

BAILEY (J. W.)

SMITHSONIAN CONTRIBUTIONS TO KNOWLEDGE

MICROSCOPICAL OBSERVATIONS

MADE IN

SOUTH CAROLINA, GEORGIA, AND FLORIDA,

BY PROF. J. W. BAILEY,

OF THE U. S. MILITARY ACADEMY, WEST POINT.

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PROF. WM. B. ROGERS,

PROF. LEWIS R. GIBBES.

JOSEPH HENRY,  
*Secretary of the Smithsonian Institution.*

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# MICROSCOPICAL OBSERVATIONS

MADE IN

SOUTH CAROLINA, GEORGIA, AND FLORIDA.

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THE observations here recorded were made during the winter and spring of the years 1849—50, while on a tour as an invalid through the Southern States. Although my researches were pursued under many disadvantages, and amount to scarcely more than a *reconnoissance* of the places visited, yet some facts of considerable interest were determined; and as the microscopic productions of these regions have never before been studied, some value must attach to even the most imperfect examinations. With this feeling, I offer the following notes, hoping that if they have no other interest, they may serve to point out to Southern naturalists, and the numerous intelligent invalids who hybernate in the South, how rich a field of amusement and instruction surrounds them even in midwinter.

Among the most interesting results obtained were—1st. The discovery of an extensive stratum of fossil Infusoria near Tampa Bay, (see page 19). 2d. The existence of vast quantities of infusorial remains in the rice fields and salt marsh formations of the South, (see pages 5, 11, 12, 13 and 20). 3d. The discovery of many new species of microscopic plants and animals, (see page 36). 4th. The demonstration of the cosmopolite character of many minute beings hitherto only known as European species, (see tables, pages 28, 31 and 33).

For the convenience of those microscopists who may hereafter visit any of the regions which I examined, I will state in detail the circumstances of time and place under which each observation was made, and give for each locality a list of the species, and then combine these into a general table, to illustrate the distribution of species.

## SULLIVAN'S ISLAND, S. C.

Dec. 11th, 1849.—On the logs and stones of the breakwater, in front of Moultrieville, I found the following forms :

## DIATOMACEÆ.

Achnanthes longipes ? Ag., forming very long bands, containing 50 to 100 frustules, mounted on a long footstalk. (See fig. 1, pl. 2.)	Coscinodiscus lineatus, Ehr.
Amphora Lybica, Ehr.	Grammatophora oceanica, Ehr.
Ceratoneis fasciola, Ehr.	Gallionella sulcata, Ehr.
Ceratoneis closterium, Ehr.	Navicula sigma, Ehr.
	Licmophora radians, Kg.

## CHARLESTON NECK.

Dec. 19th, 1849.—In company with Prof. Gibbes, of Charleston College, I collected the following forms in a fresh-water ditch near "the Lines," viz :

Bacillaria paradoxa, Ehr.	Scenedesmus obliquus, Turp.
Synedra valens, Ehr.	Docidium nodulosum, Bréb.
Closterium acerosum, Schrank.	Amblyphis viridis, Ehr.
Cosmarium undulatum, Corda.	Arcella vulgaris, Ehr.
"    cucumis, Corda.	Euglena viridis, Ehr.
"    margaritifera, Turp.	"    pleuronectes, Ehr.
Euastrum ampullaceum, Ralfs.	Stentor polymorphus, Ehr.
Penium digitus, Ehr.	

## MUD OF CHARLESTON HARBOR.

In mud collected from the logs of wharves, and from other situations in Charleston Harbor, the following species of Diatomaceæ were noticed.

Actiniscus sirius, Ehr.	Navicula sigma, Ehr.
Actinocyclus bioctonarius, Ehr.	Pinnularia interrupta, Kg.
Actinoptychus senarius, Ehr.	"    didyma, Ehr.
Biddulphia pulchella, Gray.	"    lyra, Ehr.
Cocconeis scutellum, Ehr.	Rhaphoneis rhombus, Ehr.
Coscinodiscus excentricus, Ehr.	Stauroptera aspera, Ehr.
Dictyocha fibula, Ehr.	*Suriella circumscuta, B.
Eupodiscus Rogersii, Ehr.	Terpsinoë musica, Ehr.
*Eupodiscus radiatus, B.	Triceratium favus, Ehr.
Gallionella sulcata, Ehr.	"    alternans, B.

\*Species marked with a star are believed to be new, and are described at page 36.

## CEDAR HILL, ASHLEY RIVER.

*Dec. 15th, 1849.*—At Mr. Dwight's plantation, (Cedar Hill,) I found growing abundantly on stems of grasses in the river, *Bostrichia scorpioides* and *Deleseria Leprieurii* Mont., two species of Algæ which I have found in all our estuaries from the Hudson to Tampa Bay. In company with them in the Ashley River, I found—

<i>Achnanthes brevipes</i> , Ag.	<i>Meloseira nummuloides</i> , Kg.
<i>Bacillaria paradoxa</i> , Ehr.	

In fresh water ditches, at the same place, I found the following Algæ, viz :

<i>Vaucheria cespitosa</i> , Ag.	<i>Spirogyra decimina</i> , Kg.
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with the following Diatomaceæ, viz :

<i>Bacillaria paradoxa</i> , Ehr.	<i>Pinnularia viridis</i> , Ehr.
<i>Diatoma Ehrenbergii</i> , Kg.	<i>Surirella splendida</i> , Ehr.
<i>Himantidium arcus</i> , Ehr.	

## MIDDLETON PLACE, ASHLEY RIVER.

*Dec. 16th, 1849.*—In an artificial pond or reservoir at this locality, I found a great variety of interesting objects, among which were the following—

DESMIDIEÆ.	DESMIDIEÆ.
<i>Ankistrodesmus falcatus</i> , Corda.	<i>Staurastrum gracile</i> , Ralfs.
<i>Arthrodesmus convergens</i> , Ehr.	“ <i>muticum</i> , Bréb.
“ <i>incus</i> , Bréb.	<i>Xanthidium cristatum</i> , Bréb.
<i>Cosmarium margariferum</i> , Menegh.	—
<i>Docidium verrucosum</i> , B.	INFUSORIA.
<i>Euastrum elegans</i> , Bréb.	<i>Arcella vulgaris</i> , Ehr.
<i>Pediastrum ellipticum</i> , Hass.	“ <i>dentata</i> , Ehr.
“ <i>heptactis</i> , Menegh.	<i>Lepadella ovalis</i> , Ehr.
“ <i>Napoleonis</i> , Menegh.	<i>Monostyla lunaris</i> , Ehr.
<i>Scenedesmus quadricauda</i> , Bréb.	<i>Peridinium cinctum</i> , Ehr.
<i>Sphaerosozma excavatum</i> , Ralfs.	<i>Rotifer vulgaris</i> , Schrank.
* “ <i>serratum</i> , B.	<i>Squamella oblonga</i> , Ehr.

## SAVANNAH, GA.

*December, 1849.*—I had long entertained the belief that the earth of rice fields, from its frequent submergence, must contain a considerable quantity of infusorial remains; and on visiting Savannah, I gladly availed myself of the opportunity to determine the truth of this supposition. The amount of infusorial remains which I detected far exceeded my expectations, but to my surprise I found that a large portion of the remains were of forms which only inhabit salt or brackish waters. Many of these forms are large enough to be seen by means of a pocket Coddington lens, and indeed it was thus that I first detected the infusorial character of the earths referred to. The large triangular *Triceratium favus*, Ehr., and the circular discs of *Coscinodiscus subtilis*, Ehr., may thus be seen in considerable numbers on the surface of every fresh fracture of the earth thrown from the rice-field ditches.

It is not merely the superficial layers which contain these remains, but earth thrown out from the depth of fifteen to twenty feet, as at the excavations for foundations and ditches at Fort Pulaski and Fort Johnson, abound in the same fossils, among which, besides Spongiolites and Phytolitharia, the following Diatomaceæ were noticed :

Actinocyclus, several species.	Pinnularia placentula, Kg.
Actinoptychus senarius, Ehr.	“ elliptica, Kg.
“ denarius, Ehr.	Rhaphoneis rhombus, Ehr.
Coscinodiscus radiatus, Ehr.	Suirella splendida, Ehr.
“ subtilis, Ehr.	Triceratium favus, Ehr.
Cocconema cymbiforme, Ehr.	“ alternans, B.
*Eupodiscus radiatus, B.	Terpsinoë musica, Ehr.
Gallionella sulcata, Ehr.	Zygoceros rhombus, Ehr.
“ varians, Ehr.	

It will be noticed that all these forms are such as are now common in estuaries along the Atlantic coast.

In a fresh water ditch, about a mile below the city of Savannah, and communicating directly with the river, I found the following Diatomaceæ in a living state.

Bacillaria paradoxa, Ehr.	Pinnularia viridis, Ehr.
Coscinodiscus subtilis, Ehr.	*Odontella Mobilensis, B., with spicules of sponge
Meloseira arenaria, Moore.	

In another fresh water ditch, in the same vicinity, I noticed among Draparaldia glomerata, Ag., and Spirogyra quinina, Kg., the following forms, viz :

Closterium lunula, Ehr.	Naunema, undetermined, with long slender frustules.
Coscinodiscus excentricus, Ehr., dead.	Synedra vitrea, Ehr.
Navicula hippocampus, Ehr.	Suirella splendida, Ehr.

#### SWAMP ON THE ROAD TO BONAVENTURE, NEAR SAVANNAH.

On the 24th of December, I collected *Hydrocharis spongiosa*, or “Coltsfoot,” from a small swamp near the roadside, about a mile from Savannah; and on examining it with a microscope, I found that the small hairs which cover its aquatic roots give an admirable display of the phenomena of the circulation of the sap. These hairs are as transparent as glass, and in each one a turbid fluid may be seen in rapid motion, along the walls of the cells. Slowly revolving c t oblasts were also noticed in some of the hairs. Entangled among the roots of this plant I noticed specimens of *Hydatina senta*, Ehr., and frustules of *Eunotia diodon*, Ehr.



Near the same locality I found *Botrydium argillaceum*, Wall? and *Vaucheria racemosa*, Lyngh.

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POND BY THE SIDE OF THE RAIL-ROAD, NEAR SAVANNAH.

Dec. 27th, 1850.—The bottom of this pond was covered with beautiful, waving, plume-like masses of *Myriophyllum*, among the leaves of which the following species were found :—

ALGÆ.	DESMIDIEÆ.
Bulbochæte setigera, Ag.	Euastrum didelta, Ralfs.
Tolythrix distorta, Kg.	“ elegans, Bréb.
—	“ muricatum, B.
DESMIDIEÆ.	“ rostratum, Ralfs.
Ankistrodesmus falcatus, Corda.	Micrasterias Americana, Ralfs.
Aptogonum Baileyi, Ralfs.	“ rotata, Ralfs.
Closterium setaceum, Ehr.	Penium digitus, Bréb.
Cosmarium Broomei, Thwaites.	*Triplloceras verticillatum, B.
“ cucumis, Corda.	* “ gracile, B.
“ pyramidatum, Bréb.	Sphærozozma excavatum, Ralfs.
Desmidium Swartzii, Ag.	* “ serratum, B.
Didymoprium Grevillii, Ralfs.	Xanthidium cristatum, Ehr.
Docidium baculum, Bréb.	—
“ verrucosum, B.	INFUSORIA.
“ constrictum, B.	Arcella vulgaris, Ehr.
Euastrum crassum, Bréb.	Peridinium cinctum, Ehr.

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DITCHES NEAR THE CANAL OF SAVANNAH.

On the road to the steam saw-mill, above Savannah and near the canal, the following species were seen in ditches, viz :

ALGÆ.	DIATOMACEÆ.
Chætophora pisiformis, Ag.	Naunema, sp. undetermined, with long slender frustules.
Nostoc, sp. undetermined.	“ “ “ with lanceolate frustules.
Spirillum, sp. do. moving actively.	
Spirogyra decimina, Kg.	Navicula amphirhynchus, Ehr.
—	Synedra vitrea, Kg.
DESMIDIEÆ.	—
Closterium acerosum, Schrank.	INFUSORIA.
—	Arcella vulgaris, Ehr.
DIATOMACEÆ.	Euglena viridis, Ehr.
Bacillaria paradoxa, Ehr., abundant and active.	Rotifer vulgaris, Schrank.
Gallionella aurichalcea, Ehr.	Synura uvella, Ehr.

## VICINITY OF GRAHAMVILLE, BEAUFORT DISTRICT, S. C.

January, 1850.—In the ditches and “Backwater” of Dr. Bolen’s rice field, near Grahamville, S. C., I detected the following species on the 1st of January, 1850.

DESMIDIEÆ.	DESMIDIEÆ.
Ankistrodesmus falcatus, Corda.	Micrasterias fimbriata, Ralfs.
Aptogonum Baileyi, Ralfs.	“ Americana, Ralfs.
Arthrodesmus convergens, Ehr.	*Sphærozozma serratum, B.
Closterium acerosum, Schrank.	Staurostrum margaritaceum, Ehr.
“ setaceum, Ehr.	—
Cosmarium ovale, Ralfs.	INFUSORIA.
Desmidium Swartzii, Ag.	Actinophrys viridis, Ehr.
Didymocladon furcigerus, Ralfs.	Arcella vulgaris, Ehr.
Didymoprium Borreri, Ralfs.	Megalotrocha alboflavicans, Ehr.
Docidium clavatum, Bréb.	Ophrydium versatile, Ehr.
“ minutum, Ralfs.	*Peridinium Carolinianum, B.
“ nodulosum, Bréb.	Rotifer vulgaris, Schr.
Hyalotheca dissiliens, Bréb.	Stentor polymorphus, Ehr.
Micrasterias furcata, Ag.	Vorticella chlorostigma, Ehr.
“ Baileyi, Ralfs.	—
	Hydra viridis.

This locality is chiefly remarkable for the great abundance of the curious and novel form *Peridinium Carolinianum*. See p. 41.

## GRAHAMVILLE, S. C.—continued.

In a small ditch by the side of the road leading from Grahamville to Savannah, and about a mile from Grahamville, the following forms were seen, viz :

DESMIDIEÆ.	DESMIDIEÆ.
Cosmarium margaritiferrum, Menegh., abundant.	Tetmemorus Brebissonii, Ralfs., abundant.
Euastrum crassum, Bréb.	“ granulatus, Ralfs.
“ insigne, Hass.	—
Micrasterias crenata, Bréb.	DIATOMACEÆ.
“ denticulata, Bréb., abundant.	Eunotia tetradon, Ehr.

## GRAHAMVILLE, S. C.—continued.

In pools near the dam of a “Backwater,” on the road to Savannah, about two and a half miles from Grahamville, great numbers of the following species were found, viz :

DESMIDIEÆ.	DESMIDIEÆ.
Closterium lunula, Ehr.	Micrasterias denticulata, Bréb.
Desmidium Swartzii, Ag.	Penium closteroides, Ralfs.
Didymoprium Borreri, Ralfs.	(in immense numbers.)
Docidium Ehrenbergii, Ralfs.	Spirotaenia condensata, Bréb.
“ minutum, Ralfs.	—
“ nodulosum, Bréb.	INFUSORIA.
Euastrum ansatum, Ehr.	Arcella vulgaris, Ehr.
“ affine, Ralfs.	“ hyalina, Ehr.
“ didelta, Ralfs.	Diffugia proteæformis.
Micrasterias crenata, Bréb.	* “ spiralis, B.

GRAHAMVILLE, S. C.—*continued.*

In a ditch by the roadside, near Gopher Hill, I found—

Micrasterias pinnatifida, Ralfs.	Pinnularia amphigompha, Ehr.
Xanthidium amatum, Ralfs.	“ iridis, Ehr.

