A List of the Protozoa Found at Havana, in the Illinois River and Adjacent Lakes.

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A. S.

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The material from which this list is compiled was obtained at the Biological Station on the Illinois River. The observations extend over a period of one year, and are made chiefly upon catches taken at seven stations on the Illinois River and neighboring lakes. Stations A, B, and C were located on Deiver Lake, Stations D, and E, on the Illinois River, Station F, on Phelps' Lake, and Station G, on Thompson's Lake. Collections were also made at Mataugas and Dogfish Lakes.

From the beginning of April until the middle of September, the material was examined as soon as collected, and notes were kept of all species found. Those species only are included in this list that could be definitely determined. The material collected during the remainder of the year was preserved, either in alcohol or picric-nitric acid, and examined at the zoological laboratory. During the summers, collections were made at an interval of two to three weeks; after that they were made once a month, excepting January, when they were omitted. The tow-net, Buge-net and hand-nets were chiefly used in collecting.

The most widely distributed form was Diffugia globulosa, which was
found at every station, and was present every month but February. Other species of *Difflugia* and also *Arcella* were present a considerable part of the year including the summer months. *Dinobryon sertularia* was very abundant, but was found only in April, May, and June. *Euglena viridis* was present throughout the summer months. *Volvox globator* was found every month but February and April. *Coleps hirtus* was found from May to October. *Catenella cratera* was present in February, and from April to September. All through the summer months many species of *Vorticella*, *Epistylis*, and *Acricularia* were found in the towings, on upon the backs of turtles or crustaceans, but few of them could be definitely determined.

Several of the species here recorded were found in aquaria started with sand from the bottom of Phelps' Lake, and filtered water. In all there were sixty-one species observed, four of which are described here for the first time.

That the Protozoa play an important part in the food of other organisms is certain, but the observations on this point are so few,
that very little data can be gathered upon which to base our beliefs.

Many *Difflugia*, *Codonella*, and *Volvox*, were found in stomachs of
rotifers; so we know that they form an important item of food of
the rotifers. *Difflugia* have also been found in the stomachs of young
fishes.

While many of the Protozoa live upon plants and gases, others like
*Tokophrya* and *Acineta*, are predacious; and live upon other Protozoa
and higher forms. Diatoms seem to be a favorite article of food of such
forms as *Vorticella* and *Aphercularia*.

In making out this list Bürtschi’s classification has been
followed. Kent’s Manual of the Infusoraria has been used mainly in
the determination of species. References to the original descriptions
are made in the case of all forms that have been described
since the Manual was published. All references to authors are made
by putting the date of publication in parentheses after the author’s name.
At the end is an alphabetical list of authors, with dates corresponding
with those in the text.
Class I. Sarkodina.

Subclass: Rhizopoda.

Order: Rhizopoda Dujard.

Family: Amoebidae.

Dactylomphrion Hertie. and. Lenes.

Amoeba-like, naked, many finger-like pseudopodia radiating from a round central body. Pseudopodia slightly reversible. Animal usually suspended in the water.

1. D. radiolusum Ehrlg.

This interesting form was found but once, during July, when a few were taken in the tow-net at Station F.

Pelomyxa Greff.

"Amoeba-like, naked, usually quite large (3-4 mm. in diameter), moves by means of blunt pseudopodia, commonly more or less club-like or slug-like in shape when in motion. Nuclei many."

2. P. villosa Leidy.

This species was found several times in June, July, and August.
In June it was rare among the plants on the east side of Station C. In July a few were found in the tow from Station F. In August it was rare in bottom tow from Station C. This form was found in company with the preceding at Station F.

**Family Arcellidae Ehrbg.**

*Arcella Ehrbg.*

Shell chitinous, usually round convex on the adoral surface, and concave on the oral surface. A large round mouth-opening in middle of ventral surface. Shell yellow or brown, the surface either smooth or thickly pitted. Usually several nuclei and contractile vacuoles.

*3. A. vulgaris Ehrbg.*

This species was quite constant during the summer months. In May it was rare in surface tows from Stations A, and C. In June a few were found in tow at Stations A, B, C, and E; and also among vegetation at Station C. In July a few were found in tow from Stations C, and E; and, also among vegetation at Stations A, and D. In August it was scarce in tow and among vegetation from Station C. In Septem-
ber it was rare in surface tow from Station E, while a few were found in tow from Station C, in both September and October. In March it was rare in tow from Station G. This last find seems remarkable as it was not found before at this station.


This variety was usually found in company with the preceding. In April it was rare in surface tow from Station C. In May it was rare in tow from Station A, and a few were found in tow from Station C. In June it was scarce in tow from Station A. In July, August, September, and October, a few were found among vegetation and in tow from Station C. A few were also found among vegetation at Stations D and E, in August; and among vegetation and in tow from Station E, in September. It was rare in tow from Station G in September. In August it was also rare in surface tow from Watangas Lake.


This variety was found only during three months. In May it was scarce in tow from Station B; and rare in surface tows from
Stations A, C, and E. In July and August a few were found in
tows from Station C.

