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# A STUDY OF THE FRESH-WATER CRUSTACEA (EXCLUSIVE OF THE COPEPODA) OF THE ROCHESTER AREA

by

ALICE A. LARSEN

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# A STUDY OF THE FRESH-WATER CRUSTACEA (EXCLUSIVE OF THE COPEPODA) OF THE ROCHESTER AREA

*by*

ALICE A. LARSEN

Submitted in partial fulfillment of the requirements for the degree of Master of Science at the University of Rochester, Rochester, New York, 1956.

Supervised by William B. Muchmore, Ph.D., Department of Biology.

## ACKNOWLEDGMENTS

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## INTRODUCTION

The recent fresh-water Crustacea of the Rochester area heretofore have not been investigated intensively, either taxonomically or ecologically. A limnological investigation of Irondequoit Bay in 1939–1940 by Tressler and Austin (1953) resulted in only a short list of Cladocera. Biological surveys of the Lake Ontario watershed and Irondequoit Bay conducted by the New York State Conservation Department have been concerned with the plankton as fish food and have not specifically identified the Cladocera nor noted ecological items. Any species of the various orders known from the area have been collected incidentally, and no intensive survey has been attempted.

The only comprehensive surveys conducted in New York State known to the writer are one by DeKay (1844) in which lists of Crustacea were compiled from the entire state, and one by Paulmier (1907) for the New York City area. Smaller isolated studies, such as Sibley's (1926) biological survey of the Lloyd Cornell reservation and Wilson's work (1929) have been conducted, but nothing extended has been done in recent years. It is to correct this lack for the littoral regions that the present study has been undertaken in the Rochester area.

The purpose of this study is to present a preliminary survey of the littoral species of Crustacea (exclusive of the Copepoda) of the Rochester area including distributional and ecological notes. No attempt has been made to study seasonal fluctuations quantitatively or to measure detailed physical and chemical factors of the environment.

The survey is based on collections made in the spring, summer, and fall of 1954. A few other isolated collections by others have been included as is indicated in the discussions of each order. The area covered extended on the north to Lake Ontario, west to Cedar Springs, east to Irondequoit Bay, and south to Mendon Ponds, Plate I. A variety of habitats was covered as is shown by the descriptions of the collecting stations.

The following species were collected in this work. Due to the confinement of the sampling to littoral areas, and the omission of spring collections, the list is incomplete. It is particularly poor for the Anostraca, Conchostraca and Decapoda.

**Crustacea of the Rochester Area, Species List**

Anostraca

*Chirocephalopsis bundyi*

Conchostraca

*Lynceus brachyurus*

## Cladocera

*Sida crystallina*
*Daphnia pulex*
*Daphnia longispina*
**Simocephalus expinosus*
*Simocephalus serrulatus*
*Simocephalus vetulus*
*Scapholeberis mucronata*
*Ceriodaphnia reticulata*
*Bosmina longirostris*
*Ilyocryptus sordidus*
*Ilyocryptus spinifer*
**Macrothrix rosea*
*Macrothrix laticornis*
*Eurycercus lamellatus*
*Camptocercus rectirostris*
*Kurzia latissima*
*Graptoleberis testudinaria*
**Leydigia acanthocercoides*
*Leydigia quadrangularis*
†*Alona affinis*
†*Alona costata*
*Alona guttata*
†*Alona rectangula*
*Alona quadrangularis*
†*Chydorus globosus*
*Chydorus sphaericus*
*Pleuroxus denticulatus*
*Pleuroxus hamulatus*
*Pleuroxus procurvatus*
*Pleuroxus striatus*

## Ostracoda

**Candona punctata*
**Candona fluviatilis*
**Candona simpsoni*
**Candona decora*
**Candona n. sp.*(†)
**Cyclocypris forbesi*
*Cyclocypris sharpei*
**Cyclocypris ovum*
**Cypria turneri*
**Physocypria pustulosa*
*Cypricercus splendida*
*Cypridopsis vidua*
**Potamocypris smaragdina*

## Isopoda

*Asellus communis Say*
**Asellus militaris Hay*
*Lirceus lineatus Say*

## Amphipoda

*Hyalella azteca*
*Gammarus limnaeus*
*Gammarus fasciatus*
*Crangonyx gracilis*

## Decapoda

*Cambarus bartoni robustus*
*Orconectes limosus*
*Orconectes propinquus*
*Orconectes immunis*

* First record from New York State.
† Probably first record from New York State.

## MATERIALS AND METHODS

In the selection of collecting sites an attempt was made to choose randomly, whether the area looked favorable for crustacean life or not. At each station, samples were taken from open water as well as among aquatic plants. However, collections were made only in the littoral areas of ponds and lakes; consequently there are no exclusively limnetic species in the study. Since the survey was a qualitative one, several sweeps of a fine mesh dip net through the water sufficed. The contents were washed into appropriately labelled collecting jars. In addition samples of vegetation were collected, noted and washed to collect any animals on them. Crayfish were collected by hunting under rocks and along the banks.

At almost every site the temperature of the shallow water was taken; likewise, hydrogen-ion concentrations were determined at most stations through the use of *Accutint* pH test papers. The accuracy of these papers is not great but they sufficed to give an indication of the pH range within .5 of a point. At each station notes were also made of the type of habitat with a short description of the vegetation.

Samples of animals were usually sorted under a binocular dissecting microscope and killed within two days of collecting. When it was not possible to kill the animals on the same day the sampling was done, they were placed in open glass containers in the food compartment of a refrigerator where they kept in reasonably good condition.

Unless otherwise noted in the specific preparation methods for each order, all the animals were killed and preserved in 70% ethyl alcohol until identifications could be made. In general, identifications were made from dead animals, living members of the same species serving for reference. This was not possible for the ostracods, however.

Specific details of the preparation of the animals for identification varies considerably for each order and are included in a special section under the discussion of each order.

## COLLECTING STATIONS

A variety of ecological habitats were covered by the Author: stagnant marshes, temporary pools, permanent ponds and lakes, swift clear streams, sluggish creeks, ditches, part of Lake Ontario, and Irondequoit Bay. The collecting areas are roughly arranged according to the type of habitat. A brief description of the stations follows, usually with the temperatures and pH readings on the dates collections were made (1954, unless otherwise stated). Tables I and II tabulate the species found at each station, and Plate I gives the geographical locations. Restricted and minor areas and the stations of other collectors are noted in the specimen lists.

TABLE I.

DISTRIBUTION OF THE CRUSTACEA IN THE PONDS, LAKES, AND MARSHY AREAS OF ROCHESTER

| | *Cladocera* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | *Ostracoda* | | | | | | | | | | | | | | | | *Isopoda* | *Amphipoda* | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sida Crystallina | Daphnia longispina | Simo. serrulatus | Simo. vetulus | Scaph. mucronata | Cerio. reticulata | B. longirostris | I. sordidus | I. spinifer | Macrothrix rosea | E. lamellatus | Camp. rectirostris | Kurzia latissima | G. testudinaria | L. quadrangularis | Alona affinis | Alona costata | Alona guttata | A. rectangula | A. quadrangularis | Chydorus globosus | Chydorus sphaericus | P. denticulatus | P. hamulatus | P. procurvatus | P. striatus | Candona punctata | Candona fluviatilis | Candona simpsoni | Candona decora | Candona n. sp. | Cyclo. forbesi | Cyclo. sharpei | Cyclo. ovum | Cypria turneri | Physo. pustulosa | Cypridopsis vidua | Potamo. smaragdina | Asellus communis | Hyalella azteca | Gammarus fasciatus | Crangonyx gracilis |
| *1. Mt. Hope Pond* | x | | | | | x | | | | | | | | | | | | | | | | x | | | | | | | | | | | | | | x | | | | | | | |
| *2. Lily Pond* | | | x | x | x | x | | | | | | | | | | | | | | | | x | x | | | | | | | | | | | | x | x | | | x | x | x |
| *3 Riley Pond* | | | x | x | | x | x | | | | | | | | | | | | x | | | | | | | | | | | | | | | x | x | x | x | | | |
| *4. Black Creek Marsh* | | | x | x | | | | | | | | | | | | | | | | | | x | x | | | | | | | | | | | | x | x | | | x | | |
| *5. Blue Pond* | | | | x | | | | | | | x | | | | | | | | | | | x | x | | | | | x | x | | x | | | | | x | | x | x | | | |
| *6. Deep Pond* | | | x | x | | | | | x | x | | x | | | | | | | | | | | | | | | | | | | | x | x | x | x | x | | x | | | |
| *7. 100 Acre Pond* | | | | | | | | | | | | | | | | | | | | | | | | | | | | x | x | | | | | x | | | | | | | |
| *8. Tobin Rd. Pond* | | | x | x | | x | | | | | | | | | x | | | | | | | x | | | | | | | | | | | | x | x | | | | | | |
| *9. Ellison Marsh* | | x | x | x | x | x | | | | | | | | | | | | | | | | x | | | | | | | | | | | | | x | x | | | | | | |
| *10. Buell Pond* | | | | | | | | | | | | | | | | | | | | | | x | | | | | | x | | | | | | x | | x | | x | x | | x |
| *11. Ridgewood Pond* | | | | | x | | | x | | | | | | | | | | x | x | | | x | | | | | | x | | | | | | | x | x | x | | x | | |
| *12. Durand Lake* | | | | x | | | | x | | | | | | x | | | x | x | | | | x | x | | | | | x | | | | | | x | x | x | | x | x | | |
| *13. Ponds S. Durand Lake* | | | x | x | | x | | | | | | | | | | | | | | | | x | x | | x | | | | | x | | | | | | x | | x | x | | |
| *14. Eastman Lake* | | | | | | | | | | | | | x | | | | x | x | | | | x | x | | x | | x | | | x | | x | | x | | x | | x | x | x | |
| *15. Marsh S. Eastman Lake* | | | | | | | | | | | | | | | | | | | | | | x | | | | | | | x | x | | | | x | x | | x | | x | x | | x |
| *16. 2 ponds W. Eastman Lake* | | | x | | | | | | | | | | | | | | | | | | | x | | | | | | | | | | | | | x | | | | x | x | | |
| *17. Buck Pond marsh* | | | x | x | | x | | | | | x | | | | | | | x | | | | | | | x | | x | x | x | | | | | x | x | x | | x | x | | x |
| *18. Buck Pond entrance* | x | | | x | | | x | | | | x | | | | | | | | | | x | x | x | | x | | | | | | | x | | | | x | | x | x | x | | |
| *19. Buck Pond (Long Pond Rd.)* | | | | x | x | | | | | | | | x | | | | | | | | | | | x | x | x | | | | | | | | | x | | x | | x | | | |
| *20. Round Pond* | | | x | x | | x | | | | | | | x | | | | | | | x | | | x | | | | | | | | | | | | x | | | | x | | | |
| *21. Long Pond* | x | | | | | | | x | | | x | | | | | x | | | | | | | | | | | | | | | | | | | x | x | | x | | x | | |

## Table II.

Distribution of Crustacea in the Rivers, Creeks and Irondequoit Bay of Rochester

| | | *Eubranchiopoda* | | *Cladocera* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | *Ostracoda* | | | | | | | | *Isopoda* | | | *Amphipoda* | | | | *Decapoda* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | C. bundyi | C. brachyorus | Sida. crystallina | Daphnia pulex | Simo. expinosus | Simo. serrulatus | Simo. vetulus | Scaph. mucronata | Cerio. reticulata | B. longirostris | I. sordidus | Macro. laticornis | E. lamellatus | Camp. rectirostris | L. acanthocercoides | L. quadrangularis | Alona affinis | Alona guttata | Alona rectangula | Alona quadrangularis | Chydorus globosus | Chydorus sphaericus | P. denticulatus | P. hamulatus | P. procurvatus | Candona fluviatilis | Candona simpsoni | Cyclocypris ovum | Cypria turneri | Physio. pustulosa | Cypricer. splendida | Cypridopsis vidua | Potamo. smaragdina | Asellus communis | Asellus militaris | Lirceus lineatus | Hyalella azteca | Gammarus limnaeus | Gammarus fasciatus | Crangonyx gracilis | Cambarus bartoni r. | Orconectes limosus | Orcon. propinquus | Orconectes immunis |
| Rivers | *Genesee R.—Faculty Rd.* | | | x | x | | x | | x | | x | | | x | x | x | x | | | x | x | x | x | x | x | | | | | | x | | x | | | | | | | x | | | | | | x | |
| | *Genesee R.—Elmwood* | | | x | x | | x | x | x | | | | | x | x | | | | | x | x | x | x | | x | | | | | | x | | | | | | | | x | x | | | x | |
| | *Genesee R.—E149* | | | x | | | x | | x | | | | | x | | | | | | x | | x | x | x | | | | | | | x | | x | | | | | x | | | x | | | | |
| Moderately Flowing Creeks | *Red Creek—Hawthorne* | | | x | | | x | | | | | | x | | | | x | | | | | | x | x | | | | | | | x | | x | x | | | | x | | x | | | | | |
| | *Red Creek—E. River Rd.* | | | | | | x | | x | | | x | | | | | | | | | | | x | x | | | | | | | x | | x | x | | | | x | | x | | | | | |
| | *Little Black Creek* | | | | | | x | | | | | | | | | | | | x | | | | | | | | | | | | x | | x | | x | | | x | | x | x | | | | |
| | *Irondequoit Creek (E)* | | | | | | | | | | | x | | | | | x | | | | | | | | | | | | | | | | | x | | | | | | x | | | x | |
| | *Hobbie Creek* | | | | | | | | | | | | | | | | | | | | | | | | | | x | | | x | | x | | | | | | | | | | | | |
| | *Slater Creek* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | x | | x | | x | | | | | |
| | *Round Pond Creek* | | | | | | | x | | | | | | | | | | | | | | | x | | | | x | | | x | | x | | | | | x | | x | | | | | |
| Swift Clear Streams | *Cedar Springs Streams* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | x | x | | | ? | | |
| | *Irondequoit Cr. (F)* | | | | | | | x | | | | | x | | | | | | | | | | x | x | | | | | | | | | | | | | | x | | x | | | | | |
| | *Creek S. Eastman Lake* | | | | | | | | | | | | | | | | | | | | | | | | | x | | | | | | | | x | | | x | x | | | | | | |
| | *Flemming Creek* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | x | | | x | | x | | |
| Irondequoit Bay | *Big Massaug Cove* | | | | | | x | x | x | | | x | | | | x | | | | | | x | | x | | | | | | | x | | x | | | | | x | | | | | | |
| | *Little Massaug Cove* | | | | | | | | | | | | | | x | x | | x | | x | | x | x | x | x | x | | | | | x | | x | x | | | | x | | x | | | | | |
| Others | *Barge Canal* | | | | | | | | | | | | | | | | | | | | | | | x | | | | | | | | x | | | | | | x | | x | | | | | |
| | *Pool (Cedar Springs)* | | | | | | | | | | | | | | | | | | | | | | x | | | | | x | x | | | | | | | | | x | | x | | | | |
| | *Ditch—Mendon Ponds* | | | | | x | | | | | | | | | | | | | | | | | x | x | | | | | x | x | | x | | | | | | x | | | | | | x |
| | *Temporary ponds and Powder* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | *Mill Park locations* | x | x | | x | | | | | x | | | | | | | | | | | | | | | | | | | | | x | | | | x | | | x | x | x | x | | | |
| | *Lake Ontario* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | x | | | | | |

**Ponds, Lakes, and Marshy Areas**

*Pond in Mount Hope Cemetery.*

This is a small stagnant pond full of green algae and balls of blue-green algae as well as other aquatic vegetation. Collections were made in the shallow edges at a depth of about six inches, in areas replete with tadpoles and larval mosquitoes. Temperature: 24°C, June 17. W. B. Muchmore made collections on September 23.