GRAHAMVILLE, S. C.—*continued.*

Near the village, by the side of the road to “Hap Hazard,” I found among the roots of *Utricularia verticillata*, the following species, viz :

DESMIDIEÆ.	DIATOMACEÆ.
Aptogonium desmidiûm, Ehr.	Himantidium bidens, Ehr.
Closterium acerosum, Schr.	Diatoma stellata, B.
Desmidiûm Swartzii, Ag.	—
Didymoprium Grevillii, Ralfs.	INFUSORIA.
Euastrum affine, Ralfs.	Amœba princeps, Ehr.
Penium interruptum, Bréb.	Arcella vulgaris, Ehr.
Spirotœnia condensata, Bréb.	“ hyalina, Ehr.
Xanthidium cristatum, Bréb.	Dinobryon sertularia, Ehr.
“ fasciculatum, Ehr.	Hydatina senta, Ehr.
	*Peridinium carolinianum, B.
	Pterodina patina, Ehr.

GRAHAMVILLE, S. C.—*continued.*

A ditch by an old saw-mill near the village furnished these species, viz :

DESMIDIEÆ.	DIATOMACEÆ.
Euastrum ansatum, Ehr., abundant.	Naunema, undetermined.
Hyalotheca dissiliens, Bréb.	Surirella splendida, Ehr.
Micrasterias rotata, Ralfs.	—
Penium closteroides, Ralfs.	ALGÆ.
“ interruptum, Bréb.	Tetraspora lubrica, Ag.
Spirotœnia condensata, Bréb.	Vaucheria cespitosa, Ag., with a parasitic Rotifer in its branches.

GRAHAMVILLE, S. C.—*continued.*

The mill-pond at “Hap Hazard” furnished the following species, viz :

DESMIDIEÆ.	DESMIDIEÆ.
Closterium acerosum, Schr.	Micrasterias denticulata, Bréb.
“ lunula, Ehr.	Penium digitus, Bréb.
Didymoprium Borreri, Ralfs.	Scenedesmus obliquus, Kg.
Docidium nodulosum, Bréb.	*Sphacrosoma serratum, B.
Euastrum verrucosum, B.	Spirotœnia condensata, Bréb.
Micrasterias incisa, Kg.	Staurastrum margaritaceum, Ehr.

## INFUSORIA.

<i>Amœba princeps</i> , Ehr.	<i>Hydatina senta</i> , Ehr.
<i>Arcella vulgaris</i> , Ehr.	<i>Rotifer vulgaris</i> , Schr.
“ <i>dentata</i> , Ehr.	<i>Scaridium longicaudum</i> , Ehr.
<i>Epistylis anastatica</i> , Ehr.	<i>Stentor polymorpha</i> , Ehr.

## HAZARD'S BACK CREEK, NEAR GRAHAMVILLE, S. C.

In the floating scum of this salt water creek, at Mr. Bolen's Landing, the following Diatomaceæ were detected:—

<i>Amphiprora alata</i> , Ehr.	<i>Coscinodiscus subtilis</i> , Ehr.
<i>Amphora libyca</i> , Ehr.	<i>Navicula Baltica</i> , Ehr.
<i>Bacillaria paradoxa</i> , Ehr.	<i>Pinnularia interrupta</i> , Ehr.

The following Algæ were also found at the same place, viz:

<i>Delesseria Leprieurii</i> , Mont.	<i>Ectocarpus littoralis</i> , Lyngb.
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## BRYAN COUNTY, GA.

*January and February, 1850.*—In ditches by the side of the Ogeechee Causeway, on the road from Savannah to Darien, I noticed the following species among the roots of *Utricularia verticillata*, which grows here in great profusion.

DESMIDIEÆ.	DIATOMACEÆ.
<i>Ankistrodesmus falcatus</i> , Corda.	<i>Himantidium arcus</i> , Ehr.
<i>Arthrodesmus convergens</i> , Ehr.	<i>Tabellaria flocculosa</i> , Ehr.
<i>Closterium acerosum</i> , Schr.	—
“ <i>Ehrenbergii</i> , Menegh.	INFUSORIA.
“ <i>Leiblenii</i> , Kg.	<i>Arcella dentata</i> , Ehr.
“ <i>setaceum</i> , Ehr.	“ <i>vulgaris</i> , Ehr.
<i>Didymoprium Borreri</i> , Ralfs.	<i>Euglena pleuronectes</i> , Ehr.
<i>Docidium Ehrenbergii</i> , Ralfs.	<i>Euplotes charon</i> , Ehr.
“ <i>nodulosum</i> , Bréb.	<i>Rotifer vulgaris</i> , Schr.
<i>Euastrum rostratum</i> , Ralfs.	“ <i>macrurus</i> , Ehr.
<i>Micrasterias americana</i> , Ralfs.	<i>Stentor polymorpha</i> , Ehr.
“ <i>denticulata</i> , Bréb.	<i>Synura uvella</i> , Ehr.
“ <i>incisa</i> , Kg.	—
“ <i>rotata</i> , Ralfs.	ALGÆ.

\**Aporea ambigua*, B. (Pl. 3, fig. 3.)  
*Bulbochæte setigera*, Ag.  
*Coleochæte scutata*, Bréb.

At the same locality, *Hydrocharis spongiosa*, *Riccia fluitans*, and a species of *Azolla*, occur abundantly.

BRYAN CO., GA.—*continued.*

## RICE FIELD MUDS.

The mud from the rice fields on the Ogeechee was collected at the embankments by the side of the canals and ditches on the following estates, viz :

Cherry Hill, belonging to R. J. ARNOLD, Esq.  
 Strother Hall, " Col. McALLISTER.  
 A new plantation, " Judge LANGDON CHEVES.

These muds all agreed in character with those examined near Savannah, and furnished the following species, viz :

Actinoptychus denarius, Ehr.	Surirella splendida, Ehr.
" senarius, Ehr.	Terpsinoë musica, Ehr.
Coscinodiscus excentricus, Ehr.	Triceratium favus, Ehr.
" subtilis, Ehr.	" alternans, B.
Dietyocha fibula, Ehr.	" reticulum, Ehr.
Gallionella sulcata, Ehr.	Zygoceros rhombus, Ehr.
Pinnularia interrupta, Kg.	—
" viridis, Ehr.	Pollen pini.
Rhaphoneis rhombus, Ehr.	Phytolitharia, &c.

BRYAN CO., GA.—*continued.*

## WHITE HALL, THE RESIDENCE OF R. J. ARNOLD, ESQ.

In a ditch of an old rice field, and at some distance from the river, the following species were found among the leaves of *Utricularia verticillata*, viz :

Bacillaria paradoxa, Ehr.	Closterium acerosum, Schr.
Gallionella aurichalcea, Ehr.	—
Himantidium arcus, Ehr.	Arcella dentata, Ehr.
Synedra spectabilis, Ehr.	Vaginicola crystallina, Ehr.
" vitrea, Ehr.	

## DITCH NEAR THE CHURCH IN THE VICINITY OF WHITE HALL.

This furnished the following :

DESMIDIEÆ.	
Ankistrodesmus falcatus, Corda.	Micrasterias crenata, Bréb.
Aptogonium desmidium, Ehr.	Pediastrum heptactis, Menegh.
Arthrodesmus convergens, Ehr.	Penium digitus, Bréb.
" incus, Bréb.	Scenedesmus obliquus, Kg.
Didymoprium Borreri, Ralfs.	Staurastrum dejectum, Bréb.
Docidium verrucosum, B.	" gracile, Ralfs.
Euastrum affine, Ralfs.	Xanthidium aculeatum, Ehr.

## DIATOMACEÆ.

*Pinnularia amphigompha*, Ehr.  
*Diatoma stellaris*, B.

## INFUSORIA.

*Dinobryon sertularia*, Ehr.  
*Euglena longicauda*, Ehr.  
*Peridinium cinctum*, Ehr.  
*Rotifer vulgaris*, Schr.  
*Stentor polymorpha*, Ehr.

## GLYNN COUNTY, GA.

## HOPETON, ON THE ALTAMAHA, RESIDENCE OF J. HAMILTON COUPER, ESQ.

About the time when I arrived at Mr. Couper's hospitable mansion, there had been several severe frosts, and some days of cold rains. Under these circumstances, the opportunities to collect the microscopic forms were much less favorable than at the preceding localities. The rice-field muds at this locality proved to be quite rich in remains of diatomaceous shells, agreeing with those noticed on the Savannah and Ogeechee, and furnishing abundance of the following forms, viz :

*Antinocyclus*, several species.  
*Actinocyclus denarius*, Ehr.  
 " *senarius*, Ehr.  
 \**Campylodiscus argus*, B.  
*Eupodiscus Rogersii*, Ehr.  
 \* " *radiatus*, B.  
*Gallionella sulcata*, Ehr.  
*Pinnularia amphioxys*, Ehr.

*Pinnularia interrupta*, Kg.  
 " *viridis*, Ehr.  
*Rhaphoneis rhombus*, Ehr.  
*Terpsinoë musica*, Ehr.  
*Triceratium favus*, Ehr.  
 " *reticulum*, Ehr.  
*Zygoceros rhombus*, Ehr.

In a rice-field ditch, remote from the river, I found the following species in a living state, viz :

## DESMIDIÆ.

*Closterium lanceolatum*, Kg.  
*Desmidium Swartzii*, Ag.  
*Micrasterias crenata*, Bréb.  
*Scenedesmus obliquus*, Kg.

## DIATOMACEÆ.

*Cocconema cymbiforme*, Ehr.  
*Eunotia gibba*, Ehr.  
 " *librile*, Ehr.  
 " *amphioxys*, Ehr.  
*Fragillaria pectinalis*, Ehr., in large masses.  
*Gallionella aurichalcea*, Ehr.  
*Gomphonema constrictum*, Ehr.  
*Navicula hippocampus*, Ehr.  
*Naunema undet.*, frustules slender.

## DIATOMACEÆ.

*Suirella splendida*, Ehr.  
*Synedra vitrea*, Kg.

## INFUSORIA.

*Gonium pectorale*, Ehr.  
*Hydatina senta*, Ehr.  
*Laciniaria socialis*, Ehr.  
*Synura uvella*, Ehr.  
*Vaginicola crystallina*, Ehr.

## ALGÆ, &amp;c.

\**Aporea ambigua*, B.  
*Coleochaete scutata*, Bréb.  
*Mougeotia genulflexa*, Ag.

HOPETON.—*continued.*

In a ditch leading from a small artesian well in the rice fields at Hopeton, the following forms were noticed, viz :

Closterium lunula, Ehr.	Synedra vitrea, Kg.
“ lanceolatum, Kg.	Areolla dentata, Ehr.
Eunotia gibba, Ehr.	Euglena viridis, Ehr.
Surirella splendida, Ehr.	Rotifer vulgaris, Schr.

In a ditch behind the Negro Hospital at Hopeton, I found the following, viz :

Closterium Dianæ, Ehr.	Dinobryon vulgaris, Ehr.
“ moniliferum, Ehr.	Petridinium cinetum, Ehr.
Docidium clavatum, Kg.	Rotifer vulgaris, Schr.
Himantidium arcus, Ehr.	and several species of Cyclops, Daphnia and Gam-
Synedra vitrea, Kg.	marus.

GLYNN CO., GA.—*continued.*

## ST. SIMON'S ISLAND.

In the salt marsh mud from the “Cut-off” at the north end of St. Simon's Island, the following species were found, either alive or evidently in a very recent condition, viz :

*Campylodiscus argus, B.	Gallionella sulcata, Ehr.
Coscinodiscus oculus iridis, Ehr.	Rhaphoneis rhombus, Ehr.
“ radiatus, Ehr.	Terpsinoë musica, Ehr.
“ subtilis, Ehr.	Triceratium favus, Ehr.
*Eupodiscus radiatus, B.	Zygoceros rhombus, Ehr.

The same forms were noticed in mud from the “Inland Passage” from Darien to Jacksonville, Fa. The resemblance of these marsh muds to those thrown out in digging the canals of the rice fields, and the identity of the forms contained in them, serve to show that the rice fields were once salt marshes, and have been cut off from the influence of the ocean either by elevations of the coast, or changes in the course of the rivers. It should be borne in mind, however, that marine forms occur in estuaries far above where the surface water is brackish.

## FLORIDA.

## PILATKA.

Feb. 20th, 1850.—In sphagnous swamps, near the village of Pilatka, Florida, I found the species named below.

DESMIDIEÆ.	DIATOMACEÆ.
Closterium accerosum, Schr.	Himantidium diodon, Ehr.
“ Dianae, Ehr.	Pinnularia viridis, Ehr.
*Cosmarium depressa, B.	—
Didymoprium Borreri, Ralfs.	INFUSORIA.
Didymoeladon furcigerus, Ralfs.	Actinophrys viridis, Ehr.
Docidium minutum, Ralfs.	Amœba princeps, Ehr.
Euastrum elegans, Bréb.	Arella dentata, Ehr.
“ sublobatum, Bréb.	“ vulgaris, Ehr.
Micrasterias truncata, Bréb.	Mctopidia lepadella, Ehr.
Penium digitus, Bréb.	Monostyla lunaris, Ehr.
Staurastrum gracile, Ralfs.	Notcus quadricornis, Ehr.
“ tricornis, Bréb.	Pterodina patina, Ehr.
“ polymorphum, Bréb.	Rotifer vulgaris, Schr.
Xanthidium armatum, Ehr.	Stylonychia mytilus, Ehr.
“ fasciculatum, Ehr.	Cothurnia imberbis, Ehr.

## PILATKA.—continued.

The following species were found in a living state, attached to a log in the St. John's River, at Pilatka, viz :

Bacillaria paradoxa, Ehr.	Odontella polymorpha, Kg.
*Campylodiscus argus, B.	

## PILATKA.—continued.

In a ditch by the roadside, three miles from Pilatka, I found these species, viz :

DESMIDIEÆ.	DIATOMACEÆ.
Didymoprium Borreri, Ralfs.	Eunotia tetraodon, Ehr.
(in conjugation.)	—
“ Grevillii, Ralfs.	INFUSORIA.
Euastrum ampullaceum, Ralfs.	Colurus tricuspisidatus, Ehr.
Hyalotheca dissiliens, Bréb.	Dinobryon sertularia, Ehr.
Tetmemorus Brebissonii, Ralfs.	Pterodina patina, Ehr.
	Stentor polymorphus, Ehr.



## PONDS NEAR PILATKA.

In the "First Pond," about five miles west of Pilatka, the following species were collected, viz :

DESMIDIEÆ.  
 Ankistrodesmus falcatus, Corda.  
 Cosmarium amœnum, Bréb.  
 " pyramidatum, Bréb.  
 Didymoprium Borreri, Ralfs.  
 Docidium Ehrenbergii, Ralfs.  
 Euastrum clegans, Bréb.  
 Micrasterias truncata, Bréb.  
 Spirotœnia condensata, Bréb.  
 Sphærozosma excavatum, Ralfs.  
 \* " serratum, B.  
 Staurostrum dejectum, Bréb.  
 Tetmemorus Brebissonii, Ralfs.

DESMIDIEÆ.  
 Xanthidium fasciculatum.  
 —  
 INFUSORIA.  
 Arcella angulata, Ehr.  
 Euglena longicauda, Ehr.  
 Megalotrocha albolavicans, Ehr.  
 Monostyla lunaris, Ehr.  
 \*Peridinium carolinianum, B.  
 —  
 ALGÆ.  
 \*Aporia ambigua, B.  
 Bulbochæta setigera, Ag.

In the "Second Pond," near the above locality, were found—

\*Cosmarium depressum, B.  
 \*Didymocladon cerberus, B.  
 \*Micrasterias arcuata, B.  
 \* " expansa, B.