*G. dentata* Elveh.  
This form was very rare, and was found but twice. Once during
August, when it was rare in surface tow from Station C; and
again in September, when it was rare in tow from the same Station.

*Hilusia Leclere.*  
Shell variable, sometimes clintonian, but usually composed of small
grains of sand, and other foreign substances. Pseudopodia, narrow, long,
sometimes branching, rounded at the ends. Nucleus usually simple.

*H. globulosa* Muy.  
This species was present every month but one, and was widely
distributed, being found at every station. In April a few were
found in surface tows from Stations A, C, and G. In May it was com-
mon in tow from Station C, and scarce in tows from Stations A, B, D, E, F, and G. In June a few were found in both surface and
oblique tows from Stations A, B, C, D, E, and G. In July a few were
found in tows from Stations C, E, and F; and among vegetation at Station A. In August it was scarce in tow from Station C, and among vegetation at Stations C, and D. In September a few were taken among vegetation from Station C, and in tow from Station E. In October it was scarce in tows from Stations C, and E. In November it was rare in tows from Stations C, and E. In December it was rare in tow from Station E. In March a few were found in tow from Station G.

*E. D. pyriformis* Perty.

This species was at no time abundant and was widely scattered among the stations. In May it was rare in tows from Stations A, D, and E. In June it was scarce in tow from Station C, and rare in surface tow from Stations E, and F. In July a few were found among vegetation from Stations A, and C, and in tow from Stations E, and F. In October it was rare in surface tow from Station C. In November it was rare in surface tow from Station E. In February a few were taken in tow from Station C, under a foot of ice. In March it was rare in tow from Station G. In August a few were found in tow from Matanzas Lake.

No individuals of this species were found in any of the catches that were made; but in November a quantity of the dried mud from the bottom of Phelps' Lake, at Station F, was gathered, and several small aquaria were started by putting some of this mud into jars with filtered water. Several specimens of *D. urceolata* were found in these aquaria, together with other forms which will be mentioned in their order.


But few specimens of this species were found. In May it was rare in tow from Station A, and scarce in that from Station Q. In June it was rare in tow from the west side of Station E. In July a few were found in tows from Stations C and F. In August it was rare among vegetation from Station D, scarce in tow from Station F, and common in tow from Watanges Lake. In September it was rare in tow from Station E, and among vegetation from Station C. In February it was rare in tow taken at Station C, under a foot of ice.
In March it was rare in tow from Station G.

**D. lobostoma** Leidy.

This species was quite well distributed and was usually associated with **D. globulosa**. In May it was common in tow from Station F, and scarce in tows from Stations A, C, E, and G. In June a few were found in tows from Stations D and E. In July, August, and September it was common in surface and oblique tows from Station C. In September it was also scarce in tow and among vegetation at Station E. In October a few were taken in tows from Stations C and E. In August a few were also found in tow from Matangas lake. In December, February, and March a few were found in tows from Station C. The catch in February was made through a foot of ice. In March it was also common in tow from Station G.

This form may be at first mistaken for **D. globulosa**, unless care be taken. However it is smaller than **D. globulosa**, and longer in proportion to its width. I have found both species in the stomachs of Rotifers.

This beautiful and attractive species was met with every month but two, and was well represented at almost all of the stations. In April a few were found in tows from Stations A, C, and G. In May it was rare in tow from Station D. Scarcely in tows from Station C, and E, and common in tow from Station A. In June it was rare in surface tow from Stations D, and E, and scarce in tow from Station A, and in tow and among vegetation from Station C. In July a few were found in tow from Station C, and among vegetation at Station A. In August it was common among vegetation from Station D, and scarce among vegetation at Stations C, and E, and also in tow from Station C. In September it was scarce in tow from Station C, and in tow and among vegetation at Station E. In October and December a few were found in tow from Station C. In March it was rare in tow from Station G.

Schewiakoff (1833) identifies this species with *D. lobostoma*, but they are distinct. *D. corona* is larger and more spherical...
in shape than *D. lobostoma*, and the fundus always carries one or more spines. Then too in *D. corona*, the border of the mouth has a number of lobes or excavations, while in *D. lobostoma* there are usually but three or four lobes present. Of all the specimens of *D. lobostoma* that I have examined, there was but one which had more than three lobes; while I have never seen a specimen of *D. corona* with such a small number of lobes.

13. *D. aculeata* Elbg. (Centroopsis aculeata Elbg.)

Although this species was present every month but two, yet it was found at only four stations. In May it was rare in tow from Station E. In June it was rare in tow from Station B. In July, August, and September, a few were found among vegetation at Station C. In August, September, October, December, and February, a few were found in tows from Station C. In August it was rare in tow from Walumps Lake. In March it was scarce in tow from Station G.

14. *D. tuberculatus* n. sp.

Sp. Ch. Shell compressed, irregularly void in shape, slightly constricted around
the mouth, and prolonged into a short neck, funnus rounded and ending in one or more blunt processes like P. pyriformis var. nodosa Leidy. On each of the compressed sides there are three small prominences or tubercles.

