f.* 172; *Schw. & Torr.! car. l. c.* p. 322.

*C. triceps*, Michx.! *fl.* 2. p. 170; *Elliott, sk.* 2. p. 538?

*C. viridula*, *Schw. & Torr.! car. l. c.* p. 320. (excl. syn. *Michx.*)

$\beta$ . *pedunculata*, *Schw. & Torr.! l. c.*

HAB. Canada to Florida!  $\beta$ . near Philipstown, New York, *Dr. Barratt!*

82. *CAREX COMPLANATA*, *Torr. & Hook.*

Spikes 3—4, sessile, approximated towards the summit of the culm, thick, oblong, the terminal one staminate below; fruit lenticular, obtuse, smooth, with an entire orifice, about the length of the broadly ovate, rather acute scale.

*Culm* about 18 inches high, very slender, triquetrous, with the angles scabrous and very acute. *Leaves* narrow, channelled. *Spikes* 6—8 lines long, and 3 lines in diameter, greenish; the terminal one largest, somewhat obovate, flowers crowded. *Fruit* broadly oblong, much compressed, not striate; orifice minute, entire. *Stigmas* 3. *Scales* as broad as the fruit, and somewhat exceeding it in length in the lower part of the spike.

HAB. Texas, *T. Drummond!* (Texan collection III. no. 424.)—This species has at first sight the appearance of *C. virescens*.

83. *C. VIRESCENS*, *Muhl. in Willd. sp.* 4. p. 251; *Schkuhr, car. f.* 147; *Schw. & Torr.! car. l. c.* 321. &  $\beta$ . *costata, l. c.*

HAB. Canada? to North Carolina!

84. *C. GRACILLIMA*, *Schw.! anal. tab. l. c.; Dewey! car. l. c.* 8. p. 98.

*C. digitalis*, *Schw. & Torr.! car. l. c.* p. 324. t. 26. f. 1. not of *Muhl.*

HAB. Sub-Arctic America to Kentucky!



85. CAREX OXYLEPIS, *Torr. & Hook.*

Spikes 4, slender, rather loosely flowered, subdistant, on filiform peduncles; the terminal one staminate below; fruit oblong, acute at each end, subtrigonus, smooth, with a membranaceous and minutely 2-lobed orifice, somewhat exceeding the lanceolate cuspidate scale.

*Culm* 12—18 inches high. *Leaves* narrow, flat, pungently acute, nearly as long as the culm, the midrib and margins sparsely hairy, especially on the lower surface. *Peduncles* filiform, nearly erect; the lowest about 2 inches long, included in the sheath for the greatest part of its length; the upper ones shorter, scarcely sheathed. *Spikes* about an inch in length, 15—30-flowered; the terminal one staminate for more than half its length. *Scales* lanceolate, scarious, with a green keel, gradually attenuate into a scabrous cusp, which is longest in the lowest flowers. *Fruit* pale green, obscurely nerved. *Stigmas* 3. *Nut* triquetrous.

HAB. Texas, *T. Drummond!* (Texan collection III. no. 436.) This species is intermediate between *C. gracillima* & *C. formosa*; it more nearly resembles the former, but is quite distinct from either.

86. *C. FORMOSA*, *Dewey! car. l. c. 8. p. 98. t. 2. f. 6;*  
*Schw. & Torr.! car. l. c. p. 325.*

HAB. Massachusetts! and the Western part of the State of New York!

87. *C. DAVISII*, *Schw. & Torr.! car. l. c. p. 326.*

*C. aristata*, *Dewey! car. l. c. 7. p. 277, & 9. t. 1. f. 1, not of R. Brown.*

*C. Torreyana*, *Dewey! car. l. c. 10. p. 47.*

HAB. Massachusetts! and the Western part of the State of New York! to Kentucky!; Cherokee, *Muhlenberg* (Herb.

no. 273).—A rare species, but one of the handsomest of the genus. The name originally given by Prof. Dewey had been previously applied by Brown to another species. The one given by Schweinitz & Torrey being older than the one subsequently given by Prof. Dewey, must consequently be retained.

\*\*\* Staminate and pistillate spikes distinct.

‡ *Pistillate spikes either sessile or on peduncles more or less sheathed at the base.*

88. *C. FILIFORMIS*, *Linn.*; *Schkuhr*, *car.* f. 45.

*C. striata*, *Michx.* *fl.* 2, p. 174?

HAB. Sub-Arctic America! to South Carolina!

89. *C. LANGUINOSA*, *Michx.!* *fl.* 2. p. 175.

*C. pellita*, *Muhl.!* *in Willd. sp.* 4. p. 302; *Schkuhr*, *car.* f. 149 & 150.

HAB. Hudson's Bay to Pennsylvania!; west to Columbia river!—The name of Michaux is restored to this species on account of its priority.

90. *C. VESTITA*, *Willd. sp.* 4. p. 263; *Schkuhr*, *car.* f. 182.

HAB. Massachusetts! to Georgia,

91. *C. PENNSYLVANICA*, *Lamarck, enc. meth.* 3. p. 388; *Gray!* *Gram. & Cyp.* part 2. no. 162.

*C. marginata*, *Muhl. in Willd. sp.* 4. p. 261; *Schkuhr*, *car.* f. 143.

*β. Muhlenbergii*, *Gray!* *Gram. & Cyp.* part 2. no. 163.

*C. varia*, *Muhl. in Willd. sp.* 4. p. 259; *Schkuhr*, *car.* f. 167.

92. *C. EMMONSII*, *Dewey!* *in litt.*

*C. alpestris*. *Schw. & Torr.!* *car. l. c.* p. 341, not of *Allioni*.

*C. Davisii*, *Dewey!* *car. l. c.* 10. p. 279, & 11. t. H. f. 25. (bad), not of *Schw. & Torr.*

HAB. Massachusetts!—Certainly very different from the European *C. alpestris*. The so-called radical peduncles sometimes observed in this species, are culms bearing a small staminate, and one or two few-flowered pistillate spikes, all aggregated at the summit so as readily to be mistaken for a single spike. The same thing is observed in *C. Floridana* & *C. nigromarginata*.

Another species having been previously dedicated to Mr. Davis, it becomes necessary to provide a new appellation for this plant; and we cheerfully accord with the wishes of Prof. Dewey, that it should bear the name of Prof. Emmons of Williams' College, a zealous and successful cultivator of natural history.

93. *C. NOVÆ ANGLIÆ*, *Schw. anal. tab. l. c.*; *Dewey!* *car. l. c.* 11. p. 314. t. 7.

*C. collecta*, *Dewey!* *car. l. c.* 11. p. 314, t. 7. f. 44.

HAB. Massachusetts, *Dewey!*—This species has been thought to have but 2 stigmas, but by careful management we have no difficulty in finding 3 in our specimens; and the nut, moreover, is constantly triangular. We therefore place the plant along with the closely allied species, *C. Pennsylvanica*, and *Emmonsii*. We perceive no essential difference between this species and *C. collecta*, *Dewey*.

94. *C. FLORIDANA*, *Schw.!* *anal. tab. l. c.*; *Schw.!* & *Torr.!* *car. l. c.* p. 306 (very badly described), t. 28. f. 1.

*C. albicans*, *Spreng. syst.* 3. p. 818?

HAB. Florida, *Le Conte!* and *Dr. Chapman!*; Louisiana, *Dr. Ingalls!*—This species has no resemblance whatever to

*C. Muhlenbergii* and *C. sparganioides*, with which it is placed in the monograph of North America Carices, and is very properly referred to the same group with *C. Novæ Angliæ* by Prof. Dewey. It has three stigmas almost uniformly in our specimens.

95. *C. NIGROMARGINATA*, *Schw. anal. tab. l. c.*; *Dewey! car. t. c. 10. p. 282*, & 11. t. 1. f. 27, (very bad).

HAB. Salem, North Carolina, *Schweinitz!*—Wholly distinct from *C. pedunculata*, and belonging to the same group with the preceding.

96. *C. RICHARDSONII*, *R. Brown! in Rich. app. Frankl. journ. ed. 2. p. 35*; *Schw. & Torr! car. l. c. p. 330*.

HAB. Northern regions of British America, *Dr. Richardson!*

97. *C. ORNITHOPODA*, *Willd. sp. 4. p. 255*; *Schkuhr, car. 1. p. 57, t. 37*.

*C. concinna*, *R. Brown! in Rich. app. Frankl. journ. ed. 2. p. 35*.

HAB. Arctic America, *Dr. Richardson!*—We agree with Prof. Dewey in referring *C. concinna* of R. Brown to this species.