*Lily Pond in Highland Park off South Avenue.*

A small pond thick with green algae, water lilies, Elodea, duckweed, and dead leaves. The mud bottom is overgrown with Myriophyllum, and animals were collected from among this vegetation along the shore. Temperature: 23.5°C, June 17 and 19.

*Riley Pond below Cobbs Hill.*

A fairly shallow pond, it contains much Elodea, Potamogeton, Eleocharis and a variety of green algae. Collections were made among the vegetation and along the mud bottom. Temperature: 21°C, pH ca. 6–7, August 18.

*Marsh area from Black Creek on Scottsville Road.*

Collections were made in small pools in the muddy edge of a pond-like area. Cattails, decaying leaves, wood and other vegetation abound. Temperature: 7°C, November 5.

*Blue Pond near Cedar Springs Park.*

Collections were made from the shallow edges of this large pond. All the animals were found among the thick Anacharis which forms large masses near the bottom. Temperature: 7°C, pH 6.6–6.8, November 8.

*Deep Pond in Mendon Ponds Park.*

A large pond south of One Hundred Acre Pond. Its western shore line is a marshy area overgrown with cattails. Collections were made in the muck and small pools amid much duckweed. Temperature: 17–22°C, June 30 and July 10.

*One Hundred Acre Pond in Mendon Ponds Park.*

Collections were made along the shore of this large pond in shallow pools. November 17. Most of the animals collected were lost with the exception of the ostracods listed in Table I.

*Pond at the corner of Tobin and Clover Roads near Mendon Ponds Park.*

A shallow stagnant pond covered with green algae and lumps of blue-green algae, cattails, duckweed and other decaying vegetation. Collections were made along the shore in little pools present. Temperature: 10°C, November 17.

*Marsh along main road of Ellison Park.*

The area is covered with cattails and the bottom muck is full of duckweed and grasses. Collections were made in little pools of water found in between the plants. Temperature: 24° and 28°C, June 23 and July 28.

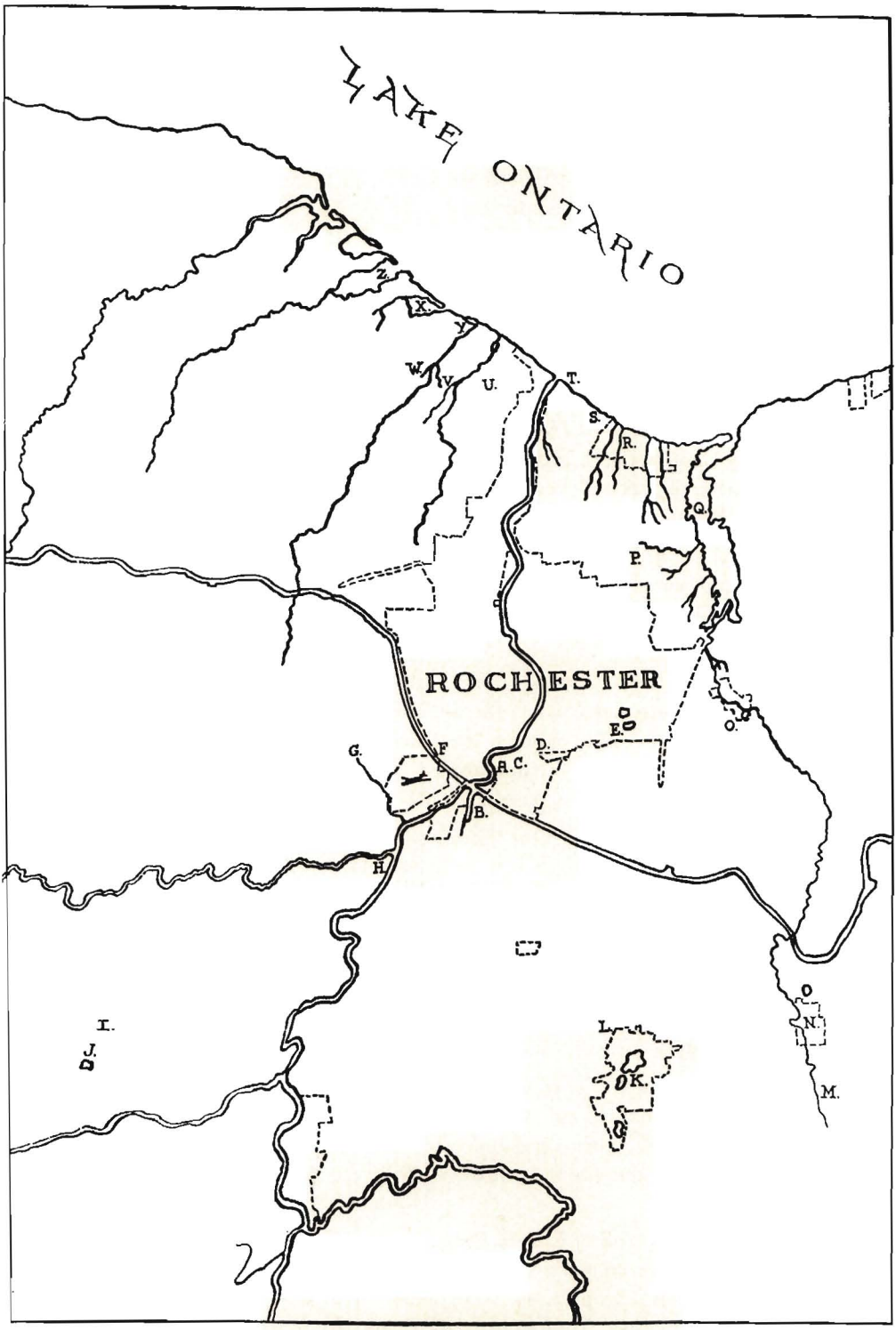
LAKE ONTARIO
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Plate I

COLLECTING SITES

A. Genesee River Area
B. Red Creek (Hawthorne Drive and East River Road)
C. Mount Hope Cemetery Pond
D. Lily Pond (South Avenue)
E. Riley Pond (Below Cobbs Hill)
F. Barge Canal (Brooks Avenue)
G. Little Black Creek
H. Little Black Creek marsh (Scottsville Road)
I. Cedar Springs Area
J. Blue Pond
K. Sites in Mendon Ponds Park
L. Pond at Tobin and Clover Roads
M. Irondequoit Creek at Fisher Road and Main Street-of-Fisher
N. Sites at Powder Mill Park
O. Ellison Park sites
P. Buell Pond and Hobbie Creek east of pond
Q. Little and Big Massaug Coves (west shore of Irondequoit Bay)
R. Sites in Durand-Eastman Park
S. Two ponds west of Eastman Lake
T. Site at Lake Ontario
U. Flemming Creek area
V. Slater Creek
W. Round Pond Creek
X. Sites at and near Buck Pond
Y. Round Pond
Z. Long Pond

*Buell Pond on Culver Road north of Ridge Road.*

A small stagnant pond with duckweed cover, algal masses, Ceratophyllum, and cattails along the shore. Collections were made in the shallow areas among the vegetation. Temperature: 23°C, August 18.

*Ridgewood Pond north of Ridge Road.*

A shallow pond with some aquatic vegetation, and parts of its shore are lined with cattails and duckweed. Temperature: 28°C, pH 8.2–8.5, September 7.

*Durand Lake in Durand-Eastman Park.*

Collections were made from the shore line of this large lake in sections where green algae, duckweed, Ceratophyllum, Rumex and other vegetation grows in abundance. Temperature: 13°–19°C, pH 6.6–7.6, September 16 and October 21.

*Ponds, southern extensions of Durand Lake.*

These are small ponds with marshy shores lined with cattails. Some duckweed, Elodea, and Pontamogeton were present in fairly clear water, and collections were taken from among them. Temperature: 12°C, pH ca. 6.5, October 21.

*Eastman Lake in Durand-Eastman Park.*

Collections were made from the shores of this lake amid water lilies, algal mats, Ceratophyllum, Rumex and other aquatic vegetation. Temperature: 15°–18°C, pH 6.5–7.0, September 16 and October 21.

*Marsh south of Eastman Lake.*

The area has the typical marsh vegetation: cattails, duckweed, mosses. Collections were made in small pools present. Temperature: 12°C, October 21.

*Two Ponds West of Eastman Lake along shore of Lake Ontario.*

Both ponds are similar to Eastman Lake in vegetation and type of water. Collections were made along the shore by rotting logs. Temperature: 12°C, October 21.

*Marsh east of Buck Pond near Island Cottage Road.*

An area full of cattails, duckweed, algal mats, lilies, and clumps of Sagittaria. Collections were made in the shallow margins near shore. Temperature: 15°C, September 21 and 30.

*Buck Pond at its entrance to Lake Ontario.*

Collections were made in the shallow water among clumps of aquatic vegetation. The water, although there is some duckweed, is fairly clear. Temperature: 15°C, pH ca. 7, September 30.

*Buck Pond east of Long Pond Road.*

Collections were made along the marshy shore among cattails and duckweed. Temperature: 15°C, September 30.

*Round Pond.*

A section of Round Pond has cattails and a duckweed cover. Collections

were made in water about two feet deep among clumps of Ceratophyllum. Temperature: 15°C, pH 6.5–7.5, September 21 and 30.

*Long Pond at its entrance to Lake Ontario.*

Collections were made in the shallow still water in which algae, Myriophyllum, and duckweed are found. Temperature: 15°C, September 30.

**Rivers**

*Genesee River opposite Faculty Road along River Boulevard.*

This protected area is pond-like, located between shore and an arm of land jutting into the Genesee. The water is still and overgrown with algae, cattails, Elodea and other aquatic vegetation. Collections were made in the shallows. Temperature: 23°C, June 17.

*Genesee River near Elmwood Avenue.*

Collections were made among the rocks on the eastern shore. The water is moderately still, for many rocks act as small breakwaters. Some dead leaves and rotting wood are present, but the water is fairly clear. Animals were obtained from depths up to two feet. Temperature: 24°C, June 22.

*Genesee River by Bridge E149 in Genesee Valley Park.*

Collections were made along the shore in shallow water full of Elodea. The water is still and clear, and the bottom is muddy. Temperature: 20.5°C, pH 6–6.2, September 11.

**Moderately Flowing Creeks**

*Red Creek off Hawthorne Drive in Genesee Valley Park.*

A small leisurely running creek of clear water with a mud bottom and grassy banks. Aquatic vegetation lines the shores, and collections were made in this vegetation. Temperature: 20°C, pH 6.2–6.4, September 11.

*Red Creek at East River Road.*

Collections were made in a marshy area created by the creek's invasion of a small wooded area. Animals were obtained from little pools in the mud, which is overgrown thickly with Sagittaria. Temperature: 20°C, pH ca. 6, September 11.

*Little Black Creek as it crosses Brooks Avenue.*

A small creek with clear water which during rains runs swiftly. The creek has a pebbled bottom over dark soil. Collections were made among the grasses, twigs, and some duckweed, although amphipods were found sparsely in clear midstream areas. The depth of the creek does not exceed two feet. Temperature: 6°–7°C, pH 6–6.4, September 14 and November 5.

*Irondequoit Creek in Ellison Park.*

A moderately swift clear creek about fifteen feet across with a sandy bottom. The depth does not exceed four feet, and collections were made

among the shore-line vegetation, and among some water plants in mid-stream. Temperature: 25°C, pH 6.6, July 28.

*Hobbie Creek east of Buell Pond.*

A tiny creek with clear running water over a sandy bottom. Collections were made about the scant vegetation. Temperature: 20°C, pH 6, August 18.

*Slater Creek, west of Dewey Avenue on Latta Road.*

A small sluggish creek full of algal mats, Elodea, cattails, and other vegetation. At the time the collections were made it was less than eight inches deep. It apparently has dry spells, for when it was revisited (June, 1955) a mere trickle of water was present. Temperature: 15°C, September 21 and September 30.

*Round Pond Creek on Island Cottage Road southwest of Round Pond.*

A moderately sluggish creek about ten feet wide. There are large beds of Elodea, some green algae, Potamogeton, Ceratophyllum, and scattered clumps of Sagittaria. Collections were made about the vegetation. Temperature: 15°C, pH ca. 7, September 21 and 30.

**Swift Clear Creeks**

*Streams in Cedar Springs Park.*

The park, at the time the collections were made, was crisscrossed with swift, clear, cold streams, many of them full of trout. The area about the brooks was heavily overgrown with sphagnum, and this moss, along with some bushes, often lined the banks. The depth of the mud-bottomed streams ranged from along one-half to one foot where the collections were made. Most animals were gotten from the protected banks. Some amphipods were found in mid-stream. Since the time of these collections the park has been greatly changed because of its conversion to a fish hatchery. Temperatures: 9°–10°C, pH 6.2–7.2, October 23 and November 8.

*Irondequoit Creek along Main-Street-of-Fisher and Fisher Road (south of Powder Mill Park).*

This part of the creek is about fifteen feet across with swift, clear water. It has a clay bottom and some rocks, with a depth of less than three feet. Much Elodea is present and some other grasses. Samples were taken around the vegetation. Temperature: 5.5°C, pH 7.0–7.4, November 17.

*Creek south of Eastman Lake.*

A small, moderately swift creek with some aquatic vegetation. Collections were made mid-stream and shore among the plants. Temperature: 12°C, pH 6.6–6.8, October 21.

*Flemming Creek, east of Dewey Avenue on Latta Road.*

The creek, about six feet wide, contains swiftly running clear water over a gravel and sand bottom. Amphipods and crayfish were in abundance swimming about the rocks and shore-line vegetation. Collections were made in mid-stream as well as along the shore. The same type of

animals were collected in both places. Temperature: 14°C, pH 6.8–7.2, September 21.

**Irondequoit Bay**

*Little Massaug Cove of Irondequoit Bay.*

A large protected cove of the Bay with fairly sandy soil. The shore contains some Elodea, rotting wood, and a few cattails. On September 7 the water was clear. Temperature: 28°C, pH about 8.

*Big Massaug Cove of Irondequoit Bay.*

This cove is immediately south of the preceding one and is characterized by a rather marshy area on one side. This section has cattails, duckweed, and other vegetation, and collections were made here. Temperature: 26°C, pH 8, September 7.

**Others**

*Barge Canal by Brooks Avenue Bridge.*

Collections were made along the edge of a concrete wall which has an unidentified green moss-like plant growing on it. The canal is very deep here so animals were gotten only from the surface and among the vegetation. Some collecting was done from a pebbled embankment along which water washes. The pH 6, September 14.