This is a medium sized species, about one and one-fourth times as long as wide. The shell is composed of large and small rounded sand grains. No diatoms, and but very few grains of sand with sharp corners are found in the shell. This species is characterized by having three small tubercles on each of the two compressed sides. These tubercles are arranged on each side of the shell so as to form the angles of a triangle. One is near the edge of the funnus, the other two are placed one at each side of the shell, a little above the neck. Although the shell is asymmetrical and varies greatly in outline, these tubercles are constant, and afford an easy means of recognizing the species. The pseudopodia are simple and few in number. Length of shell, 1.43 mm. (1/5 in.). Width, 1.11 mm. (2.25 in.).

This species was found at Watangas Lake in August. But few
individuals were found. Six different towings were taken in the lake, and members of this species were found in but three of them. When once seen it will always be remembered, as it attracts immediate attention, because of its irregular outline and peculiar construction.

Subclass 2. Heliozoa.

Order Aphrothoraca Hertm.

Actinophrys Elhrbg.

"Body soft, spherical, with numerous fine filamentous pseudopods radiating in all directions. Endosarc finely granular; ectosarc vacuolated; although there is no sharp distinction between ectosarc and endosarc. Nucleus single, central. Large contractile vacuole at the periphery."

15. A. sol Elhrbg.

This species was present during the summer months. In June it was rare in surface tow from Station C, and common among Lemma at Station D. In July a few were found in tow from Station C, and among vegetation at Station A. In August it was
rare in tow and among plants at Station C. In September and October a few were found in tows from Station C.

Actinosphaerium Stein.

"Body spherical, a number of long tapering pseudopods radiating in all directions. Pseudopods with an axis thread. Distinction between endosarc and ectosarc sharp. Protoplasm vacuolated, but the vacuoles of the ectosarc larger than those of the endosarc. Contractile several, at the periphery. Nuclei numerous."


This interesting and fine species was found but once, in August, when it was scarce in both surface and oblique tows from Station E.

Raphidiophrys Archer.

Body spherical with numerous fine long pseudopodia. The animal is protected by a covering of fine spicules arranged tangentially to the surface of the body. Nucleus one or several. Contractile vacuole probably present.
17. *R. pallida* Schulze.
This species was taken in July and August, at which time it was scarce in tows from Station C.

Class II. Mastigophora.
Order Flagellata.

Suborder Monadina Bütschli.
Family Heteromoniadaceae Bütschli.
Subfamily Heteronomineae Stein.

Anthophyesa Boy d. Vinc.

"Gloids minute, obliquely pyriform, attached in clusters to the extremities of a rigid, granular, branching pedicle; flagella two, one considerably longer than the other. Nucleus and contractile vacuole usually conspicuous."

18. *A. vegetans* O. F. Müll.

Several colonies of this species were taken in December, with the tow-net at Station E. A number of colonies were also found in an aquarium that was started with mud from the bottom of Phelps' Lake.
Subfamily Dinobryinae Ehrbg.

Dinobryon Ehrbg.

Animals loricate, free swimming, colonial. Lorica transparent. Colonies branching. Fooids with two flagella, one long and one short. An anterior pigment spot usually present.


This species was very abundant and widely distributed during three months. In April it was common in surface tow from Stations A and C. In May it was scarce in surface tow from Station E, common in tow from Stations C, and B, abundant in tow from Station A, and very abundant in tows from Stations B, and G, and among vegetation on the east shore of Station C. In June it was scarce in tows from Stations E, and B, common in tows from Stations A, and D, and very abundant in tow from Station C. It is evident that this species prefers the situations among the plants, rather than those in open water. Variety of this species was also found.

Suborder Englenoidina.
Family Euglenidae Stein.

Euglena Ehrbg.

Animals free-swimming, usually elongate, but very changeable in shape; commonly green. The anterior part usually truncated and the posterior more or less prolonged and attenuate. One flagellum on the anterior end. Anterior red pigment spot.


This species was present during the summer months. In May a few were found in tow from Station C. In June it was scarce in tows from Stations A, C, D, E, and F, and abundant among vegetation at Station C. In July a few were found in tow from Station F, and in tow and among plants at Station C. In August it was scarce in tow from Station C, and Matanzas Lake; and very abundant in scum from Station F, and the west side of Station C. In September it was scarce in tows from Stations C and F. This species can be found in large numbers in summer, on almost any body of water, where the individuals collect on the surface to form a green or brown scum. They
are readily eaten by rotifers and other Protozoa. *Eospora annita* Elbrg., was found in scour of this kind.


This pretty species was found once in July, at which time a few were taken in tow from Station F. This species preserves its form better than the preceding, is slightly thicker in proportion to its length, and is marked on the surface with oblique rows of small bead-like elevations.

22. *E. acus* Elbrg.

This form was found in tow from Station F. during July and August. In July it was scarce, and in August common. In August it was also scarce in tow from Matangas Lake. This species is very slender, ends posteriorly in a sharp point, and is persistent in shape.

