

**THE PROTOZOA OF  
IOWA, VOL. XI,  
SEPTEMBER 1906**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649177462

The protozoa of Iowa, Vol. XI, September 1906 by Charles Howard Edmondson

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**CHARLES HOWARD EDMONDSON**

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SEPTEMBER, 1906

VOL. XI. PAGES 1-124

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**Proceedings**

— OF THE —

**Davenport Academy of Sciences**

**THE PROTOZOA OF IOWA**

BY CHARLES HOWARD EDMONDSON

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Published from the Income of the  
**Putnam Memorial Fund**

DAVENPORT, IOWA, U. S. A.  
DAVENPORT ACADEMY OF SCIENCES

1906

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Beginning with Volume XI the Davenport Academy of Sciences will change the manner of publication of its PROCEEDINGS. To avoid the delay incident to waiting for volumes to be completed, and to make less likely the burying of valuable papers in a general volume, hereafter the separate papers will be distributed in pamphlet form as soon as printed. The last section of each volume will contain reports of officers and a record of the Academy meetings, together with title page for the volume, table of contents, and index. This plan will make possible the binding of the volumes of the PROCEEDINGS by those libraries and societies that wish to keep their file intact. On the other hand there will be a more prompt and direct distribution of the separate papers to those who are most interested.

THE PUBLICATION COMMITTEE

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September, 1906.

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VOL. XI. PAGES 1-124

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## Proceedings

— OF THE —

# Davenport Academy of Sciences

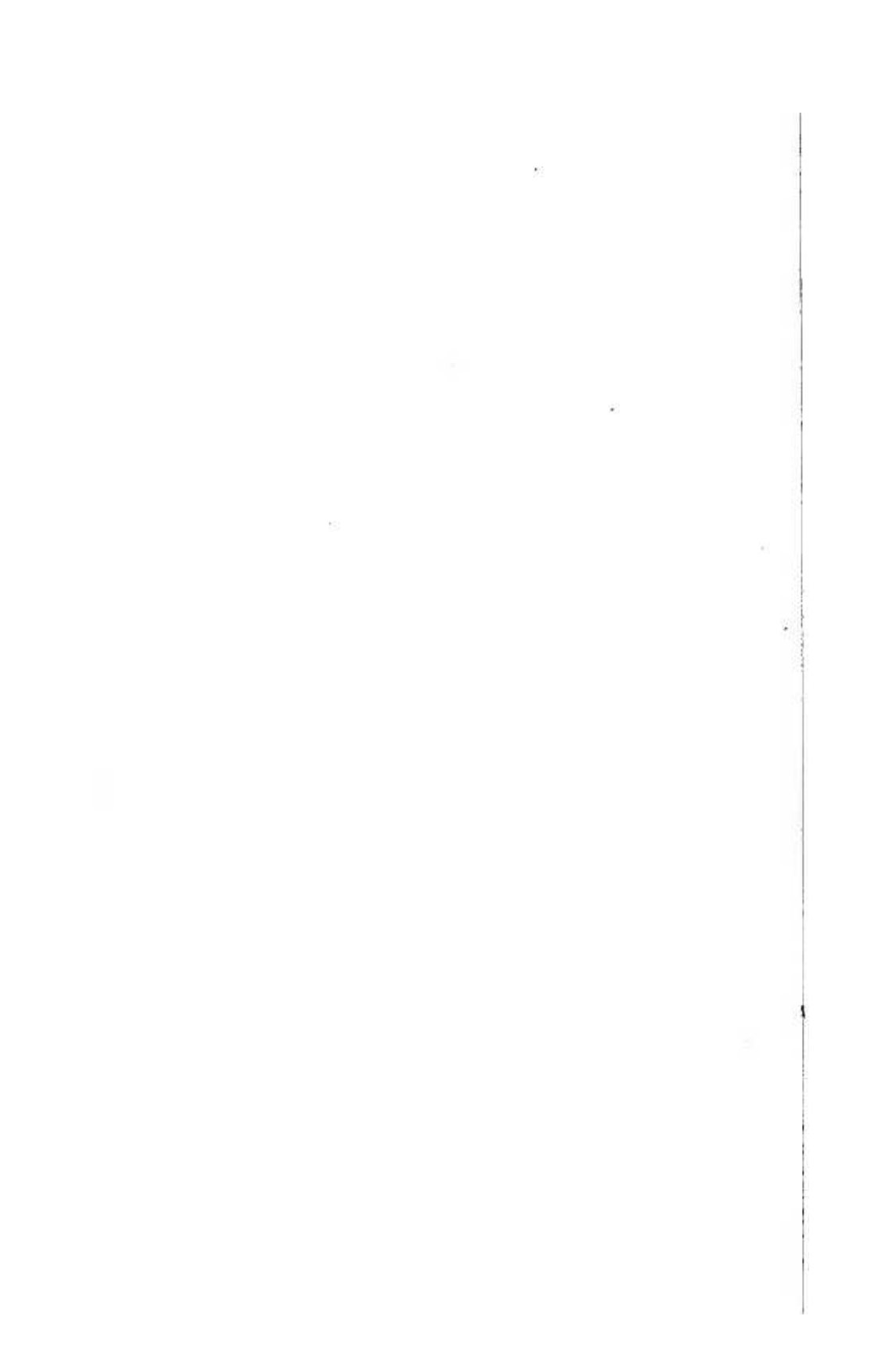
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PROCEEDINGS OF THE DAVENPORT ACADEMY OF SCIENCES

Davenport, Iowa, September, 1906

Vol. XI, Pages 1-124

**THE PROTOZOA OF IOWA.**

**A STUDY OF SPECIES KNOWN TO OCCUR IN THE WATERS  
OF THIS STATE**

By CHARLES HOWARD EDMONDSON.