98. *C. PRÆCOX*, *Jacquin; Willd. sp. 4. p. 262*; *Schkuhr, car. f. 27*; *Dewey! car. l. c. 11. p. 324*.

*C. verna*, *Vill.*, not of *Schkuhr*.

HAB. Salem, Massachusetts, *Dr. Pickering!*—Said to be introduced.

99. *C. SUPINA*, *Wahl. act. Holm, 1303, p. 258*; *Willd. 4. 265*; *Schkuhr, car. f. 41*; *Dewey! car. l. c. 26. p. 376*.

*C. Schkuhrii*, *Willd. sp. 4. p. 264?*; *Schkuhr, car. f. 158?*; *Dewey! car. l. c. 27, p. 238*,

HAB. British America!—We here unite these two species, because Sprengel considers them the same, and our American specimens seem to differ but slightly; and moreover the specimens labelled *C. supina* by Prof. Dewey accord in every respect with a specimen of *C. Schkuhrii* from Russia. The plant called *C. Schkuhrii* by Prof. Dewey agrees with the figure in Schkuhr; but is not sufficiently mature for perfect determination.

100. *C. PUBESCENS*, *Muhl. in Willd. sp.* 4. p. 281; *Schkuhr, car.* f. 226.

HAB. Canada! to Pennsylvania!

101. *C. DASYCARPA*, *Muhl.!* *gram.* p. 236; *Elliott, sk.* 2. p. 541. t. 12. f. 4.

HAB. North Carolina to Florida!

102. *C. HOUGHTONII*, *Torrey; Dewey!* *car. l. c.* 30. p. 63.

HAB. Lake La Biche, N. W. Territory, *Dr. Houghton!*—This species is most nearly allied to *C. polymorpha*, *Muhl.* It is hardly necessary to remark that in accordance with well established rules of botanical nomenclature, and the uniform practice of the most accomplished naturalists, we adopt the genitive termination wherever a species is named after its discoverer.

103. *C. POLYMORPHA*, *Muhl.!* *gram.* p. 239.

*C. Halseyana*, *Dewey!* *car. l. c.* 11. p. 313. t. 7. f. 43. (bad)

HAB. Massachusetts! to Georgia!

104. *C. HITCHCOCKIANA*, *Dewey!* *car.* 10. p. 274. t. 3, f. 17.

HAB. Northern States to Kentucky!—We have a variety of this plant, much smaller in all its parts, both from Kentucky and the Western part of the State of New York.



105. *C. LAXIFLORA*, Lamarck, *enc.* 3. p. 378; Schkuhr, *car.* f. 141.

?  $\beta$ . *mutica*; scales scarcely cuspidate; leaves slightly glaucous.

HAB. Canada! to Georgia and Texas!  $\beta$ . Texas, *T. Drummond!* (Texan collection III. no. 442.) It is by no means improbable that the plant here doubtfully referred to *C. laxiflora* is a distinct species.

106. *C. GRANULARIS*, Muhl.! in Willd. *sp.* 4. p. 279; Schkuhr, *car.* f. 169.

HAB. Northern and Middle States!

107. *C. CONOIDEA*, Schkuhr, *car.* f. 168; Dewey! *car.* 10. p. 47, not of Muhl. or Schw. & Torr.

*C. tetanica*, Schw. & Torr.! *car. l. c.* p. 347, (excl. syn. Schkuhr, &c.)  
*C. granularioides*, Schw. *anal. tab. l. c.*

HAB. Canada to North Carolina!

108. *C. TETANICA*, Schkuhr, *car.* 2. p. 68. f. 100 & 207; Dewey! *car. l. c.* 11. p. 312, not of Schw. & Torr.

HAB. Northern and Middle States!—A somewhat rare species.

109. *C. ANCEPS*, Muhl.! in Willd. *sp.* 4. p. 278; Schkuhr, *car.* f. 128.

*C. plantaginea*, Muhl.! *gram.* p. 235; Schkuhr, *car.* f. 128, not of Lamarck.

*C. striatula*, Michx.! *fl.* 2. p. 173.

*C. conoidea*, Muhl.! *gram.* p. 248; Schw. & Torr.! *car. l. c.* p. 346.

*C. blanda*, Dewey! *car. l. c.* 20. p. 45.

HAB. Carlton House in British America! to Florida! west to Arkansas and the Rocky Mountains!—The three synonyms last quoted belong to the slender and narrow-leaved

varieties of *C. anceps*. In different states and situations the leaves of this species are found from an inch and a half to a line in width; and the form of the fruit and scales is also quite variable: we are, however, unable to distinguish any one of the narrow-leaved varieties as a distinct species.

110. *C. PLANTAGINEA*, *Lamarck, enc. 3. p. 398; Michx.! fl. 2. p. 103.*

*C. latifolia*, *Wahl. act. Holm. 1800, p. 156.*

HAB. Northern States and British America!

111. *C. CAREYANA*, *Dewey! car. l. c. 30. p. 61.*

HAB. Woods near Auburn, New York, *J. Carey, Esq.*—This interesting and beautiful species, which has only been found at the above specified locality, is, as our esteemed friend the discoverer informs us, in imminent danger of annihilation from the destruction of the wood in which it grows.

112. *C. OLIGOCARPA*, *Schkuhr, car. f. 170; Willd. sp. 4. p. 270; Muhl.! gram. p. 242.*

*C. digitalis*, *Willd. sp. 4. p. 298?*

*C. Van Vleckii*, *Schw.! anal. tab. l. c.*

HAB. Canada! to Louisiana!—This species, like *C. anceps*, sometimes occurs with broad leaves; and in this variety (*C. oligocarpa* var. *latifolia*, *Gray, Gram. & Cyp. part 2. no. 178*) the leaves are usually glaucous, the spikes more densely flowered, and the fruit usually somewhat larger. The figure of *Schkuhr* represents the plant with fewer flowers than is usual, but is obviously intended to represent this species.

113. *C. PAUPERCULA*, *Michx.! fl. 2. p. 172.*

*C. alba*, *Dewey! car. l. c. 7. p. 266; Schw. & Torr.! car. l. c. p. 341, not of Hænke.*

*C. alba*, var. *setifolia*, *Dewey! car. l. c. 14. p. 216, t. 1. f. 26.*

HAB. Arctic America to Kentucky! west to Missouri! and the Rocky Mountains!—Resembles the European *C. alba* in many respects, but certainly a distinct species.

114. *C. CAPILLARIS*, *Linn.*; *Schkuhr*, *car. f.* 56; *Schw. & Torr.*! *car. l. c.* p. 350.

HAB. Arctic America, from Greenland to the Rocky Mountains!

116. *C. SYLVATICA*, *Hudson, fl. Angl.* p. 411; *Schkuhr*, *car. f.* 101.

*C. Drimeja*, *Linn. f. supp.*; *Willd. sp.* 4. p. 296.

HAB. Canada! and the Northern States!

116. *C. DEBILIS*, *Michx.*! *fl.* 2. p. 172.

*C. tenuis*, *Rudge, in Linn. trans.* 7. p. 96. t. 9. f. 2.

*C. flexuosa*, *Muhl. in Willd. sp.* 4. p. 296; *Schkuhr*, *car. f.* 124.

HAB. British America! to Louisiana!—The name of Michaux having been first published, must be restored to this species.

117. *C. VENUSTA*, *Dewey!* *car. l. c.* 26. p. 107; t. T. f. 62.

HAB. S. Carolina! to Florida!

118. *C. PANICEA*, *Linn.*; *Schkuhr*, *car. f.* 100; *Dewey!* *car. l. c.* 25. p. 140.

HAB. Massachusetts! Supposed to be introduced from Europe.

119. *C. PETRICOSA*, *Dewey!* *car. l. c.* 29. p. 246.

HAB. Summit of the Rocky Mountains, *T. Drummond!*—We are inclined to consider the few pistillate flowers at the base of the upper spike as an accidental occurrence, and accordingly place the species in the present section. The specimens are too young for satisfactory determination.

120. *C. LANCEATA*, *Dewey! car. l. c.* 29. p. 249.

HAB. British America, *Dr. Richardson!*—Habit of *C. livida*. The specimens do not exhibit the full grown fruit.

121. *C. LIVIDA*, *Willd. sp.* 4. p. 601; *Schkuhr, car. f.* 211; *Gray! in ann. lyc. nat. hist. New York*, 3. p. 235.

*C. limosa, var. livida, Wahl. act. Holm.* 1803, p. 162.

*C. Grayana, Dewey! car. l. c.* 25, p. 141, t. S. f. 49.