23. *E. oxyuris* Schwanda.

This species was present during the summer months. In June it was scarce in tows from Stations A, C, D, and F, and common in both surface and oblique tows from Station E. In July it was rare
in tow from Station A, scarce in tow from Stations C, and E, and common in tow from Station F. In August it was rare in tow from Station C, scarce in tow from Station E, and Watergas Lake, and common in tow from Station F. In September a few were found in tow from Station E. This is a fine species, persistent in shape and easily recognized.


This small species was found once in July when it was rare in tow from Station F. It agreed in all particulars with the description given by Dr. Stokes, and to my mind it is a well defined separate species.

*Frackeltonia* Ehren.

Animals like *Engelina*, except that they have an ova-tate or spheroidal chitinous loricca. The flagellum is thrust out of the anterior end of the loricca through a small opening.


This species appeared in large numbers in aquaria that had been
started with mud from Station 5. They began to develop within two
days after the water had been added to the mud. They had no lorica at
first, and could hardly be distinguished from *Engelina viridis*. In a
short time the lorica began to be secreted around the central and
anterior parts of the body first. At this stage before the posterior part
of the lorica had become fully formed and hardened, they would swim
about and occasionally contract the body and draw the posterior
part into the lorica.


Station 5 seemed to be well fitted for the development of the
*Englenidae*, since more of this family were found at this Station
than at any of the others. This species was found at Station 5, in July
and August; at which time it was scarce in tow from this Station.
In August a few were also found in tow from Mataugas Lake.

*Family Chloropeltinidae* Steind.

*Phaeus Nitzsch.*

"Animalcules free-swimming, persistent in shape, mostly..."
compressed and leaf-like, terminating posteriorly in a sharp-pointed
tail-like prolongation; flagellum single, long; cuticular surface indurate,
usually striated longitudinally; endoplasm green, usually enclosing anterior
an eye-like pigment spot."

27. *P. longicauda* Ehrbg.

This fine attractive species was present only three months. In June
a few were taken in tows from Stations D, E, and F. In July a few were
found in tows from Stations C, E, and F. In August it was rare in
tow from Station E, and scarce in tows from Station F, and Waterugas Lake.


This species was quite rare, and was found but once in October, in
oblique tow from Station E.

*Family Volvocidae* Ehrbg.


Animalcules small, green, with two flagella, united into large
spherical free-swimming colonies. All the zooids usually of the
same size.
29. *V. globator* Ehrg.

This species was abundant and well distributed. In May it was scarce in tow from Stations A, B, II, and G; common in tow from Station E; and abundant in tow from Station C. In June it was rare in tow from Station B; scarce in tow from Stations A, II, E, and G; and common in tow from Station C. In July it was scarce in tow from Station E, and among vegetation at Station C; and abundant in tow from Station C. In August a few were found in tow from Stations C, and E, and among vegetation at Stations C, II, and E. In September it was rare in tow from Station G; scarce in tow and among plants at Station E; and abundant in tow from Station C. In October and December a few were found in tow from Stations C, and E. In November it was rare in tow from Station G. In March a few were found in tow from Station C. The colonies are large, easily seen with the unaided eye, and are especially attractive to beginners. In July when they were abundant at Station C, more were taken in surface tows during the day, but many were caught when bottom tows were made.
Pandorina was also found but was not studied. Both of these species form an important article of food for large rotifers.

Pleodorina Shaw (1944).

This genus differs from the preceding in that the colonies are more oval in shape, and the zooids are of two kinds, one, large; the other, small. The large ones are arranged at one pole and the small ones at the other.


This species was found during August, September, and October. In August it was scarce in tow, and among vegetation from Station E; common in tow from Station G; and abundant in tow from Station F. In September a few were found in tow and among vegetation from Station C; and in tows from Stations E and G. In October a few were found in tow from Station C.

Family Cryptonoumadiidae.

Cryptononas claudii.

'Animalcules free-swimming, illoricate, persistent in form, more or less ovate or elongate; flagella two, subequal, issuing from beneath
a prominent, anterior, lip-like process; endoplasm enclosing two lateral, longitudinally placed colour-bands.

31. C. ovata Elidy.

This species was met with but once in October; at which time it was common in oblique tow from Station E.

Order Choanoflagellata S. K.

Family Craspedomonadidae Stein.

Subfamily Salpingoecinææ S. K.

Salpingoea James-Clark.

"Animalecula solitary, plastic and variable in form, secreting and inhabiting a fixed, transparent sheath or lorica; the lorica either sessile or mounted on a pedicle; contractile vacuoles two or more in number, conspicuous; flagellum single terminal."

32. S. urinata Kent.

This extremely small species was found in May, in tow from Station D. It was found fastened to the loricas of Ninobryon sentulensis taken in the tow. Scarce.
Archer Dinoflagellata Bütschli.
Suborder Dinifera Bergh.
Family Peridiniidae Ehrlbg.