*Swimming Pool at Cedar Springs Park.*

Here some swift, clear streams are dammed and the resulting pool is used for swimming. It was lined with some aquatic vegetation and collections were made from these areas. The water was very cold and clear. Temperature: 7°C, pH about 7, November 8.

*Ditch by main road in Mendon Ponds Park.*

This is a temporary pond by a wooded area and overgrown with vegetation. July 10 (Richard L. Heinemann).

*Powder Mill Park Stations.*

Sporadic collections were made in various areas of the park. No record of the different orders of animals collected from each spot was kept. Below are listed the animals recorded from the park, the place of their collection and the date. These are listed here to facilitate the presentation of Table II.

Anostraca

*Chirocephalopsis bundyi*

Temporary pond, Park Road; March, 1954 and Spring, 1955.

Conchostraca

*Lynceus brachyurus*

Temporary pond, Park Road; March, 1954 and Spring, 1955.

Cladocera

*Ceriodaphnia reticulata*

Beech Grove; May 1955.

*Cypricercus splendida*
Beech Grove; April 1954.

*Daphnia pulex*
Beech Grove; April, 1954 and May, 1955.

Isopoda

*Asellus militaris*
Shores of ponds; April, 1954 and April, 1955.

Amphipoda

*Crangonyx gracilis*
Stream; April 1954.

*Gammarus fasciatus*
Stream; October 13, 1953.

*Gammarus limnaeus*
Stream; October 13, 1953.

Decapoda

*Cambarus bartoni robustus*
Streams; September 12, 1952 and November 27, 1954.

*Lake Ontario by the Summerville Coast Guard Station.*

A very scanty sample was taken from the water by the breakwater. Waves keep the water quite turbulent here but some animals were found about vegetation clinging to the concrete wall. Temperature: 13.5°C, pH 6–7, October 21.

## Animals of the Area

## DIVISION EUBRANCHIOPODA

The Eubranchiopoda are exclusively fresh-water animals resident in temporary ponds and pools usually during the spring and early summer. Only a few genera and species of this group are cosmopolitan. In fact, many species listed from the United States by Pennak (1953) are reported only from one isolated locality. Both species found in the Rochester area are common and widely distributed in the United States.

There have been many studies on the species of this group, one of the earliest in America being included in Underwood's monograph (1886). This work reports the following species from New York: *Eubranchipus holmani* (from Long Island), *E. vernalis,* and *Streptocephalus seali.* Shantz (1905) and Pearse (1912) published extensive notes on this group, and Pearse (1918) summarized the known species. The most comprehensive work on the world species of Anostraca and Conchostraca is a series by Daday published successively in 1910, 1915, 1923, 1925, 1926, 1927. He reports the following species from Long Island, New York: *Lynceus brachyurus, E. holmani,* and *S. seali.* Creaser (1930b) published a paper on the North American phyllopods of the genus *Streptocephalus* in which he, too, reported *S. seali* from New York, and in his earlier paper (1930a) he published a revision of the genus *Eubranchipus* in which he recorded *Chirocephalopsis bundyi* and *E. vernalis* from this state. Mattox (1939) in a study of the Phyllopoda of Illinois, and Dexter and Kuehnle (1951) in a survey of the fairy shrimp population of northeastern Ohio have summarized much distributional information. Mackin (1952) did much to clarify the specific names of some North American species of Branchinecta, and Linder (1941) clarified a great number of uncertain and controversial taxonomic questions in the group. Dexter (1953) reviewed the geographical distribution of the known Anostraca, giving some records on multiple species of Anostraca living together.

The following section lists only two members of the group Eubranchiopoda collected from two localities. Since most of the collections for this survey were made from June to November, most of the species of this group had disappeared with the vernal ponds. The members of the species which were collected were found in March and April. No significant ecological information was recorded for this sub-class.

### List of Species

*Division Eubranchiopoda*

*Order Anostraca*

*Family Thamnocephalidae*

*Genus Chirocephalopsis*

**Chirocephalopsis bundyi** Forbes, 1876

**Branchipus gelidus** Hay
**Eubranchipus gelidus** Hay

March, 1954: Park Road, Powder Mill Park (W. B. Muchmore); April, 1954: Genesee Valley Park pond (W. B. Muchmore); April, 1955: Powder Mill Park.

All the specimens were collected early in the spring in pools and ditches among grasses. Whenever found the members of the species were present in abundance, and in the April, 1955 collection *C. bundyi* was associated with *Lynceus brachyurus.*

*Order Conchostraca*
*Family Lynceidae*

*Genus Lynceus O. F. Müller*
*Limnetis Loven*
*Hedessa Lièvin*

Lynceus brachyurus O. F. Müller

**Hedessa Sieboldii** Lièvin
**Hedessa brachyura Siebold**
**Limnetis brachyurus** Grube
**Limnetis brachyura** Leydig
**Limnetis gouldii** Baird
**Limnetis mucronatus** Packard
**Limnetis zichyi** Daday

March, 1954: Park Road, Powder Mill Park (W. B. Muchmore); April, 1955: temporary pond in ditch, Powder Mill Park.

Whenever members of this species were found they were present in great numbers. In the April, 1955 collection *L. brachyurus* was found associated with *Chirocephalopsis bundyi.*

## ORDER CLADOCERA

This order has been intensively studied both taxonomically and ecologically, perhaps because of its availability in nearly all types of fresh-water habitats. Early comprehensive records of taxonomy and distribution in North America include Herrick and Turner's work (1895), and Birge's complete notes (1893, 1910). A very masterful treatment of this group by Birge (1918) has retained its authority until the present, for surprisingly little has been added to our knowledge of cladoceran taxonomy and distribution (Pennak, 1953). Recent listings of Cladocera for areas in the same ecological life zone are found in Langlois' book (1954) and in Ward's paper (1940).

Limnological studies throughout New York have resulted in a fairly complete list of genera for the state. As a result of biological studies conducted by the New York State Conservation Department, cladoceran genera have been listed for Cayuga, Seneca, and Oneida Lakes; lakes in the St. Lawrence watershed; Silver Lake and Conesus Lake; Lake Champlain (Muenscher, 1928, 1931, 1927, 1930); Oswegatchie and Black

River systems (Burkholder and Tressler, 1932); Mohawk-Hudson watershed; lower Hudson area lakes; Chautauqua Lake; lakes in the Raquette River watershed; lakes in the Delaware and Susquehanna watersheds; four Long Island lakes; Lake Ontario watershed, excluding Genesee River and its tributaries (Tressler and Bere, 1935, 1937, 1938, 1934, 1936, 1939, 1940); and lakes of the upper Hudson watershed (Burkholder and Bere, 1933). Since none of these studies include species identifications or much ecological data, their value is limited. However, individuals of all the genera recorded have been collected in this survey with the exception of two limnetic genera, *Holopedium* and *Leptodora,* and the following littoral genera: *Alonella, Acroperus, Acantholeberis, Diaphanosoma, Moina, Ophryoxus, Parophryoxus,* and *Polyphemus.*

Rimsky-Korsakoff (1930) in a study of the food of fishes in the Champlain watershed has recorded a detailed list of cladoceran species. Only four of the species listed have not appeared in this Rochester survey: *Leptodora kindtii, Holopedium gibberum, Acroperus harpae,* and *A. angustatus.* Of these, the first two are limnetic species and thus individuals could not have been collected by the methods employed in this survey. Sibley (1926) in a biological survey of the Lloyd-Cornell reservation collected members of eleven species of Cladocera, all of which occur in Rochester. The macroplankton in Eastern Lake Erie have been studied by Wilson (1929) and twenty-seven cladoceran species reported. Specimens of nineteen of these have been collected in the Rochester area. The following have not been found: *A. harpae, Ceriodaphnia pulchella, Chydorus gibbus, H. gibberum, Latona setifera, L. kindtii, Moina rectirostris* and *Pleuroxus adunctus.*

Of the surveys listing species, a limnological investigation of Irondequoit Bay conducted by Tressler and Austin (1953) in 1939–1940, is the only previous one known to the writer which includes waters sampled in the present study. Here *Alona* sp., *Bosmina longirostris, Daphnia longispina, D. pulex* (including *D. retrocurva*), *Leptodora kindtii* and *Sida crystallina* were reported. Individuals from all except the limnetic *L. kindtii* and the retrocurva variety of *D. pulex* have been collected fairly commonly throughout the Rochester area.

The following section lists specimens of the littoral species of Cladocera collected in this area. It is preceded by details of preparation and annotated with ecological and distributional data.

*Methods of Preparation.*

The specimens were usually killed in 95 per cent ethyl alcohol soon after collections were made. When *Sida crystallina* was found, it was killed by adding 70 per cent ethyl alcohol to the water in order to prevent too great a distortion caused by the swift contraction of its strong muscles. All specimens were preserved in 70 per cent alcohol until identifications could be made.

No dissections were necessary, but the animals were mounted on slides to facilitate identification. Slides were first ringed with Murrayite cement and allowed to dry thoroughly. CMC-10, a non-resinous mounting medium, was added to the cavity and the animal was put directly from alcohol into the medium and oriented. A cover slip was then applied and after a few days it was ringed with the cement. This new mounting medium has the advantage of being a clearing agent and is soluble in water, formalin, and alcohol. A disadvantage was observed, however, in its long drying time. It also tended to dissolve the Murrayite giving the completed slide a brown streaked appearance. It might be more advantageous to use Höyer's Medium.

## List of Species

*Order Cladocera*
*Suborder Calyptomera*
*Tribe Ctenopoda*
*Family Sididae*
*Genus Sida Straus, 1820*

**Sida crystallina** (O. F. Müller, 1785)

June 17: Genesee River near university; June 22: Genesee River near university; September 11: stream off Hawthorne Drive in Genesee Valley Park, stream off bridge on East River road; September 23: Mt. Hope Pond (W. B. Muchmore, collector); September 30: Long Pond at its entrance to Lake Ontario, Buck Pond at its entrance to Lake Ontario.

Temperature range: 15–24 degrees centigrade, pH 6–7.4. Members of this species were found in the littoral areas of ponds, Genesee River and creeks, among weeds and often rotting wood. They were associated with many Cladocera, and appear to be quite common in this area. This species has been reported from Irondequoit Bay (Tressler and Austin 1953), as well as other parts of New York State.

*Suborder Calyptomera*
*Tribe Anomopoda*
*Family Daphnidae*
*Genus Daphnia O. F. Müller, 1785*

**Daphnia pulex** (de Geer, 1778)

April 6: Park Road, Powder Mill Park; June 22: Genesee River, shallows near Elmwood Avenue Bridge; June 17: Genesee River, shallow inlet opposite Faculty Road; April 4, 1955: Powder Mill Park.

Temperature range: 23–24°C. Specimens have only been found in the spring and early summer, and then not in very great abundance. They

have been found in littoral areas among cattails, algae, and other aquatic vegetation among individuals from many other cladoceran species.

This is a very common species, being truly cosmopolitan (Pennak, 1953).

**Daphnia longispina** (O. F. Müller, 1785)

April 7: drainage ditch near railroad tracks behind University of of Rochester (W. B. Muchmore); July 28: Ellison Park marsh near main road.

Temperature: 28°C. Only a few specimens were found in two localities where samples were taken. This lack of specimens might be due to the confinement of sampling areas to littoral regions full of vegetation, for Woltereck (1932) says ". . . *D. longispina* prefers the open water of the same ponds and of fresh water lakes."

This is a common, widely distributed species in America. It has been reported from Irondequoit Bay (Tressler and Austin, 1953).

*Genus Simocephalus Schoedler, 1858*

**Simocephalus expinosus** (Koch, 1841)

July 10: temporary pond off main road at Mendon Ponds Park.

Only a few animals were found at this one pond, which was stagnant and thickly overgrown with algae and duckweed. They were found associated with *Pleuroxus denticulatus,* and *Chydorus sphaericus.*

This species is reported by Birge (1918) to be "not common; reported from Massachusetts, Wisconsin and the Southern states." However, Ward (1940) reports it as a common species from Ohio, so its range has not been defined as yet.

**Simocephalus serrulatus** (Koch, 1841)
**Daphnia serrulata** Koch

June 17: Genesee River, shallows opposite Faculty Road and River Boulevard; June 19: Lily Pond; June 23: Ellison Park marsh along main road; June 30: Deep Pond in Mendon Ponds Park; July 28: Ellison Park, marsh and pond both along main road; August 18: pond below Cobbs Hill; September 7: Big Massaug Cove, stagnant area; September 11: Genesee Valley Park stream off Hawthorne Drive, same stream by East River Road bridge, Genesee River in Genesee Valley Park by bridge E149; September 21: O'Neil Point marsh (Island Cottage Road and Edgemere Drive); September 28: Genesee River near Elmwood Avenue bridge (Dick Heineman), drainage ditch in Genesee Valley Park; September 30: Round Pond at entrance to Lake Ontario; October 21: pond south of Durand Lake, pond near Sunshine Camp entrance west of Eastman Lake; November 5: Little Black Creek (Brooks Road), Black Creek marsh off Scottsville Road near Genesee River; November 17: pond at Tobin and Clover Roads.

Members of this species are very abundant and have been found in

temperatures ranging from 6°–28°C, and pH 6–8.4. They have been collected in all littoral areas, usually associated with aquatic vegetation. They frequent stagnant and clear running water alike, and are associated with individuals of many different species of Cladocera.

This species has been widely reported from New York State and is common everywhere (Birge, 1918).

**Simocephalus vetulus** (O. F. Müller, 1776)
**Daphnia vetula** Baird
**Daphnia sima** Müller

June 17: Lily Pond; June 19: Lily Pond; June 22: Genesee River shore near Elmwood Avenue; June 23: Ellison Park marsh by main road; June 30: little pools among reeds of Deep Pond, Mendon Ponds Park; August 18: pond below Cobbs Hill, Buell Pond; September 7: Big Massaug Cove along stagnant area; September 30: Round Pond Creek (off Island Cottage Road), beside Buck Creek, Buck Pond near Long Pond Road, Round Pond, Buck Pond where pond enters Lake Ontario; October 21: pond south of Durand Lake, Durand Lake; November 8: Blue Pond near Cedar Springs; November 5: Black Creek marsh off Scottsville Road near Genesee River; November 17: pond at Tobin and Clover Roads, creek along Main Street-of-Fisher and Fisher Road.

Temperature range: 5.5°–26°C, pH 6–8.4. Specimens found every month collections were made. Individuals were found abundantly in the vegetation of the shoreline of creeks, ponds, rivers, and marshes, in running or stagnant water. It is difficult to differentiate this species from *S. serrulatus,* for often the head spines of the latter are very inconspicuous, thus removing a diagnostic feature. Very often members of these two species were found living together. Pennak (1953) reports that *S. vetulus* is not common although widely distributed. However, in the collections made in this area large numbers have been found in rather widespread areas.

This species has been reported from eastern Lake Erie, Lloyd-Cornell reservation and other parts of New York State.