**A THESIS**

Submitted to the Faculty of the Graduate College of the State University  
of Iowa for the Degree of Doctor of Philosophy.

INTRODUCTION.

To the zoölogist the Protozoa which swarm the seas and are found abundantly in inland rivers, lakes, ponds and pools, adapting themselves to nearly every condition of moisture, offer an interesting and fruitful field for investigation.

The one-celled animals concern the student of Nature not only because of their position in the scale of animal life; not only by reason of their economic value both positive and negative, but also because many of the phenomena exhibited by highly specialized life can be explained only by a knowledge of the characteristics and behavior of these lowly organisms.

Although discovered in 1675 by Leeuwenhoek, the unicellular nature of the Protozoa was not declared with assurance until 1848, but within recent years these one-celled animals have not been unimportant factors in solving puzzling biological problems when subjected to skilful and patient experimental work. Especially have the Protozoa been a means of advancing the knowledge concerning the animal cell by the careful labor of many devoted students of science, and as a result of the concentration of attention upon the simplest of microscopic animals problems of a diverse and complex character have arisen. There is some

reason to believe, in the light of recent experimental work, that the psychical is a factor in the behavior at least of the higher forms of unicellular animals; the discovery of the relation of parasitic Protozoa to various diseases has opened up a broadening field for the pathologist, and no doubt, in the future, questions of sanitation involving the Protozoa will arise, as others have already arisen, making a knowledge of the forms which inhabit the sources of common water supplies, their life histories and the means of successfully combatting them essential for the protection of the public health. An acquaintance, therefore, with as many species as possible, their structure and the conditions under which they exist would seem to be quite desirable.

From a purely systematic point of view the one-celled animals of this country have been neglected, only a few workers here and there having devoted a portion of their time toward classifying and working out the life histories of the species in their immediate vicinities.

The purpose of this paper is to furnish a preliminary report on the species of Protozoa to be found in the waters of the state of Iowa. It is an attempt to set forth, in as plain and concise terms as possible, descriptions of species already known which inhabit the waters of this state, also calling attention to certain forms which apparently have been undescribed previous to this time. Drawings of the species observed have been made either from the living specimens or from permanent preparations, the former being in most instances preferable and more accurate as even the best of reagents may give to the delicate organisms a distorted and unreal appearance.

The entire state has not been covered in the preparation of this paper although the waters of more than thirty counties comprising the eastern, central, southern and extreme north-western portions of the state have been examined. Observations have been made over wide enough territory for us to conclude that the distribution of Protozoa in this state is quite general. For the most part, species taken from Lake Okoboj were identical with those found in the ponds, pools and small streams of the south-eastern counties of the state and, with few exceptions, species found in other localities of the state have been obtained from the waters of Johnson county where the greater part of the work for this paper

has been done. In some instances individuals of the same species have been found in widely separated regions while the species was not found in intermediate localities. This, however, is not conclusive evidence that the species did not exist in the intervening territory.

Judging from collections of material in various counties, so general seems to be the distribution of Protozoa that it is quite probable that a permanent body of water such as a small lake would, during the different seasons of the year, furnish most of the species that might be obtained from the waters of the entire state.

Although perhaps the most successful group of animals because of their minute size, the nature of their habitat, their power of encystment, rapidity of reproduction and manner of distribution, all forms of fresh water Protozoa do not indiscriminately find a habitat in similar environments. After considerable experience in collecting them one learns to know, with at least some degree of accuracy, the conditions under which species exist. Such knowledge is of some value when certain forms are desired for biological studies. Holotrichous and hypotrichous ciliates are commonly found in stagnant and bacteria-laden water, while the Mastigophora and shell bearing Rhizopods preferring a purer habitat are commonly found among algae and other plants of low rank. Stalked peritrichous forms may be found in fresh water in running streams or quiet pools, usually attached to stones, sticks, leaves, etc. Vorticella, however, is commonly observed in stagnant pond water. For the most part, suctorians have been found among aquatic plants in fresh water.

Some species are bottom swimmers while others are found at the surface; some seek the shaded places while others are attracted by the light. It should be noted that these are only general habitats and a species may be found in very diverse environments when conditions are correct for its existence.

In making permanent preparations of Protozoa various methods may be employed. Shelled Rhizopods and forms possessing well-defined lorice may be readily and permanently preserved by allowing them to dry on the slide, then mounting in balsam. Glycerine preparations of many forms of Protozoa may also easily be made by draining off as much water as possible after the organisms are fixed, then applying glycerine, but it is often necessary to nullify