HAB. Hudson's Bay! to New Jersey!; also on the Rocky Mountains, *T. Drummond!*; Sitcha, *Bongard!*—We have in one or two instances observed a distant and long peduncled fertile spike as depicted by Schkuhr; but this is not uniformly present in the European plant.

122. *C. USTULATA*, *Wahl.; Willd. sp.* 4. p. 293; *Schw. & Torr.! car. l. c.* p. 349.

*C. atrofusca, Schkuhr, car. f.* 82.

HAB. Labrador, *Herb. Schweinitz!*

123. *C. NIGRA*, *Allioni; Willd. sp.* 4. p. 166; *Schkuhr, car. f.* 115.

HAB. Labrador, fide *Schweinitz*.

124. *C. MEMBRANACEA*, *Hook.! app. Parry's 2d voy.* p. 26; *Hook. & Arn.! bot. Beechey's voy.* p. 131.

HAB. Arctic America! Kotzebue's Sound.

125. *C. CÆDERI*, *Ehrhart; Michx.! fl.* 1. p. 175; *Schkuhr, car. f.* 26.

*C. flava, var. patula, Host, gram.* 1. p. 48, t. 64.

*C. viridula, Michx.! fl.* 2. p. 170.

HAB. Northern States to Hudson's Bay!—*C. irregularis, Schw. anal. tab. l. c.* is an unusual form of this species.

126. *C. FLAVA*, Linn.; Michx.! fl. 2. 171; Schkuhr, car. f. 36.

HAB. Canada! and Northern States! west to Arkansas.

127. *C. ELLIOTTII*, Schw. & Torr.! car. l. c. p. 357.

*C. fulva*? Muhl.! gram. p. 246, not of Goodenough.

*C. castanea*, Elliott, sk. 2. p. 546, not of Wahlenberg.

*C. lonchocarpa*, Spreng. syst. 3. p. 817, (fide Dewey).

*C. Baldwinia*, Dewey! car. l. c. 26. p. 107, t. T. f. 61.

HAB. North Carolina, Mr. Croom! and Mr. Curtis! Georgia, Elliott; Florida, Dr. Baldwin!—We are confident that we have at length settled the synonymy of this species, which one or two mistakes had involved in almost inextricable confusion. The description in Dewey's Caricography corresponds in a good degree with the true plant, being chiefly derived from that of Elliott and of Muhlenberg; but his figure represents a different plant, which agrees neither with Elliott's description nor with his own. Prof. Dewey does not state from whence his specimen was obtained; we suspect it to be *C. oligosperma*, since we have a specimen of that plant which Prof. Dewey has named *C. Elliottii*. On the other hand, our plant agrees minutely with the description of Elliott, who states his plant to be the *C. fulva* of Muhlenberg; and, to make assurance doubly sure, we find a specimen from Elliott himself with the *C. fulva* in Muhlenberg's herbarium. Elliott, perceiving that the plant was not the *C. fulva* of Europe, changed the name to *C. castanea*, which unfortunately had been previously applied to a different species, and the name of its estimable discoverer was therefore given, it appears, both in the monograph of North American Carices, and by Prof. Dewey. The latter being somehow misled by the specimen figured in his Caricography, afterwards dedicated the real *C. Elliottii* to Dr. Baldwin. The distant and long pedunculate fertile spike seems to be only of occasional occurrence, since it is not observed in the eight specimens now before us.



128. *C. FOLLICULATA*, *Linn. sp.* 4. no. 1387; *Rudge*, in *Linn. trans.* 7, p. 98, t. 9. l. 4; *Gray!* in *ann. lyc. nat. hist. New-York*, 4. p. 235, not of *Schkuhr, Wahl., &c.*

*C. rostrata*, *Michx.!* *fl.* 2. p. 173.

*C. folliculata*,  $\beta$ . *xanthophysa*, *Muhl.!* *gram.* p. 244.

*C. xanthophysa*, *Wahl. car.* no. 73; *Schw. & Torr.!* *car. l. c.* p. 329, &c.

HAB. British America! to S. Carolina. For remarks upon this species see *Gray*, in the *Annals of the Lyceum*, 3. p. 235.

The *C. folliculata* of Elliott is certainly not *C. intumescens*; but his description does not agree in every respect with the genuine species.

129. *C. SUBULATA*, *Michx.!* *fl.* 2. p. 173; *Schw. & Torr.!* *car. l. c.* p. 340. t. 27. f. 1.

*C. Collinsii*, *Nutt. gen.* 2. p. 208.

*C. Michauxii*, *Dewey!* *car. l. c.* 10. p. 27.

HAB. Canada, *Michaux*; and cedar swamps of New Jersey!

### 130. CAREX TURGESSENS.

Fertile spikes about '3, few-flowered, distant; the uppermost nearly sessile at the base of the elongated, short-pedunculate staminate spike; the second on a nearly included peduncle; the lowest remote, very long peduncled; fruit expanding horizontally; perigynium ovate, conspicuously and evenly marked with numerous salient striæ, acuminated into a slender straight beak, with a bifid orifice, about twice the length of the ovate scale; leaves and sheaths minutely scabrous.

*C. folliculata*, *Elliott, sk.* 2. p. 545?

*Culm* 2—3 feet high, slender, and, with the leaves and sheaths, striate and minutely punctulate. *Cauline leaves* linear, narrow, shorter than the culm. *Fertile spikes* 8—14-flowered; the uppermost nearly sessile

in the axil of a setaceous bract; the others on partially enclosed peduncles. *Fruit* ovate, inflated, gradually tapering into a beak, beautifully striate. *Nut* triquetrous, with very concave sides.

**OBS.** This species has the habit and general aspect of *C. folliculata*, *Linn.*, from which it seems well distinguished by the inflated fruit with regular and prominent striæ; the narrower more rigid and scabrous leaves, &c. We suspect that it will prove to be the *C. folliculata* of Elliott.

**HAB.** New Orleans, *Dr. T. Ingalls!*

131. *C. INFUMESCENS*, *Rudge*, in *Linn. trans.* 7. p. 97. t. 9. f. 3; *Gray!* in *ann. lyc. nat. hist. New-York*, 3. p. 236.

*C. folliculata*, *Schkuhr*, *car.* f. 52; *Michx.!* *fl.* 2. p. 172, not of *Linnaeus*.

*β. globularis*, *Gray, l. c., and Gram. & Cyp.* part 2. no. 173.

**HAB.** Canada to S. Carolina! west to Arkansas.

132. *C. LUPULINA*, *Muhl.!* in *Willd. sp.* 4. p. 266; *Schkuhr*, *car.* f. 123 & 194.

*β. polystachya*, *Schw. & Torr. car. l. c.* p. 337.

*C. gigantea*, *Rudge*, in *Linn. trans.* 7. p. 98. t. 10. f. 2.

**HAB.** Hudson's Bay to Georgia! west to Arkansas.

133. *C. TENTACULATA*, *Muhl. in Willd. sp.* 4. p. 266; *Schkuhr*, *car.* f. 131.

*C. rostrata*, *Schkuhr*, *car.* f. 134.

**HAB.** Canada to Georgia, west to Arkansas.

134. *C. STENOLEPIS*, *Torr.!* in *Dewey, car. l. c.* 30. p. 59.

**HAB.** Kentucky, *Drs. Short and Peter!*—Related to *C. tentaculata* and *C. retrorsa*.—On examining a pretty extensive suite of specimens of this interesting species, received from

our valued correspondent, Dr. Short, we find several deviations from the form described by Prof. Dewey, which seem to require a notice. In a hundred specimens, about thirty or forty have the terminal spike androgynous, the pistillate flowers occupying the summit; and, in some specimens, more than half of the spike is pistilliferous. In other cases, the staminate spike is inconspicuous, or even reduced to a mere rudiment, and the fertile spikes are smaller and shorter, so as to be ovate or subglobose. Specimens of this latter form occur among the plants collected in Texas by the late Mr. Drummond (Texan collection, III. no. 432,) in which there is even no vestige of a staminate spike.

135. *C. RETRORSA*, *Schw. anal. tab. l. c.*; *Schw. & Torr. car. l. c. p. 366. t. 28. f. 2.*

*C. reversa*, *Spreng. syst. 3. p. 827.*

HAB. Northern States and British America! ; west to the Rocky Mountains!

136. *C. OLIGOSPERMA*, *Michx.! fl. 2. p. 174.*

*C. Oakesiana*, *Dewey! car. l. c. 14. p. 251,*

HAB. Massachusetts! and British America!