*Genus Scapholeberis Schoedler, 1858*

**Scapholeberis mucronata** (O. F. Müller, 1785)
**Daphnia mucronata** Müller

June 17: Genesee River shore near Faculty Road and River Boulevard, Lily Pond; June 22: Genesee River shore near Elmwood Avenue bridge; June 23: Ellison Park marsh along main road; July 28: Ellison Park marsh along the main road; September 7: pond near Ridgewood school, Big Massaug Cove stagnant area; September 11: Genesee River bridge E149 in Genesee Valley Park, stream off East River Road; September 30: Buck Pond near Long Pond Road.

Temperature range: 15–28°C, pH 6–8.4. Specimens have been found abundantly in stagnant and clear still waters from early spring to late fall.

They have been associated with individuals from many other cladoceran species around aquatic vegetation.

This species has been commonly reported from New York State.

*Genus Ceriodaphnia Dana, 1853*

**Ceriodaphnia reticulata** (Jurine, 1820)

**Monoculus reticulatus** Jurine
**Daphnia reticulata** Baird
**Ceriodaphnia quadrangula** Schoedler
**Ceriodaphnia fischeri** Leydig

June 19: Lily Pond; June 23: Ellison Park marsh along main road; August 18: Pond below Cobbs Hill; September 23: Mt. Hope Cemetery pond (W. B. Muchmore); September 30: marsh off Buck Creek, Round Pond near Island Cottage Road; October 21: pond south of Durand Lake; November 17: pond at Tobin and Clover Roads.

Temperature range: 10–24°C, pH 6–8.4. Individuals were found throughout the time when collections were made in marshes and along the littoral areas of ponds and lakes among aquatic vegetation. With one exception (Mt. Hope Cemetery pond) all the collections which included members of this species also included *Simocephalus vetulus* and *S. serrulatus*. Individuals from other species were found associated with these, but none with such regularity. Whenever *C. reticulata* was found a fair number of individuals was collected.

This species has been reported from other parts of New York State and specimens are common and widely distributed (Birge, 1918).

**Ceriodaphnia quadrangula** (O. F. Müller, 1785)

**C. scitula** Herrick
**Daphnia quadrangula** O. F. Müller
**Daphnia reticulata** Baird

April 4, 1955: Powder Mill Park pond.

A single specimen was found associated with some *Daphnia pulex* in a pond from which frog eggs were collected (littoral area).

This species has been recorded from other parts of New York State (Sibley, 1926) and is common in all regions (Birge, 1918).

*Family Bosminidae*

*Genus Bosmina Baird, 1845*

**Bosmina longirostris** (O. F. Müller, 1785)

June 17: Genesee River opposite Faculty Road and River Boulevard; August 18: pond below Cobbs Hill; September 30: Buck Pond at entrance to Lake Ontario.

Temperatures: 15°, 22° and 24°C, pH 6.9–7.4 (at Buck Pond). A single specimen was found in each collection listed above, all of which were

taken from the weeds of shallow water. *B. longirostris* was outnumbered by a great variety of the more abundant Cladocerans.

This species is commonly reported from many areas in New York State (including Irondequoit Bay) and surrounding areas.

*Family Macrothricidae*

*Genus Ilyocryptus Sars, 1861*

**Ilyocryptus sordidus** (Lièvin, 1848)

**Acanthocerus sordidus** Lièvin

July 28: Irondequoit Creek in Ellison Park; September 7: pond near Ridgewood School, Big Massaug Cove stagnant area; September 11: stream off East River Road; September 16: Durand Lake; September 30: Long Pond entrance to Lake Ontario.

Temperature range: 18–28°C, pH 6.2–8.4. Specimens were found in July and September in both clear running water and stagnant marshy water associated with weeds on muddy bottoms. Pennak (1953) reports these animals as uncommon, but in this vicinity they are found singly or in small numbers, crawling on mud bottoms, their red bodies covered with debris. Whenever they have been collected in this area they have always been found with other Cladocerans.

This species has been reported from the eastern end of Lake Erie (Wilson, 1929).

**Ilyocryptus spinifer** Herrick, 1884

**I. longirimus** Sars
**I. halyi** Brady

June 30: mud shore of Deep Pond, Mendon Ponds Park.

Temperature: 23°C. A few specimens were found crawling in the mud of the pond's shore, which is lined with cattails and duckweed. They were found along the same shore with *Simocephalus serrulatus, S. ventulus, Camptocercus rectirostris* and *Macrothrix rosea.*

This species has previously been reported from New York State.

*Genus Macrothrix Baird, 1843*

**Macrothrix rosea** (Jurine, 1820)

**M. tenuicornis** Kurz
**M. elegans** Sars

June 30: mud of shore of Deep Pond, Mendon Ponds Park.

Temperature: 23°C. One specimen was found in the muddy area of the pond in association with members of the species mentioned under *Ilyocryptus spinifer.*

Although Birge (1918) says that this species is "common everywhere in marshy pools and margins of lakes", this is the first recent report of its presence in New York.

**Macrothrix laticornis** (Jurine, 1820)

September 11: stream near Hawthorne Drive, Genesee Valley Park; November 17: creek running along Main Street-of-Fisher and Fisher Road.

Temperatures: 20° and 5.5°C, pH 6.2–6.4 and 7.0–7.4. Specimens were found in clear running water, swimming among the aquatic vegetation. They were associated with members of several other cladoceran species in both collections. Only one individual was collected at each place.

This species has previously been reported from New York State (Wilson, 1929). Birge (1918) says it is widely distributed.

*Family Chydoridae*
*Subfamily Eurycercinae*
*Genus Eurycercus Baird, 1843*

**Eurycercus lamellatus** (O. F. Müller, 1785)

June 17: Genesee River shore opposite Faculty Drive and River Boulevard; June 22: Genesee River near Elmwood Avenue; September 11: Genesee River in Genesee Valley Park near bridge E149; September 21: O'Neil Point, marsh at Island Cottage Road and Edgemere Drive; September 30: Long Pond at entrance to Lake Ontario, Buck Pond near Long Pond Road; November 8: Blue Pond near Cedar Springs.

Temperature range: 7°–23°C, pH 6–8.4. Specimens were found in shallows of river, ponds, lakes, and marshes among vegetation. They were always collected with other large bodied forms as well as the smaller sizes of Cladocerans and were present in collections in large numbers.

This species has commonly been reported from New York and surrounding areas.

*Subfamily Chydorinae*
*Genus Camptocercus Baird, 1843*

**Camptocercus rectirostris** (Schödler, 1882)

June 17: Genesee River shore opposite Faculty Drive and River Boulevard; June 22: Genesee River near Elmwood Avenue; June 30: Deep Pond at Mendon Ponds Park; September 7: Little Massaug Cove.

Temperature range: 23°-27°C. Individuals were collected in shallow water among weeds and associated with members of many different species of Cladocera. A few were found in each collection listed above; these animals were often outnumbered by the members of other species.

This species is common in New York State.

*Genus Kurzia (Dybowski and Grochowski, 1894)*

**Kurzia latissima** (Kurz, 1874)

September 16: Durand-Eastman Park; September 30: Round Pond near Island Cottage Road.

Temperatures: 19° and 15°C, pH 6.6–7.2. This species was found among weeds in shallows and associated with several different species of Cladocera. Only one or two were obtained in each collection, both collections, however, being made in September.

This species has been reported from New York and is found in all regions (Birge, 1918).

*Genus Graptoleberis Sars, 1863*

**Graptoleberis testudinaria** (Fischer, 1848)
**Lynceus testudinarius** Leydig
**Lynceus reticulatus**
**Alona testudinaria** Schoedler
**Graptoleberis inermis** Birge

September 16: Durand Lake.

Temperature: 19°C, pH about 7.5–7.8. Representatives of this species were found only in Durand Lake, but were abundant, greatly outnumbering individuals of accompanying species. *G. testudinaria* was found at the shore line among lilies, duckweed and rotting wood.

*Genus Leydigia Kurz, 1874*

**Leydigia acanthocercoides** (Fischer, 1854)
**Lynceus acanthocercoides** Fischer
**Eurycercus acanthocercoides** Schoedler
**Alona acanthocercoides** Müller

June 17: Genesee River shore opposite Faculty Drive and River Boulevard; September 7: Little Massaug Cove, Big Massaug Cove stagnant area.

Temperature range: 23°–27°C, pH at both coves was 8.2–8.5. One or two specimens were found in each collection listed above, and these were greatly outnumbered by members of several other species. All these collections were made in shallow water among cattails. According to Birge (1918) this species is rare, found only in Louisiana. It is a European species, so perhaps it was introduced from there. Because of the Cladocera's resistant ephippial eggs, individuals are easily transported to new habitats. One *L. quadrangularis* was found along with members of this species in the Genesee River collection.

**Leydigia quadrangularis** (Leydig, 1860)
**Lynceus quadrangularis** Leydig
**Alona leydigia** Schoedler

June 17: Genesee River shore opposite Faculty Drive and River

Boulevard; July 28: Irondequoit Creek in Ellison Park; November 17: pond at Tobin and Clover Roads.

Temperature range: 10°–23°C, pH 6–6.6. Specimens were collected singly among the weeds of both a clear running stream and a stagnant pond. Associated with individuals of many varied species in the pond and river shoreline, it was found only with *Ilyocryptus sordidus* in Irondequoit Creek.

This species has commonly been reported from New York State.

*Genus Alona Baird, 1850*

**Alona affinis** (Leydig, 1860)

September 7: Little Massaug Cove; September 30: Long Pond at entrance to Lake Ontario.

Temperatures: 28°C and 15°C, pH 8.2–8.4 and 6.9–7.4. One or two were found associated with individuals of many other species of Cladocera among weeds at the margins of the cove and pond listed above. In no collection made were members of the species abundant as has been reported by other collectors for other regions (Birge, 1918).

This species was reported in abundance in Ohio (Ward, 1940), as well as being very common in all regions.

**Alona costata** Sars, 1862

September 16: Durand Lake; October 21: Durand-Eastman Park.

Temperatures: 19° and 15°C, pH 7.5–7.8 and ca. 6.6. Individuals were found singly in littoral areas among lily pads and rotting logs associated with *A. guttata* and members of several other species. Specimens of this species were not found abundantly as has been reported from other places (Pennak, 1953).

Birge (1918) reports this species as being found everywhere in abundance.

**Alona guttata** Sars, 1862

September 7: pond near Ridgewood School; September 14: Little Black Creek (Brooks Avenue); September 16: Durand Lake, and other ponds in Durand-Eastman Park; September 30: marsh along Island Cottage Road; October 21: Durand-Eastman Park.

Temperature range: 14°–28°C, pH 6.2–8.5. Specimens were found among weeds in running and still water associated with members of several species of Cladocera and two of its own genus, *A. costata, A. rectangula.* Only a few individuals were found in each collection, although this scarcity may be due to the season.

Birge (1918) reports this species as "not uncommon everywhere".

**Alona rectangula** Sars, 1861

June 22: Genesee River near Elmwood Avenue; August 18; pond near Cobbs Hill; September 7: pond near Ridgewood School, Little Massaug Cove; September 11: Genesee River near bridge E149 in Genesee Valley Park; September 28: Genesee River near Elmwood Avenue.

Temperature range: 20°–28°C, pH 6–8.5. This species, the most common of its genus in the collections of this area, was found in still water among weeds of the margins of ponds, river, and a cove of Irondequoit Bay. Many species of Cladocera were associated with the several individuals obtained in each sample, those of their own genus being *A. guttata, A. affinis,* and *A. quadrangularis.*

This species has commonly been reported from many parts of New York State.

**Alona quadrangularis** O. F. Müller, 1785

**Alona oblonga** Müller
**Alona sulcata** Schoedler

June 17: Genesee River opposite Faculty Drive and River Boulevard; September 11: creek near Hawthorne Drive in Genesee Valley Park; September 28: Genesee River near Elmwood Avenue; September 30: Round Pond.

Temperature range: 15°–23°C, pH 6.2–7.2. Specimens were found under a duckweed cover as well as among weeds of a sluggish creek, in both stagnant and clear running water. Only a few individuals were collected in each sample along with members of many different species of Cladocera. On September 28 *A. rectangula* was found with individuals of this species but no other members of its genus.

*Genus Chydorus*

**Chydorus globosus** Baird, 1850

June 17: Genesee River opposite Faculty Drive and River Boulevard; June 22: Genesee River near Elmwood Avenue; September 7: Little Massaug Cove, Big Massaug Cove; September 11: Genesee River near bridge E149 in Genesee Valley Park; September 30: Buck Pond near bridge.

Temperature range: 15°–27°C, pH 6–8.5. One or two specimens (from each sample) were found in still water among the weeds, sometimes with a duckweed cover, along the margins of ponds, in the Genesee River and in coves off Irondequoit Bay. It was found associated with several other species, and often with another member of its genus, *C. sphaericus.*

Birge (1918) reports this species as being common everywhere.

**Chydorus sphaericus** O. F. Müller, 1785

June 17: *Genesee River opposite Faculty Drive and River Boulevard, Lily Pond; June 19: *Lily Pond; June 22: *Genesee River near Elmwood Avenue; July 10: temporary pond on side of road at Mendon Ponds Park; July 28: *marsh on side of road at Ellison Park; August 18: Buell Pond; September 7: *pond near Ridgewood School, *Little Massaug Cove; September 11: *creek off Hawthorne Drive in Genesee Valley Park, *same creek as it crosses East River road, Genesee River at bridge E149 in Genesee Valley Park; September 16: *Durand Lake, *other ponds in Durand-Eastman Park; September 23: Mt. Hope Cemetery pond; September 28: drainage ditch in Genesee Valley Park; September 30: *Buck Pond at entrance to Lake Ontario, Round Pond Creek; October 21: *pond (extension of Durand Lake) south of Durand Lake, *Durand Lake, *pond west of extension to Durand Lake, pond near Sunshine Camp entrance west of Eastman Lake, creek south of Eastman Lake; November 5: Black Creek off Scottsville Road near Genesee River; November 8: Blue Pond near Cedar Springs; November 17: creek running along Main Street-of-Fisher and Fisher Road, pond at Tobin and Clover Roads; April 1955: Cedar Springs Park.

(* *See remarks below.*)

Temperature range: 5.5°–28°C, pH 6–8.5. This species is the most common of all Cladocera in this region as well as all over the world. It is found abundantly in all habitats in which extensive collections were made, even in the swift cold streams of Cedar Springs Park in which no other Cladocera were found. The size range of this species varied greatly and in the localities marked with an * a variety of *C. sphaericus* appears which has a reticulated shell and three or less rows of round depressions regularly spaced. This variety appears alone or with the other type of *C. sphaericus*.

Birge (1918) reports this species as being found all over the world.

*Genus Pleuroxus Baird, 1843*

**Pleuroxus denticulatus** Birge, 1877

June 19: Lily Pond; July 10: temporary pond off road in Mendon Ponds Park; September 7: Little Massaug Cove, Big Massaug Cove; September 11: stream off Hawthorne Drive in Genesee Valley Park, same stream near East River Road bridge, Genesee River near bridge E149 in Genesee Valley Park; September 16: Durand Lake, other ponds in Durand-Eastman Park; September 30: Round Pond, Buck Pond at entrance to Lake Ontario; October 21: Durand Lake, pond southwest of Durand Lake, pond (extension of Durand Lake) south of Durand Lake; November 5: Black Creek at Scottsville Road near Genesee River; November 8: Blue Pond near Cedar Springs; November 17: creek along Main Street-of-Fisher and Fisher Road; Spring 1955: Genesee River near University of Rochester (W. B. Muchmore).