Peridinium Ehrlbg.
"Animociles free-swimming, encrusted." Body divided into two parts by an equatorial groove. Shell made up of a number of small plates; usually somewhat depressed. Flagella two, one lying in the equatorial furrow; the other thrust out in advance of the animal and used for locomotion.

33. P. tabulatum Ehrlbg.
This species was found abundant in July, in tow from Station 9. In August it was scarce in tow from Watangas Lake. It seems rather odd that this species should be found at these two stations, which are five miles apart, while none were found in the intervening stations.
Ceratium Schrank.

Animociles the same as the preceding, except that the angles of the lorica are prolonged into long horn-like projections. Body sub-triangular.
in shape. The anterior projections may be small, but the posterior part of the body is always developed into one rather long spine.

34. C. breviconis n. sp.

Sp. ch. Body small, compressed, triangular in shape; three spines, two anterior and one posterior; the left anterior one quite small. There are small spines on the surface of the shell and the anterior spines, but the posterior spine is smooth.

This is a compact robust little species, about two and a half times as long as wide. The shell is curved so as to be convex on the dorsal surface, and concave on the ventral. The three horn-like processes or spines are straight prolongations of the shell; no specimen was found in which these were bent or curved.

It was found in August at Watangas Lake in connection with Peridinium tabulatum. A few were found in each of the six catches that were made with the townet. It was not found at any of the regular stations.

This form cannot easily be confounded with any known species.
and can be readily distinguished by its compact triangular form, and short, straight spines. Length including spines 0.115 mm. (2/7 in.). Width 0.046 mm. (5/10 in.). Scarce.

Class III. Infusoria.

Subclass I. Ciliata Perty.

Order Gymnostomata Bütschli. (Holotrichia Stein).

Family Enchelidae (Elhr.) Stein 1860.

Subfamily Holophryinae Perty.

Lacrimarya Elhr.

"Animals free-swimming, more or less cylindrical, elevate, or flask-shaped, moderately elastic, the anterior end narrowest, the apical extremity conical in outline, and separated from the remaining portion of the body by an annular constriction; cuticular surface finely and entirely ciliate."

35. L. truncata Stokes (85a).

This species was not found at any of the regular stations, but in August it was taken in a barge-net collection at the mouth of
Dogfish Lake. This species was found but once, and no other members of the genus are recorded. Among vegetation, Rare.

Subfamily Colepinae Clap. and L.

Colesa Nitzsch.

Animals more or less evenly ovate, persistent in shape, cuticular surface usually longitudinally and transversely furrowed, thus divided into numerous symmetrical quadrangular facets; the facets smooth and indurated, the narrow intervening furrows soft, and clothed with cilia; oral aperture terminal, surrounded with cilia slightly larger than those of the general surface.

38. C. hirtus Elbrgy.

This is a lively and interesting little species, and was found throughout the summer months. In May it was rare in tow from Station A. In June a few were found in surface tows from Stations D, and E; and in tow and among vegetation at Station C. In July it was rare in tows from Stations F, and G, and among vegetation at Station A, and scarce in tows from Stations C, and E, and among plants at Station D.
In August it was rare in tow from Station C, and scarce in tows from Station F, and Matangas Lake, and among vegetation at Stations C, D, and E. In September it was rare in tow from Station C, and among plants at Station E; and scarce among vegetation at Station C. In October it was rare in tow from Station C.

Subfamily Cycloculininae Stein.

Didinium Stein.

"Animals free-swimming, ovate or subcylindrical, provided with an anterior and posterior ciliary wreath; the anterior extremity snot-like, enclosing a tubular, protusible, prehensile proboscis?"

37. D. maseum D. F. Müll.

This very peculiar protocan was found in the aquaria started with mud from Station F. It was found but once or twice in the aquaria, and was scarce. This is a fine species of striking form, and very quick movements.

Family Tracheliidae Schinz.

Subfamily Anoploteleinae Bütschli.
Amphileptus Ehrbg.

"Animals highly elastic, moist, usually more or less flattened or compressed, the anterior region produced in the form of a trunk-like appendage, at the base of which the oral aperture is situated; cuticular surface entirely and finely ciliate; contractile vacuoles single or multiple."

38 R. ansae Ehrbg.

This species was found in August, in a bing-nest collection made among the plants at the mouth of Fogfish Lake. Scarce.

Dileptus Dujard.

"Large elongated, very long contractile trunk, at the base of which is the month opening. On the ventral surface of the trunk there is a band of trichocysts, and on each side a row of larger cilia. Trichocysts on the body also. Body uniformly ciliated. Contractile vacuoles numerous in a longitudinal row on dorsal surface of body. Nucleus band-like or moniliform."

39 D. ansae O. F. Müll.

This interesting species was also taken once during August in a
Birent collection made among the vegetation on the west side of Station E. Scarce.

**Family Chlamydodontaidae Stein.**

**Subfamily Nassulinae.**

*Nassula Ehrbg.*

"Body ovate, cylindrical, flexible, usually highly colored; oral aperture lateral; pharynx armed with a simple horny tube, or with a cylindrical fascicle of rod-like teeth; entire surface of cuticle finely and evenly ciliated."

