

A LIST OF ALGÆ.

(Chiefly from Monroe County, Indiana.)

BY F. M. ANDREWS.

The list of Algæ given at the end of this paper includes about one hundred and seventy-five forms, most of which are from Monroe County, Indiana. Some few species of these Algæ are from the Eagle Lake and Turkey Lake in the northern part of Indiana, while a few others have been obtained from other sources. The collection of these forms has extended over a period of several years, for a continuous effort to obtain the forms here mentioned was not made except in the case of the Algæ found in the water works of this city in 1896. At this time some of the forms of Algæ then to be found in the city water works of Bloomington were collected by Dr. George J. Peirce, now of the Leland Stanford Junior University, Mr. A. C. Life, and myself. A title of the work done by us conjointly appeared in the proceedings of the Indiana Academy of Science for 1896, on page 208, entitled: "A Microscopic Examination of Certain Drinking Waters."

In this work not only the forms at the surface and edges of the reservoir were obtained, but also those to be found at different depths in the water. On account of the lack of more elaborate instruments and means for doing this, we hit upon a very simple but sufficiently effective plan. This was done by securing a bottle of the proper size and shape, fitted with a stopper, to a heavy cord. The stopper also was attached to a cord. After rowing out into the reservoir, the water of which varied from fifteen to thirty feet in depth, this weighted bottle was lowered to the desired depth by one string and the stopper partly removed by the other string. After the bottle had filled with water, as could be told by the rising of bubbles, the stopper was allowed to slide back in place, thus reclosing the bottle. To prevent the stopper from being pulled out of the bottle and thus rendering it impossible to replace it before raising the bottle from the water, a string of the proper length was tied around the neck of the bottle and to the stopper. To be sure that the glass stopper would settle back into the bottle after filling, I found a band of rubber fastened around the neck of the bottle and the stopper to be effective in accomplish-

ing this end. It is always best to close the vessel used in such experiments to prevent the entrance of Algæ not at the depth at which it is desired to take the samples or to keep some in the bottle from being lost in raising the bottle to the surface. In this way it is easily possible to obtain specimens that are floating from any part of the body of water. By this method, too, it was shown that numerous forms of Algæ were distributed all through this body of water. The living ones were found in greater abundance at or near the surface, as would be expected, but they were also found in the deeper water as well. In some places the number of forms was often very small, but in order to make a study of the greater number from such a locality the following method was used: A suitable quantity of water was obtained in the above described way from the desired location, and this allowed to filter through a small surface. A funnel, the lower end of whose tube was closed with closely woven cloth, served quite well, and in this way enough forms would be obtained for a convenient study. Such concentration of forms, we may term it, also brings about a great saving of time in looking for forms that would otherwise be found only after much searching, and at the same time was more representative for any given depth.

The effectiveness with which various of the Algæ forms could be removed by means of sand was attempted. This will vary with the kind of sand employed. The kind of sand here employed was very fine, white sand, especially employed for the microscopic examination of water. The following are some of the results:

Twenty-five ccm. of water from the bottom of the reservoir, in five cm. of this sand, required seven minutes to filter.

One thousand ccm. of water from the surface of the reservoir required forty-three minutes to filter, through a closely woven cloth tied over the end of a very small glass tube. A considerable depth of very fine, clear sand is necessary to entirely remove all of the smaller Algæ forms from the water, for I found after only twenty-five ccm. of the water from this reservoir had been filtered through five cm. of fine sand, a considerable number of some forms came through. In one instance, in tap water, coming from this same source, some small forms came through four cm. of this fine, white sand, which to filter twenty ccm. it required one hour and twenty-five minutes.

In another case only eighty-five minutes was required to filter twenty-five ccm. of this water through four cm. of sand, due in this case to the less

quantity of sediment and forms than in the instance where one hour and twenty-five minutes was required for filtration. Some permanent slides were prepared in 1896 and part of these I still have, which show some of the various Algae forms obtained by the method above referred to. These slides were prepared by making a mounting fluid of the following substances:

Alcohol, 95%	10 ccm.
Glycerin	30 "
Distilled water	30 "
Acetic acid, 5%.....	30 "

Specimens mounted in this mixture should be sealed with balsam. The slide should be thoroughly cleansed and dry before ringing the cover-glass with balsam. The only danger from the loss of specimens so mounted is from the liability of the balsam to crack and allow the liquid under the cover-glass to evaporate. For this reason they had better have the balsam covered with a layer of dammar-lac or shellac, and be noticed from time to time and not kept in too warm a place.

Dilute glycerin seems also to be a good medium for mounting Algae. One specimen of *Pandorina* has been preserved and mounted in it fifteen years and is still apparently as green and as perfect as the day it was mounted. Camphor water¹ and glycerin also seem to give good results from the standpoint of preservation.

Other forms of the Algae of this list not found in the water works reservoir have been observed at different times and recorded as found. It is not supposed that this list of Algae here given is by any means complete, but gives an idea of a few out of an enormous number of forms that must be widely distributed. A good many of the forms here mentioned have been found by Mr. A. B. Williamson, one of the students in the Botany Department, and reported to me for the following list.