Micrasterias furcata, Ehr.  
 " radiosa, Ehr.  
 Penium digitus, Ralfs.  
 Xanthidium fasciculatum, Ehr.

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 PILATKA.—*continued.*

In a deep ravine south of Pilatka, I found large brown masses of *Diatoma Ehrenbergii*, Kg., attached to twigs, etc., in a small stream.

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 SHELL BANKS OF PILATKA.

While at Pilatka, I carefully examined the immense deposit of fluviatile shells upon which the town is built, and which is chiefly made up of *Paludina vivipara*, *Ampullaria depressa*, several small *Helices*, *Melaniæ*, etc., with valves of an undetermined *Unio*. I could detect no trace of microscopical organisms in any of the earthy matter accompanying them.

## PILES' "NEW PLACE," FA.

At "Piles'," about forty miles west of Pilatka, on the road to Tampa, I examined the rock recently excavated in forming a well. It proved to be the White Orbitulite limestone, containing large masses of flint. Both the limestone and flint abound in microscopical Polythalamia, which may be detected in the flint by mounting thin fragments in Canada balsam. Rock of similar character was seen at numerous places between Pilatka and Tampa, and it even forms extensive ridges, of the height of three or four hundred feet, giving an appearance to the interior of Florida very different from the flat monotonous aspect which it is generally supposed to present.

## OCALA, FA.

Feb. 26th, 1850.—In a "Lime-sink" near Ocala, on the road to Tampa, I found the following forms among the roots of *Lemna minor*, which covered the surface of the water, viz :

<i>Docidium nodulosum</i> , Bréb.	<i>Salpina mucronata</i> , Ehr.
<i>Cosmarium Thwaitesii</i> , Ralfs.	—
" <i>margaritaceum</i> , Menegh.	* <i>Aporea ambigua</i> , B.
—	<i>Coleochaete scutata</i> , Bréb.
<i>Arcella vulgaris</i> , Ehr.	<i>Tyndaridea cruciata</i> , Harv.
<i>Euglena pleuronectes</i> , Ehr.	<i>Spirogyra quinina</i> , Kg.
<i>Rotifer vulgaris</i> , Schr.	

## DADE'S BATTLE GROUND, FA.

At the pond near Dade's Battle Ground, I found the following forms, viz :

DESMIDIEÆ.	DESMIDIEÆ.
<i>Arthrodesmus convergens</i> , Ehr.	* <i>Micrasterias ringens</i> , B.
" <i>incus</i> , Bréb.	<i>Pediastrum Boryanum</i> , Menegh.
* <i>Cosmarium depressum</i> , B.	" <i>heptactis</i> , Menegh.
" <i>connatum</i> , Bréb.	* <i>Sphærozozma serratum</i> , B.
" <i>margaritifera</i> , Menegh.	<i>Xanthidium cristatum</i> , Bréb.
" <i>ornatum</i> , Ralfs.	—
<i>Docidium minutum</i> , Ralfs.	INFUSORIA.
<i>Euastrum binale</i> , Ralfs.	<i>Arcella dentata</i> , Ehr.
" <i>elegans</i> , Bréb.	* <i>Diffugia spiralis</i> , B.
<i>Micrasterias crenata</i> , Bréb.	<i>Gonium glaucum</i> , Ehr.
" <i>incisa</i> , Kg.	<i>Rotifer vulgaris</i> , Schr.
" <i>pinnatifida</i> , Kg.	<i>Salpina mucronata</i> , Ehr.
" <i>radiosa</i> , Ag.	

## DITCH BY ROADSIDE, THIRTY MILES EAST OF TAMPA.

At this locality I collected the following :

Cosmarium pyramidatum, Bréb.	Penium digitus, Bréb.
Docidium minutum, Ralfs.	Pterodina patina, Ehr.
Euastrum sublobatum, Bréb.	Rotifer vulgaris, Schr.
Micrasterias pinnatifida, Kg.	Stentor polymorpha, Ehr.
“ truncata, Bréb.	

## “ WARM SPRING ” ON THE ROAD TO TAMPA.

This spring furnished the following species, viz :

Closterium Ehrenbergii, Menegh.	Eunotia gibba, Ehr.
“ turgidum, Ehr.	“ librile, Ehr.
Docidium nodulosum, Bréb.	Gallionella aurichalcea, Ehr.
Cocconema cymbiforme, Ehr.	Himantidium arcus, Ehr.

The surface of the spring was covered with a green mucous mass, composed of Nostoc-like filaments, mingled with Mougeotia genuflexa, Ag., and Spirogyra decimina, Kg.

## LITTLE HILLSBOROUGH RIVER, ON THE ROAD FROM PILATKA TO TAMPA.

This river furnished the following, viz :

DESMIDIEÆ.	DIATOMACEÆ, &c.
Closterium Dianæ, Ehr.	Cocconeis pediculus, Ehr.
“ Ehrenbergii, Menegh.	Cocconema cymbiforme, Ehr.
	*Peridinium carolinianum, B.
	Pinnularia viridis, Ehr.
	Synedra vitrea, Kg.

## WITHLACOOCHEE RIVER, ON THE ROAD TO TAMPA.

March 1st, 1850.—In this river I found, among the roots of Pistia stratiotes, the following species, viz :

DESMIDIEÆ.	Cocconeis pediculus, Ehr.
Closterium Dianæ, Ehr.	Cocconema cymbiforme, Ehr.
“ Ehrenbergii, Menegh.	Eunotia gibba, Ehr.
“ setaceum, Ehr.	“ librile, Ehr.
Micrasterias americana, Ralfs.	Fragillaria pectinalis, Ehr.
—	Himantidium arcus, Ehr.
DIATOMACEÆ, &c.	Surirella splendida, Ehr.
*Amphiprora ornata, B. Pl. 2, figs. 15 and 23.	Synedra vitrea, Kg.

## BIG HILLSBOROUGH RIVER, ON THE ROAD FROM PILATKA TO TAMPA.

In this river I noticed the following species in a living state :

Cocconema cymbiforme, Ehr.	Arcella dentata, Ehr.
Eunotia gibba, Ehr.	“ vulgaris, Ehr.
Suirella splendida, Ehr.	—
Synedra vitrea, Kg.	Batrachospermum moniliforme, Roth.
Terpsinoë musica, Ehr.	Spirogyra decimina, Kg.

It was at this locality that I first saw living chains of that exquisite form, the *Terpsinoë musica*, Ehr. The frustules contained yellowish endochrome and granules, irregularly scattered.

## VICINITY OF TAMPA, (FORT BROOKE), FLA.

The mud of a salt-marsh, half a mile east of Fort Brooke, furnished the following Diatomaceæ, viz :

Amphiprora constricta, Ehr.	Navicula baltica, Ehr.
Coccinodiscus subtilis, Ehr.	Stauroptera aspera, Ehr.
*Eupodiscus radiatus, B.	Triceratium favus, Ehr.
Gallionella sulcata, Ehr.	“ reticulum, Ehr.

TAMPA.—*continued.*

On the shores of Hillsborough River, near the Hotel at Tampa, I noticed that the sand below high-water mark was of the peculiar yellowish or ferruginous tint which often indicates the presence of living Diatomaceæ. Microscopical observations proved the presence of large numbers of a species of *Amphiprora*, (see figs. 2, 3, 4, Pl. 2,) whose living frustules showed four parallel yellowish bands, and which I shall refer to as *Amphiprora fasciata*, B. A small sigmoid *Navicula*, probably *N. sigma*, Ehr., accompanied the *Amphiprora*.

About a mile and a half above the Hotel, I collected some salt-marsh grasses, attached to which were great quantities of *Delesseria Leprieurii*, Mont., and *Bostrichia scorpioides* ? and among these Algae I detected the following :

DIATOMACEÆ.	INFUSORIA.
Achnanthes brevipes, Ag.	Carchesium polypinum, Ehr.
Bacillaria paradoxa, Ehr.	Cothurnia maritima, Ehr.
Cerataulus turgidus, Ehr.	“ havniensis, Ehr.
Meloseira salina, Kg.	
Stauroptera aspera, Ehr.	
Triceratium favus, Ehr.	

Figures of these species of *Cothurnia* are given on Pl. 3, figs. 11 & 12.

TAMPA.—*continued.*

On the beach in front of the flagstaff at Fort Brooke, I collected the following :

## ALGÆ.

Sargassum vulgare, Ag.  
 Spyridia filamentosa, Harv.  
 Ceramium clavulatum, Ag.

## DIATOMACEÆ.

\*Achnanthes ? arenicola, B, see page 38.  
 Bacillaria paradoxa, Ehr.  
 Grammatophora stricta, Ehr.  
 Gallionella sulcata, Ehr.  
 Rhabdonema adriaticum, Kg.

On the west side of the bay, the following Algæ were found on the beach at low tide, viz :

Bangia fusco-purpurea, Lyngb.  
 Calothrix confervicola, Ag.  
 Ceramium clavulatum, Ag.

Gracilaria multipartita, J. Ag.  
 Polysiphonia Olneyi ? Harv.

## INFUSORIAL STRATUM NEAR TAMPA.

Between the ferry at Tampa and the well known locality of silicified corals at Ballast Point, on Hillsborough Bay, and directly on the shore of the bay, I detected a highly interesting stratum of fossil marine Diatomaceæ or Infusoria. It is exposed for at least a quarter of a mile along the shore, and from five to ten feet of its thickness may be seen. In its external characters, (whiteness, lightness, fissility, &c.,) it has some resemblance to the infusorial strata of Virginia, but is much more indurated, so that, although it is easy to show that it is made up of the remains of Diatomaceæ, spicules of sponges, &c., it is yet difficult to isolate and determine the individual species. The following forms, however, were distinctly recognized, viz :

Actinoptychus senarius, Ehr.  
 Coscinodisci, undetermined fragments.  
 Denticella ? tridentata, Ehr.=Zygoeceros Tuomeyi, B.

Gallionella sulcata, Ehr.  
 Rhaphoneis rhombus, Ehr.

with numerous sponge spicules.

This infusorial earth, like that at Petersburg, Va., changes in a singular manner, to a salmon color, when exposed to the *vapor* of Turpentine or Canada Balsam. The geological position is probably in the upper part of the Eocene Tertiary, for a bed of shells, which apparently belong to that epoch, lies a short distance to the east of the infusorial bed.

This discovery of a marine infusorial stratum, similar to those of Virginia and Maryland, but at so great a distance from them, is, I think, of much interest, and gives reason to hope for the detection of similar deposits at many intermediate points.

Some interesting remarks on the geology of the localities in the vicinity of Tampa and Ballast Point, by J. H. Allen, may be found in *Silliman's Journal*, New Series, Vol. I., p. 38, and others by T. A. Conrad, in the same series, Vol. II., pp. 36, 399.

## ST. AUGUSTINE, FLA.

March 16th, 1850.—The mud of the St. Sebastian River, collected at the bridge west of St. Augustine, proved to be very rich in siliceous shells of recent and living Diatomaceæ, among which the following were noticed, viz :

Actinoptychus senarius, Ehr.	†Navicula elongata.
Actinocyclus, several species.	“ baltica, Ehr.
Biddulphia pulchella, Gray.	*Pinnularia Couperi, B.
Coscinodiscus excentricus, Ehr.	“ lyra, Ehr.
“ lineatus, Ehr.	*Pyxidicula compressa, B.
“ oculus-iridis, Ehr.	Rhaphoneis rhombus, Ehr.
“ subtilis, Ehr.	Stauroptera aspera, Ehr.
Dityocha fibula, Ehr.	*Surirella circumscuta, B.
*Eupodiscus radiatus, B.	“ splendida, Ehr.
“ Rogersii, Ehr.	Triceratium favus, Ehr.
Gallionella sulcata, Ehr.	“ hexagonalis, B.
Meloseira salina, Kg.	Zygoceros rhombus, Ehr.

The following Algæ were found at the same place, viz :

Bostrichia scorpioides ? Mont.	Porphyra vulgaris, Ag.
Delssonia hypoglossum, Lamour.	Ulva latissima, L.
“ Leprieurii, Mont.	

## ST. AUGUSTINE.—continued.

In the mud at the foot of the sea wall, near the old Spanish Fort St. Marco, I noticed the following Diatomaceæ, viz :

Ceratoneis closterium, Ehr. very active.	Grammatophora marina, Ehr.
Coscinodiscus lineatus, Ehr.	Navicula baltica, Ehr.
“ radiatus, Ehr.	“ sigma, Ehr.
“ subtilis, Ehr.	

The following Algæ were also noticed at the same locality, viz :

Bostrichia scorpioides ? Mont.	Gracilaria multipartita, Clem.
Callithamnion, undetermined.	Rhabdonia Baileyi, Harv.
Ectocarpus siliculosus, Lyngb.	Spyridia filamentosa, Wulf.
Gelidium cornicum, Lamour.	

† Specimens which I received from London, agreeing well with our own, were marked *N. elongata*, but by whom they were so named I do not know. I had been in the habit of calling it *N. diagonalis*, but had not published any notice of it. Its delicate diagonal, transverse, and longitudinal rows of dots make it an interesting microscopic object.

In a grayish slime covering the creek west of St. Augustine I found

Amphiprora alata, Ehr. See figs. 8, 9, 10, Pl. 2.  
Amphora libyca, Ehr.

Pinnularia interrupta, Ehr.  
Rhaphoneis rhombus, Ehr.

In a fresh-water pond, on St. Anastasia Island, near St. Augustine, I found on the 26th March, 1850, the following, viz :

## ALGÆ.

\*Aporea ambigua, B.  
Chætophora pisiformis, Ag.  
Coleochæte scutata, Bréb.

In fruit, abundant on petioles of Sagittaria.

Arcella vulgaris, Ehr.  
\*Pterodina magna, B.  
Rotifer vulgaris, Schr.  
Stentor polymorphus, Ehr.

## DIATOMACEÆ.

Himantidium arcus, Ehr.  
Cocconeis pediculus, Ehr.  
Pinnularia viridis, Ehr.

ST. ANASTASIA ISLAND.—*continued.*

On the "Coquina" Rocks, near the light-house, on Anastasia Island, I found the following forms, viz :

## ALGÆ.

Ceramium rubrum, Ag.  
Gelidium corneum, Huds.  
Laurencia dasyphylla, Woodw.  
Rhabdonia Baileyi, Harv.

Acineteta Lyngbyi ? Ehr. See fig. 16, Pl. 3.

## DIATOMACEÆ.

Achnanthes minutissima, Kg.  
Rhipidophora crystallina, Kg.  
Schizonema quadripunctata, Ag.

On the sands of the above locality I noticed yellowish spots, which owed their color to great numbers of Amphiprora quadrifasciata, B., and a species of Amphora, apparently new, which moved very rapidly. I have named it Amphora amphioxys, B. See page 38.

ST. AUGUSTINE.—*continued.*

In fresh-water ditches in the pine barrens near St. Augustine, I observed these forms, viz :

Closterium acerorum, Schr.  
" Dianæ, Ehr.  
" turgidum, Ehr.  
Euastrum oblongum, Ralfs.  
Staurastrum dilatatum, Ehr.  
Eunotia diodon, Ehr.

Brachionus urceolaris. See fig. 17.

Bulbochæte setigera, Ag.  
Mougeotia genuflexa, Ag.  
Tyndaridea cruciata, Harv., in fruit.