**40. *N. ornata* Ehrbg.**

This species was found rare in an aquarium started with sand from Station F.

**Family Paraemaecidae S. K.**

*Paraemaecium* (Hoff 1752) emend. Stein 1860.

"Animals free-swimming, ovate or elongate, asymmetrical, persistent in shape, finely ciliate throughout; an oblique groove or buccal fossa developed on the ventral surface, at the posterior..."
extremity of which the oral aperture is situated; contractile vacuoles two, stellate.

44. P. aurelia A. F. Müll.

But very few individuals of this species were found, due possibly because none of the stations were located among stagnant water. In August it was rare among vegetation at Stations D, and E; and scarce in both surface and oblique tows from Station E. In October a few were found in oblique tow from Station E.

Suborder Spirotricha Bütschli.

Section 1. Heterotricha Stein.

Family Stentoridae Stein.

Stentor Aken.

"Animals sedentary or freely motile as will; bodies highly elastic and variable in form; when swimming and contracted, clavate, pyriform, or turbinate; when fixed and extended, trumpet-shaped, broadly expanded anteriorly, tapering off and attenuate towards the attached posterior extremity; cilia of the cuticular surface very fine, distributed
in even longitudinal rows; peristomal cilia cirrose, very large and strong.

42. S. polymorphus A. F. Müll.

This species was not abundant at any time. In April it was rare in surface tow from Station C; and scarce in surface tow from Station G. In May a few were found among the vegetation at Station B. In July it was scarce among the vegetation at Station A, and also in tow from the west side of Station C. This species has been found very abundant in an aquarium at the zoological laboratory. Large colonies more than half an inch in diameter, composed of a gelatinous substance, in which the animals were fixed, were found.

43. S. coerulescens Ehrlbg.

This species was not so widely distributed as the preceding. In May it was rare among vegetation at Station B, and common in tow from the west side of Station C. This form was also kept in aquaria at the zoological laboratory. Small glass jars filled with water containing some of them, and allowed to stand several weeks, would have the inside just lined with the starters. They reproduce very rapidly.
and a constant supply for laboratory work, can be kept on hand, if a little care be taken.

44. S. Barretti Barrett.

This species was met with but once. In March 1875, a few specimens were found in oblique tow taken at Station E. This species is closely allied to S. roeselii, but is not identical with it. I have seen both species and to me they appear distinct.

Another member of this genus was found, but could not be definitely determined. This was a small green species, and was quite abundant in Pumpkin Patch.

Section 2. Oligotricha Bütschli.

Family Halteriidae C. and L.

Halteria Thijsard.

"Animalcules free-swimming, more or less globose; oral aperture terminal, eccentric, associated with a spiral or sub-circular wreath of large cirrosc cirria; a zone of long hair-like setae or springing hair developed around the equatorial region."

45. H. grandinella A. F. Müll.
This peculiar species was present only in June, July, and August. In June a few were found among vegetation and in tow at Station E, and among plants at Station D. In July a few were found in tow from Station F. In August it was rare among vegetation at Station C, scarce in surface tow from Stations G and E, and common in tow from Station F.

Family Tintinnidae S. R.

Cadenella Haeckel.

"Animals free-swimming, conical or elongate, inhabiting an indurate lorica; oral aperture terminal, surrounded by an outer circle of long, flexible, tentaculiform cilia, and an inner circle of shorter, cirrate cilia or lappet-like appendages."

46. C. cratera Leidy (F9. Hafflingia cratera).

Among the Tintinnidae there is no species that attracts so much attention as does this one. In April it was scarce in tow from Station E; common in tow from Station G; and abundant in tow from Station C. In May it was scarce in tows from Stations C, D, and E.
and also among vegetation at the east side of Station C; and abundant in tow from Station G. In June it was found rare in tow from Station C, and scarce in tows from Stations II, E, and G. In July a few were found in tow from Station G. It was rare in tow from Station E, during July, August, and September. In September it was also rare in tow from Station G.

Six towings were taken during the latter part of August in different parts of Watangas Lake. A few of this species were found in all of the collections but one. That one taken near the south end of the lake, and near where the water from a large spring enters the lake, contained an abundance of these forms. Watangas Lake is fed almost entirely by springs, and so the water is comparatively cool during the summer, thus affording a congenial habitat for species that thrive better during cold weather. In February a few were found in tow from Station G, taken under eighteen inches of ice. This species serves as food for such rotifers as *Daphnia* and *Daphanichopus*

47. *C. illinoisensis* n. sp.
Sp. Ch. Animal small, inhabiting a narrow cylindrical or thimble-shaped shell, composed of the most part of small sharp-angled grains of sand. The funnus is obtusely conical or rounded. The shell is quite rough and usually slightly dilated at the oral opening. The sides are straight. Length a little more than twice as long as wide.

This is a minute species, but slightly longer than C. cratera Leidy, and might easily be overlooked. It has a characteristic shape, long, narrow, usually straight sides, slightly dilated at the mouth, and frequently with a blunty conical funnus, giving it the shape of a rather long thimble.