Temperature range: 7°–27°C, pH 6–8.5. Specimens were found abun-

dantly among weeds in clear running water as well as stagnant water in littoral areas. They always were found associated with many other Cladocera. Other species of the same genus with which they were often found were *P. hamulatus, P. procurvatus.*

This species is commonly reported from New York State, and is common everywhere in aquatic vegetation (Pennak, 1953).

**Pleuroxus hamulatus** Birge, 1910

June 17: Genesee River opposite Faculty Drive and River Boulevard; June 22: Genesee River near Elmwood Avenue; September 7: Little Massaug Cove; September 14: Barge Canal (Brooks Avenue); September 28: Genesee River near Elmwood Avenue; September 30: Buck Pond near Long Pond Road.

Temperature range: 15°–27°C, pH 6–8.5. Members of this species have been found among weeds in littoral areas of still water. A fair number of individuals was collected in each locality mentioned above along with other Cladocera, those of its own genus being *P. denticulatus, P. procurvatus* and *P. striatus.* Most of the individuals collected were not conspicuously reticulated, although striations were always evident.

Birge (1918) reports this species from New England and southern states and says it is probably a coastal form. However, Ward (1940) reports it from Ohio and so its range must be extended.

**Pleuroxus procurvatus** Birge, 1878

September 7: Little Massaug Cove; September 16: Durand-Eastman Park; September 30: Buck Pond before Long Pond Road, Buck Pond near bridge, beside Buck Creek; October 21: pond southwest of Durand Lake, other ponds of Durand-Eastman Park.

Temperature range: 12°–27°C, pH 6.6–8.5. Individuals were found in duckweed cover, among cattails and other weeds on the margins of ponds, a creek and a cove off Irondequoit Bay. The collections listed above included several individuals in each sample associated with many other Cladocera. At times it was found with the other representatives: *P. denticulatus, P. hamulatus,* and *P. striatus.*

Pennak (1953) reports this species as common in vegetation in the northern states.

**Pleuroxus striatus** Schoedler, 1863
**P. gracilis** Hudendorf
**P. unidens** Birge

September 30: Buck Pond near Long Pond Road.

Although Pennak (1953) lists this species as common in aquatic vegetation, only one specimen was found. This was associated with *P. hamulatus, P. procurvatus, Scapholeberis mucronata,* and *Simocephalus vetulus* among cattails and duckweed.

This species has been reported from New York.

## ORDER OSTRACODA

The free-living ostracods of the Rochester area have received little attention from zoologists. In a plankton survey of the Lake Ontario watershed (Tressler and Austin, 1940) no ostracods were listed. New York State, in its entirety, has only reports from sporadic collections. Sharpe (1908, 1918) lists *Physocypria dentifera* (Sharpe), *Cyclocypris laevis* (O. F. Müller)—actually *C. sharpei* Furtos—and *Cypria dentifera* Sharpe. Furtos (1933, 1935) adds *Cyclocypris cruciata* Furtos and *C. ampla* Furtos. Tressler (1947) reports *Candona crogmaniana* Turner, *Eucypris reticulata* (Zaddach), *E. fuscata* (Jurine), *Cypricercus splendida* Furtos and *Cypridopsis vidua* (O. F. Müller). Only these ten species have previously been reported from New York. This survey lists thirteen ostracods, eleven of which are new records for the state; one of the eleven is probably new to the literature. The only other areas in North America in which fresh-water ostracods have received any extended treatment are Ohio, Illinois, Massachusetts, Florida, Washington, South Carolina, Iowa, Texas, Mexico, Mississippi and Louisiana.

Historically, the first comprehensive list of described species of North America was published by Underwood (1886) in which fifteen species were listed. Although Turner (1899), Weckel (1914) and Sharpe (1918) all published studies of the known ostracods, very little was clear with respect either to taxonomy or to distribution. Sars (1926) gave an account of the ostracods of southeastern Canada and Klie (1931) listed three ostracods from Indiana. However, it was not until Furtos introduced comprehensive statewide studies of ostracods for Ohio (1933), Massachusetts (1935), Florida and North Carolina (1936a), and Yucatan (1936b), that a new era of ostracod study was begun. Dobbin (1941) extended the coverage to Washington and nearby western localities. Hoff's (1942) is the first major work in this field, for not only are the species of Illinois extensively surveyed by him, but most of the publications relative to North American Ostracoda are compiled. Tressler (1947) has published a check-list of all the known species of North American fresh water Ostracoda. Major works since then have included a list of Iowa Ostracoda (Danforth, 1948), a synopsis of the genus *Cypricercus* (Tressler, 1950), a report on Orange County, South Carolina ostracods (Ferguson, 1952) and a survey of fresh water species from Texas and Mexico (Tressler, 1954).

The following section is a list of the Ostracoda identified in the Rochester area with their local distribution and pertinent ecological notes. Seven genera and thirteen species are recorded, one species of which is possibly new to North America.

*Methods of Preparation.*

The specimens were killed by dropping them into 50 per cent alcohol so their valves would remain open after death. They were then preserved

in 70 per cent ethyl alcohol. Dissections were made under the high power of a binocular microscope with sharpened sewing needles fused into glass rods. The valves were removed from the animal in glycerine after which they were transferred to a drop of Höyer's medium on a slide and a cover glass supported by glass chips was placed over them. The soft body was removed from the glycerine to a drop of Höyer's medium containing some eosin and aniline blue. In this medium the appendages were dissected and covered with a coverslip, or a whole mount was made. Both entire and dissected specimens of every species encountered were mounted permanently, when possible. There were only three exceptions. *Cypridopsis vidua* (O. F. Müller) and *Potamocypris smaragdina* (Vávra) are readily identifiable under the binocular dissecting microscope after some experience. *Physiocypria pustulosa* (Sharpe) was easily recognized when temporarily mounted and dissected in glycerine.

## List of Species

*Order Ostracoda*
*Suborder Podocopa s. str.*
*Family Cypridae*
*Subfamily Candoninae*
*Genus Candona Baird, 1845*

**Candona punctata** Furtos, 1933

September 30: Buck Pond, near Buck Creek; October 21: Eastman Lake.

Temperature: 15°C, pH 6.6–7.8. Only one female was found from each locality cited. Both were smaller than either Hoff (1942) or Furtos (1933) describe, the length of both was about 0.65 and the height 0.35 millimeters. The literature reports the length as 0.80–0.90 and height 0.45–0.51 millimeters. These may have been immature specimens, for no eggs were found in them. One female was found among duckweed, dead leaves and other aquatic vegetation in the shallows of Eastman Lake; the other in a marshy area among duckweed and cattails. This agrees with Furtos (1933) who reports this species to be "common in temporary or permanent ponds, marshes, and lakes. March to May, and November." Members of this species were found associated with other ostracods, two of its own genus, *C. simpsoni* and a new species of *Candona* reported later.

This species has been reported from Illinois (Hoff, 1942), Ohio (Furtos, 1933) and Massachusetts (Furtos, 1935).

**Candona fluviatilis** Hoff, 1942

September 21: marsh between Round and Buck Ponds (Island Cottage Road); October 21: creek south of Durand Lake.

Temperatures: 14°C, 12°C, pH 6.6–7. One female was found in a

small sandy-bottomed creek among many aquatic plants, while another was found in a marsh among duckweed and cattails and was associated with other Ostracoda. Previously Hoff (1942) reports finding them only in vernal streams over a muddy bottom.

This species has been reported from Illinois (Hoff, 1942).

**Candona simpsoni** Sharpe, 1897
**Candona relexa** Sharpe, 1897
**Candona exilis** Furtos, 1933

August 18: Buell Pond, Hobbie Creek; September 7: pond near Ridgewood School; September 16: Durand Lake; September 21: marsh between Round and Buck Ponds (Island Cottage Road); September 30: Round Pond Creek (Island Cottage Road), marsh between Round and Buck Ponds (Island Cottage Road), Buck Pond beside Buck Creek; October 21: marsh south of Eastman Lake; November 8: Blue Pond; November 17: 100 Acre Pond at Mendon Ponds Park.

Temperature range: 7°–28°C, pH 6.6–8. Members of this species have been the most abundant of the genus in this area. They have been found among vegetation, in permanent ponds, marshes and sluggish creeks, often associated with other ostracods. Many collections contained only one animal, while some contained several of the species. Only females have been collected, and some of these range in length about 0.60 millimeters, height about 0.30 millimeters, which is slightly smaller than Hoff (1942) reports. In one locality, September 21 collection, one female was found with S-shaped claws of the "exilis" type.

This species has been reported from Illinois (Sharpe, 1918; Hoff, 1942) and Iowa (Danforth, 1948).

**Candona decora** Furtos, 1933
**Candona candida** (part.) Brady and Norman, 1889

October 21: marsh south of Eastman Lake; November 8: Blue Pond; November 17: 100 Acre Pond in Mendon Ponds Park.

Temperature: 7°C, 15°C, pH 6.6–6.8. Furtos (1933) reports this species as occurring in temporary leafy pools and occasionally in ponds and lakes in the spring. This appears to be the first report of its occurrence in the late fall. Eleven males and four females were found among duckweed and rushes in a marshy area, October 21; two males were found in the littoral area of a pond. A single unusually large female was found among Anacharis in Blue Pond, the length being 1.69 millimeters and the height 0.74 millimeters. The normal size is length 1.3 millimeters and height 0.70 millimeters. The specimen contained the characteristic reticulations in the posterior portion of the valves.

This species has been reported from Ohio (Furtos, 1933), Massachusetts (Furtos, 1935) and Michigan (Tressler, 1947).

**Candona n. sp.**

October 21: Eastman Lake; pond in Durand-Eastman Park (a southern extension of Durand Lake).

Temperature: 13°–15°C, pH 6.4–6.6. A single female was found in each of the two localities mentioned above. Both were collected in clear water among duckweed, reeds, and dead leaves along the shallow edges of these permanent ponds. These individuals resemble *C. suburbana* Hoff, 1942 in many respects, particularly in the shape of the valves. However, *C. suburbana* has been reported only from temporary ponds in the spring, quite different from the above locations. A complete description of the specimens and contrasts between them and members of *C. suburbana* are contained in the Memorandum, page 226.

*Subfamily Cyclocyprinae*

*Genus Cyclocypris Brady and Norman, 1889*

**Cyclocypris forbesi** Sharpe, 1897

November 8: Blue Pond.

Temperature: 7°C, pH 6.6–6.8. Eighteen males were taken from an Anacharis bed covered by clear shallow water. Associated with these were *Candona simpsoni, Cypridopsis vidua,* and the giant *Candona decora.* Members of this species have previously been found in ponds and lakes collected from mats of vegetation, as Chara, Myriophyllum and Potamogeton.

These animals differ slightly from the description offered by Furtos (1935). The valve surfaces are covered with quite a number of well defined tubercles each with a slender hair, many more than Furtos shows in her diagram. Further, there has been a slight but consistent difference in the height to length ratio. Furtos reports the size to be 0.58 millimeters in length, 0.38 millimeters in height. The following chart shows the measurements of four males:

| | RIGHT | | LEFT | |
|---|---|---|---|---|
| Animal | Length | Height | Length | Height |
| 1 | 0.58 | 0.43 | — | — |
| 2 | 0.60 | 0.46 | 0.58 | 0.44 |
| 3 | 0.58 | 0.45 | 0.56 | 0.43 |
| 4 | 0.61 | 0.47 | 0.58 | 0.45 |

The prehensile palps are very much elongated as Furtos describes, but the larger propodus differs somewhat in the amount of sinuation of the outer and inner margins. The neck-like region formed by these sinuations is much broader than that described by Furtos. Furtos' diagram shows the neck to be one-third as long as the widest part of the propodus, while the Rochester specimens measure three-fourths of the widest part of the propodus. Also, the inner margin of the short moderately inflated dactylus

(larger propodus) is slightly curved, not straight as shown by Furtos (1935).

The shortest terminal seta of the third foot is not one-half the length of the terminal propodus as Furtos (1935) reports, but the ratio in the four specimens examined more often approaches two-fifths.

These differences are small, however, that they may well be just isolated variations, for only four specimens were examined from one collection.

This species has previously been reported from Illinois (Sharpe, 1897 and Hoff, 1942), Massachusetts (Furtos, 1935), and South Carolina (Ferguson, 1952).

**Cyclocypris sharpei** Furtos, 1933

**Cyclocypris laevis** Sharpe, 1908, 1918 (non O. F. Müller, 1785)

June 30: Deep Pond in Mendon Ponds Park; September 30: Buck Pond at entrance to Lake Ontario; October 21: Eastman Lake.

Temperatures: 28° and 15°C, pH 6.6–7.4. Only five females were found, two in the first and last localities, one at Buck Pond. All were found associated with other ostracods among vegetation mats, especially duckweed, above mucky bottoms. Members of this species have previously been found in ponds, marshes and lakes, and there seems to be no seasonal restriction (Hoff, 1942).

The forms found bear the typically brown banded appearance as described by Furtos (1933). However, Furtos makes no mention of a conspicuous hyaline flange on the anterior margin of the right valve. The forms found in the Rochester area show such a flange which bears a slightly scalloped appearance. This resembles that described for *Cyclocypris cruciata* Furtos (Furtos, 1935), except that scallops are not as pronounced in these forms. Except for this flange, this species fits exactly the characteristics described for *C. sharpei* by Furtos (1933).

This species has previously been reported from Illinois, Indiana, New York, and New Jersey (Sharpe, 1908, 1919), Ohio (Furtos, 1933), Illinois (Hoff, 1942), Louisiana (Hoff, 1943d), New Brunswick, Iowa (Tressler, 1947), Iowa (Danforth, 1948).

**Cyclocypris ovum** Jurine, 1820

**Cypris laevis** (part.) O. F. Müller, 1776
**Monoculus ovum** (part.) Jurine, 1820
**Cypris scutigera** (part.) Fischer, 1851
**Cypris serena** Brady and Norman, 1889
**Cyclocypris pygmaca** Croneberg, 1895
**Cyclocypris laevis** Kaufmann, 1900
**Cyclocypris laevis pygmaca** Elman, 1907
**Cyclocypris ovum** G. W. Müller, 1912

June 30: Deep Pond, Mendon Ponds Park; October 21: marsh south of Eastman Lake; November 8: swimming pool in Cedar Springs Park.

Temperatures: 28°C, 15°C, 8°C, pH 6.6–7.0. Males and females were

both collected along the marshy edges of permanent ponds among duckweed and reeds, while some were collected in the vegetation of a cool clear creek. Several individuals were collected at each station cited associated with other ostracods. Furtos (1933) also finds members of this species common "in marshes, occasionally in cold streams. April to November."

This species has previously been reported from Ohio (Furtos, 1933) and Washington (Dobbin, 1941).