## VOLUSIA, ON THE ST. JOHN'S RIVER, FA.

On the roots of the "Water Lettuce," *Pistia stratiotes*, L.,† I collected at Volusia, on the 9th of April, 1850, the following species, viz :

DIATOMACEÆ.		
<i>Achnanthes</i> , undetermined. See fig. 11, Pl. 2.	<i>Navicula elongata</i> , Harrison ?	
<i>Amphora libyca</i> , Ehr. Fig. 12, Pl. 12.	<i>Odontella polymorpha</i> , Kg.	
<i>Bacillaria paradoxa</i> , Ehr. Abundant, and very active.	<i>Synedra vitrea</i> , Kg.	
<i>Cocconeis pediculus</i> , Ehr.	<i>Terpsinoë musica</i> , Ehr. Living, and forming zigzag chains.	
<i>Cocconema cymbiforme</i> , Ehr.	—	
<i>Eunotia gibba</i> , Ehr.	INFUSORIA.	
“ <i>nodosa</i> , Ehr.	<i>Amœba princeps</i> , Ehr.	
“ <i>librile</i> , Ehr.	<i>Arcella vulgaris</i> , Ehr.	
<i>Gallionella aurichalcea</i> , Ehr.	<i>Rotifer vulgaris</i> , Schr.	
“ <i>varians</i> , Ehr.	—	
<i>Himantidium arens</i> , Ehr.	DESMIDIEÆ.	
	<i>Staurastrum enorme</i> , Ralfs.	

## ENTERPRISE, FA.

*Latitude between 28° and 29° N.*

*April 10th to 23d, 1850.*—On Lake Monroe, 200 miles from the mouth of the St. John's River. This was the most southern point which I visited, and there is no place which I have ever seen which afforded so many delights to the microscopist. The sub-tropical climate produces in the numerous lakes and creeks countless myriads of the most interesting Infusoria and Desmidiæ, which may be collected within a few hundred yards of the boarding-house. The numerous sulphur springs, surrounded by beautiful palmetto groves; the parasitic *Tillandsias* of several species; the epidendri and parasitic ferns; the lake with its hundreds of alligators, and its strange mixture of marine and fresh-water forms; and lastly, the wonderful shell banks on which Enterprise is built, are all calculated to interest even the most indifferent. I would be glad if every invalid who visits this place could pass as many pleasant hours there as it was my privilege to enjoy.

In Lake Monroe I collected, from among the roots of *Pistia stratiotes*, the following species, viz :

DESMIDIEÆ.	DIATOMACEÆ.
<i>Closterium Jenneri</i> , Ralfs.	<i>Amphiprora constricta</i> , Ehr. Pl. 2, figs. 5, 6, 7.
<i>Euastrum ampullaceum</i> , Ralfs.	* “ <i>pulchra</i> , B. Pl. 2, figs. 16 and 18.
<i>Pediastrum boryanum</i> , Menegh.	<i>Bacillaria paradoxa</i> , Ehr.
—	<i>Campylodiscus clypeus</i> , Ehr.
ALGÆ.	* “ <i>argus</i> , B. Pl. 2, figs. 24, 25.
<i>Coleochaete scutata</i> , Bréb.	<i>Cocconeis pediculus</i> , Ehr.
<i>Spyrogyra quinina</i> , Kg.	<i>Cocconema cymbiforme</i> , Ehr.

† This gigantic representation of the Lemna of the northern waters grows in vast profusion in the Withlacoochee and St. John's Rivers. Like the Lemna, it contains spiral vessels in its roots, and abounds with Biforines, which actively discharge their raphides in water. See Pl. 3, fig. 1.



ENTERPRISE, FA.—*continued.*

## DIATOMACEÆ.

Eunotia librile, Ehr.  
 Gallionella aurichalcea, Ehr.  
 Himantidium arcus, Ehr.  
 Navicula elongata, Har.?  
 Odontella polymorpha, Kg.  
 Stauroneis maculata, B.  
 Surirella ovalis, Bréb.  
 Synedra vitrea, Kg.  
 “ scalaris, Ehr.  
 Terpsinoë musica, Ehr.

## INFUSORIA.

Amœba princeps, Ehr.

## INFUSORIA.

Arcella vulgaris, Ehr.  
 Brachionus polyacanthus, Ehr.  
 Coleps hirtus, Ehr.  
 Cothurnia imberbis, Ehr.  
 Dinocharis tetractis, Ehr.  
 Floscularia ornata, Ehr.  
 Opercularia articulata, Goldf.  
 Cœcistes crystallinus, Goldf.  
 Philodina erythrothalma, Goldf.  
 Rotifer vulgaris, Schr.  
 Scaridium longicaudum, Ehr.  
 Vorticella nebulifera, Bory.

Spongilla fluviatilis, is also abundant in Lake Monroe.

The species of Amphiprora, Bacillaria, Odontella, and Navicula, mentioned in this list, are decidedly marine forms, and have been found by me on the shores of the Atlantic. They also occur in estuaries; but I confess I was surprised to find them so far up the St. John's, and in company with such truly lacustrine forms as many of those above mentioned. To add to the curious mixture of marine and fresh-water species in Lake Monroe, I will mention that the lake abounds with Paludina vivipara, Say, Ampullaria depressa, Say, with Unios, and several other fresh-water molluscs, and yet contains abundance of a living marine zoophyte (Campanularia,) and a large fish of the Ray family, called by the settlers a “Stingaree.” A curious living crustacean, a species (probably new) of Sphæroma, also abounds here, and is very destructive to cypress logs, canoes, &c. Many of the silicious forms above mentioned were found in the mud of the creeks leading from the immense sulphur springs near Lake Monroe, and neither the Diatomaceæ, nor the numerous fish which inhabit these waters, appear to dislike the sulphur waters. I daily saw hundreds of large gar-fish which assembled directly over “the boil” of one of these springs, as if it was their favorite resort; and I also noticed that the large Amphiprora pulchra, B., and the Navicula elongata, grew in great profusion in waters charged with sulphuretted hydrogen, as in the outlet of the Green Spring at Mr. Duval's.

## SHELL BANKS OF ENTERPRISE, ETC.

The vast deposits of fluviatile shells which exist at Picolata, Volusia, and Enterprise, are of great geological interest. Enterprise and Volusia present bluffs and hills of forty and fifty feet in height, and extending half a mile or more

from the river, which are literally composed of almost nothing else but well preserved shells of the *Paludina vivipara*, Say, *Ampullaria depressa*, Say, some undetermined species of *Unio*, *Helix septemvolvris*, *Melania*, and a few others. There is scarcely any mixture of earth, but the shells are clean, and look as if they had been washed ashore after the death of the animals. In some places the beds are sandy, and are hardening into a calcareous sandstone. In one such bed, the superficial stratum furnished a few bones of turtles and undetermined fragments, the bones of some large vertebrate animal. This is, I believe, the same locality where Count Pourtalés collected human bones in a recent sandstone. That the sandstone is *recent* I have no doubt, but the shells from which these banks are formed, though belonging to species now inhabiting the lake and river, were probably accumulated thousands of years ago, under very different circumstances as to elevation, topography, &c., from those now existing. They certainly form the most remarkable fresh-water deposits in the United States. No microscopical forms were detected in these beds, after the most careful search.

PONDS NEAR ENTERPRISE, FA.

*April 12th to 18th, 1850.*—In fresh-water ponds, near Mr. Duval's boarding house at Enterprise, I found a most abundant supply of interesting microscopical forms, among which the following were identified:

DESMIDIEÆ.

- |  |   |
|--|---|
| Ankistrodesmus falcatus, Corda.                  | * <i>Micrasterias expansa</i> , B. Pl. 1, fig. 7.       |
| Aptogonum Baileyi, Ralfs.                        | “ <i>fimbriata</i> , Ralfs.                             |
| “ <i>desmidium</i> , Ehr.                        | “ <i>pinnatifida</i> , Kg.                              |
| * <i>Cosmarium depressum</i> , B. Pl. 1, fig. 1. | * “ <i>quadrata</i> , B. Pl. 1, fig. 5.                 |
| “ <i>pyramidatum</i> , Bréb.                     | “ <i>rotata</i> , Ralfs.                                |
| <i>Closterium lunula</i> , Ehr.                  | “ <i>truncata</i> , Bréb. Pl. 1, fig. 20.               |
| “ <i>setaceum</i> , Ehr.                         | <i>Penium Jenneri</i> , Ralfs.                          |
| <i>Didymocladon furcigerus</i> , Ralfs.          | “ <i>margaritaceum</i> , Bréb.                          |
| * “ <i>cerberus</i> , B. Pl. 1, figs. 15, 16.    | <i>Sphærozozma excavatum</i> , Ralfs.                   |
| * “ <i>longispinum</i> , B. Pl. 1, fig. 17.      | “ <i>serratum</i> , B.                                  |
| <i>Didymoprium Grevillii</i> , Ralfs.            | “ <i>pulchrum</i> , B.                                  |
| “ <i>Borreri</i> , Ralfs.                        | <i>Spirotænia condensata</i> , Bréb.                    |
| * <i>Docidium hirsutum</i> , B. Pl. 1, fig. 8.   | <i>Staurastrum aristiferum</i> , Ralfs.                 |
| “ <i>minutum</i> , Ralfs. Pl. 1, fig. 3.         | “ <i>gracile</i> , Ralfs.                               |
| “ <i>undulatum</i> , B. Pl. 1, fig. 2.           | “ <i>margaritaceum</i> , Ehr.                           |
| <i>Euastrum ampullaceum</i> , Ralfs.             | “ <i>tricornis</i> , Bréb.                              |
| “ <i>elegans</i> , Bréb.                         | <i>Triploceras verticillatum</i> , Bréb. Pl. 1, fig. 9. |
| “ <i>insigne</i> , Hass.                         | “ <i>gracile</i> , B. Pl. 1, fig. 10.                   |
| “ <i>rostratum</i> , Ralfs.                      | <i>Tetmemorus Brebissonii</i> , Ralfs.                  |
| “ <i>sublobatum</i> , Bréb.                      | <i>Xanthidium armatum</i> , Bréb.                       |
| “ <i>verrucosum</i> , Ehr.                       | “ <i>fasciculatum</i> , Ehr.                            |
| <i>Hyalotheca dissiliens</i> , Bréb.             | “ <i>octocorne</i> , Ralfs.                             |
| <i>Micrasterias Baileyi</i> , Ralfs.             | —   |
| * “ <i>arcuata</i> , B. Pl. 1, fig. 6.           | * <i>Aporea ambigua</i> , B. Pl. 3, fig. 3.             |
| “ <i>denticulata</i> , Bréb.                     |   |

PONDS AT ENTERPRISE.—*continued.*

## INFUSORIA.

Arcella aculeata, Ehr.	Philodina vestita, B. Pl. 3, figs. 9 and 14.
Conochilus volvox, Ehr. Pl. 3, fig. 2.	Rotifer macrourus, Ehr.
Dinobryon sertularia, Ehr.	“ pamosus, B. Pl. 3, figs. 6, 7.
Gonium glaucum, Ehr.	“ vulgaris, Schr.
Hydatina senta, Ehr.	Spirostomum ambiguum, Ehr.
Lacinularia socialis, Ehr.	Stephanoceros Eichhornii, Ehr.
*Melicerta nuda, B. Pl. 3, figs. 8, 10.	—
“ ringens, Schrank.	*Diatoma stellaris, B.
*Peridinium carolinianum, B. Pl. 3, figs. 4, 5.	Tabellaria fenestratum, Ehr.
Philodina aculeata, Ehr.	

## SULPHUR SPRINGS NEAR ENTERPRISE, ETC., FLA.

The enormous sulphur springs of Florida are among the most remarkable of the features of this interesting region. They are often from fifty to one hundred feet in diameter, and as many in depth, and pour out bold streams of sulphuretted water of such magnitude that large boats may proceed up them directly into the basins of the springs. The sulphur springs at Orange Spring, (Pearson's), the Blue Spring on the St. John's, and the Green Spring at Enterprise, are the most remarkable which I saw. In all of these I noticed immense quantities of an Oscillatoria which, I believe, is the *O. terebriformis* of Agardh, with the description of which in Kützing's *Species Algarum*, p. 239, it agrees perfectly. Its very active vermiform and spiral motions I observed very frequently while at Enterprise. It is accompanied at the springs by a white plant, generally more or less coated with sulphur, which appears to be the *Beggiatora raineriana* of Meneghini. (See Kützing, l. c. p. 237.) In my notes I have recorded the following forms as found in Demaster's Sulphur Spring, "close to the Boil."

Closterium acerosum, Schr.	Navicula elongata, (?)
—	Pinnularia viridis, Ehr.
*Amphiprora pulchra, B.	Beggiatora raineriana, Menegh.
Eunotia gibba, Ehr.	Oscillatoria terebriformis, Ag.
Navicula cuspidata, Kg.	

## ADDITIONAL OBSERVATIONS IN GEORGIA.

On my return from Florida, I visited the interior of Georgia, hoping to have an opportunity of comparing the inland microscopical forms with those of the coast which I had previously studied. I was disappointed, however, by the almost constant rains, which in the hilly or mountainous regions produced freshets which swept away everything living in the streams, or buried them in mud. I have, therefore, only to record the species noticed at two localities.

## MACON, GA.

May 6th, 1850.—In a mill-pond on the road to Brown's Mount, near Macon, Ga., I found the following species, viz :

## DESMIDIEÆ.

- Arthrodesmus convergens, Ehr.  
 Closterium moniliferum, Ehr.  
 Cosmarium margaritiferrum, Menegh.  
 " ovale, Ralfs.  
 " pyramidatum, Bréb.  
 Desmidium quadrangulatum, Ralfs.  
 Didymocladon furcigerus, Ehr.  
 Euastrum elegans, Bréb.  
 " rostratum, Ralfs.  
 " sublobatum, Bréb.  
 " verrucosum, Ehr.  
 Micrasterias denticulata, Bréb.  
 " furcata, Ag.  
 " truncata, Bréb.  
 Pediastrum boryanum, Menegh.  
 " heptactis, Menegh.  
 " ellipticum, Hassall.

## DESMIDIEÆ.

- Pediastrum tetras, Ralfs.  
 Penium digitus, Bréb.  
 \*Sphærozozma serratum, B.  
 Staurastrum cyrtocentrum, Bréb.  
 " gracile, Ralfs.

## INFUSORIA, ETC.

- Arcella dentata, Ehr.  
 Dinobryon sertularia, Ehr.  
 Euglena pleuronectes, Ehr.  
 Pterodina patina, Ehr.  
 Rotifer vulgaris, Schr.

## ALGÆ.

- \*Aporea ambigua, B.  
 Bulbochaete setigera, Ag.

## ATHENS, GA.

The following species were collected on the 20th of May, near Athens, Ga. viz :

## DESMIDIEÆ.

- Closterium lunula, Ehr.  
 " moniliforme, Ehr.  
 " turgidum, Ehr.  
 Desmidium Swartzii, Ag.  
 Didymocladon furcigerus, Ralfs.  
 Docidium clavatum, Kütz.  
 Euastrum oblongum, Ralfs.  
 " verrucosum, Ehr.  
 Micrasterias papillifera, Bréb.  
 " pinnatifida, Ehr.  
 Penium digitus, Ehr.  
 Staurastrum orbiculare, Ehr.

## DESMIDIEÆ.

- Staurastrum muticum, Bréb.  
 Spirotenia condensata, Bréb.

## INFUSORIA, ETC.

- Amœba princeps.  
 Arcella angulata.  
 Cœconema cymbiforme.  
 Diffugia proteiformis.  
 \* " spiralis, B.  
 Pinnularia viridis, Ehr.

## NORTHERN LOCALITY, NEAR PROVIDENCE, R. I.

For the sake of comparison with the above lists of Southern forms, I give here the names of the species noticed by me in Wainskut Pond, near Providence, R. I., on the 12th of July, 1850.