A list of the growing forms of plants in any locality is best made and more complete when extended over a series of years, so as to include those individuals which for various reasons or changes of conditions do not appear during one season.

¹ Stokes—Analytical Keys to the Genera and Species of the Fresh-water Algae, p. 20.

A LIST OF ALGÆ.

Glœocapsa polydermatica.	Synedra Acus.
“ aeruginosa.	“ pulchella.
“ coracina.	Fragilaria capucina.
“ rupestris.	Achanthes Hungarica.
“ sanguina.	
	Cocconeis placentula.
Chroococcus turgidus.	Eunotia gracilis.
“ coherens.	“ pectinalis.
Spirulina Jenneri.	
“ duplex.	Amphora ovalis.
Glœotrichia pisum.	Epithemia turgida.
“ natans.	“ gibba.
Calothrix gracilis.	
Tolypothrix distorta.	Gyrosigma attenuatum.
“ tenuis.	
	Spirogyra jugalis.
Rivularia Dura.	“ nitida.
“ echinulata.	“ crassa.
Seytonema tolypothrichoides.	“ decimina.
“ myochrous.	“ setiformis.
“ natans.	“ gracilis.
	“ fusco-atra.
Sirosiphon pluvinatus.	“ communis.
	“ quinina.
	“ longata.
Hapalosiphon tenuissimus.	
	Zygnema leiospermum.
Nostoc pruniforme.	“ insigne.
“ verrucosum.	“ anomalum.
“ sphaericum.	
“ commune.	Zygonium decussatum.
Anabæna inaequalis.	Mougeotia divarecata.
Nizschia sigmoidea.	Mesocarpus nummuloides.
“ constricta.	“ recurvus.
“ acicularis.	“ robustus.
Cocconema lanceolatum.	

Staurastrum arcticon.	Oedogonium crassum.
“ muticum.	“ sexangulare.
“ dejectum.	“ obtruncatum.
“ incisum.	“ fonticola.
“ alternans.	
“ crytocerum.	Bulbochaete intermedia.
“ arachne.	
“ gracile.	Colochaete irregularis.
“ vestitum.	“ soluta.
“ hirsutum.	“ scutata.
“ spongiosum.	
“ luteolum.	Draparnaldia glomerata.
Pediastrum Boryanum.	Stigeoclonium nanum.
“ pertusum.	
“ tetras.	Cylindrospermum macrospermum.
	Cylindrocapsa geminella.
Sorastrum spinulosum.	Merismopædia glauca.
	“ convoluta.
Cælastrum microporum.	Oscillaria chalybea.
“ cambricum.	“ cruenta.
	“ tenuis.
Scenedesmus obtusus.	“ subfusca.
“ dimorphus.	“ natans.
“ caudatus.	“ antliaria.
“ acutus.	“ limosa.
	“ percursa.
Pandorina morum.	“ princeps.
	“ Froelichii.
Endorina stagnalis.	“ brövis.
Volvox globator.	Navicula viridis.
Sphaerella (Chlamydococcus)	“ sphaerophera.
pluvialis.	“ serians.
	“ alpina.
Ulothrix subtilis.	
“ muralis.	Cymbella lanceolata.
Gonium pectorale.	Meridion circulare.
Cladophora glomerata.	
“ fracta.	Diatoma elongatum.
“ crispata.	

- | | |
|--------------------------|------------------------------|
| Melosira arenaria. | Euastrum crassum. |
| " varians. | " cuneatrum. |
| Gomphonema geminatum. | " didelta. |
| " constrictum. | " ansatum. |
| Licmorphora flabellata. | Micrasterias radiosa. |
| Tabellaria fenestrata. | " papillifera. |
| " flocculosa. | " truncata. |
| Pleurocarpus mirabilis. | Chaetophora pisiformis. |
| Cosmarium obsoletum. | " elegans. |
| " sexangulare. | " tuberulosa. |
| " globosum. | Pleurococcus viridis. |
| " orbiculatum. | Dactylococcus bicaudatus. |
| " cucumis. | Botryococcus Braunii. |
| " suborbiculare. | Hydrodictyon utriculatum. |
| " benustum. | Conferva floccosa. |
| " quasillus. | " fugacissima. |
| Closterium acerosum. | " affinis. |
| " cucumis. | " vulgaris. |
| " Ehrenbergii. | Chlamydomonas pluviale. |
| " acutum. | " tingens. |
| " attenuatum. | Dictyosphaerium reniforme. |
| " Leibleinii. | Tetraspora cylindrica. |
| Hyalotheca dissiliens. | " lubrica. |
| Desmidiium Swartzii. | Raphidium polymorphum. |
| Mesotenium Braunii. | " convolutum. |
| Spirotocia condensata. | Vancheria sessilis. |
| Docidium crenulatum. | " gemmata. |
| " connatum. | " terrestris. |
| " nodosum. | " sericea. |
| Tetmemorus Brebissonii. | " Dillwynii. |
| Xanthidium armatum. | Botridium granulatum. |
| Arthrodesmus convergens. | Batrachospermum moniliforme. |