137. *C. MILIARIS*, *Michx.! fl. 2. p. 174.*

HAB. Canada, near Lake Mistassins, *Michaux.*—This species seems not to have been met with since the time of Michaux.

138. *C. BULLATA*, *Schkuhr, car. f. 166; Willd. sp. 4: p. 309.*

*C. cylindrica*, *Schw.! anal. tab. l. c.*

HAB. Canada and Northern States!

? $\beta$ . fertile spikes cylindrical, elongated, rather slender; fruit somewhat smaller, with a shorter beak.

*C. vesicaria*, *Dewey!* *car. l. c.* 10. p. 272.

*C. vesicaria*,  $\beta$ . *cylindracea*, *Dewey!* *l. c.* 30. p. 273.

HAB. Northern States! and British America!—Perhaps a distinct species, yet we can scarcely find characters to distinguish it.

139. *C. VESICARIA*, *Linn. sp.* 4. no. 1388; *Schkuhr, car.* f. 106; *Schw. & Torr.!* *car. l. c.* p. 365.

*C. ampullacea*, *Dewey!* *car. l. c.* 7. p. 266.

HAB. Northern States! to sub-Arctic America!—We find no constant characters by which to distinguish *C. vesicaria* and *ampullacea* of American authors; and we refer all our specimens to *C. vesicaria*, merely because that is the oldest name. If the European *C. ampullacea* be distinct from *C. vesicaria*, the two plants are certainly not generally understood nor readily discriminated.

140. *C. SCHWEINITZII*, *Dewey!* *car. l. c.* 9. p. 68. t. B. f. 8; *Schw. & Torr.!* *car. l. c.* p. 367.

HAB. Canada to New Jersey!

141. *C. CHEROKEENSIS*, *Schw.!* *anal. tab. l. c.*; *Schw. & Torr.!* *car. l. c.* p. 369. t. 25. f. 1.

*C.* no. 46. *Muhl.!* *gram.* p. 254.

HAB. Georgia, Florida! and Louisiana!

142. *C. ARISTATA*, *R. Brown, in Rich. app. Frankl. journ.* ed. 2. p. 36; *Gray!* *in ann. lyc. nat. hist. New-York,* 3. p. 237; *Dewey!* *car. l. c.* 27. p. 240. t. 5. f. 57.

*C. atherodes*, *Spreng. syst.* 3. p. 828.

HAB. Watertown, New-York! and sub-Arctic America! Very nearly related to *C. trichocarpa*.

143. *C. TRICHOCARPA*, Muhl. ! in Willd. sp. 4. p. 302 ; Schkuhr, car. f. 148.

HAB. British America ! to Georgia !

144. *C. LACUSTRIS*, Willd. sp. 4. p. 306 ; Schkuhr, car. f. 182.

*C. riparia*, Muhl. ! gram. p. 259.

HAB. Canada to South Carolina !—Distinguished from *C. riparia* by its strongly nerved fruit with a more acutely bifid mouth.

145. *CAREX MICRODONTUS*, Torr. & Hook.

Staminate spikes 3 ; fertile spikes about 4, exsertly pedunculate, erect, cylindrical, attenuate and more or less stamiferous at the summit ; fruit ovate, compressed, obscurely striate, acute, with a minutely bidentate orifice, scarcely exceeding the broadly ovate, acuminate, somewhat cuspidate scale.

*Culm* 2 feet high, slender. *Leaves* 2—3 lines wide. *Fertile spikes* an inch and a half long, about 3 lines in diameter, gradually attenuate into a point ; peduncles as long as the spikes. *Fruit* 2 lines long, acute but scarcely acuminate, the orifice almost entire. *Scales* of the staminate spike ovate, acuminate.

HAB. Texas, *T. Drummond* ! (Texas collection, III. no. 439.)

OBS. This species seems to be allied to *C. paludosa*, but is much smaller in all its parts ; its fruit is very distinct.

146. *C. BINERVIS*, Smith, Eng. bot. t. 1099 ; Hook. Eng. flora, p. 396 ; Dewey ! car. l. c. 30. p. 61.

HAB. Boston, *B. D. Greene*, Esq. !—Agrees very nearly with the European plant. Introduced ?



147. *C. GREENIANA*, Dewey! *car. l. c.* 30. p. 61.

HAB. Near Boston, *B. D. Greene, Esq.*!—Differs from the preceding chiefly in its rather longer and cuspidate scales, and the less strongly nerved fruit with a longer beak.

†† Pistillate spikes mostly on peduncles which are not sheathed at the base.

148. *C. SCABRATA*, Schw.! *anal. tab. l. c.*; Schw. & Torr.! *car. l. c.* p. 345. t. 26. f. 2.

HAB. New Hampshire! to New York!

149. *C. HYSTERICINA*, Muhl.! in Willd. *sp.* 4. p. 232; Schkuhr, *car. f.* 127.

HAB. Canada! to Georgia!

150. *C. PSEUDO-CYPERUS*, Linn.; Schkuhr, *car. f.* 102.  
*C. furcata*, Elliott, *sk.* 2. p. 552.

HAB. British America! and throughout the United States east of the Mississippi.

151. *C. MACROCHÆTA*, Meyer, in *mem. acad. St. Petersb. l. c.* p. 224. t. 13; Bongard! *veg. Sitcha, l. c.* p. 169.

HAB. Unalashka, Meyer; Sitcha, Bongard!

152. *C. LONGIROSTRIS*, Torr.! in Schw. *anal. tab. l. c.*; Schw. & Torr.! *car. l. c.* p. 170.

*C. Sprengelii*, Dewey, in *Spreng. syst.* 3. p. 827.

HAB. New York! and Michigan! to British America; west to the Rocky Mountains!

*C. longirostrata* of C. A. Meyer, in the *mem. St. Petersb. acad. l. c.*, collected in Kamtschatka, is very near the present species, but is not the same.

153. *C. GLAUDESCENS*, *Elliott, sk.* 2. p. 553; *Schw. & Torr.!* *car. l. c.* p. 356.

*C. verrucosa*, *Muhl.!* *gram.* p. 201, not of *Dewey* or *Schw. & Torrey*.  
*C. sempervirens*, *Schw.!* *anal. tab. l. c.*

HAB. North Carolina! to Florida! and New Orleans!—The examination of Muhlenberg's herbarium proves this species to be the original *C. verrucosa* of that author. This name, being the oldest, should, in strictness, be retained; but inasmuch as the fruit is not in the slightest degree verrucose, this name would lead to error, while that of Elliott is remarkably appropriate. Much confusion has also been caused by the name *verrucosa* having been subsequently applied to another species. We have therefore concluded not to restore the original appellation of Muhlenberg to the present plant.

*C. verrucosa* of *Schweinitz*, of the monograph of N. American Carices, and of *Dewey's* Caricography, is a variety of *C. acuta* collected by *Schweinitz* in North Carolina. We know not what species *Elliott* has included under this name.

154. *C. BARRATTII*, *Schw. & Torr.!* *car. l. c.* p. 362; *Dewey!* *car. l. c.* 11. p. 162, & 12. t. P. f. 51.

*C. littoralis*, *Schw.!* *anal. tab. l. c.*

HAB. Cape May, New Jersey, *Mr. Collins!*—A doubtful species established upon an immature specimen, which seems to us exceedingly near *C. recurva*, *Good.* (*C. flacca*, *Schkuhr.*) It has been seen in no other locality.

155. *C. LIMOSA*, *Linn.;* *Schkuhr, car. f.* 78; *Schw. & Torr.!* *car. l. c.* p. 358. (excl. syn. *C. lenticularis.*)

*C. laxa*, *Willd. sp.* 4. p. 204; *Dewey!* *car. l. c.* 30. p. 275.

*β. irrigua*, *Wahl. act. Holm.* 1803, p. 162.

*C. lenticularis*, *Dewey!* *car. l. c.* 7. p. 273.

*γ. rariflora*, *Wahl. l. c.*

*C. rariflora*, *Smith, Eng. bot. t. 2516.*

HAB.  $\alpha$  &  $\beta$ . Northern States! and Arctic America!  $\gamma$ . Greenland! and Arctic America!—The variety *rariflora* is considered by Smith and Hooker, and perhaps correctly, as a distinct species. The specimen referred by Prof. Dewey to *C. mutica* of R. Brown, seems to us to be this variety of *C. limosa*. See p. 398.

156. *C. SUBSPATHACEA*, *Wormskiold, fl. Dan. t.*

HAB. Greenland, *Prof. Hornemann!*—Referred by Sprengel to *C. tetanica*, to which it has little resemblance.