DESMIDIEÆ.	DESMIDIEÆ.
Ankistrodesmus falcatus, Corda.	Scenedesmus obliquus, Kg.
Arthrodesmus convergens, Ehr.	“ obtusus, Meyen.
Cosmarium ovale, Ralfs.	“ quadricauda, Bréb.
“ undulatum, Corda.	Sphærozosma excavatum, Ralfs.
Closterium Dianae, Ehr.	Staurastrum alternans, Bréb.
“ angustatum, Kg.	“ gracile, Ralfs.
“ lineatum, Ehr.	“ hirsutum, Ehr.
“ Jenneri, Ralfs.	Spirotænia condensata, Bréb.
“ moniliferum, Ehr.	Tetmemorus Brebissonii, Ralfs.
Docidium nodulosum, Bréb.	Xanthidium fasciculatum, Ehr.
Desmidiium Swartzii, Ag.	—
“ quadrangulatum, Ralfs.	DIATOMACEÆ.
Didymoprium Borreri, Ralfs.	*Diatoma stellaris, B.
Euastrum ansatum, Ehr.	Eunotia serra, Ehr.
“ circulare, Hass.	Himantidium arcus, Ehr.
“ didelta, Ralfs.	Gomphonema acuminata, Ehr.
“ elegans, Bréb.	Tabellaria flocculosa, Ehr.
“ gemmatum, Kg.	“ fenestrata, Ehr.
“ oblongum, Ralfs.	—
“ rostratum, Ralfs.	INFUSORIA.
“ verrucosum, Ehr.	Arcella vulgaris, Ehr.
Hyalotheca dissiliens, Bréb.	Brachionus Bakeri, Ehr.
Micrasterias pinnatifida, Kg.	Coleps hirtus, Ehr.
“ truncata, Bréb.	Diffugia proteiformis, Ehr.
“ denticulata, Bréb.	“ spiralis, B.
“ rotata, Ralfs.	Dinobryon sertularia, Ehr.
Penium digitus, Bréb.	Euglena viridis, Ehr.
“ margaritaceum, Bréb.	“ pleuronectes, Ehr.
Pediastrum pertusum, Kg.	Floesularia ornata, Ehr.
“ boryanum, Menegh.	Melicerta ringens, Schr.
“ ellipticum, Hass.	Peridinium cinctum, Ehr.
“ heptactis, Menegh.	Rotifer macrourus, Ehr.
“ tetras, Ralfs.	“ vulgaris, Ehr.
“ selenæa, Kg.	Stentor polymorphus, Ehr.

See also in the Appendix a list of forms found near Salem, Mass., by Thomas Cole, Esq.

By consulting the above lists, the species found at each locality will be seen. The following tables will show the same in a more condensed form, and will also exhibit the geographical distribution of species.

TABLE A.

SHOWING THE GEOGRAPHICAL DISTRIBUTION OF THE SPECIES OF DESMIDIEÆ INCLUDED IN THE PRECEDING LISTS. THEIR OCCURRENCE AT ANY LOCALITY IS INDICATED BY +.

NAMES OF SPECIES.	LOCALITIES.								
	Vicinity of Charleston, S. C.	Vicinity of Grahamville, S. C.	Vicinity of Savannah, Ga.	Bryan Co., Ga.	Glynn Co., Ga.	Macon and Allens, Ga.	Phloka and Road to Tampa, Florida.	Vicinity of Enterprise, Florida.	Vicinity of Providence, R. I.
Ankistrodesmus falcatus, Corda.....	+	+	+	+	+	+	+	+	+
Aptogonum Baileyi, Ralfs.....		+	+						
“ desmidium, Ehr.....		+	+						
Arthrodesmus convergens, Ehr.....	+	+				+	+		+
“ incus, Bréb.....	+			+			+		
Closterium acerosum, Schr.....	+	+		+			+		
“ amblyonema, Ehr.....									+
“ angustatum, Kg.....									+
“ Dianae, Ehr.....					+		+		+
“ Ehrenbergii, Menegh.....				+			+		
“ Jenneri, Ralfs.....									+
“ lanceolatum, Kg.....					+				
“ Leiblenii, Kg.....				+					+
“ lunula, Ehr.....		+			+			+	
“ moniliferum, Ehr.....					+				+
“ setaceum, Ehr.....		+	+	+				+	+
“ turgidum, Ehr.....							+	+	+
Cosmarium amœnum, Bréb.....								+	
“ Broomeii, Thwaites.....			+						
“ connatum, Bréb.....							+		
“ cucumis, Corda.....		+	+					+	
* “ depressa, B. Pl. 1, fig. 1.....							+	+	
“ margaritiferum, Menegh.....	+						+		
“ ornatum, Ralfs.....							+		
“ ovale, Ralfs.....		+							+
“ pyramidatum, Bréb.....			+				+	+	
“ Thwaitesii, Ralfs.....							+		
“ undulatum, Corda.....	+								+
Desmidium Swartzii, Ag.....		+	+		+	+			+
“ quadrangulatum, Ralfs.....								+	+
Didymocladon furcigerus, Ralfs.....		+					+	+	+
* “ cerberus, B. Pl. 1, figs. 15, 16.....								+	+
* “ longispinus, B. Pl. 1, fig. 17.....								+	
Didymoprium Borrieri, Ralfs.....		+		+			+		+
“ Grevillii, Ralfs.....		+	+						
Docidium baculum, Bréb.....			+						
“ clavatum, Kg.....		+			+	+			
“ constrictum, B.....			+						
“ Ehrenbergii, Ralfs.....		+		+			+		
* “ hirsutum, B. Pl. 1, fig. 8.....							+		
“ miutum, Ralfs. Pl. 1, fig. 3.....		+					+		
“ nodosum, B. Pl. 1, fig. 4.....			+						+
“ nodulosum, Bréb.....	+	+		+			+		+
* “ undulatum, B. Pl. 1, fig. 2.....								+	
“ verrucosum, B.....			+	+					+
Euastrum affine, Ralfs.....		+		+					
“ ampullaceum, Ralfs.....	+						+	+	
“ ansatum, Ehr.....		+							+
“ binale, Ehr.....							+		

TABLE A.—Continued.

NAMES OF SPECIES.	LOCALITIES.								
	Vicinity of Charleston, S. C.	Vicinity of Grahamville, S. C.	Vicinity of Savannah, Ga.	Bryan Co., Ga.	Glynn Co., Ga.	Macon and Athens, Ga.	Plakita road, Road to Tampa, Fla.	Vicinity of Enterprise, Fla.	Vicinity of Providence, R. I.
<i>Euastrum</i> <i>circularc</i> , Hass.									+
“ <i>crassum</i> , Bréb.			+					+	+
“ <i>didelta</i> , Ralfs.		+	+					+	+
“ <i>elegans</i> , Bréb.	+		+			+	+	+	+
“ <i>gemmatum</i> , Kg.									+
“ <i>insigne</i> , Hass.								+	+
“ <i>muricatum</i> , B.			+						+
“ <i>oblongum</i> , Ralfs.									+
“ <i>rostratum</i> , Ralfs.			+	+		+		+	+
“ <i>sublobatum</i> , Bréb.					+	+	+	+	+
“ <i>verrucosum</i> , Ehr.		+				+		+	+
<i>Hyalotheca</i> <i>dissiliens</i> , Bréb.		+					+	+	+
* <i>Micrasterias</i> <i>arcuata</i> , B. Pl. 1, fig. 6.							+	+	+
“ <i>americana</i> , Ralfs.		+	+	+			+	+	+
“ <i>Baileyi</i> , Ralfs.		+					+	+	+
“ <i>crenata</i> , Bréb.		+		+	+		+	+	+
“ <i>denticulata</i> , Bréb.		+		+		+	+	+	+
* “ <i>expansa</i> , B. Pl. 1, fig. 7.							+	+	+
“ <i>fimbriata</i> , Ralfs.		+					+	+	+
“ <i>fureata</i> , Ag.		+				+	+	+	+
“ <i>incisa</i> , Kg. Pl. 1, fig. 13.		+		+			+	+	+
“ <i>oscitans</i> , Ralfs. Pl. 1, fig. 19.							+	+	+
“ <i>papillifera</i> , Bréb.								+	+
“ <i>pinnatifida</i> , Kg. Pl. 1, fig. 12.		+				+	+	+	+
* “ <i>quadrata</i> , B. Pl. 1, fig. 5.							+	+	+
“ <i>radiosa</i> , Ag.							+	+	+
* “ <i>ringens</i> , B. Pl. 1, fig. 11.							+	+	+
“ <i>rotata</i> , Ralfs.		+	+	+			+	+	+
“ <i>truncata</i> , Bréb. Pl. 1, fig. 20.						+	+	+	+
<i>Pediastrum</i> <i>boryanum</i> , Menegh.						+	+	+	+
“ <i>ellipticum</i> , Hass.		+				+	+	+	+
“ <i>heptactis</i> , Menegh.		+		+		+	+	+	+
“ <i>napoleonis</i> , Menegh.		+							+
“ <i>pertusum</i> , Kg.									+
“ <i>sclecnæa</i> , Kg.									+
“ <i>tetras</i> , Ralfs.						+			+
<i>Penium</i> <i>Brebbisonii</i> , Ralfs.		+						+	+
“ <i>closteroides</i> , Ralfs.		+							+
“ <i>digitus</i> , Ralfs.		+	+			+	+	+	+
“ <i>interruptum</i> , Ralfs.		+							+
“ <i>Jenneri</i> , Ralfs.								+	+
“ <i>margaritacum</i> , Bréb.								+	+
<i>Scenedesmus</i> <i>acutus</i> , Meyen.									+
“ <i>obliquus</i> , Kg.		+	+		+	+			+
“ <i>obtusus</i> , Meyen.					+				+
“ <i>quadricauda</i> , Bréb.									+
<i>Sphærozozma</i> <i>excavatum</i> , Ralfs.		+		+			+	+	+
“ <i>pulchrum</i> , B.							+	+	+
* “ <i>scrratum</i> , B. Pl. 1, fig. 14.		+	+	+	+		+	+	+
<i>Spirotaenia</i> <i>condensata</i> , Bréb.		+					+	+	+
<i>Staurastrum</i> <i>alternans</i> , Bréb.						+			+
“ <i>aristiferum</i> , Ralfs.								+	+
“ <i>cyrtoceram</i> , Bréb.						+			+

TABLE A.—Continued.

NAMES OF SPECIES.	LOCALITIES.								
	Vicinity of Charleston, S. C.	Vicinity of Grahamville, S. C.	Vicinity of Savannah, Ga.	Bryan Co., Ga.	Glynn Co., Ga.	Macon and Albany, Ga.	Flintka and Road to Tampa, Fla.	Vicinity of Enterprise, Fla.	Vicinity of Providence, R. I.
<i>Staurastrum dejectum</i> , Bréb.....					+		+		
“ <i>enorme</i> , Ralfs. Pl. 1, fig. 18.....							+	+	
“ <i>gracile</i> , Ralfs.....	+			+			+	+	+
“ <i>hirsutum</i> , Ehr.....							+	+	+
“ <i>margaritaceum</i> , Ehr.....		+				+		+	+
“ <i>muticum</i> , Bréb.....		+							+
“ <i>orbiculare</i> , Ehr.....									+
“ <i>polymorphum</i> , Bréb.....							+		
“ <i>tricome</i> , Bréb.....							+	+	
<i>Tetmemorus Brobissonii</i> , Ralfs.....		+					+	+	+
“ <i>granulatus</i> , Ralfs.....		+							
* <i>Triploceras verticillatum</i> , B. Pl. 1, fig. 9.....			+					+	+
* “ <i>gracile</i> , B. Pl. 1, fig. 10.....			+					+	+
<i>Xanthidium aculeatum</i> , Ehr.....				+					
“ <i>armatum</i> , Bréb.....		+					+		
“ <i>eristatum</i> , Bréb.....	+	+	+				+		
“ <i>fasciculatum</i> , Ehr.....		+				+	+	+	+
“ <i>octocorne</i> , Ralfs.....							+		+

Full descriptions and accurate figures of all these except the new ones marked with \*, may be found in Ralfs' beautiful volume, the “British Desmidiæ.”





TABLE B.—Continued.

NAMES OF SPECIES.	LOCALITIES.																								
	Vicinity of Charleston, S. C.		Vicinity of Grahamville, S. C.		Vicinity of Savannah, Ga.		Bryan Co., Ga.		Glynn Co., Ga.		Macon and Athens, Ga.		Pikaska and Road to Tampa, Fla.		Vicinity of Tampa, Fla.		Vicinity of St. Augustine, Fla.		Volusia, Fla.		Vicinity of Enterprise, Fla.		Hudson River, West Point.		
	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	
<i>Navicula cuspidata?</i> Pl. 2, figs. 29 and 37, . . . . .																									
“ <i>elongata</i> , (of the English), . . . . .														+											
“ <i>hippocampus</i> , Ehr. . . . .																									
“ <i>signa</i> , Ehr. . . . .																									
<i>Odontella polymorpha</i> , Kg. . . . .																									
<i>Pinnularia amphigompha</i> , Ehr. . . . .																									
* “ <i>amphioxys</i> , Ehr. . . . .																									
“ <i>Couperi</i> , B. Pl. 2, fig. 33, . . . . .																									
“ <i>didyma</i> , Ehr. . . . .																									
“ <i>elliptica</i> , Kg. . . . .																									
“ <i>iridis</i> , Ehr. . . . .																									
“ <i>interrupta</i> , Kg. . . . .																									
“ <i>lyra</i> , Ehr. . . . .																									
* “ <i>peruagna</i> , B. Pl. 2, figs. 28 and 38, . . . . .																									
“ <i>placentula</i> , Ehr. . . . .																									
“ <i>viridis</i> , Ehr. . . . .																									
* <i>Pyxidicula?</i> <i>compressa</i> , B. . . . .																									
<i>Rhabdonema adriaticum</i> , Kg. . . . .																									
<i>Rhabdonema rhombus</i> , Ehr. . . . .																									
<i>Rhipidophora crystallina</i> , Kg. . . . .																									
<i>Schizonema quadripunctata</i> , Ag. . . . .																									
* <i>Stauroneis maculata</i> , B. Pl. 2, fig. 32, . . . . .																									
<i>Stauroptera aspera</i> , Ehr. . . . .																									
* <i>Surirella circumscuta</i> , B. Pl. 2, fig. 36, . . . . .																									
“ <i>ovalis</i> , Ehr. . . . .																									
“ <i>splendida</i> , Ehr. . . . .																									
<i>Synedra scalaris</i> , Ehr. . . . .																									
“ <i>spectabilis</i> , Ehr. . . . .																									
“ <i>valens</i> , Ehr. . . . .																									
“ <i>vitrea</i> , Kg. . . . .																									
<i>Tabellaria flocculosa</i> , Ehr. . . . .																									
“ <i>fenestratum</i> , Ehr. . . . .																									
<i>Terpsinoë musica</i> , Ehr. . . . .																									
<i>Triceratium favus</i> , Ehr. . . . .																									
“ <i>alternans</i> , B. . . . .																									
“ <i>obtusum</i> , Ehr. . . . .																									
“ <i>reticulum</i> , Ehr. . . . .																									
* <i>Zygoceros</i> ( <i>Denticella?</i> ) <i>Mobilensis</i> , B. Pl. 2, figs. 34 and 35, . . . . .																									
<i>Zygoceros rhombus</i> , Ehr. . . . .																									

Such of the above species as are not indicated as new, will be found described in Ehrenberg's "Verbreitung und Einfluss des mik. Lebens in S. und N. America," and in Kützing's "Bacillarien, oder Diatomeen." For a description of the new species, see page 38.



TABLE C.--Continued.