*Genus Cypria Zenker, 1854*

**Cypria turneri** Hoff, 1942

**Cypris striolata** Herrick, 1887
**Cypria exculpta** Turner, 1894
**Cypria exsculpta** Sharpe, 1897
**Cypria elegantula** Furtos, 1933 (non Lilljeborg, 1853)

June 30: Deep Pond at Mendon Ponds Park; July 10: ditch on side of road in Mendon Ponds Park; August 18: Buell Pond; September 21: marsh between Round and Buck Ponds (Island Cottage Road); September 30: Buck Pond before Long Pond Road; October 21: Durand Lake, marsh south of Eastman Lake, pond near Sunshine Camp west of Eastman Lake, Eastman Lake; November 8: swimming pool in Cedar Springs Park; November 17: 100 Acre Pond, pond at Tobin and Clover Roads near Mendon Ponds Park.

Temperature: 8°–29°C, pH 6.6–8.4. Males and females were collected sometimes in groups of three or so, and in some collections many specimens were found. Individuals of this species were taken in ponds, lakes, marshes, and along the edge of a dammed up creek. They were associated with other ostracods among vegetation such as grass, duckweed, and algae. Hoff (1942) reports members of this species to be "abundant from March to late June but sometimes found in the serotinal and autumnal seasons." The largest numbers of individuals were collected in October and November in this area, however. The species appears common in this area.

This species has previously been reported from Newfoundland (Alm, 1914), Delaware (Turner, 1897), Washington, Alaska (Dobbin, 1941), Illinois (Hoff, 1942, 1943a), Alabama (Herrick, 1887), Ohio (Furtos, 1933 and Turner, 1897), Tennessee (Hoff, 1943b), Mississippi (Hoff, 1943d), Wisconsin, Michigan, Utah, Virginia (Tressler, 1947), Iowa (Danforth, 1948), South Carolina (Ferguson, 1952).

*Genus Physocypria Vávra, 1897*

**Physocypria pustulosa** (Sharpe, 1897) G. W. Müller, 1912

**Cypria pustulosa** Sharpe, 1897
**Cypria (Physocypria) pustulosa** Sharpe, 1897
**Physocypria pustulosa** (Sharpe, 1897) G. W. Müller, 1912
**Physocypria globula** Furtos, 1933

June 17: Genesee River opposite Faculty Drive; June 19: Lily Pond on South Avenue; June 22: Genesee River by Elmwood Avenue; June 23: marsh on main road in Ellison Park; June 30: Deep

Pond, Mendon Ponds Park; August 18: Pond below Cobbs Hill, Hobbie Creek; September 7: pond near Ridgewood School, Little Massaug Cove, Big Massaug Cove; September 11: creek off Hawthorne Drive in Genesee Valley Park, same creek where it crosses East River Road, Genesee River at bridge E149 in Genesee Valley Park; September 14: Little Black Creek (Brooks Avenue); September 16: Durand Lake; September 21: marsh between Round and Buck Ponds (Island Cottage Road); September 30: Round Pond Creek (Island Cottage Road), marsh by Buck Pond, Round Pond, Long Pond as it enters Lake Ontario; October 21: marsh south of Eastman Lake; November 4: marsh from Black Creek off Scottsville Road near Genesee River bridge; November 17: pond at Tobin and Clover Roads (Mendon Ponds Park).

Temperatures: 10°–28°C, pH 6.0–7.8. Males and females of this species were found abundantly in almost every collection cited. They were always found in quiet waters full of vegetation and usually associated with other ostracods.

Most of the individuals of the scores collected were extremely variable in shell shape, length to height ratio of the shell and the number, position and size of the tubercles on the shell. Often single populations contained members exhibiting the inflated shell and distinct tubercles on the anterior margin, as well as those of the "Globula" type (Furtos, 1933) with the tubercles lining the posterior margin also. Most of the specimens showed submarginal tubercles readily visible only under high magnifications. All of the representatives, however, showed the typical large flattened pustules posterio-ventrally. The great variety in the populations here bears out Hoff's findings in Illinois (Hoff, 1942).

This species has previously been reported from Ohio (Sharpe, 1897 and Furtos, 1933), Illinois (Furtos, 1933 and Hoff, 1942), Missouri (Ferguson, 1944), Alaska, Washington, Mississippi (Hoff, 1943d), Michigan, Virginia, Oklahoma (Tressler, 1947), South Carolina (Ferguson, 1952a), Iowa (Danforth, 1948), Georgia (Ferguson, 1952b).

*Subfamily Cyprinae s. str.*
*Genus Cypricercus Sars, 1895*

**Cypricercus splendida** Furtos, 1933(?)

April 6: Beech Grove, Powder Mill Park (W. B. Muchmore).

A single female with only the right valve present in poor condition was found. One large purple band ran dorso-laterally on the shell, and no marginal tubercles were seen. The specimen differed from Furtos' (1933) description of *C. splendida* in the shell size and location of the dorsal seta of the ramus. *C. splendida* has a reported length of 1.75 millimeters, a height of 0.98 millimeters, while this specimen measured 1.40 in length and 0.90 in height. *C. splendida* has the dorsal seta of the ramus removed from the subterminal claw a distance equal to the width of the ramus,

while the dorsal seta of this female was a distance of two and one-half times the width of the ramus away from the subterminal claw. In spite of these two distinctions, the specimen has tentatively been recorded as *C. splendida.*

This species has previously been reported from Ohio (Furtos, 1933), Massachusetts (Furtos, 1935), New York (Tressler, 1947).

*Subfamily Cypridopsinae*

*Genus Cypridopsis Brady, 1867*

**Cypridopsis vidua** (O. F. Müller, 1776) Brady, 1867

**Cypris vidua** O. F. Müller, 1776
**Cypridopsis vidua** (O. F. Müller, 1776) Brady, 1867
**Cypridopsis vidua obesa** Furtos, 1933 (non Brady and Robertson, 1869)
**Cypridopsis pustulosa** Furtos, 1933

June 17: Genesee River opposite Faculty Drive; June 19: Lily Pond; June 23: marsh beside the main road of Ellison Park; June 30: Deep Pond, Mendon Ponds Park; July 10: ditch in Mendon Ponds Park; July 28: marsh in Ellison Park; August 18: pond below Cobbs Hill, Buell Pond, Hobbie Creek; September 7: pond near Ridgewood School, Little Massaug Cove, Big Massaug Cove; September 11: creek off Hawthorne Drive in Genesee Valley Park, same creek at East River Road, Genesee River at bridge E149 in Genesee Valley Park; September 14: Barge Canal (Brooks Avenue), Little Black Creek (Brooks Avenue); September 16: Durand Lake, Eastman Lake; September 21: Round Pond Creek, marsh between Round and Buck Ponds (Island Cottage Road); September 23: Mt. Hope Cemetery Pond (W. B. Muchmore); September 30: Round Pond Creek (Island Cottage Road), marsh between Round and Buck Ponds (Island Cottage Road), marsh near Buck Pond, Buck Pond where it enters Lake Ontario, Long Pond where it enters Lake Ontario, Buck Pond near Long Pond Road; October 21: Eastman Lake, marsh south of Eastman Lake, Durand Lake, pond south of Durand Lake; November 4: Little Black Creek (Brooks Road), marsh of Black Creek off Scottsville Road near Genesee River Bridge; November 8: Blue Pond.

Temperature: 10°–28°C, pH 6.0–8.4. Only females of this species were noted. They were found abundantly in every type of habitat, marshes, ponds, lakes, and streams. Hoff (1942) reports, "Not only is it found everywhere, but there are few ostracods which are found in such great numbers of individuals in single collections."

*Genus Potamocypris Brady, 1870*

**Potamocypris smaragdina** (Vávra, 1891) Daday, 1900

**Cypridopsis smaragdina** Vávra, 1891
**Potamocypris smaragdina** (Vávra, 1891) Daday, 1900
**Potamocypris smaragdina** (Vávra, 1891) var. **compressa** Furtos, 1933

August 18: pond below Cobbs Hill; September 7: pond near Ridgewood School, Little Massaug Cove; September 11: creek off

Hawthorne Drive in Genesee Valley Park, same creek as it crosses East River Road; November 17: creek at Main Street-of-Fisher and Fisher Road.

Temperature: 5.5°–28°C, pH 6.2–8.4. All the specimens collected were found associated with vegetation in permanent waters. Males and females were found both in still waters as well as in clear running streams.

This species has previously been reported from Ohio, Lake Erie, Illinois (Furtos, 1933), Illinois (Hoff, 1942), Missouri (Ferguson, 1944), Mississippi (Hoff, 1943d), Tennessee (Hoff, 1943b), Illinois (Sharpe, 1918), Washington (Dobbin, 1941), Mexico (Sharpe, 1897), Texas, Louisiana (Tressler, 1947), South Carolina (Ferguson, 1952), Iowa (Danforth, 1948) and Texas (Tressler, 1954).

## ORDER ISOPODA

Although the literature dealing with the taxonomy of the order Isopoda is extensive, relatively little is known of its distribution and life history in America. Comprehensive monographs about localities on the continent or about some sections of America have been published. One of the earliest works was that by Say in 1818. Richardson (1905), Van Name (1936, 1940, 1942) and Mackin and Hubricht (1938, 1940, 1949) have covered sections of North America.

Some regional studies also have been made: Longnecker (1924) for Iowa, Johanson (1926) and Walker (1927) for Canada, Blake (1931) for the New England States, Miller (1938) for California, Hatchett (1947) for Michigan and Mackin (1940) for Oklahoma. No such regional survey for the Rochester area, or New York State in general, is known to the writer. DeKay (1844) reports *Asellus communis* Say from New York. Paulmier (1905) in his survey of the higher Crustacea of New York City reports this species as the only fresh water isopod found in New York City. Van Name (1936) records *A. communis* Say as, "by far the most abundant and widely distributed fresh water isopod in the eastern half of the United States." The other fresh water isopod recorded from New York State is *Lirceus lineatus* Say, which Johanson has reported from Jefferson County: Alexandria Bay, Thousand Islands (Hubricht and Mackin, 1949). Bayliff (1938) reported *Exosphaeroma papillae* from Nassaquatuck Creek which empties into the "Inner Harbor" of Cold Spring Harbor, Long Island, New York. However, this species is essentially a marine form, and its presence in "fresh" water may be accounted for by the tides forcing salt water into this part of the creek.

This section reports three species of isopods found in temporary and permanent waters of the Rochester area. Pertinent ecological notes are included.

*Methods of Preparation.*

The isopods collected were killed and preserved in seventy per cent

ethyl alcohol. Identifications were made using the binocular dissecting microscope. When necessary, dissections were carried out in glycerine and temporary slides were made with this medium for study under higher magnification. No attempt was made to stain the animals in any way.

### List of Species

*Order Isopoda*
*Suborder Asellota*
*Family Asellidae*
*Genus Asellus Geoffrey*

**Asellus communis** Say, 1818
**Asellus vulgaris** Gould, 1841

September 1941: Genesee River (W. B. Muchmore); July 28: Irondequoit Creek at Ellison Park; August 18: pond below Cobbs Hill, Buell Pond; September 14: Little Black Creek (Brooks Avenue); September 16: Durand Lake; September 21: marsh off Island Cottage Road; September 30: Buck Creek, Long Pond at entrance to Lake Ontario; October 21: Durand Lake, pond south of Durand Lake, creek south of Eastman Lake, marsh south of Eastman Lake; November 5: Little Black Creek; November 8: Blue Pond.

Temperature: 7°–23°C, pH 6.0–7. Members of this species were found in ponds, marshy areas, and in sluggish as well as swift streams. They generally were associated with vegetation and rocks. No other fresh water isopods were ever found in the same collecting area. The range of this species has previously been reported to extend over most of the eastern half of the United States, also in southern Canada (Ontario, Quebec, Nova Scotia) (Van Name, 1936). It has previously been reported from New York State.

**Asellus militaris** Hay, 1878

April 6, 1954: Powder Mill Park (W. B. Muchmore); April 1, 1955: Powder Mill Park (W. B. Muchmore).

Representatives were found in the spring ponds at Powder Mill Park, and members of no other fresh water isopod species were found along with them.

These animals are almost identical with *A. communis* except for the size of the endopodite of the uropod, and the size relationship between the endopodite and the exopodite of the male second pleopod. Mackin (1940) establishes this as a valid species apart from *A. communis* by the following criteria: "Endopodite of the uropods broadly lanceolate in form, pointed. The endopodite of the male second pleopod short, only slightly more than half as long as the exopodite and ending in a blunt lobe." Van Name (1942) reports this species as an inhabitant of lowland temporary ponds. The animals found in Powder Mill Park agree with all the preceding characteristics.

Mackin (1940) reports that this species has a considerable distribution in the interior parts of the United States. It may have been seen by previous investigators in New York State, but since *A. militaris* was, previous to 1940, included as a synonym for *A. communis*, this is difficult to ascertain.

*Genus Lirceus Rafinesque, 1820*
*Asellopsis Harger, 1874*
*Mancasellus Harger, 1876*

**Lirceus lineatus** (Say, 1818)
**Asellus lineatus** Say, 1818
**Asellus tenax** Smith, 1871
**Asellopsis tenax** (Smith, 1874)
**Asellopsis tenax** var. **dilata** Harger, 1874
**Mancasellus tenax** (Smith, 1876)
**Mancasellus** sp. n. Herrick, 1887
**Mancasellus lineatus** (Say, 1900)
**Mancasellus danielsi** Richardson, 1902
**Mancasellus tenax dilata** (Smith, 1905)
**Mancasellus dilatus** (Smith, 1936)
**Mancasellus herricki** Van Name, 1936

September 21: Slater Creek.

Temperature: 15°C. Only one specimen was collected in this small creek in an algal mat. No other specimens were found when looked for in June, 1955. This may have been due in part to the almost complete drying of the creek. Members of no other isopod species were collected from this station.

Johanson (1926) has previously reported this species from New York State (Hubricht and Mackin, 1949). It has a reported distribution in the Great Lakes region and southeastern United States from Virginia to Florida and Alabama (Hubricht and Mackin, 1949).

## ORDER AMPHIPODA

Most of the members of this order are marine forms, for, of the three suborders, only one, the Gammaroidea, has representatives in the American fresh waters. Ada L. Weckel (1907) published the first comprehensive American listing of this group. Since 1907, the list of fresh water species has grown from sixteen to fifty, of which five have been reported from New York State. De Kay (1844) and Weckel (1907) listed *Gammarus fasciatus* Say from the Hudson River and Niagara Falls, and *G. limnaeus* Smith from Caledonia, New York. Paulmier (1905) lists *G. fasciatus* Say as "common in fresh-water ponds . . . and in the brooks." He also adds *Hyalella azteca* (Saussure) as occurring frequently throughout the city. *H. azteca* has also been reported from Mud Pond in the Lloyd-Cornell reservation (Sibley, 1926), the Oswego River system (New York State Conservation Department, 1927), the Raquette watershed (Creaser, 1934), the Hudson River (De Kay, 1844, Weckel, 1907, Townes, 1937)

and Lake Chautauqua (Townes, 1938). *G. fasciatus* Say, *G. limnaeus* Smith, and *Crangonyx gracilis* Smith have all been reported from localities in New York State (Creaser, 1934). A common deep water form, *Pontoporeia affinis* (Lindstrom), has been recorded from the Finger Lakes region (Wilson, 1929, and Pennak, 1953) and from Lake Ontario (Nicholson, 1872).