157. *C. PODOCARPA*, *R. Brown, in Rich. app. Frankl. journ. ed. 2. p. 36; Dewey! car. l. c. 29. 251.*

HAB. Arctic America; Fort Vancouver!—Resembles in many respects *C. limosa*, var. *rariflora*.

158. *C. SPECTABILIS*, *Dewey! car. l. c. 29. p. 248.*

HAB. British America!—The fruit is not sufficiently mature for satisfactory determination.

159. *C. STYLOSA*, *Meyer, in mem. acad. St. Petersb. l. c. p. 222. t. 13; Bongard! veg. Sitcha, l. c. p. 169.*

HAB. Unalashka, *Meyer*; Sitcha, *Bongard!*—The reference of *C. Carltonia* to this species made by Prof. Dewey (*Sill. journ. 29, p. 252*) was a mistake. *C. Parryana* is the plant intended; but *C. stylosa* proves, now that we have the means of comparison, wholly distinct.

160. *C. PARRYANA*, *Dewey! car. l. c. 27. p. 239. t. 5. f. 56.*

?  $\beta$ . staminate spike somewhat pistilliferous near the summit.

*C. arctica*, *Dewey! car. l. c. 27. p. 239. t. 5, f. 66.*

HAB. Hudson's Bay, *Dr. Richardson!*  $\beta$ . Carlton House, *Dr. Richardson!*—We are inclined to think that the terminal spike is not constantly androgynous in the *C. arctica* of Dewey; and, although the specimen is immature, we see no other important difference between it and *C. Parryana*.

161. *C. BLEPHAROPHORA*, *Gray!* in *ann. lyc. nat. hist. New York*, 3. p. 235, & *Gram. & Cyp.* part 2. no. 185; *Dewey! car. l. c.* 30. p. 59.

HAB. Oneida County, New York, *Dr. Gray!*

162. *C. MILIACEA*, *Muhl. in Willd. sp.* 4. p. 290; *Schkuhr, car. f.* 151.

HAB. Canada! to Georgia!

163. *C. PALLESCENS*, *Linn.;* *Schkuhr, car. f.* 90.

HAB. British America! and Northern States!

164. *C. UMBELLATA*, *Schkuhr, car. f.* 171; *Dewey! car. l. c.* 10. p. 31. & (*var. vicina*) 11. p. 317, & 10. t. 1. f. 13.

HAB. Pennsylvania! to British America! and Rocky Mountains!

## 22. UNCINIA, *Persoon.*

SPIKES solitary or several, pistillate below. STAMENS 3. PISTILLATE FLOWERS solitary in the axil of each scale. STYLE 3-cleft. NUT trigonous, furnished with a hypogynous, usually exerted and hook-shaped seta; the whole invested with a membranaceous perigynium.—Habit of *Carex*.

*Uncinia*, *Pers. syn.* 2. p. 534; *R. Brown; prodr.* 1. p. 241; *Lestib. ess. fam. Cyp.* p. 22. no. 3; *N. ab Esenb. in Wight's contrib.* p. 72; and in *Linnæa*, 9. p. 20. & 10. p. 206.

Species of *Carex*, *Linn. Schkuhr, &c.*

The genus *Uncinia* differs from *Carex* only in having a hypogynous seta within the perigynium. The nature of this body seems to be explained by the structure of *Schœnoxyphium*, *N. ab E.* (and the same thing we observe in a single specimen of *Carex phyllostachys*, *Meyer*) in which the perigynium includes the peduncle of a staminate spikelet as well as the nut; and moreover, in *U. Nepalsensis*, *N. ab E. in Wight's contrib.* p. 129, the seta is said to bear on its summit an imperfect rudiment of a flower or spikelet.

#### UNCINIA BREVISETA.

Spike solitary, simple, attenuate above; scales of the pistillate flowers suborbicular, scarious, amplexicaul, a little shorter than the fruit; nut ovate, obtusely 3—(or 4—) angled, apiculate; seta straight, smooth, flattened, mostly shorter than the nut.

*Carex filifolia*, *R. Brown!* in *Rich. app. Frankl. journ.* ed. 2. p. 35; *Schw. & Torr.!* *car. l. c.* p. 298, not of *Nutt.*

*Kobresia globularis*, *Dewey!* *car. l. c.* 29, p. 253.

Cespitose. *Culm* 6—10 inches high, smooth, slender, clothed at the base with numerous brown sheaths. *Leaves* setaceous, slightly scabrous, nearly as long as the culm. *Spike* about an inch long, pistilliferous, and rather loosely flowered below, staminiferous, attenuate, and densely flowered above. *Scales* of the pistillate flowers 6—8, ovate-orbicular scarious and silvery, ferruginous in the centre. *Perigynium* minutely puberulent, scarious, white and somewhat mottled with ferruginous; orifice entire or slightly lacerate. *Nut* completely filling the perigynium, obtusely tri, or quadrigonous, glabrous, with a short abrupt acumination. *Style* 3-parted. *Seta* included or exserted (*fide Brown*), in our specimens shorter than the nut.

**HAB.** In the woody country of Arctic America, *Dr. Richardson*; also near *Carlton House!*



OBS. This plant was incorrectly referred by R. Brown to *C. filifolia* of Nuttall, a species which has only been found on the banks of the Missouri. Prof. Dewey, who mistook another species for the *C. filifolia* of R. Brown, has recently described the present plant under the name of *Kobresia globularis*. It is somewhat strange that it should be placed in the latter genus, since, although the perigynium is unusually thin and membranaceous, the plant only differs from *Carex* in the presence of a seta, which Prof. Dewey happened not to observe. As the most accomplished botanists now include in *Uncinia* species with a straight and an included seta, it seems advisable to remove this plant to that genus.

## SUPPLEMENT.

CYPERUS DIANDRUS, p. 252. Burke County, North Carolina, *Mr. Curtis!*

C. FLAVICOMUS, p. 253. The rays of the umbel are sometimes branched at the summit, the divisions bearing spikelets in a distichous order throughout their whole length. One or two setaceous bracts at the base of the partial rays. Spikelets 9—30-flowered. v. s. *in herb. Le Conte.*

C. MICRODONTUS, p. 255. *β. Texensis*: Culm slender, obtusely triangular; leaves very narrow; umbel simple; rays 3—4; involucre 3-leaved, very long; spikelets linear, many-flowered, inserted on all sides of the common rachis, somewhat fasciculate; scales lanceolate, appressed, mucronulate; stamens 2; nut linear-oblong, obtuse; style deeply 3-cleft; rachis denticulated with the inner scales.

*Culms* cespitose, almost filiform. *Leaves* shorter than the culm. *Rays* of the umbel 1—2 inches long, each bearing towards its summit about 30 somewhat spreading spikelets. *Involucels* 0. *Spikelets* three-fourths of an inch long, much compressed, narrow, pointed. *Scales* closely appressed, ferruginous, dull, with a green keel. *Nut* dark purplish-brown, convex on both sides.

HAB. Texas, *T. Drummond!* (Coll. III. no. 454.)

OBS. Very near *C. microdontus*; but the culm is taller, the leaves much narrower, the spikelets more slender, the scales lanceolate, &c.

*C. GATESII*, p. 255. Middle Florida, *Dr. Chapman!*; Wilmington, North Carolina, *Mr. Curtis!* I have also what appears to be the same plant collected near New Orleans, by the late Mr. Drummond, and numbered 388.

After *C. occidentalis*, p. 259, insert the two following new species :

*CYPERUS CEPHALANTHUS*, *Torr. & Hook.*

Culm tall, triquetrous, umbel somewhat simple ; rays 3—4, somewhat erect ; involucre 2—3-leaved ; one of the leaves very long, the other about the length of the umbel ; spikes ovate, capitate, with short setaceous involucels ; spikelets 50—80 in each head, linear, about 10-flowered ; the lowest ones fasciculate ; scales lanceolate, remote, pointless, 7-nerved ; interior scales narrow, scarious, minute ; nut obovate-oblong, with a short abrupt point.

*Culm* 4 feet high, concave on the sides ; the angles scabrous and very acute. *Leaves* 2 lines wide, flat. *Umbel* rather small for the size of the plant ; rays 2—3 inches long. *Ochreæ* 2-awned. *Spikes* or heads an inch and a half in length, and an inch in diameter, of an ovate form, with one or two setaceous bracts at the base ; the spikelets inserted on all sides of a common rachis. *Spikelets* half an inch long ; the florets quite distinct. *Scales* rather acute, ferruginous, with a pale green keel ; the sides strongly nerved. Interior scales narrow-lanceolate, adnate. *Stamens* 3. *Nut* brownish, dull, two-thirds the length of the keel.