NAMES OF SPECIES.	LOCALITIES.											
	Vicinity of Charleston, S. C.	Vicinity of Grahamville, S. C.	Vicinity of Savannah, Ga.	Bryan Co., Ga.	Glynn Co., Ga.	Macon and Athens, Ga.	Pilatka and Road to Tauppi, Fla.	Vicinity of Tampa Fla.	Vicinity of St. Augustine, Fla.	Volusia, Fla.	Vicinity of Enterprise, Fla.	Vicinity of Providence, R. I.
Rotifer vulgaris,.....	+	+	+	+	+	+	+	.....	.....	+	+	+
* " pannosus, B. Pl. 3, figs. 6, 7,.....	.....	.....	.....	+	.....	.....	.....	.....	.....	.....	.....	.....
Salpina mucronata,.....	.....	.....	.....	.....	.....	.....	+	.....	.....	.....	.....	.....
Scardium longicaudum,.....	.....	+	.....	.....	.....	.....	.....	.....	.....	.....	+	.....
Spirostomum ambiguum,.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	+	+
Squamella oblonga,.....	+	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stentor polymorphus,.....	.....	+	+	+	.....	.....	+	.....	.....	.....	+	+
Stephanoceros Eichhornii. Pl. 3, fig. 13,.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	+	+
Stylonychia mytilus,.....	.....	.....	.....	.....	.....	.....	+	.....	.....	.....	.....	.....
Synura uvella,.....	.....	+	+	.....	+	.....	.....	.....	.....	.....	.....	+
Vaginicola crystallina,.....	.....	.....	.....	+	.....	.....	+	.....	.....	.....	.....	.....
Vorticella chlorostigma,.....	.....	+	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" nebulifera,.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	+	.....

Descriptions of most of the above species, with figures and copious lists of synonyms, may be found in Ehrenberg's splendid volumes, "Die Infusionsthierchen," and accounts abridged from the same work are given in Pritchard's "Infusoria, Living and Fossil." The latter work was the one I had with me in my Southern tour.

NOTE. In the preceding tables I have separated the Desmidiæ and Diatomacæ from the Infusoria, and I have done so because many distinguished observers now consider these groups as decidedly belonging to the vegetable kingdom. While I believe that no accurate line of separation can be drawn between vegetables and animals, I am yet disposed to consider the Desmidiæ, from the sum of all their characters, as most nearly allied to admitted vegetables, while the Diatomacæ, notwithstanding Thwaites' interesting observations on their conjugation, still seem to me, as they have always done, to be true animals. There is such apparent volition in their movements, such an abundance of nitrogen in the composition of their soft parts, and such resemblances between the stipitate Gomphonemata, and some of the Vorticellæ, that I should still be disposed to class them as animals, even if Ehrenberg's observations of the retractile threads and snail-like feet of some of the Naviculæ should not be confirmed.

## TABLE D.

LIST OF ALGÆ REFERRED TO IN THE PRECEDING PAGES, WITH LOCALITIES.

- Aporea ambigua*, B. Occurs everywhere in the lakes and ditches of the Southern States.  
*Bangia fusco-purpurea*, Dillw. Tampa, Fa.  
*Batrachospermum moniliforme*, Roth. Big Hillsborough River, Fa.  
*Botrydium argillaceum*, Wall. Near Savannah, Ga.  
*Bulbochæte setigera*, Ag. Common throughout the United States.  
*Ceramium clavulatum*, Ag. Tampa.  
*Chætophora pisiformis*, Ag. Common.  
*Colcochete scutata*, Bréb. In lakes, &c., from Massachusetts to Florida. Very abundant in a pond on Anastasia Island, near St. Augustine.  
*Delesseria hypoglossum*. Near Wilmington, N. C., Charleston, S. C., and St. Augustine, Fa.  
   " *Leprieurii*, Mont. An estuary species found first in Cayenne, South America, afterwards in the Hudson River, at West Point, N. Y., and on this tour in the Ashley, Savannah, Ogeechee, Altamaha, St. Sebastian, and Hillsborough rivers, usually accompanied by a large species of *Bostrichia*.  
*Ectocarpus littoralis*, L. Common.  
*Gelidium corneum*, Huds. St. Augustine.  
*Gracilaria multipartita*, Clem. St. Augustine and Tampa.  
*Laurencia dasyphylla*, Woodw. St. Augustine.  
*Mougeotia genuflexa*, Ag. Hopeton, Ga., Warm Springs and St. Augustine, Fa.  
*Oscillatoria terebriformis*, Ag. Abounds in the sulphur springs of Florida, and in the streams issuing from them. The motion of the filaments is very active.  
*Polysiphonia Olneyi*? Harv. Tampa.  
*Porphyra vulgaris*, Ag. Charleston, S. C., St. Augustine, Fa.  
*Rhabdonia Baileyi*, Harv. Very large specimens are common at St. Augustine.  
*Sargassum vulgare*, Ag. Tampa.  
*Spirogyra*, (*Zygnema*, Ag.) *quinina*, Kg. } Common everywhere.  
   " *decimina*, Kg. }  
*Spiridia filamentosa*, Wulf.  
*Tetraspora lubrica*, Ag. Grahamville, S. C.  
*Vaucheria cespitosa*, D. C. Common.  
   " *racemosa*. Near Savannah, Ga.  
*Ulva latissima*, L.

## DESCRIPTION

OF THE NEW SPECIES, REFERRED TO IN THE PRECEDING LISTS.

## DESMIDIEÆ.

1. *COSMARIUM DEPRESSUM*, B. Pl. 1, fig. 1. Elliptical, binate, division in the plane of the longest axis. Segments entire, nearly twice as long as broad, rounded above, very much flattened at base.

Hab. Lakes in Florida.

This species resembles *C. bioculatum*, Bréb., but the segments are much closer together, and are angular, not rounded at the basal extremities.

2. *DIDYMOCLADON?* *CERBERUS*, B. Pl. 1, fig. 15 and 16. Small, deeply constricted, segments three-lobed, lobes with four teeth, two of which project upwards and two downwards at each truncated angle.

Hab. Lakes in Florida.

3. *DIDYMOCLADON?* *LONGISPINUM*, B. Pl. 1, fig. 17. Large, smooth, triangular, with two long spines at each angle.

Hab. Lakes in Florida.

The two last species are not very nearly allied to each other, nor to the typical *D. furcigerus*, yet they agree better with the verbal characters of the genus than with those of any other known to me; I therefore refer them here provisionally.

4. *DOCIDIUM HIRSUTUM*, B. Pl. 1, fig. 8. Segments many times longer than broad, slightly inflated at base, surface hirsute.

A small species resembling *D. Ehrenbergii* in form, but strongly hirsute on its outer surface.

Hab. Lakes in Florida, at Enterprise.

5. *DOCIDIUM UNDULATUM*, B. Pl. 1, fig. 2. Segments eight to ten times longer than broad, constricted six to eight times at regular intervals throughout their entire length, with the base and ends crenate.

Smaller than *D. nodulosum*, Bréb., with more frequent and deeper constrictions. The same characters distinguish it from *D. nodosum* and *D. constrictum*, B.

6. *MICRASTERIAS ARCUATA*, B. Pl. 1, fig. 6. Quadrangular, segments three-lobed, the basal lobes long and arcuate, subtended by the transverse projections from the ends of the slightly notched terminal lobes.

An interesting and very distinct species, which can be confounded with no other except the following.

Hab. Lakes in Florida.

7. *MICRASTERIAS EXPANSA*, B. Pl. 1, fig. 7. Segments three-lobed, basal lobes long, sub-conical, acute; terminal lobes slender, forked at the end, with the divisions much shorter than the basal lobes.

This somewhat resembles the preceding species, with which it occurs, but I have seen no intermediate forms, out of many hundreds of each, and the characters above given appear sufficient to separate them.

Hab. Lakes in Florida, at Pilatka and Enterprise.

8. *MICRASTERIAS QUADRATA*, B. Pl. 1, fig. 5. Large, quadrangular, three-lobed, basal lobes elongated, slightly curved, bidentate; terminal lobes with two slender transverse bidentate projections.

Its larger size and distinctly bidentate projections sufficiently distinguish it from the two preceding species.

Hab. Lakes in Florida.

9. *MICRASTERIAS RINGENS*, B. Pl. 1, fig. 11. Oblong, segments three-lobed, coarsely granulated near the edge; basal lobes subdivided by a deep notch into two rather broad and obtuse or slightly bidentate projections; terminal lobes exerted, emarginate; extremities bidentate or obtuse.

Resembles *M. Baileyi*, Ralfs, but is larger, its divisions less slender, and with the granulations differently placed.

Lakes in Florida, near Dade's Battle Ground.

10. *SPILEROZOSMA SERRATUM*, B. Pl. 1, fig. 14. Joints broader than long, deeply notched or divided into two transverse portions with acute projecting ends, which give a serrated outline to the chain.

Common in fresh water in South Carolina, Georgia, and Florida.

#### TRIPLOCERAS, nov. gen.

Fronde binate; segments straight, much elongated, with numerous whorls of knot-like projections; ends of the segments three-lobed; lobes bidentate.

A genus closely allied to *Docidium*, but differing in the three-parted ends of the segments. Pl. 1, fig. 9.

11. *TRIPLOCERAS VERTICILLATUM*, (Bailey in lit. cum icone 1847, v. Brit. Desmid. p. 219) Robust, with whorls of emarginate projections. Syn. *Docidium verticillatum*, Ralfs. l. c. p. 219, Pl. 35, fig. 9 *a, b, d, e*.

Hab. same as next species.

12. *TRIPLOCERAS GRACILE*, B. Pl. 1, fig. 10. Slender, with whorls of rounded projections. Ralfs, l. c. Fig. 9, c.

I discovered these forms in Rhode Island, in 1847, and sent sketches of them to Ralfs, who has published an account of them in his *British Desmidiæ*, p. 219. I then included both forms under the same name, but as I have now seen great numbers of each kind, I think them sufficiently distinct to be separated.

Hab. Worden's Pond, R. I., Princeton, N. J., Georgia and Florida. Abundant in lakes near Enterprise, Fa.

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#### DIATOMACEÆ.

1. *ACHINANTHES ? ARENICOLA*, B. Pl. 2, fig. 19. Frustules minute, rectangular, or slightly curved; end view lanceolate, striate.

Small plates, composed of two or three frustules, supported by a short pedicel, were found abundantly on grains of the beach sand, below high-water mark, at Fort Brooke, Tampa. It is possibly a species of *Hyaloseira*, but requires further study.

2. *AMPHIPRORA PULCHRA*, B. Pl. 2, figs 16 and 18. Large, deeply constricted, ends rounded, sides compressed, carinate, distinctly striate, and near the margin punctate. Central portion narrow, sigmoid, with a few fine longitudinal lines. Often contorted so as to bring one half into a plane at right angles to the other.

Hab. Beach at Rockaway, Long Island; Hudson River, at Washington's Valley, near West Point, and in great abundance and of large size at Enterprise, Fa. The figures were drawn from Florida specimens collected in the mud of a small creek near Mr. Duval's boarding-house, at Enterprise.

3. *AMPHIPRORA ORNATA*, B. Pl. 2, figs. 15 and 23. Small, deeply constricted, ends truncated and rounded, sides marked with a longitudinal row of undulations or pinnulæ, as in *Surirella*. Often contorted.

The ruffle-like rows of pinnulæ distinguish this species from all others. It probably has minute striæ also, but I did not have an opportunity to examine with high powers.

Hab. Withlacoochee River, where it is crossed by the road from Pilatka to Tampa, Fa.

4. *AMPHIPRORA QUADRIFASCIATA*, B. Pl. 2, figs. 2, 3, 4. Small, moderately constricted, ends truncate or slightly rounded, sides compressed or carinate, lanceolate, with the apices produced and rostellate.

When living, each specimen was marked by four transverse yellow bands. A high power shows the surface to be very minutely striate. No contorted specimens were seen.

Hab. Tampa, and St. Augustine, Fa.



5. *AMPHORA AMPHIOXYS*, B. Pl. 2, figs. 20, 21, 22. Ventral side rectangular, with slightly rounded ends, and two arcuate bands of striae, which are broadest near the centre. Back convex, minutely striate. Sides convex above, minutely striate, concave below, strongly striate. Ends produced and rostellate.

The side view of this species bears a striking resemblance to *Eunotia amphioxys*, Ehr.

Hab. St. Anastasia Island, near St. Augustine, Fla.

6. *CAMPYLODISCUS ARGUS*, B. Pl. 2, figs. 24, 25. Large, circular, and saddle-shaped, surface marked with rows of conspicuous dots; margin smooth, with a row of pinnulae placed at a short distance from its edge.

A fine, large, and very distinct species, which appears to be widely diffused in the estuaries of the United States. I first found it, several years ago, in the mud of the Hudson River, at West Point, and in mud from the harbor of New Haven, Conn. In Florida I found it at St. Augustine, Tampa, and quite abundant at Enterprise. I also noticed it at Hopeton, on the Altamaha, in Georgia, and the mud from near New Orleans.

7. *CERATAULUS TURGIDUS*, Ehr. Pl. 2, figs. 26, 27. Frustules globular, or slightly compressed, with two large rounded prominences at each end, cohering by alternate angles, forming zigzag chains. Between the two rounded processes, and in a plane at right angles to that containing them, are placed two long horn-like processes.

Two frustules are often connected by an external decussately punctate cell, as in *Isthmia* and *Biddulphia*. I first noticed this species at Rockaway, N. J., in the year 1843, and sent it to Ehrenberg, who informed me that he had named it *Cerataulus turgidus*.

I am not aware that any description of it has heretofore been published.

I found it at Tampa; and it also occurs in the Hudson River, at West Point.

8. *DIATOMA STELLARIS*, B. Frustules rectangular, many times longer than broad, usually in groups of five or six individuals, cohering by the adjacent (not alternate) angles, so as to produce a stellate arrangement. These stellate groups of minute frustules are so common from Rhode Island to Florida, that I am inclined to believe them a distinct species of *Diatoma*, and have accordingly referred to them by the name of *D. stellaris* in the preceding pages.

9. *EUPODISCUS RADIATUS*, B. In form, size, and reticulation resembling the *Coscinodiscus radiatus* of Ehrenberg, but having four (or more?) foot-like projections near the margin.

A common form in the Southern States.

10. *PINNULARIA COUPERII*, B. Pl. 2, fig. 33. Large, slightly constricted in the middle, with two marginal and two intermediate punctato-striate bands, the latter interrupted at the centre.

The outline is like that of *P. paradoxa*, Ehr., and the markings somewhat resemble those of *P. Iyra*.

Hab. St. Augustine.

I take great pleasure in dedicating it to James Hamilton Couper, Esq., of Hopeton, whose scientific attainments and generous hospitality are well known to naturalists.

11. *PINNULARIA PERMAGNA*, B. Pl. 2, figs. 28 and 38. Large, lanceolate on the ventral faces, with punctato-striate marginal bands, and a broad, smooth central stripe; ends slightly rounded.

Abundant in the Hudson River, at West Point, and occurs, of a smaller size, and much less abundantly, in Lake Monroe, at Enterprise, Fla.

12. *PYXIDICULA ? COMPRESSA*, B. Pl. 2, figs. 13 and 14. Elliptical, bivalve; valves separated by a plane passing through the longer axis; slightly convex, and with transverse rows of dots.

Hab. St. Augustine.

13. *STAURONEIS MACULATA*, B. Pl. 2, fig. 32. Lanceolate or elliptical, end slightly produced and rounded; surface punctato-striate, with a large smooth central space.

Resembles *S. punctata* of Kützing's Bacillarien, Pl. 21, fig. 9, but is larger, and has the ends not so much produced.

Hab. Enterprise, Florida, where it is common in Lake Monroe, and in several of the smaller creeks near Mr. Duval's.