It was first found in April at Station G, in company with C. cratera Leidy. At this time it was common in the surface tow from this station. During this month it was also scarce in surface tow from Station C, and rare in surface tow from Station E. In May it was again found at Station G, but was scarce at this time. None were found after May.

Size. Average length .059 mm. (7/20 in.), width .0267 mm. (5/30 in.).
Section 3. Hypotricha Stein.

Family Azytrichidae (Elbrg.) Stein 1859.

Subfamily Pleurotrichinae Bütschli.

Stylonychia Elbrg.

"Animalcules free-swimming, persistent in shape, encrusted, ovate or elliptical, anterior styles usually eight, occupying a more or less distinct circular area; five claw-like ventral styles, and five straight anal styles; three long hair-like caudal setae usually developed at the posterior extremity."

48. S. mytilus Elbrg.

But few specimens of this form were found. In June it was scarce among vegetation at Station C. It was not found again until December, when it was common in a barge-net collection made at Station II.

Section 4. Peritricha Stein.

Family Vorticellidae Elbrg.

Subfamily Vorticellinae Bütschli.
Vorticella Lin.

"Body ovate, spheroidal or campanulate, attached posteriorly by a simple highly contractile, thread-like pedicle; adoral system consisting of a spirally convolute ciliary wreath, the right limb of which descends into the oral or vestibular fossae, the left one obliquely elevated and encircling the so-called rotary or ciliary disc, nucleus usually band-like."

42. V. similis Stokes (87).

This species was found in July. It was common on roots of Lemma from Pumpkin Patch.

Many other species of this genus were found, but none other could be determined with certainty.

Cardiumimus Clark.

"Animules ovate or pyriform, alike in shape and size, resembling Vorticella, but united in social clusters, and forming compound colony stocks, contractile; the muscular fiber within the compound pedicle not continuous throughout, but interrupted
at each bifurcation, so as to permit of the independent extension and contraction of the separate zooids.”

50. *C. polyplumum* Lin.

This species was found in July, on the roots of Lemma from Pumpkin Patch. The colonies that were found were rather small, scarce.

51. *C. lachmannii* S. K.

This species was abundant in May. It was first noticed at Station C, in some breeding cages that were used to rear aquatic insect larvae. This species multiplies very rapidly in food or stagnant water. Some in glass jars in the zoological laboratory multiplies so rapidly that in a few days the entire inside of the jars was coated with a dense grayish layer.

52. *C. granulatum* Kellicott (59).

This species was found in May. Many large colonies were found upon an Iselius taken among vegetation at the west shore of Station E. Commonly, *Gotheomusium Ehrlbg.*
"Animalcules like Vorticella, but often dissimilar in shape, and of two sizes; forming compound colony stocks; highly contractile; internal muscle of pedicle continuous throughout, not disconnected as in Cardiogaster."

53. G. arbuscula Elbrg.
This interesting and beautiful species was met with twice. Once in June when it was scarce in tow from Station C, and again in August when it was common in bottom tow from Station E. This is a very attractive form, the colonies are usually large and symmetrical; and when once seen will not soon be forgotten. Epistyliis Elbrg.
"Like Vorticella, forming colonies; attached in numbers to a rigid, uncontractile, more or less branching, tree-like pedicle; the gonids usually of similar shape and size."

54. E. plicatilis Elbrg.
This species was present during April and May. It was usually found upon smaller animals taken at the various stations. In
April it was scarce at Station B. In May it was scarce at Station C, and in tow from Station E, and common at the west shore of Station E, and the east shore of Station F. It was found on insect larvae, and on the snails, Physa and Vivipara. Tokophyra quadriradiata was sometimes found associated with it.

55. E. flanicas Ehrbg.

This species was abundant in May; when it was found among plants at Station B.

Alpressularia (Goldf. 1820, Ehrbg.) amended. Stein 1854.

"Colonies and pedicle same as in Erpistylis; ciliary disc attached to one side of the wide oral entrance or vestibulum, isolated and usually elevated a considerable distance above the margin of the peristome; a delicate hyaline collar-like membrane taking its origin from the inner border of the peristome, usually protruded with and forming a sort of under-lip to the ciliary disc."

56. O. rectans Ehrbg.

This species is listed as occurring in May; when it was found...
upon a small Planorbis, taken among the vegetation on the west side of Station C.

57. C. rugosa Kellicott (84).

This species was found in May. It was scarce in bottom too from Station C; and common among vegetation at the east side of Station F. This is a fine species and can be very easily recognized by the thick pedicle, and the sessile zooids. Schewiakoff (93), marks this species with a ?, but I see no reason for it.

One species of Scyphidia was found on the falkri of Ulia forma; and several species of Rhabdostyla were found on various Entomostraca, and small aquatic worms.