*HAB.* Texas, *T. Drummond.* (Coll. III. no. 445.)

*OBS.* The spikelets in this very distinct species are somewhat capitate ; but they are inserted on an elongated common axis, and not aggregated at the summit of the rays, as in *C. filiculmis* and its allies.

*CYPERUS UNIFLORUS*, *Torr. & Hook.*

Culm filiform, triangular, smooth, leaves very narrow ; umbel simple, 4—5-rayed, erect ; involucre 3-leaved ; the leaves

much longer than the umbel; spikes ovate; spikelets approximated, spreading on all sides, subulate, somewhat quadrangular, 2—3-flowered, only the lower floret fertile; scales linear-lanceolate, slightly mucronate; nut oblong-linear, nearly covered with the inner scales.

*Culm* 12—14 inches high, very slender, wiry. *Leaves* scarcely half a line wide, shorter than the culm. *Ochrea* truncate, entire. *Spikes* about three-fourths of an inch long, composed of about 25 spikelets, which spread irregularly in all directions. *Spikelets* 4—5 lines long, attenuated, curved, composed of about 5 scales, the two lowest of which are very short and empty; the third linear-lanceolate, fertile; and the fourth abortive, but containing stamens and ovary; the uppermost very slender, empty. *Rachis* broad, margined with persistent inner scales. *Stamens* 4. *Style* 3-cleft. *Nut* light brown, dull, partly imbedded in the broad rachis, and covered with the inflexed margin or inner scales.

HAB. Texas, *T. Drummond!* (Coll. I. no. 287.)

OBS. In the structure of the spikelets this species strongly resembles *Mariscus retrofractus*; yet the plant has the habit of *Cyperus*.

C. MICHAUXIANUS, p. 259.  $\beta?$  *elongatus*. Culm tall and slender; rays elongated; spikelets subulate, obtusely quadrangular; scales lanceolate, acute.

*Culm* 3 feet high, triquetrous. *Leaves* 3—4 lines wide, shorter than the culm. *Umbel* somewhat compound, 6—8-rayed; the rays rather erect, 3—5 inches long. *Ochrea* 2-toothed. *Involucre* 6—8-leaved; several of the leaves nearly as long as the umbel. *Involucels* short, setaceous. *Spikelets* much crowded on the rays, forming an ovate spike, slender, somewhat curved, 6—8-flowered, very acute, quadrangular when mature; the lower ones somewhat fasciculate or compound. *Scales* somewhat distinct and rather loose towards the summit, striate, slightly mucronate. *Rachis* nearly as broad as the spikelet, winged with the ovate, firm interior scales. *Stamens* 3. *Style* 3-cleft. *Nut* oblong, unequally triangular, rather acute, dull.

HAB. Texas, *T. Drummond!* (Coll. I. no. 337.)

OBS. This plant much resembles *C. strigosus* in its tall slender culm, and in the elongated rays of the umbel; but in the structure of the spikelets, it is nearer *C. Michauxianus*; yet it may prove to be distinct from either.

*C. STENOLEPIS*, p. 363. Texas. *T. Drummond!*

*C. REPENS*, p. 264. Martha's Vineyard, and Nantucket, Massachusetts, *Mr. Oakes!*; West Haven, Connecticut, *Dr. Robbins!*

After this species insert the following:

*CYPERUS LUTESCENS*, *Torr. & Hook.*

Umbel simple, 5—6-rayed; involucre 3-leaved, about as long as the umbel; spikelets 15—20 on each ray, somewhat distichously inserted, spreading horizontally, linear, 30—40-flowered; scales oblong, mucronulate, rounded on the back, strongly nerved, closely imbricated, but free at the apex; interior scales narrow, adnate; nut obovate-oblong.

*Culm* 18 inches high, triquetrous, smooth, firm. *Leaves* 3 lines wide, very smooth, becoming yellowish in drying. *Umbel* large, the rays 2—3 inches long, erect. *Ochreae* short, loose, bidentate. *Spikelets* more than an inch in length, one line broad; upper ones alternate; the lower ones somewhat fasciculate. *Scales* light brown, closely appressed, except near the summit which is very slightly turned outward, so that the spikelets have a serrated appearance. *Stamens* 3. *Style* 3-cleft. *Nut* triquetrous.

HAB. Texas, *T. Drummond!* (Coll. III. no. 452.)

OBS. Resembles *C. repens*; but the spikelets are much longer and broader, and the flowers much more numerous; the scales are also narrower, and the involucre much shorter.

*C. HYDRA*, p. 365. Newbern, North Carolina, *Mr. Croom!*; Macon, Georgia, *Dr. Loomis!*; near New Orleans, *T. Drummond!* (N. Orl. Coll. no. 309, bis.)

Some of the specimens from Macon are two feet high!



## CYPERUS SETIGERUS, Torr. &amp; Hook.

Culm triquetrous above, firm; umbel compound, 7—9-rayed; the primary rays elongated, erect; secondary spreading widely; involucre 3-leaved, very long; involucels setaceous, shorter than the secondary rays; spikes composed of 12—16 spikelets distichously arranged; spikelets lanceolate, about 10-flowered; scales lanceolate, mucronulate, appressed, 3-nerved; interior scales adnate, conspicuous; stamens 3; nut linear-oblong.

*Culm* 4 feet high, acutely triangular, smooth. *Leaves* nearly as long as the culm, about 3 lines wide, flat. *Umbel* erect. *Primary rays* 3—6 inches long. *Ochreæ* entire. *Involucre* 4 times as long as the umbel. *Involucels* very slender, tortuous. *Spikelets* inserted in a distichous order along the upper part of the secondary rays, compressed, acute. *Scales* tinged with brownish red, somewhat carinate, the tip pointed with a very short straight mucro. *Interior scales* membranaceous. Mature *nut* not seen.

HAB. Texas, *T. Drummond!* (Coll. I. no. 315, and Coll. III. no. 453.)

OBS. This is quite distinct from any other *Cyperus* in my herbarium, and appears to have been hitherto undescribed. It has some resemblance to *C. longus* of Europe.

*C. DISSITIFLORUS*, p. 266. New Orleans (no. 389) and Texas, (Coll. III. without a number.) *T. Drummond!*

*C. FILICULMIS*, p. 267. Texas, *T. Drummond!* (Coll. I. no. 347.)

*C. GRAYII*, p. 268. Martha's Vineyard, and Nantucket, Massachussets, abundant, *Mr. Oakes!*

*C. BALDWINII*, p. 270. New Orleans, (no. 292, & 286) and Texas, *T. Drummond!* The ticket belonging to the Texan specimen was misplaced; but I believe it was no. 346 of the first collection.

*C. LEPTOS*, p. 273. New Orleans, (no. 385.) *T. Drummond!*

*C. INFLEXUS*, p. 273. Texas, (without a number,) *T. Drummond!*

*CYPERUS ACUMINATUS*, *Torr. & Hook.*

Umbel 1—2-rayed; the rays very short; involucre about 3-leaved, very long; spikelets collected into ovate heads, oblong-linear, 16—20-flowered; rachis nearly naked; scales oblong, acute, obscurely 3-nerved, reticulated, somewhat squarrose; stamen 1; nut oblong, triquetrous, acuminate at each end.

*Root* fibrous, annual. *Culms* cespitose, 3—4 inches high, leafy at the base. *Leaves* narrow, as tall as the culm. *Umbel* with scarcely distinct rays, appearing almost like an aggregated head of spikelets. *Involucre* 5—6 times as long as the umbel. *Spikelets* in heads of 10—15. *Scales* greenish, appearing reticulated, under a lens, the point acute and recurved. *Stamen* always solitary. *Style* 3-cleft. *Nut* gray, dull acutely triangular.

*HAB.* Near St. Louis, Missouri, *T. Drummond!* (v. s. in *herb. Greene.*)

*OBS.* This species has much the appearance of *C. inflexus*, but it is easily distinguished by the greater number of florets in the spikelet, and by the form of the scales. In the latter they are cuspidate, much more squarrose, and strongly nerved. I am inclined to think it is the *C. filicinus* of N. ab Esenbeck, who gave this name to a Cyperus in Mr. Drummond's St. Louis collection, and placed it in the same section with *C. aristatus*. It is doubtless a very distinct species from *C. filicinus* of Vahl.

*C. VIRENS*, p. 275. New Orleans, *T. Drummond!* (no. 384.)