14. *SURIRELLA CIRCUMSUTA*, B. Pl. 2, fig. 36. Outline nearly elliptical, with a scarcely perceptible constriction at the middle. Surface with very minute granulations, and a faint longitudinal line through the middle. Edges with a continuous row of nearly obsolete pinnulae.

Hab. Hudson River, West Point; St. Augustine and Enterprise, Florida.

15. *TRICERATIUM ALTERNANS*, B. Small, reticulated, triangular; surface marked with three lines, which, with the portions cut off from the sides, form a hexagonal figure.

Common everywhere along the Atlantic coast and in estuaries; also abundant in the fossil state, in the Infusorial strata of Virginia, and in the rice fields of Georgia and Carolina.

16. *ZYGOZEROS (DENTICELLA?) MOBILIENSIS*, B. Pl. 2, figs. 34 and 35. Frustules quadrangular, compressed, thin, delicately decussately-punctate; lateral processes slender; intermediate ones (two at each end) long and slender. Color yellowish.

I first detected this species in 1848, in soundings from Mobile Bay, and subsequently I have found it at Savannah, Ga., and St. Augustine, Florida. It is a curious and interesting form, with the shape of a *Zygoceros*, and the spines of a *Denticella*.

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INFUSORIA.

1. *DIFFLUGIA SPIRALIS*, B. Loricæ subglobose, minutely granulated; upper surface with a spiral suture of two or three turns. Pseudopodia long, numerous, constantly changing position.

Very common throughout the United States. M. Le Clerc mentions spiral corrugations as occurring on the *D. Proteiformis*, Ehr. His remark, doubtless, alludes to the *D. spiralis*, which, I think, should be distinguished from the other form.

2. *MELICERTA NUDA*, B. Pl. 3, figs. 8, 10. This is, possibly, only a condition of *M. ringens*; but no allusion is made, in the works to which I have access, to any state of that species in which the granules are not present upon the case. Numerous specimens were seen at Enterprise which were evidently full grown, and which contained eggs, and yet the case was perfectly free from granulations, being clear and transparent as glass. I have referred to such specimens by the name of *M. nuda*.

3. *PERIDINIUM CAROLINIANUM*, B. Pl. 3, figs. 4, 5. Large, processes three; two on one side, and one on the other of the middle groove. Proboscis in the sinus between two processes. Surface coarsely granulate. Color, yellowish brown.

The proboscis moves very rapidly, sometimes in irregular undulations, and sometimes revolving so rapidly as to produce the appearance of a cone, as represented in the fig. of *Peridinium fusus*, Ehr., given in Pritchard's *Infusoria*. Pl. 4, figs. 2, 23. An appearance of an orifice is obscurely seen on the under side, near the insertion of the proboscis. When mounted in Canada balsam, the shell becomes nearly invisible. The motions of the living animal are very active. I could detect no trace of phosphorescence on agitating in the dark a phial which contained myriads of the living animals.

This fine species occurs in vast quantities among the roots of *Lemna* in the "Back-waters" of rice fields, Grahamville, S. C. I also found it near Savannah and in the lakes of Florida, at Enterprise, Pilatka, &c.

4. *ROTIFER VESTITUS*, B. Pl. 3, figs. 9 and 14. Body large, elliptical, completely covered by a transparent, jelly-like case, which does not become wrinkled during the motions of the animal.

Hab. Enterprise, Fa.

5. *PTERODINA MAGNA*, B. On St. Anastasia Island, in a small fresh-water pond, I collected a species of *Pterodina* with a carapace nearly twice as large as any specimens of *P. patina* which I have ever seen, and differing somewhat in the undulations of its frontal margin. Although it has not yet been sufficiently studied to be accurately described, I give its outline in Pl. 3, fig. 19, and have referred to it by the name of *P. magna*.

6. *PHILODINA PANNOSA*, B. Pl. 3, figs. 6, 7. Body large, covered with irregular wedge-shaped projections, arranged in several longitudinal and transverse rows.

Hab. Enterprise, Fa.

#### ALGÆ.

1. *APOREA AMBIGUA*, B. Pl. 3, fig. 3. Frond (?) microscopical, thin, flat, much divided in a dichotomous manner, surface with irregular longitudinal markings; color, brown.

Merely to avoid circumlocution, I have referred by the above name to this constantly occurring form. I know nothing of its real nature; and it is almost as probable that it is the compound support of some of the stipitate infusoria, as that it belongs to the vegetable kingdom. I have never seen either spores or infusoria in connection with it. It occurs everywhere in fresh water in Georgia and Florida.

#### GENERAL REMARKS.

1. It will be seen by the preceding pages, that 275 species of *Desmidiæ*, *Diatomaceæ*, and *Infusoria* have been positively determined as occurring in regions where not one of them was previously known by direct observation to exist. Of these species, thirty-one, or about one-ninth, are believed to be new, and the others are already known to occur in the Northern States, or in Europe.

2. The identity of many of the northern species of *Desmidiæ*, &c., with those of Europe, has been known for several years, and we now have evidence that the same is true with regard to the greater number of the forms occurring in Carolina, Georgia, and Florida. We have thus another illustration of the fact, that the microscopical organisms in fresh water are less affected by differences of climate than almost any other portion of the organic world.

3. Almost every locality examined, whether in fresh or salt water, is shown to have been teeming with organic life even in mid-winter.

4. With regard to the degree of reliance to be placed upon my determinations, I may state, that no one could have criticised each observation more rigidly than I have done, and that I was anxious to admit no species into my lists which I could not be perfectly certain was identical with the European or Northern form whose name I might attach to it, while I was equally desirous to record all forms which appeared novel, and which presented characters sufficiently marked to enable other observers to recognize them by my description and figures. I

have, therefore, omitted many forms which I could not determine satisfactorily. My guides in studying these bodies, while on the journey, were Ralfs' British Desmidiæ, a work whose elaborate descriptions and exquisite figures enable the student to determine the species with perfect certainty; Kützing's Diatomaceen oder Bacillarien, which contains many figures of the Diatomaceæ, both by Ehrenberg and Kützing; and "Pritchard's History of Infusoria, Recent and Fossil," which contains abridged descriptions and reduced figures, taken from Ehrenberg's great work, "Die Infusionsthierchen."

5. The existence of vast quantities of infusorial remains in the earth of the rice fields in the Southern States is, perhaps, connected with their wonderful fertility. The fact that the species found are chiefly marine, and such as now abound in the salt marshes of the coast, indicates the former presence of salt water much farther up the rivers than it now extends.

6. Although the species found in the rice fields are such as are still living in estuaries or along the coast, those excavated in digging the deep canals of the rice fields, and the ditches of the forts near Savannah, must have been deposited many hundreds, if not thousands of years ago, and they are, therefore, fully entitled to the name of fossils, and should, I think, be referred to the Post Pleiocene epoch.

7. The vast salt marsh formations of the coast of South Carolina, Géorgia, and Florida abound in silicious Diatomaceæ, whose shells are daily becoming imbedded in mud; so that we have here, in the process of formation, deposits similar in character to the infusorial strata of Virginia and Maryland, and quite as extensive, although usually rather more sandy in their character.

8. It will be seen by table B, that certain species of Diatomaceæ which occur in the ocean itself, may also live at great distances from the ocean, in estuaries and rivers far above where the surface water is fresh; yet these same species have *never* been found in lakes or pools of fresh water, not having a direct communication, however remote, with the sea. Among the species of this character are *Amphiprora pulchra*, B., *Amphiprora constricta*, Ehr., *Amphora libyca*, Ehr., *Bacillaria paradoxa*, Ehr., *Ceratoneis closterium*, Ehr., *Ceratoneis fasciola*, Ehr., *Coscinodiscus subtilis*, Ehr., *Cerataulus turgidus*, Ehr., *Navicula elongata*, *Odontella polymorpha*, Kg., and *Terpsinoë musica*, Ehr.

9. The beautiful *Terpsinoë musica*, Ehr., is an interesting addition to our native species of Diatomaceæ. It was first received by Ehrenberg from Mexico, and he has recently proved its existence in the rivers of Texas, (see *Monatsbericht der Preuss. Akad. zu Berlin*, Feb., 1849, p. 88;) but it was not known to exist in the older States until, by the observations recorded in this memoir, I determined its existence in all our Southern rivers. I have also specimens of it from Jamaica, West Indies, and portions of a closely allied, if not identical form, from Mindanao, in the Phillipine Islands.

10. The observations above recorded will serve to show how abundant a store of organic beings await the researches of naturalists in the Southern States,—forms which, independent of their being among the most delicate and beautiful of all the displays of creative power, are also of the greatest interest, from the important relations which Ehrenberg has proved to exist between them and wide-spread cosmical phenomena.

11. The waters in which I detected the species above recorded, also abounded in many other forms of microscopic life; as, Entomostraca, Tardigradi, Anguilluli, &c., &c. Of these I have made no record, as I did not possess sufficient knowledge concerning them. They will well reward the attention of Southern naturalists.

## APPENDIX.

### MICROSCOPICAL FORMS FOUND NEAR SALEM, MASS., BY T. COLE, ESQ.

For the following interesting list of microscopical forms found near Salem, Mass., I am indebted to THOMAS COLE, Esq., of that place, who has for several years examined these forms with great zeal, and who, I believe, was the first person to make a systematic study of the American soft skinned Infusoria. This list will be useful for the purpose of comparing the forms of the Northern and Southern States. The names employed by Mr. Cole are those used by Ehrenberg, in his large work *Die Infusionsthierchen*, with the descriptions and figures of which each form was compared.

<p>Volvox sphaerosira.            " Globator.            Pandorina Morum.            Synura Uvella.            Closterium striolatum.              " lineatum.              " turgidum.              " setaceum.              " Trabecula.              " Lunula.            Amblyophis viridis.            Docidium nodosum.              " nodulosum.            Euglena acus.              " longicauda.              " Pyrum.              " pleuronectes.              " triquetra.              " spirogyra.              " Deses.            Chlorogonium euchlorum.            Distigma Proteus.            Dinobryon Sertularia.            Amœba princeps.              " radiosa.            Diffugia proteiformis.            Arcella vulgaris.            Naunema simplex.</p>	<p>Desmidium Swartzii.              " quadrangulatum.              " aculeatum.            Staurastrum dilatatum.            Xanthidium ramosum.              " aculeatum.              " hirsutum.              " fasciculatum.            Arthrodesmus convergens.              " quadricaudatus.            Odontella Desmidium.              " filiformis.            *Micrasterias heptactis.              " hexactis.              " Boryana.              " tricyelia.            *Euastrum rota.              " Crux Melitensis.              " verrucosum.              " Pecten.              " margaritifera.            Gallionella moniliformis.            Navicula striatula.              " viridis.              " sigmoidea.              " splendida.              " Baltica.              " diagonalis, (= N. angulata ?)</p>
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<i>Eunotia tetradon.</i>	<i>Amphileptas monilifer.</i>
“ <i>pentodon.</i>	“ <i>margaritifer.</i>
“ <i>serra.</i>	“ <i>fasciolus?</i>
<i>Synedra ulna.</i>	<i>Paramecium aurelia.</i>
“ <i>capitata.</i>	<i>Uroleptus Filum.</i>
“ <i>lunaris.</i>	“ <i>Piscis.</i>
<i>Podosphecia gracilis.</i>	<i>Oxytricha caudata.</i>
<i>Gomphonema acuminatum.</i>	<i>Urostyla grandis.</i>
<i>Cyclidium glaucoma.</i>	<i>Stylonychia mytilus.</i>
<i>Peridinium fuscum.</i>	<i>Trachelius Ovum.</i>
<i>Glenodinium apiculatum.</i>	“ <i>trichophorus.</i>
<i>Stentor Mulleri.</i>	<i>Oxytricha caudata.</i>
<i>Vorticella nebulifera.</i>	<i>Chaetonotus maximus.</i>
“ <i>Campanula.</i>	“ <i>Larus.</i>
“ <i>Convallaria.</i>	<i>Floscularia proboscidea.</i>
<i>Carchesium polypinum.</i>	“ <i>ornata.</i>
<i>Epistylis Galca.</i>	<i>Notommata longiseta.</i>
“ <i>anastatica.</i>	“ <i>copeus.</i>
<i>Cothurnia imberbis.</i>	<i>Scaridium longicaudum.</i>
<i>Actinophrys Sol.</i>	<i>Lepadella emarginata.</i>
“ <i>viridis.</i>	<i>Dinocharis pocillum.</i>
<i>Lacrymaria Protcus.</i>	<i>Stephanops lamellaris.</i>
<i>Coleps hirtus.</i>	<i>Rotifer vulgaris.</i>
<i>Spirostomum ambiguum.</i>	<i>Philodina aculeata.</i>
<i>Chilodon Cuculus?</i>	<i>Urocentrum Turbo.</i>
<i>Trachelocerca Olor.</i>	<i>Euplotes Charon.</i>
<i>Amphileptas Anser.</i>	“ <i>patella.</i>

I have not thought it necessary to change any of the above names to correspond with those which I have adopted. It is necessary, however, to mention that the genus *Micrasterias* of Ehrenberg is *Pediastrum* of Meyen, Ralfs, &c., and of my lists, while the *Euastrum* of Ehrenberg is in part equivalent to the *Micrasterias* of Agardh, Ralfs, &c., whose names I have used.

J. W. B.

Since this Memoir was in type I have received from Dr. W. C. DANIELL, of Savannah, Ga., several specimens of soil from his rice fields, ten miles above Savannah. These prove to be exceedingly rich in the same species of marine silicious Diatomaceæ which occur in the soil of the plantations opposite Savannah. One of Dr. Daniell's specimens appears to be almost entirely made up of perfect shells of *Coscinodiscus subtilis*, Ehr.



## Explanation of Plates.

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The figures on these Plates are little more than memorandum sketches, few or none of the details of relief, sculpturing, striation, &c., being given. They are, however, accurate as far as they go, being all, except where otherwise stated, drawn by means of the camera-lucida, from living specimens. They may serve, therefore, to identify the forms referred to in the descriptions.