58. C. irritabilis n. sp.

Sp. Ch. Body ovate, elongated and truncated posteriorly; about two and a-half times as long as wide. Greatest diameter anterior of the middle, from where the sides slope gradually to the posterior end. Peristome border everted, thickened, forming a conspicuous ridge running, constricted below the border. Ciliary disc slightly dome-shaped, not lightly
elevated; two rows of cilia are present. The cuticular surface is smooth.
Endoplasm granular, yellowish color. Contractile vacuole large
Circular, placed in the anterior part near the peristome. Nucleus
Band-like, curved, placed transversely in the anterior part of the body.

The zooids are very sensitive and when contracted they have
An oval shape; the anterior part is projected into a worm-like
Prominence and thrown into numerous longitudinal folds; while
The posterior part is contracted around the base of the pedicle, and
Thrown into transverse plications. The membranous collar is not
Very conspicuous. The pharynx is large and extends half the length
Of the body, and is lined with cilia. The endoplasm in the posterior
Part of the body is clear, and numerous fine longitudinal striations
Can be differentiated. These unite and form the core of the stalk,
Which is also supplied with fine longitudinal striations. The stalk
Is variously branched, some of the zooids have long pedicles, while
Others are nearly sessile. The colonies are large, consisting of several
Hundred individuals. Multiplication by longitudinal fission was
noticed. Length 17.8 mm. (1/2 in.) to 20 mm. (3/4 in.). Width 0.78 mm. (3/30 in.).

This is a fine large species and was found during May, June, and July. In May it was common among material from the vegetation at Stations B, C, E, and G; and abundant at Station II. In June it was abundant at Stations B, and F; and in July it was common at Station E.

It was always found attached to some animal, especially to young musk turtles, Samaecheleya odorata. It occurred also on the backs of the snapping turtle, Chelydra serpentina, and the crayfishes, Cambarus diogenes, and Cambarus Blandingii var. acutus.

Fokophyra quadripartita was found common in company with this species; as was also a small species of Aperculania, which may turn out to be a variety. The gonids are small, length 0.8 mm. (3/30 in.), width 0.42 mm. (3/50 in.), but otherwise they seem to agree with the larger species. A part of the food of this species consists of diatoms and Euglenas.

This species is similar to Aperculania articulata Eliz, but differs from it in the shape of the body, character of the peristome border, and
phaeus, and the elevation of the ciliary disc.

Subclass II. Suctoria.

Family Acinetidae Bütschli.

Tokophrya Bütschli.

"Animalcules solitary, illoricate, globose, ovate, or elongate, attached posteriorly to foreign objects, by a more or less extensively developed rigid pedicle; tentacles suctorial, usually distinctly capitate, united in fascicles or distributed irregularly over the surface of the periphery."

Multiply by the formation of ciliate embryos within the body of the parent.

59. T. cyclops C. and L.

This species was found during May and July. In May a few were found on Cyclops taken in the tow from the west side of Station C. In July it was scarce on Cyclops found in tow from Station E.

60. T. quadrivaginata C. and L.

This species was more abundant than any other of the Suctoria. In May it was rare at the west side of Station C; and scarce at Stations B, D, and the west side of E. In June it was scarce at Station B;
and common at Station $F$. In September it was rare in
oblique tow from Station $E$. This species was usually found as-
sociated with *Epistylis plicatilis*, and *Tetraedra irritabilis*, and
was found attached to small animals taken among vegetation
at the various stations. It was found on *Cambarus diogenes*,
*Cambarus blandingii* var. *acutus*, *Chelydra serpentina*, *Brono-
clys odorata*, and *Hexagenia*.

*Acineta tiberi*

"Animalcules solitary, ovoid or elongate, secreting a protective
lorica, supported upon a rigid, more or less extensively developed
pelicle; tentacles suckorial, capitated, variously distributed."

61. *A. mystacina* tiberi

This species was common in the aquaria started with sand
from the bottom of Phelps' Lake. It is very voracious and lives
upon ciliates which it catches and then extracts the nutrient parts.
Several specimens were examined while thus eating, and the passage
of food particles through the tentacles was easily seen.
It is difficult to make a sharp distinction between the littoral or shore fauna, and the so-called pelagic or limnetic fauna, found in the open waters. The water was so shallow at the various stations (having an average of five feet in Derive and Thompson's Lakes, and about fourteen feet in the Illinois River) that without doubt many of the forms intermingled.

One peculiar fact was noted, and that is the occurrence of a number of the Rhizopods in the surface towns. Mr. Frank Smith* lists three species as occurring in surface collections, while at Havana nine species and two varieties were found. These are:

Arcella vulgaris Elsbg.  Diffugia lobostoma Leidy.
Arcella vulgaris var. discoides Leidy.  Diffugia corona Wallisch.
Arcella vulgaris var.unita Leidy.  Diffugia aculeata Elsbg.
Arcella dentata Elsbg.  Actinophys sol Elsbg.
Diffugia globulosa Day.  Actinosphaerium eichhornii Elsbg.
Diffugia pyriformis Perty.

These forms did not appear in the surface collections only once, but a number of times, so that in some cases they were quite a constant factor in the catches made.