CYPERUS RUFESCENS, *Torr. & Hook.*

Culm obtusely triangular, smooth, slender; leaves very narrow; umbel simple or somewhat compound, 4—5-rayed; involucre about 3-leaved, the longer leaves twice the length of the umbel; heads composed of 40—50 spikelets, subglobose, dense; spikelets ovate, 12—16-flowered; scales ovate-lanceolate, closely imbricated, acute, straight; stamens 1—3; nut ovate, triquetrous, acuminate at each end.

*Rhizoma* short, tuberous. *Culm* about 18 inches high, less than a line in thickness, the sides concave. *Umbel* small; *rays* somewhat erect, sometimes a little divided at the summit. *Ochreae* entire. *Heads* about half an inch in diameter; the spikelets much crowded. *Spikelets* much compressed, somewhat acute, 2—3 inches long. *Scales* carinate, with a nerve on each side near the keel, somewhat coriaceous, tinged of a bright brownish red colour. *Stamens* never more than 2, and often solitary. *Style* 3-cleft. *Nut* sharply triangular, dull, not half the length of the scale.

HAB. Texas, *T. Drummond!* (Coll. I. the specimens not numbered.)

OBS. Resembles *C. virens*, but is much more slender; the leaves are also narrower, and the culm is smooth.

CYPERUS CYRTOLEPIS, *Torr. & Hook.*

Culms cespitose, slender, wiry; umbel 3—5-rayed; rays very unequal, erect; involucre 3—4-leaved, setaceous, much longer than the umbel; heads dense, subglobose; spikelets broadly ovate, much compressed, 9—12-flowered, the florets distant; scales lanceolate, acute, recurved and spreading, without nerves; interior scales 0; stamen solitary; nut oblong, acute at each end, smooth, dull.

*Culm* a foot or more in height, strong and wiry, sulcate. *Leaves* very narrow, nearly as tall as the umbel, channelled. *Umbel* simple, rays

1—2 inches long. *Heads* half an inch in diameter. *Spikelets* of a dull greenish white colour, mixed with yellow. *Scales* quite distinct, spreading almost horizontally; the upper half distinctly recurved. *Stamens* always solitary. *Nut* greenish, somewhat obovate.

HAB. Texas, *T. Drummond!* (Coll. III. no. 450.)

OBS. Allied to *C. virens*, but easily distinguished from the other species of the section to which it belongs by its slender culms, narrow leaves, and distinct scales.

#### CAREX DRUMMONDII, *Torr. & Hook.*

Culm tall and very slender, very acutely triangular, the sides concave; umbel simple, 5—6-rayed; rays very short; heads subglobose, composed of many crowded spikelets; involucre 2-leaved, longer than the umbel; spikes 20—30-flowered, much compressed; scales lanceolate, strongly appressed, acute, slightly spreading at the tip; interior scales 0; stamen solitary; nut oblong, acute at each end, papillose in lines.

*Culm* 3—4 feet high; the angles almost winged, sharp, and scabrous. *Leaves* much shorter than the culm, 2—3 lines wide. *Rays* of the umbel very short, so that the heads appear almost sessile. *Heads* nearly an inch in diameter, composed of about 40—50 radiating spikelets. *Spikelets* ovate-lanceolate, nearly one-third of an inch long, rather obtuse, of a pale yellowish colour. *Scales* somewhat coriaceous, very closely imbricated, with 3 obscure nerves, the points slightly bent outwards. *Interior scales* indistinct, forming a mere zig-zag line on the rachis. *Stamen* always solitary. *Nut* with 3 nearly flat sides, contracted at the base into a sort of pedicel; the surface roughened with minute papillæ arranged in lines.

HAB. Texas, *T. Drummond!* (Coll. I. without a number.)

OBS. The spikes have a very neat appearance, much like those of some species of *Eragrostis*. It is nearly allied to *C. aureus*, *H. B. & K.*

*C. OVULARIS*,  $\gamma$ . *cylindricus*, p. 279. No. 348 of Mr. Drummond's first Texan Collection scarcely differs from this plant.

*C. ERYTHORRHIZOS*, p. 280. Near St. Louis, Missouri, *T. Drummond!*; Kentucky. *Dr. Short!* I have specimens of this plant collected near Havana by my friend, *B. D. Greene. Esq.* Among the plants collected by Dr. Baldwin in the Southern States, is a variety of *C. erythrorhizos* with the umbel decompound, and with the secondary rays shorter than their foliaceous involuclcs.

*KYLLINGIA SESQUIFLORA*, p. 287. New Orleans, *Dr. Ingalls!*

*LIPOCARPHA*, *R. Brown*, pp. 283 & 243. This genus, I find, was first proposed in Captain Tuckey's Expedition to Congo; Appendix, p. 459, (1818). The *Hypolytrum* of Richard, which was first published in Persoon's Synop. 1. p. 70, (1805) included three species, two of which belong to Brown's *Lipocarpha*, and one to his *Hypoclyprum*. Vahl\*, who adopted the genus from Richards' Herbarium, but transcribed the name incorrectly, likewise constructed his character so as to include both genera, but nearly all his species belong to *Lipocarpha* as defined by Brown; so that I am still of the opinion that the name *Hypolytrum* should have been retained for the present *Lipocarpha*, and another name provided for the species now referred to *Hypolytrum*. Indeed this view of the subject appear to have been taken by the late P. de Beauvois, as appear from the *Essai sur la Fam. des Cyper.* of Lestiboudois (1819); for the *Beera* of P. de B. must be identical with the modern *Hypolytrum*, while *Hypolytrum* of P. de B. is Brown's *Lipocarpha*. Still I have fol-

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\* *Enum.* p. 283 (1806.)



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FUIRENA SQUARROSA,  $\beta$ . p. 291; *Curtis!* in *cat. pl. Wilmingt.* p. 139.

F. SCIRPOIDEA, p. 293. Apalachicola, *Dr. Chapman!*

ELEOCHARIS EQUISETOIDES, p. 296; add *Scirpus obtusus*, *Spreng. syst.* 1. p. 204, (not of *Willd.*)

E. OBTUSA, p. 302. New Orleans, *T. Drummond!* (no. 405. and also no. 408.)

E. SIMPLEX, p. 306. The specimens numbered 410 of Drummond's New Orleans collection seem to belong to this species; but they are too young to be determined satisfactorily.

E. TENUIS, p. 309. Mr. Arnott, in a very recent letter, informs me that the printer of Nees' Cyperaceæ, made a mistake respecting *Scirpidium tenue*. According to the Mst. the synonym ought to be, "*S. tenuis*, Muhl. ex parte, nec *S. tenuis*, Willd. et Link." It is also "*S. tenuis*, herb. Endlich. é Connecticut." The specimens which Nees examined are immature, and he remarks of the species "Fructus deest. Specimina non sufficient." So that his plant may still be identical with his *Eleocharis tenuis*. Nees was probably led into error by Muhlenberg's inaccurate description of this species.

E. MELANOCARPA, p. 311. I have received specimens of this rare species from Mr. Croom, who collected them on a journey from Middle Florida to Georgia. On carefully examining the style, I find that it is two-cleft, and remarkably hairy, particularly about the bifurcation. The culm is rather striate than sulcate, and the nut is blackish when mature. The spikes are somewhat acute in many of Mr. Croom's specimens.

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E. PYGMÆA, p. 313.  $\beta$ .? *anachæta*; nut without bristles at the base.

HAB. Near New Orleans, *T. Drummond!*

OBS. This plant greatly resembles the ordinary form of *E. pygmaea*, but the flowers are entirely destitute of bristles.

*E. PROLIFERA*, p. 316. I have received specimens of this plant, with mature fruit, collected by Dr. Chapman in Middle Florida. It is a distinct species allied to *E. microcarpa*. The spike is 4—6-flowered; the nut triangular, with the sides convex; the tubercle is broad, depressed, apiculate in the centre. The bristles are about 4 in number, and scarcely one-third the length of the nut.

*SCIRPUS PLANIFOLIUS*, p. 316. Ogdensburgh, St. Lawrence County, New-York, *Dr. Crawe!*

*β. brevifolius*. Leaves much shorter than the culm, very narrow, canaliculate, triquetrous towards the summit; scales shorter and scarcely acuminate.

*Culm* a foot long, very slender. *Leaves* scarcely half a line wide, 1—3 inches long, almost subulate. *Spike* broadly ovate.

HAB. Ogdensburgh, N. York, *Dr. Crawe!*

*SCIRPUS LENTICULARIS*, p. 328. *S. sylvaticus*, *Bong.!* *veg. Sitcha*, in *mém. acad. St. Petersb.* 6 ser. 2. p. 169. The specimen is young, but it agrees very well with Dr. Scouler's plant.