### PLATE I.

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>FIG. 1. <i>Cosmarium depressum</i>, B.<br/>         2. <i>Docidium undulatum</i>, B.<br/>         3. " <i>minutum</i>, Ralfs.<br/>         4. " <i>nodosum</i>, B.<br/>         5. <i>Micrasterias quadrata</i>, B.<br/>         6. " <i>arcuata</i>, B.<br/>         7. " <i>expansa</i>, B.<br/>         8. <i>Docidium hirsutum</i>, B.<br/>         9. <i>Triploceras verticillatum</i>, B.<br/>         10. " <i>gracile</i>, B.<br/>         11. <i>Micrasterias ringens</i>.<br/>         12. " <i>pinnatifida</i>, Kg.<br/>         13. " <i>incisa</i>, Kg.<br/>         14. <i>Sphæroszoma serratum</i>, B.</p> | <p>FIG. 15. <i>Didymocladon cerberus</i>, B., side view.<br/>         16. " <i>cerberus</i>, B., end view.<br/>         17. " <i>longispinum</i>, B.<br/>         18. <i>Staurastrum enorme</i>, Ralfs.<br/>         19. <i>Micrasterias oscitans</i>, Ralfs, with abnormal teeth at <i>a</i> and <i>b</i>.<br/>         20. <i>Micrasterias denticulata</i>, Ralfs. It has broad and slightly hirsute ends, which I have not seen mentioned as occurring in the British specimens.<br/>         21. Scale for all the figures in this Plate, being <math>\frac{5}{1000}</math>ths of an inch, magnified equally with the sketches.</p> |
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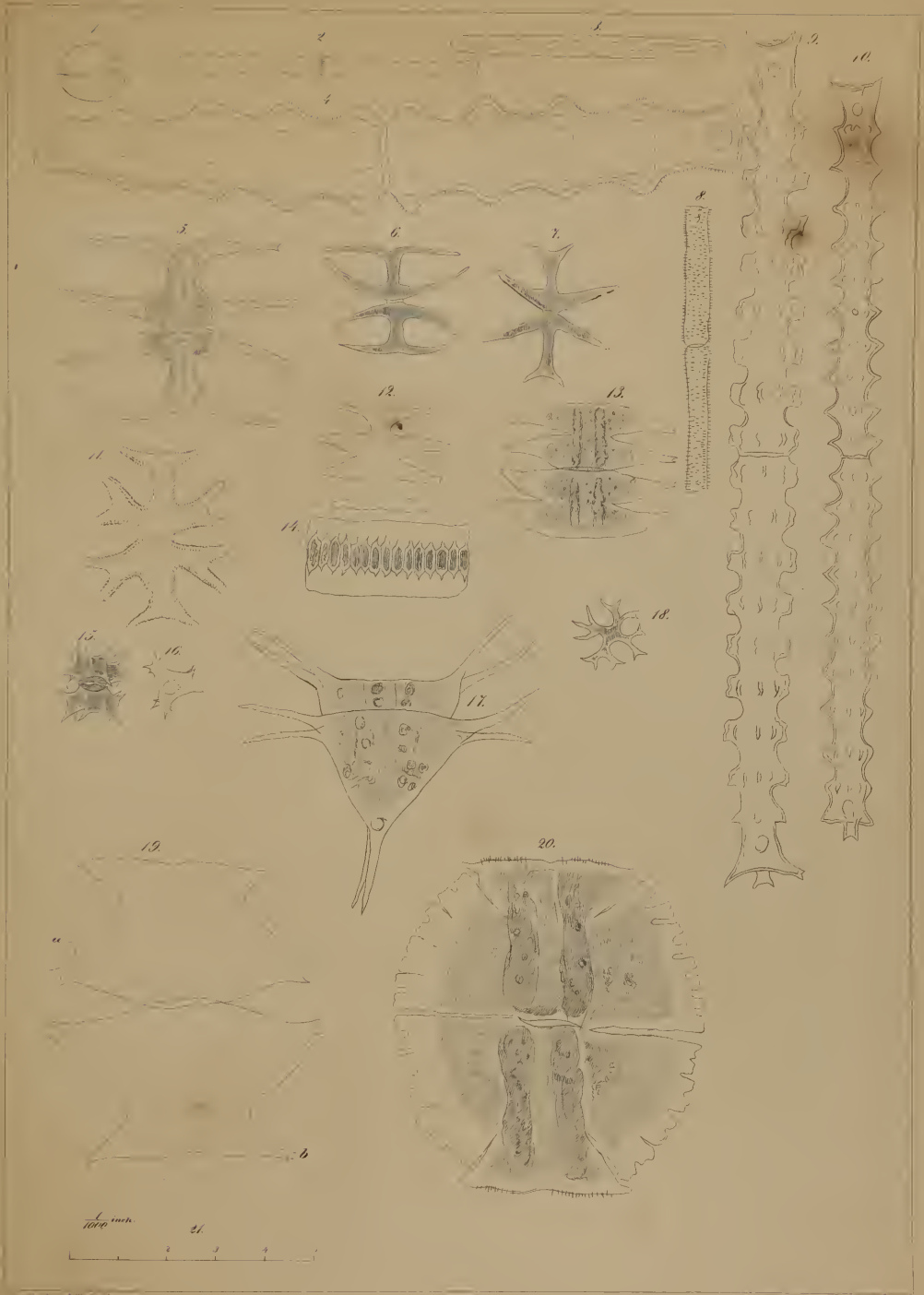
### PLATE II.

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| <p>FIG. 1. <i>Achnanthes longipes</i>? Ag. Charleston.<br/>         2. <i>Amphiprora quadrifasciata</i>, B. Tampa.<br/>         3. " " seen obliquely.<br/>         4. " " side view.<br/>         5. " <i>constricta</i>, Ehr. Tampa.<br/>         6. " " side view. Tampa.<br/>         7. " " Ehr, large specimen.<br/>         Tampa.<br/>         8, 9. <i>Amphiprora alata</i>, Ehr. St. Augustine.<br/>         10. " " " a contorted specimen, seen edgewise.<br/>         11. <i>Achnanthes</i>, a single frustule, species undetermined. Volusia.<br/>         12. <i>Amphora libyca</i>, Ehr.<br/>         13. <i>Pyxidicula compressa</i>, B. St. Augustine.<br/>         14. " " cross section of one valve.<br/>         15. <i>Amphiprora ornata</i>, B. Withlacoochee R.<br/>         23. " " " a contorted specimen.<br/>         16. " <i>pulehra</i>, B., side view.<br/>         18. " " larger specimen, front view. Enterprise.</p> | <p>FIG. 17. <i>Ceratoneis closterium</i>, Ehr. St. Augustine.<br/>         19. <i>Achnanthes</i>? <i>arenicola</i>, B. Tampa.<br/>         20. <i>Amphora amphioxys</i>, B., ventral surface. St. Augustine.<br/>         21. " " oblique view.<br/>         22. " " side view.<br/>         24, 25. <i>Campylodiscus argus</i>, B. Hudson River.<br/>         26. <i>Cerataulus turgidus</i>, Ehr. Hudson River, horns absent.<br/>         27. <i>Cerataulus turgidus</i>, Ehr., with the horns.<br/>         28, 38. <i>Pinnularia permagna</i>, B. Hudson River.<br/>         29. <i>Navicula cuspidata</i>? Ehr. Pilatka.<br/>         30. <i>Diatoma Ehrenbergii</i>, Kg. Pilatka.<br/>         32. <i>Stauroneis maculata</i>, B. Enterprise.<br/>         33. <i>Pinnularia Couperii</i>, B.<br/>         34, 35. <i>Zygoceros</i> (<i>Denticella</i>?) <i>mobiliensis</i>, B.<br/>         36. <i>Surirella circumscuta</i>, B.<br/>         37. Scale for all the figures on this Plate, being <math>\frac{1}{1000}</math>ths of an inch, magnified equally with the drawings.</p> |
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## PLATE III.

- FIG. 1. Biforine, from *Pistia stratiotes*, discharging its raphides.
2. *Conochilus volvox*, Ehr., without the case. Enterprise.
3. *Aporea ambigua*, B. See p. 42.
- 4, 5. *Peridinium carolinianum*, B. Grahamville, S. Ca.
- 6, 7. *Philodina pannosa*, B. No. 6, by the camera; No. 7, by the eye.
- 8, 10. *Melicerta nuda*, B. See p. 41. Enterprise.
11. *Cothurnia maritima*, Ehr. Tampa.
12. *Notommata longiseta*, Ehr. Enterprise.
13. Portion of arm of *Stephanoceros Eichhornii*? from Enterprise; showing lateral, not verticillate cilia. In other respects the American specimens agree with Ehrenberg's figures.
- FIG. 9, 14. *Rotifer vestitus*, B. Enterprise. See p. 41, fig. 9, extended, and drawn by the eye; fig. 14, contracted, and drawn by the camera lucida.
15. *Cothurnia maritima*? Ehr. Tampa.
16. *Acineta Lyngbyii*? Ehr. St. Augustine.
17. *Brachionus urceolaris*, Ehr. St. Augustine.
18. *Cothurnia havniensis*, Ehr. Tampa.
19. *Pterodina magna*, B. Anastasia Island, Fa. This is drawn to the scale of fig. 25.
- 20, 21. *Brachionus polyacanthus*, Ehr. Enterprise, Fa.
22. *Acineta mystacina*. Pilatka.
23. *Cothurnia imberbis*, Ehr. Pilatka.
24. Scale A, for figs. 1, 3, 4, 5, 11, 12, 17, and 21, being  $\frac{5}{1000}$ ths of an inch, magnified equally with these figures.
25. Scale B, for figs. 2, 6, 7, 8, 9, 10, 14, 15, 16, 19, and 23, being  $\frac{5}{1000}$ ths of an inch, magnified equally with the drawings.

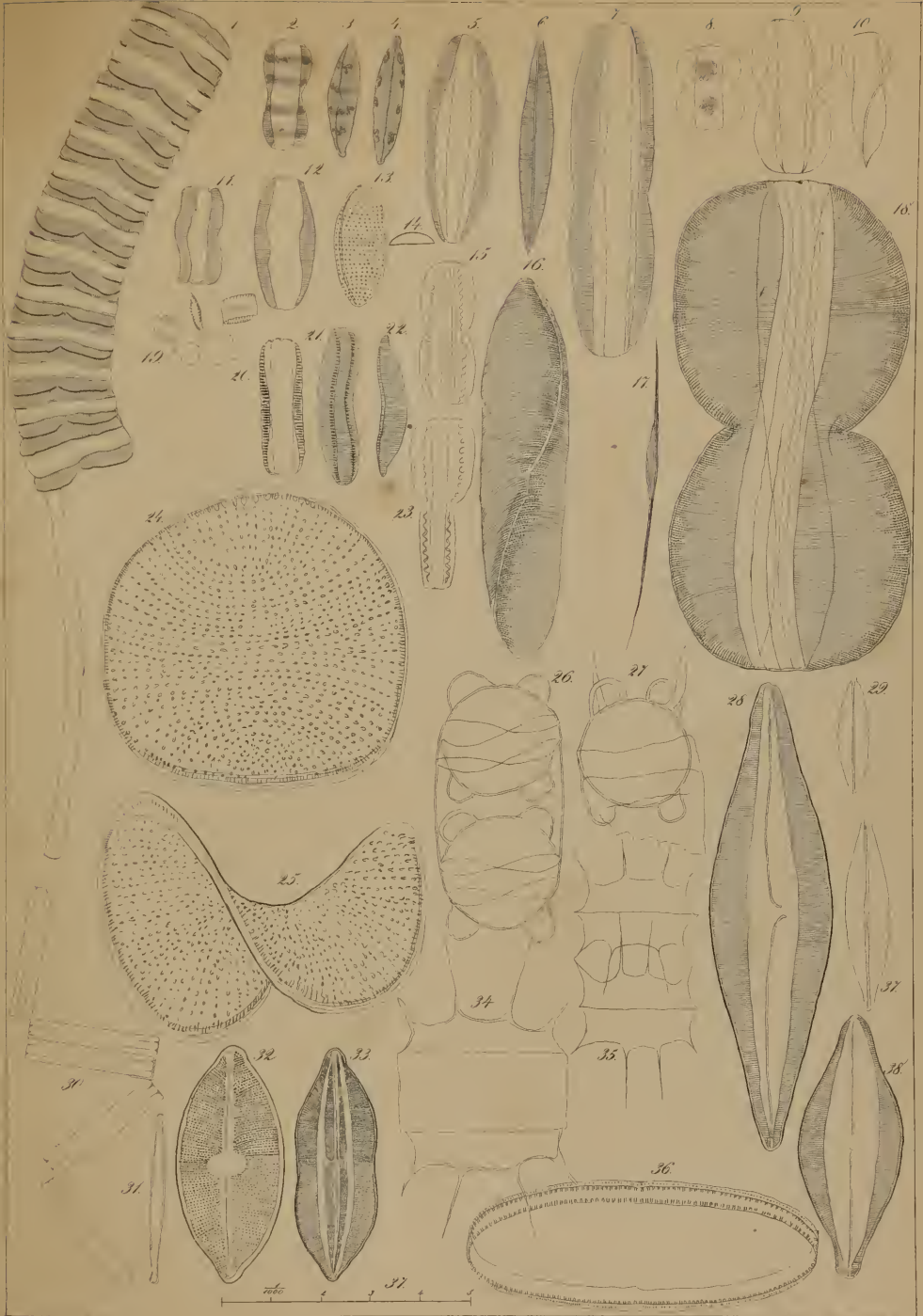
Plate 1.



DESMIDIEÆ.



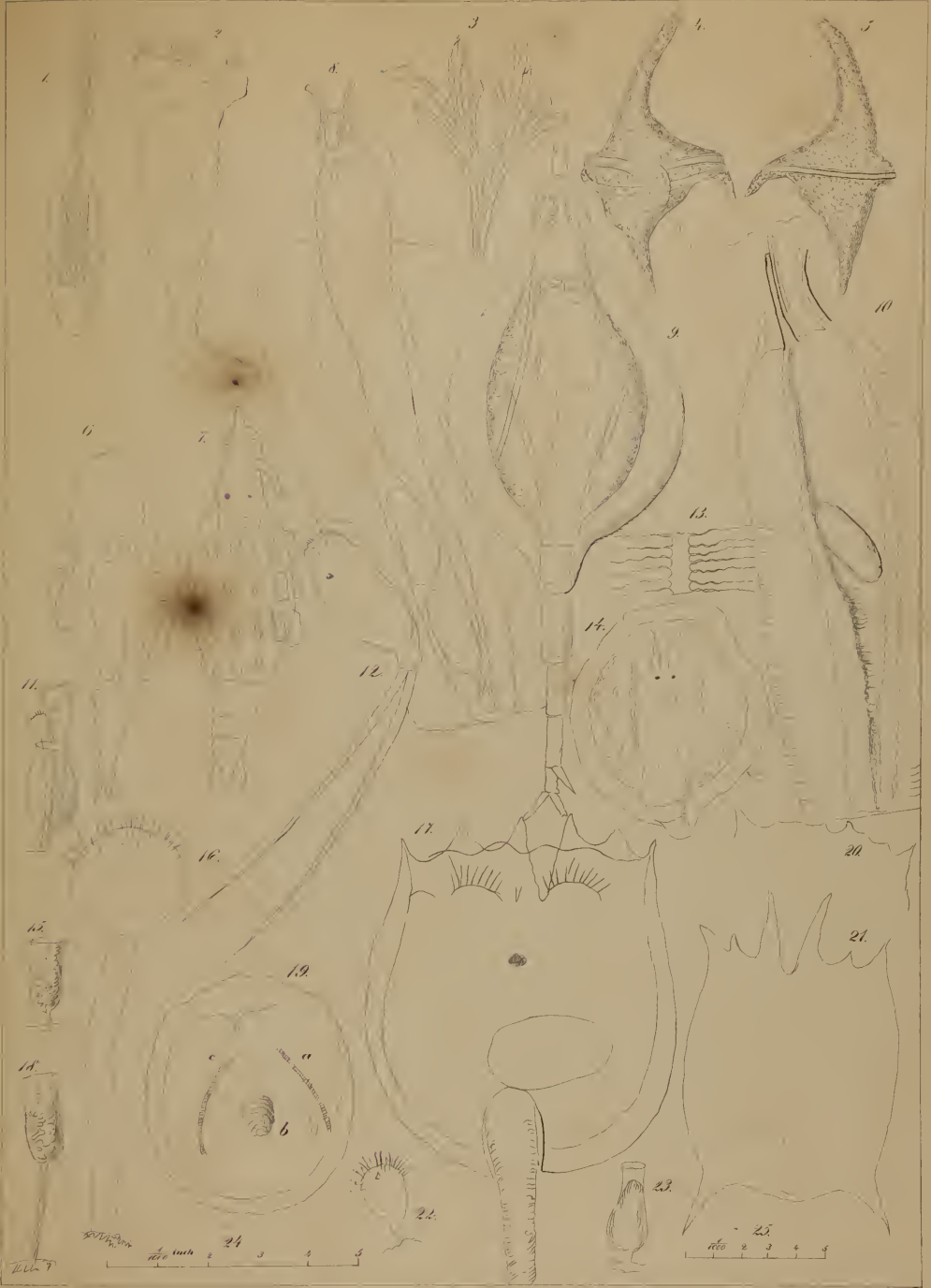
Plate 2.



DIATOMACEÆ.



Plate 3.



INFUSORIA, &c.





