A few notes respecting some of the *Cladocera* previously recorded may be of interest. *Daphnia retrocurva* was found to be much commoner than was indicated by the plankton collected during the summer of 1921. Several spot-tailed minnows (*Notropis hudsonius*) taken near the head of Orient Bay had eaten a high percentage of this *Daphnia*, which shows that it must be locally quite abundant. In some instances it formed as high as 95% of the food. The same is true with regard to *Daphnia longispina* var. *hyalina*, as specimens of the yellow perch (*Perca flavescens*) from the same part of the lake had eaten a great number of the latter entomostracan.

With regard to the *Chydoridae* it seems probable that *Alonella nana* and *Monospilus dispar* are more numerous in Lake Nipigon than in other bodies of water. The same is true of *Rhynchotalona falcata*, which is so common and widely distributed that it must be valuable as a food organism for fishes which feed close to the bottom. A single specimen with tuberculated shell valves similar to those of *Alona guttata* var. *tuberculata* was found. Small suckers taken at Sturgeon River were found to have eaten a considerable number of specimens of *Alonella rostrata*, which was otherwise very infrequent. These specimens did not have the long incurved beak so prominent as is sometimes the case with this species, but much resembled the figure 211 on page 89 of *Die Süsswasserfauna Deutschlands*. Only one specimen of this cladoceran was found in the summer of 1921, and it was a more typical individual with a long curved rostrum. *Alona costata* was found to be the commonest of this genus and one of the most widely distributed Cladocera in Lake Nipigon. A single specimen was found with tuberculate valves as in *Alona guttata* var. *tuberculata*.

Notwithstanding the fact that certain important organisms were found to be quite abundant locally, the investigations of the second summer tend to confirm the statements of the first year's studies, namely, that Lake Nipigon is relatively a plankton poor body of water with the exception of its enormous diatomaceous flora.

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THE FOOD OF YOUNG SUCKERS (*CATOSTOMUS COMMERSONII*) IN LAKE NIPIGON

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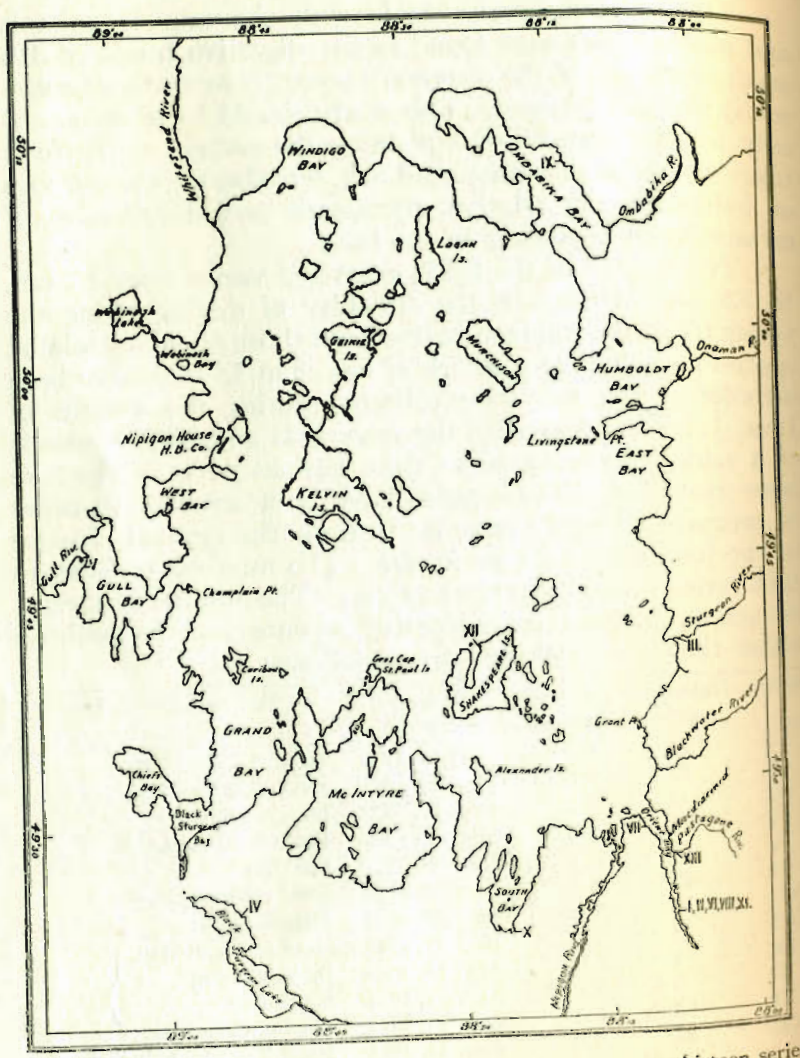
THE FOOD OF YOUNG SUCKERS (*CATOSTOMUS COMMERSONII*) IN LAKE NIPIGON

The following paper deals with the minute animals and plants which were found in the digestive tracts of 316 small specimens of the common sucker (*Catostomus commersonii*) in Lake Nipigon. This study should be of value not only for the purpose of explaining the nature of the food taken by the above-mentioned fish, but also for the purpose of indicating the relative abundance and distribution of certain small organisms in the lake.