Of these previously reported common species, individuals of all except *P. affinis* have been collected in this survey of the Rochester area. Since no deep waters were dredged, it is possible that *P. affinis* exists in this area as well. This section lists these reported species, their localities, and significant ecological data.

*Methods of Preparation.*

The amphipods were killed and preserved in seventy per cent ethyl alcohol until identifications could be made. The animals were mounted in glycerine and examined under the high power of a binocular dissecting microscope. To facilitate identification, temporary slides using glycerine as a mounting medium were employed for dissected specimens. All dissections were carried out with sewing needles as described in the Ostracoda section. No staining of the specimens was attempted.

### List of Species

*Order Amphipoda*

*Family Talitridae*

*Genus Hyalella S. I. Smith, 1874*

**Hyalella azteca** (Saussure, 1858)

**Amphitoe aztecus** Saussure, 1858
**Hyalella azteca** (Saussure, 1888)
**Hyalella knickerbockeri** (Bate, 1907)

June 17: Lily Pond; June 22: Genesee River by Elmwood bridge; June 23: marsh at entrance of Ellison Park; June 30: Deep Pond; July 28: pond and marshes at Ellison Park; August 18: Buell Pond; September 7: Ridgewood School pond, Little Massaug Cove, Big Massaug Cove; September 11: stream off Hawthorne Drive in Genesee Valley Park, continuation of same stream at East River Road; September 14: Barge Canal by Brooks Avenue, Little Black Creek by Brooks Avenue; September 16: Durand Lake, Eastman Lake; September 21: Round Pond Creek, marsh between Round and Buck Ponds (Island Cottage Road), Round Pond, Buck Pond at entrance to Lake Ontario, and Buck Pond near Long Pond Road; October 21: Eastman Lake, Durand Lake, pond south of Durand Lake, creek south of Eastman Lake, marsh south of Durand Lake, pond west of Eastman Lake, pond near entrance to Sunshine Camp; November 5: Little Black Creek (Brooks Avenue), Black Creek marsh off Scottsville Road; November 8: Blue Pond; November 17: creek along Main Street-of-Fisher and Fisher Road.

Temperature range: 5.5°–28°C, pH 6.0–8.0. Members of this species are the most common and abundant in this area. Individuals are found

in every habitat sampled, from stagnant ponds and marshes to clear swift streams. They are most often associated with aquatic vegetation and may frequently be collected with other members of their genus.

This species has previously been reported from New York State and is recognized as being widely distributed and common (Pennak, 1953).

*Family Gammaridae*

*Genus Gammarus Fabricius, 1775*

**Gammarus limnaeus** S. I. Smith, 1874

**Gammarus lacustris** Smith, 1871
**Gammarus limnaeus** Smith, 1874
**Gammarus robustus** Smith, 1875

October 13, 1953: Powder Mill Park (C. Aggeler); September 21: Flemming Creek at Latta Road; October 21: creek south of Eastman Lake; October 23: springs and streams at Cedar Springs Park; November 7: Cedar Springs Park.

Temperature range: 8°–14°C, pH 6.2–7.2. The least common of the amphipods found, individuals of this species were collected only from clear swift brooks and streams, never from ponds or marshes. They were often found associated with other members of the genus around rocks and aquatic vegetation.

It has previously been reported from New York State, and Pennak (1953) reports this species as "common and widely distributed in springs, spring brooks, and small spring fed lakes."

**Gammarus fasciatus** Say, 1818

October 13, 1953: Powder Mill Park (A. Lewis); November 12, 1953: Genesee River pond by Faculty Road (W. B. Muchmore); June 22: Genesee River at Elmwood Avenue; June 17: Genesee River near Faculty Road; July 28: Irondequoit Creek in Ellison Park; September 7: Little Massaug Cove; September 11: stream off Hawthorne Drive in Genesee Valley Park, Genesee River at bridge E149 in Genesee Valley Park; September 14: Barge Canal (Brooks Avenue); September 16: Eastman Lake; September 21: Slater Creek; September 30: Slater Creek, Long Pond at entrance to Lake Ontario, Buck Pond; October 21: pond west of Eastman Lake, Lake Ontario by Coast Guard Station; October 23: streams of Cedar Springs Park; November 5: Little Black Creek (Brooks Avenue); November 17: stream along Main Street-of-Fisher and Fisher Road.

Temperature range: 5.5°–27°C, pH 6.0–8.0. This is a very common species; individuals were often found along with *Hyalella azteca* and *Crangonyx gracilis,* less often with *G. limnaeus.* Members have been collected from ponds, marshes, and sluggish and swift streams in which they are found about rotting debris or aquatic vegetation.

This species has previously been reported from New York State. Pennak

(1953) says it is "common in lakes, ponds, streams, and springs in the Atlantic drainage, sporadic farther west and southwest as far as New Mexico."

*Genus Crangonyx Bate, 1859*
*Eucrangonyx Stebbing, 1899*

**Crangonyx gracilis** S. I. Smith, 1871
**Eucrangonyx gracilis** (S. I. Smith, 1899)

September 1951: Genesee River (W. B. Muchmore); October 13, 1953: Powder Mill Park (C. Aggeler); April 6, 1954: Beech Grove, Powder Mill Park (W. B. Muchmore); June 17: Lily Pond, Genesee River off Faculty Road; June 19: Lily Pond; June 22: Genesee River at Elmwood Avenue; August 18: Buell Pond; September 14: Little Black Creek (Brooks Avenue); September 21: Round Pond; September 30: Buck Creek; October 21: marsh south of Eastman Lake; November 5: Little Black Creek (Brooks Avenue); November 8: dammed up creeks for swimming pool at Cedar Springs Park.

Temperature range: 6°–24°C, pH 6.0–8.0. Specimens were found in quiet ponds full of aquatic vegetation and in moderately swift brooks. These animals were often found associated with other members of the order.

This species has previously been reported from New York State. Pennak (1953) says members are "generally distributed in caves, pools, ponds, springs, and brooks, east of the Mississippi River, but reported as far west as Oklahoma and Kansas."

## ORDER DECAPODA

The vast majority of the members of this order are marine. "In the United States only the Astacidae (crayfishes), about eleven species of Palaemonidae (fresh water prawns and river shrimp) and four species of Atydidae are found in fresh waters" (Pennak, 1953). The following discussion shall only concern itself with the Astacidae, for no members of the other families were collected in this survey.

An early monograph of the Astacidae was published by Hagen in 1870. Underwood (1886) listed the known crayfishes from America, north of Mexico. In 1918, Ortmann summarized the described decapods. Pennak (1953) has included all of the common decapods in his work.

A comprehensive list of crayfish species is known from New York State. De Kay (1844) and Paulmier (1905) both recorded *Cambarus bartoni* from New York. Hagen (1870) reported *Orconectes obscurus,* while Underwood (1886) added *C. bartoni robustus, O. virilis, O. immunis,* and *O. propinquus* to the list. Creaser (1931) recorded *C. diogenes* from New York. In 1934, Creaser, in his study of the larger Crustacea of the Raquette watershed listed: *O. virilis, O. propinquus, C. bartoni robustus, C. bartoni,* and *O. immunis.* Sibley (1926) reported *C. bartoni* from the Lloyd-Cornell reservation, Townes (1938) recorded *O. obscurus*

from Lake Chautauqua. Pennak (1953) reports *Procambarus blandingi* and *O. limosus* from the Great Lakes drainage.

The crayfish reported in this section are only the result of incidental collections by the writer and other collectors, for no effort was made to get a complete sampling from the area. The list is thus incomplete. All the species recorded have previously been listed from New York State. The classification system followed in this section is one proposed by Hobbs in 1942 in which the Subfamily Cambarinae is divided into six full genera (Pennak, 1953).

### List of Species

*Order Decapoda*
*Family Astacidae*
*Subfamily Cambarinae*
*Genus Cambarus*

**Cambarus bartoni robustus** Girard

September 12, 1952: Powder Mill Park (W. B. Muchmore); November 27, 1954: Powder Mill Park (W. B. Muchmore); September 21, 1954: Flemming Creek.

*Genus Orconectes*

**Orconectes limosus** (Rafinesque, 1817)

Fall, 1954: Cedar Springs Park stream(?) (Richard L. Heineman).

It is doubtful that this specimen came from Cedar Springs. All that is certain is that it came from the Rochester area.

**Orconectes propinquus** (Girard, 1852)

September 16, 1949: Seneca Park Lake (R. Yaeger); September 21, 1954: Flemming Creek; June 22: Genesee River; July 28: Irondequoit Creek at Ellison Park.

Individuals of this species have been collected associated with *Cambarus bartoni robustus*. The animal collected from the Genesee River was a female, so the identification is not certain.

**Orconectes immunis** (Hagen)

July 20, 1931: creek in Mendon Ponds Park (C. Thayer).

## MEMORANDUM

CANDONA N. SP.

Durand-Eastman Park, October 21, 1954.

*Description.*

Measurements, in millimeters, of the valves (see Plate II) mounted in Höyer's Medium are as follows:

| | RIGHT | | LEFT | |
|---|---|---|---|---|
| | Length | Height | Length | Height |
| Pond specimen: | 1.00 | 0.50 | 1.00 | — |
| Lake specimen: | 1.08 | 0.52 | 1.12 | 0.53 |

From the side, the white shell is elongated; the height is equal to, or slightly less, one-half the length. The greatest height of the shell is posterior to the middle. The anterior and posterior margins of both valves are smoothly rounded, the posterior being slightly more pointed than the anterior. In the left valve the dorsal margin is nearly evenly rounded, passing more or less insensibly into the anterior and posterior margins, although a very slight sinuation is indicated in the antero-dorsal margin. In the right valve the antero-dorsal and postero-dorsal sinuations are more evident. The dorsal margin of this valve is not as smoothly rounded as that of the left valve. The ventral edges of both valves show a definite sinuation near the middle. The pore canals are relatively inconspicuous, short and each forming a 45° angle posteriorly with the margin from which it emerges. A slight hyaline border extends from the dorso-posterior edge ventrally to the dorso-anterior edge. The anterior and posterior edges bear delicate hairs of which a few do appear in the ventral sinuation. The valves are sparsely hairy, each weak hair being set on a rather prominent papilla. The muscle scars are somewhat anterior to the center of the shell and are very definite in arrangement. There are five scars forming a rosette with a single isolated one above the group and two isolated scars slightly anterior-ventral to the rosette. The left valve, shown in Plate II, has an additional scar. It is uncertain whether this is a regular feature, for the left valve of the second specimen was cracked before close examination could be made.

The medial distal seta of the penultimate podomere of the mandibular palp is smooth. The mandibular teeth consist of five heavy teeth and three small ones.

The second leg has the second podomere slightly longer than the sum of the lengths of the third and fourth podomeres. The second podomere has a distal seta shorter than the distal width of the podomere. The ultimate podomere is nearly twice as long as it is wide; it has a distal seta about equal in length to the podomere, another about three-fourths as long and a claw slightly less than equal to the sum of the last three podomeres. The third thoracic leg has its penultimate podomere divided. The shortest distal seta of the ultimate podomere is slightly more than

three and one half times the length of the ultimate podomere. The ultimate podomere is nearly square. The oppositely directed seta of the ultimate podomere is two and one third times longer than that of the shorter seta of the pair.

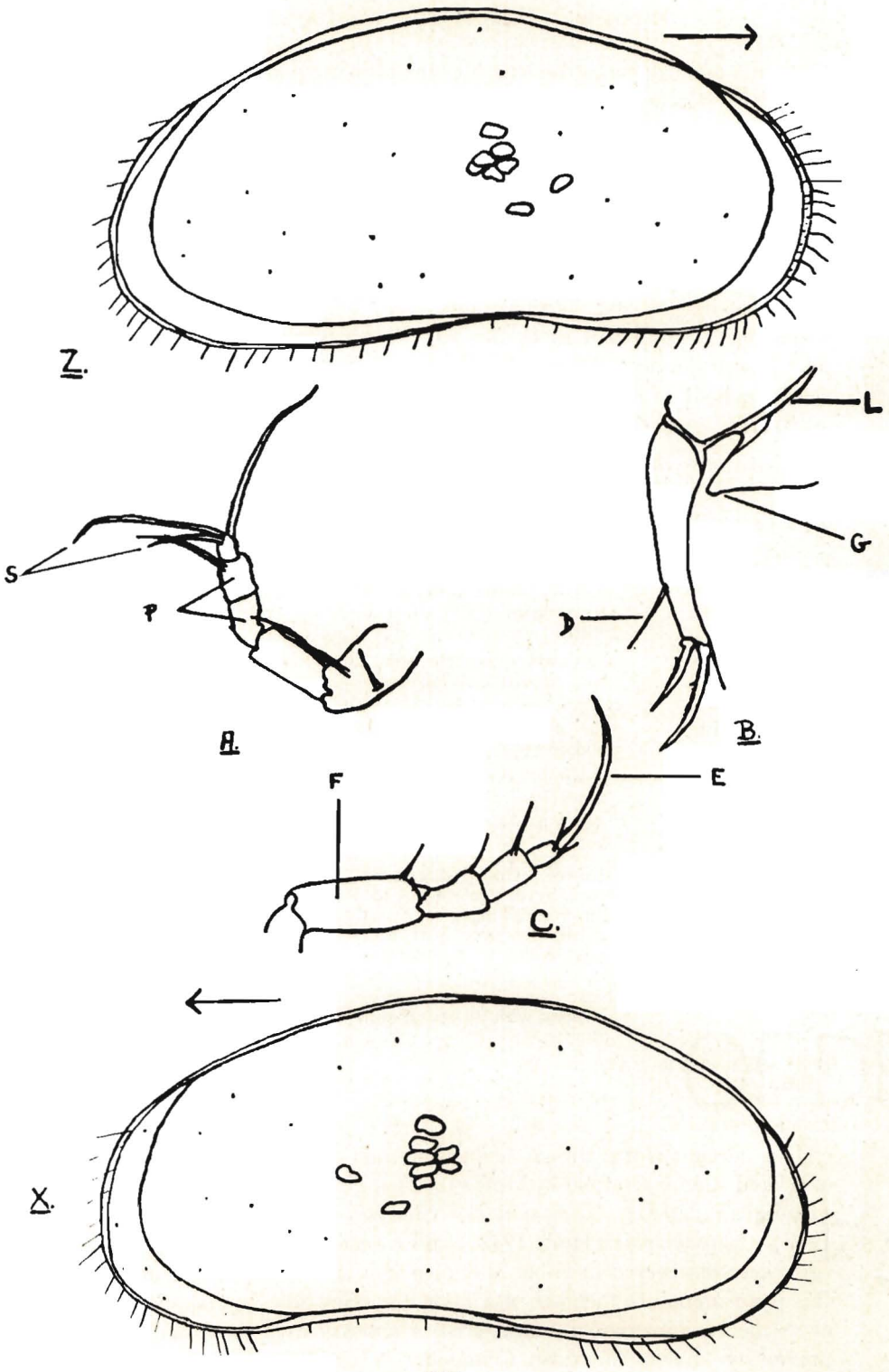
The furcal rami are slightly curved. The length of the ventral margin of the ramus is about nine times the least width; the length of the dorsal seta is three and four sevenths times the length of the dorsal margin from the distal end of the ramus. The terminal claw is finely toothed and is about one-half as long as the ramus. The length of the terminal seta is about one and one-half times the least width of the ramus. The genital lobe is well developed, conical in shape with the margins being continuous from the body of the animal. This lobe closely resembles that of *Candona sigmoides*. A short seta is located on the body dorsal to the furca.