*S. LINEATUS*, p. 332. District of Columbia, *Dr. Crandall!*

*RHYNCHOSPORA ALBA*, p. 366. The Texan specimens of Mr. Drummond, (Coll. II. no. 281,) are immature, and though greatly resembling this species, may prove to be distinct; since the hypogynous bristles are very numerous. I counted 19 in some florets, and Mr. Arnott informs me that he has seen as many as 24. The character of *Rhynchospora* must therefore be slightly altered, so as to include this plant.

CLADIUM EFFUSUM, p. 374. According to Mr. Nuttall, this plant extends a considerable distance northward beyond Wilmington, North Carolina, often occupying, almost exclusively, considerable ponds.

CAREX TENUIFLORA, p. 392. Tackmahack Swamp, Southampton, Massachusetts, *Dr. Chapman!*; Ogdensburgh, St. Lawrence Co., New-York, *Dr. Crawe!*

C. SUBULATA, p. 419. Near Fayetteville, North Carolina, *Mr. Curtis!*

SCLERIA RETICULARIS, p. 375. Wet sandy places, near the sea coast, Suffolk County, Long Island! September.

S. LAXA, p. 376. Add, HAB. New Jersey to Florida; not found far from the sea coast! September.

*Note.* Mr. Arnott states, in a letter received since the foregoing sheets were printed, that he has examined the specimen on which *Ceratoschænus corniculatus* of Nees ab Esenbeck was founded. The plant is, in his opinion, nothing more than *Schœnus corniculatus*, *Lam'k.* (*Rhynchospora corniculata*, *Gray*) in which, contrary to the usual state, the beak is somewhat curved. The reader will perceive that the character of this well-marked genus has been amended in the present monograph so as to apply to the normal form of *C. corniculatus*, and also to include a new species. The specific name of Lamarck must, of course, be retained.



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TO THE

## MONOGRAPH OF NORTH AMERICAN CYPERACEÆ.

N. B. Synonyms of Genera, Sub-Genera, &c. are printed in small capitals, with the sign (†) prefixed. Synonyms of Species, and also the Names of Species when incidentally mentioned, are italicised.

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CORRECTIONS.

- PAGE 248, line 5 from bottom, for the "spikelets long," read "also of the spikelets."
- " 257, after line 7, insert "b. *Culm triangular; spikelet solitary.*"
- " 258, line 4 from bottom, for "b," read "c."
- " 281, line 20 and 21, for "belong to a species of &c." read "belong to *Trichelostylis (T. complanata N. ab E. and T. mucronulata, Torr.)*"
- " 287, line 14, for "KILLINGIA," read "KYLINGIA."
- " 288, line 16, dele "Kunth, Vahl and others," and add "Hypælyptum, *R. Br. prod.* 1, p. 219. Species of Hypælyptum, *Vahl. Hypælyptum, Kunth, syn.* 1, p. 149. *Lestib. ess. fam. cyp.* p. 29, no. 20." (badly described.)
- " 304, line 14, for "ALBIDUS," read "ALBIDA."
- " 304, line 3, after "slender," add "or rarely o."
- " 332, line 5 from bottom, for "specimens" read "specimen."
- " 242, line 15, after "ELYTROSPEMUM," add "CALIFORNICUM."
- " 244, line 15, for "ed. 2," read "ed. 1."
- " 352, top line, for "CILIATIFOLIUS," read "CILIATIFOLIA."
- " 355, line 15, for "MUCRONULATUS," read "MUCRONULATA."
- " 379, line 17, for "ciliate," read "ciliata."
- " 383, line 5 and 8 from bottom, for "to know," read "have known."
- " 391, line 4, dele "even."
- " 392, line 6, and elsewhere, for "Schukhr," read "Schkuhr."
- " 394, line 3, from bottom, for "miralibis," read "mirabilis."
- " 400, line 22, for "cannot," read "can."
- " 403, line 19, dele "the succeeding species, viz."
- " 410, line 13, for "LANGUINOSA," read "LANUGINOSA."
- " 423, line 10, for "MICRODONTUS," read "MICRODONTA."
- " 437, line 9, for "CAREX," read "CYPERUS."
- " 438, line 18, for "*Hypælyprum*," read "Hypælytrum."
- " " line 5 from bottom, for "appear," read "seems."
- " " line 4 from bottom, for "appear," read "appears."









AMERICANA, *Bosc.*

PRUNUS

PLATE 100







Fig. 7.

Fig. 8.



Fig. 9.

Fig. 10.



Fig. 3.

Fig. 5.

Fig. 4.



Fig. 1.

Fig. 2.

Fig. 6.

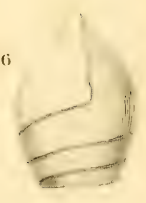


Fig. 11.

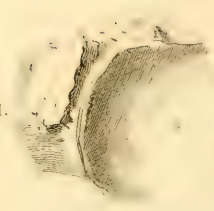






Fig. 1



Fig. 4

Fig. 5



Fig. 9

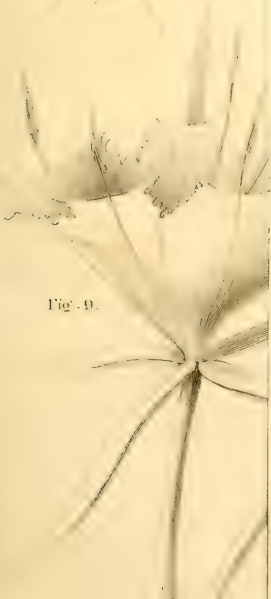




Fig. 1.



Fig. 2.

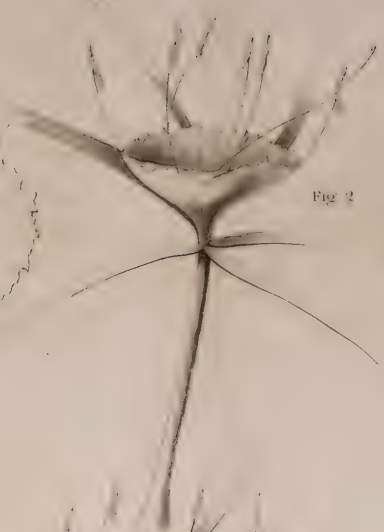


Fig. 3.



Fig. 4.

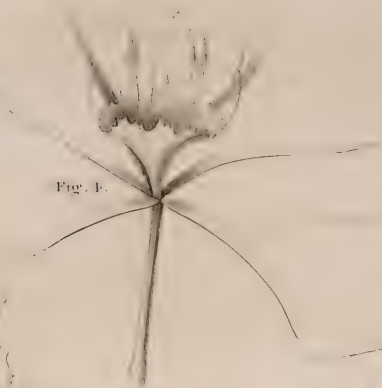


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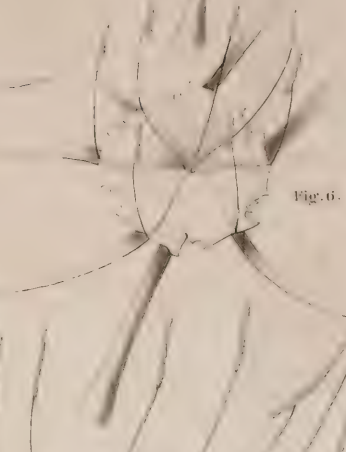


Fig. 5.



Fig. 7.



Fig. 9.

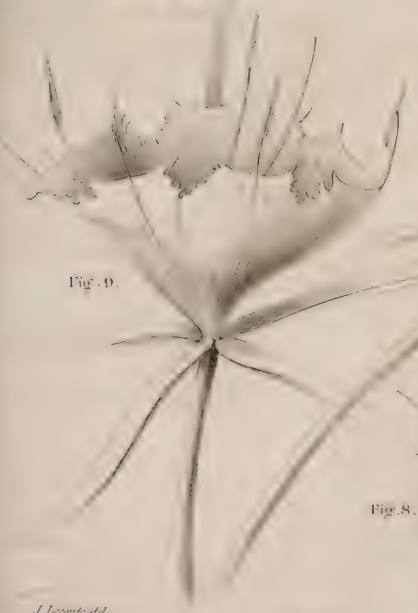


Fig. 8.

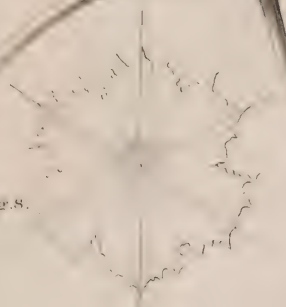






Fig. 1



Fig. 2



Fig. 3



Fig. 4







*Rhyncospira*

Alfred Warner.









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