*Comparison with* C. suburbana

| | *Candona* n. sp.? | *Candona suburbana* |
|---|---|---|
| Pore Canals | Inconspicuous | Conspicuous |
| Second leg second podomere | Slightly longer than the sum of lengths of podomeres 3 and 4. Distal seta shorter than distal width of podomere | Almost equal in length to the sum of the lengths of podomeres 3 and 4 |
| Claw, distal | Length approximately equal to sum of distal podomeres | Length slightly less than sum of distal three podomeres |
| Third leg Shortest distal seta | Slightly more than 3½ times the length of the ultimate podomere | Four times the length of the ultimate podomere |
| | Oppositely directed seta 2⅓ times longer | Oppositely directed seta 2 times longer |
| Length ventral margin of ramus | 9 times least width | 11 times least width |
| Dorsal seta of ramus | Removed from subterminal claw by distance equal to ¼ the ventral margin. Length is slightly over 3–3½ times least width of the ramus | Removed from subterminal claw by distance equal to slightly less than ⅓ the ventral margin. Length is 3½ to nearly 4 times least width of ramus |
| Genital lobe | Thick, cone-like continuation of body with no dorsal sinuation | Triangular with dorsal sinuation |
| Body seta dorsal to furca | Present | No mention of one in Hoff (1942) |

*Discussion.*

This species, along with *C. suburbana,* appears to belong to the group of related species reported by Hoff (1942). This group includes *C. caudata* (Kaufmann, 1900), *C. sigmoides* (Sharpe, 1897), *C. indigena* (Hoff, 1942), *C. fossulensis* (Hoff, 1942), and *C. acuta* (Hoff, 1942). Since no eggs were discovered in either specimen it is difficult to ascertain whether this is an immature member of a known species or a new species. However, the combination of characteristics appears to point away from any previously known American *Candona.* A review of the more common


Z.
L
G
S
P
D
A.
B.
F
E
C.
X.

## Plate II

CANDONA new species?

All the drawings were made with the aid of a camera lucida.

Z. RIGHT VALVE

The arrow points toward the anterior end of the animal

X. LEFT VALVE

The arrow points toward the anterior end of the animal

A. THIRD THORACIC LEG

S. Companion setae of the ultimate podomere

P. Divided penultimate podomere

B. FURCAL RAMUS AND GENITAL LOBE

The furcal claws are equal in length

D. Dorsal seta

G. Genital lobe

L. This "double line" separation is found more dorsal to the genital lobe than it appears in this drawing. The specimen shown here was pushed out of position in this respect.

C. SECOND THORACIC LEG

E. Claw

F. Second podomere

European species in this genus fails to reveal any counterpart. Superficial resemblances exist between this undetermined species and *C. candida,* but the penultimate podomere of the third thoracic leg is undivided in the European specimens.

From the above considerations it is clear that further work needs to be done to ascertain whether these specimens constitute a species new to literature, a European one, or varietal examples.

## DISCUSSION

*Occurrence of Species*

Of all the new records for New York State, only one species, *Leydigia acanthocercoides,* would not be expected in this general area. This is a warm water form reported in the United States only from Louisiana (Pennak, 1953). However, it is found in Europe, South America, India, China, and South Africa. It seems probable that the species was introduced into the area from another location, probably Europe. The representatives collected here were all from temperatures above 22°C and some from rather alkaline waters.

Of the other cladocerans, *Simocephalus expinosus* has been reported from Ohio (Ward, 1940), *Macrothrix rosea* is reported by Birge (1918) as "common everywhere", and the additional species, *Alona* and *Chydorus,* have been reported from Ohio and other proximal areas. The new records of ostracods are many because of the dearth of collections in New York State. All, except the tentatively new *Candona* have been reported from Ohio, Illinois or Massachusetts, and so are not unexpected in this region. The lack of a record for *Asellus militaris* in New York is probably due to its earlier synonomy with *A. communis.*

*Habitat Preferences*

By far, the most abundant numbers and kinds of species were found about vegetation in the littoral areas of ponds, lakes, rivers and marshes (Table I). Irondequoit Bay (Massaug Coves) appears to have similar species in kind and number to that of the lakes and ponds of the area. This type of habitat agrees with the results of a limnological study of the bay (Tressler and Austin, 1953).

Swift, clear creeks have very few species of Cladocera or Ostracoda (Table I) and those which were collected were found clinging to aquatic vegetation. Amphipods (except *Crangonyx gracilis*) and crayfish were present in abundance. A species which appeared only in this habitat was *Gammarus limnaeus,* found at cold temperatures (below 18°C) with a pH close to 7. It was particularly abundant at Cedar Springs, in the creeks and the swimming pool. Aside from the crayfishes, members of every other species were found in another type of habitat as well. This scarcity of Cladocera and Ostracoda may be due in part to the swift running water which renders it impossible for the animals to live. Larger

forms such as amphipods, isopods, and decapods are certainly more able to withstand greater currents.

Moderately flowing, clear creeks evidenced a larger number of Cladocera and Ostracoda than the swift streams. *Macrothrix laticornis* was the only crustacean limited to streams (swift and moderate) in these collections. However, representatives of this species were found so rarely (in two collections) that they may well be lacustrine as Ward (1940) reports for Ohio. The other member of its genus, *M. rosea,* was found in Deep Pond. *Crangonyx gracilis,* not collected in swift streams, was found once in Little Black Creek, a moderately flowing creek. By far, *C. gracilis* was more commonly collected in ponds, lakes, and the Genesee River.

The occurrence of *Lirceus lineatus* in the sluggish Slater Creek is of interest, especially since this creek has almost disappeared into a marshy area during at least one dry spell. Efforts were made, unsuccessfully, to collect more animals at such a time. Its appearance in a drainage area where *Asellus communis* seems dominant (nearby Buck Pond, Long Pond) is of note since workers have often reported the entrenchment of only one isopod species over fairly large areas. *L. lineatus* has been reported from the Thousand Islands region of New York, so its existence in this part of the country is not unexpected.

The few vernal ponds sampled yielded typically spring species, such as the *Anostraca, Conchostraca, Asellus militaris* (if this is a valid species), and *Cypricercus splendida.* Animals common to other habitats appeared also, such as *Physocypria pustulosa, Cypria turneri, Pleuroxus denticulatus,* and *Chydorus sphaericus.*

As the list of Rochester species is surveyed, it is evident that most of the animals are not limited to strictly one type of environment, but are quite adaptable to several.

*Temperature and Chemical Factors*

The limitations of temperature and acidity or alkalinity on individuals of a species was not testable by the methods employed in this study. In order to test these effects, a series of collections from specific sites is required with a record of the pH fluctuations, or laboratory experimentation. The mere absence of members of a species from an environment does not indicate an intolerance to the prevailing pH or temperature. Only in cases of an abundant species which consistently disappears below or above a certain temperature or pH range can an inference be suggested, and even then it is without assurance. *Gammarus limnaeus,* for example, was found only at cold temperatures where the pH of the water was about neutral. These factors are usually associated with swift streams, the only habitat where members of this species were found. It is difficult to demonstrate which is the dominant factor in the survival of representatives of this species, or how many factors are related to their favorable environ-

ment. Only indications can be derived from such a study; laboratory experimentation provides more precise information.

The best conclusion which unequivocally can be drawn from the data is that the representatives of many of the common species show tolerance of a wide range in temperature and pH. The information gathered here may be of some value in future studies in this realm.

*A Discussion of the Ostracods*

In view of the inadequate attention this group has received previously in this area, a separate consideration here is warranted. As shown in Tables I and II, the most common ostracods in the Rochester area are *Candona simpsoni, Cypria turneri, Physocypria pustulosa, Cypridopsis vidua,* and *Potamocypris smaragdina.* These species have been found from summer and fall collections in a variety of temperatures. However, as Hoff (1942) reports for Illinois, *Cypria turneri* is never found in moving streams, but is quite abundant in marshes and ponds. The only ostracods found in streams are *Candona fluviatilis, Physocypria pustulosa, Cypridopsis vidua,* and *Potamocypris smaragdina,* all of which have previously been reported from such a habitat by other collectors (Hoff, 1942, Furtos, 1933).

The seasonal appearance of representatives of certain species of *Candona* in Rochester has differed from previous reports. *C. fluviatilis, C. decora,* and *C. punctata* have all been reported only from waters in the spring (Hoff, 1942 and Furtos, 1933). Here, members of all three species were found in the late fall, *C. fluviatilis* and *C. punctata* in September and October, *C. decora* in October and November. All the collections were from water 15°C or less. This may indicate a temperature relation, individuals of the species having a critical survival temperature. This suggestion is further strengthened by reports of *C. punctata, C. truncata, C. distincta,* and *C. crogmaniana,* all of which have been found abundantly in Ohio in the spring and in November with no reports of collections during the summer months (Furtos, 1933). In fact, the only ostracods found at temperatures higher than 15°C in this survey were *Candona simpsoni, Cyclocypris sharpei, Cyclocypris ovum, Cypria turneri, Physocypria pustulosa, Cypridopsis vidua* and *Potamocypris smaragdina* all of which have been found during the summer months by other collectors. Any claim of limiting temperatures can only be adequately substantiated in the laboratory.

The appearance of the giant *Candona decora* in Blue Pond opens the question of whether this is a new variety, an unusual individual, or the product of an environmental factor. Little more than speculation can be offered since only one individual was found, but the problem invites further investigation.

Individuals comprising an apparently new species of Candona require

closer examination to ascertain whether this is a new American species or a previously described European one.

In some of the ostracods reported, differences were noted between the collected specimens and some part of their description in the literature. Some of the differences certainly may be ascribed to individual or group variations. Until type specimens can be examined for comparison, these differences in the classified individuals must be kept in mind. One of these is the presence of a flange on the right shell of *Cyclocypris sharpei*. None of the diagrams in the literature of *C. sharpei* were large enough to show this expansion, which may be present in some degree in the described species. The flange observed was not as pronounced as that of *C. cruciata* which caused comment by Furtos (1935), so it may be found on the type specimens.

More individuals must be collected to identify definitely the animals tentatively classified as *Cypricercus splendida*. The loss of a left valve and the bleached condition of the right one were hindrances in describing the single individual collected.

## SUMMARY

(1) The free-living fresh water Crustacea of the Rochester area have received relatively little attention by Biologists. Any specimens of the various orders known from the area have been collected incidentally, for no general survey has previously been attempted.

(2) This survey is based on collections made in the spring, summer and fall of 1954. The area covered extended on the north to Lake Ontario, east to Irondequoit Bay, west to Cedar Springs, and south to Mendon Ponds.

(3) Collections were made from a variety of ecological habitats, ponds, lakes, creeks, marshes, a river, and temporary pools. Ecological notes were made at each site.

(4) Ecological and distributional remarks are given for representatives of the fifty-six species of Crustacea which were collected in the area. Fourteen of these are definitely new records for New York State, and for four additional species the writer has found no previous New York record.

(5) A tentative description of a probable new species of *Candona* is offered.

(6) An attempt is made to analyze the field data to find approximate habitat preferences and their relation to temperature and pH factors.

(7) A special discussion of the ostracods is given which includes a consideration of habitat distribution, seasonal appearance and its relation to temperature, and systematic problems of the ostracods collected.

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## HONORS IN THE ROCHESTER ACADEMY OF SCIENCE

Early in its history the Rochester Academy of Science began conferring honors on worthy Members and prominent scientists in fields within its purview. The Council would like to further recognize the recipients by publishing the names of those not so recognized in previous issues. It proposes to maintain these memoranda in future issues of our Proceedings.

The following brings the citations up to date. It has not been practical to indicate the ranges of endeavor for those elected in the earlier years. It suffices to say that the Council carefully reviews the proposals of a Nominating Committee to weigh the outstanding qualifications of the candidates before they are selected for these honors.

Life Membership is given to those who have served the Academy for many years as members, officers and mentors to their associates; this category also includes those who support the Academy by remitting life dues of $100. The Honorary Membership is reserved for non-members who have made distinguished contributions to science and who have encouraged the activities of the Academy, which is chiefly non-professional in make up. The Fellowship is conferred upon Members who have achieved noteworthy accomplishment in science along avocational and vocational lines. The Academy is grateful to those so honored because they constitute the vital force that has sustained its efforts.

*Life Members to 1953*
Rochester Historical Society
Milroy N. Stewart
Taylor Instrument Company Library

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George B. Cressy, Ph.D.
W. F. Foshag, Ph.D.
V. Ben Meen, Ph.D.
W. C. Muenscher, Ph.D.

*Fellows to 1953*
Melissa E. Bingeman
Sherman C. Bishop, Ph.D.
Walter Bloor, Ph.D.
Edward T. Boardman, Ph.D.
Babette I. Brown, Ph.D.
Grace Carter, M.D.
Janet H. Clarke, Ph.D.
William S. Cornwell
Paul Davis
Wallace O. Fenn, Ph.D.
Edwin G. Foster
H. Lou Gibson
J. Edward Hoffmeister, Ph.D.
David Jensen
Mrs. David Jensen
Milton B. Punnett
Robert L. Roudabush, Ph.D.
John Russell, Ph.D.
John R. Russell
Henry C. Staehle, Ph.D.
Milroy N. Stewart
W. Stephen Thomas
F. Hawley Ward
George Wendt
Louise M. Zeitler

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*Life Member*
Warren A. Matthews

*Honorary Member*
Richard E. Horsey
Botany, Horticulture, Natural History, Ornithology

*Fellows*
Leo J. Houlihan
Astronomy, Gemology, Lapidary, Minerology

Edwin E. Jelley, Ph.D.
Chemistry, Crystallography

Warren A. Matthews
Botany

## 1955

*Life Member*

Grace A. B. Carter, M.D.

*Honorary Member*

Edwin H. Reiber
Model Making in Natural Science

*Fellows*

Elizabeth Slater
Botany, Natural History, Scouting

Floyd Slater
Botany, Natural History, Scouting

Robert Elliot Stauffer, Ph.D.
Botany, Photographic Chemistry, Advancement of Science

## 1956

*Fellows*

Vera Kenney Boardman
Horticulture, Illustration, Writing, Zoology

Bernard Harkness
Horticulture, Park Landscaping, Botanical Taxonomy

Paul W. Stevens
Astronomy, Optical Engineering, Photography

Leo J. Tanghe, Ph.D.
Mycology, Organic Chemistry, Ornithology

James S. Wishart, Ph.D.
Education, Geology

## 1957

*Fellows*

Ralph K. Dakin
Astrophysics

Allan S. Klonick
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