The lengths of the fishes examined varied from 1.7 cm. to 5.8 cm. Owing to the difficulty of distinguishing the young fry of the common sucker from those of closely related species none having a length of less than 1.7 cm. have been included. The fish were collected during the months of June, July, and August of the years 1921 and 1922 by means of a seine. Thirteen series from various parts of the lake were examined. These series have been arranged in order of increasing lengths in order to show the gradual changes in the food with increase in size. The numbers of fishes in each series varied from one to sixty. The number of suckers in each series, the average lengths, the dates and the localities where they were collected are as follows:

Series	Number of suckers	Average length	Date of collection	Part of Lake Nipigon
I	60	1.9 cm.	June 14, 1922	Head of Orient Bay
II	57	2.3 "	July 19, 1921	Head of Orient Bay
III	4	2.5 "	July 12, 1922	Sturgeon River
IV	1	2.6 "	July 20, 1922	Black Sturgeon Lake
V	28	2.7 "	July 23, 1922	Gull Bay
VI	20	2.8 "	Aug. 3, 1922	Head of Orient Bay
VII	50	2.9 "	July 25, 1922	Near McL. Bay
VIII	31	3.2 "	July 27, 1921	Head of Orient Bay
IX	1	3.2 "	Aug. 10, 1922	Ombabika Bay
X	2	3.5 "	Aug. 4, 1921	South Bay
XI	25	3.7 "	Aug. 15, 1921	Head of Orient Bay
XII	34	4.0 "	Aug. 12, 1921	Small Bay on Shakespeare Island
XIII	3	5.4 "	June 6, 1922	Pustagone River



Map of Lake Nipigon showing the localities from which the thirteen series of young suckers were obtained.

As will be seen the major portion of the material was taken near the head of Orient Bay, as this part of the lake was the most readily accessible and young suckers were very abundant there. The head of the bay is a long narrow bayou with several slow flowing creeks entering it and with abundant growths of pond weeds, rushes, and other aquatic plants in the shallower parts, especially in the many small, shallow indentations. It was from several of these small bays that Series I, II, VI, VIII, and XI were taken.

The series from the other parts of the lake were used largely for purposes of comparison, and any peculiarities respecting the localities will be given in the pages following.

The localities from which the series were taken are shown on the accompanying map.

In this study the food organisms have been divided into two groups: (1) the open-water (limnetic) species, which are here referred to as typical planktonts, and which commonly enter the habitats of the young suckers; (2) the bottom- and weed-haunting (lenitic littoral) species. Forms such as *Acroperus harpae* and *Chydorus sphaericus*, which may often appear in the plankton as isolated individuals and occasionally in numbers, are here considered as bottom forms.

Series I

This was the collection containing the smallest specimens which were examined. It was taken near the head of Orient Bay on June 14, 1922. The average length of the fishes in this series was 1.9 cm. The smallest specimen measured 1.7 cm., while the largest was 2.1 cm. in length. The total number of individuals was sixty.

In this and the series which follow the number after the name of each organism indicates the number of fishes in the series which had fed upon it. The organisms are listed in order of their greatest frequency.

CLADOCERA	
Daphnia longispina	48
Bosmina longirostris	38
Sida crystallina	9
Daphnia retrocurva	6
Diaphanosoma sp.	3
Rhynchotalona falcata	2
Alona costata	2
Alona affinis	1
COPEPODA	
Nauplii	58
Cyclops sp.	57
Diaptomus sp.	12
Canthocamptus sp.	1
ROTATORIA	
Notholca longispina	58
Keratella cochlearis	54
Polyarthra trigla	42
Monostyla sp.	11
Keratella quadrata	8
Lecane luna	6
Diurella sp.	5
Notholca foliacea	2
Bdelloid rotifers	2
PROTOZOA	
Ceratium hirundinella	18
Codonella sp.	2
Difflugia lobostoma	1
MISCELLANEOUS	
Chironomid larvae	10
Oligochaeta podal-spines	2
Caddis larvae	1
Ephemerid nymphs	1
DIATOMS	
Melosira	45
Tabellaria	34
Stephanodiscus	18
Navicula	12
Cocconema	12
Pinnularia	9
Cymbella	8
Epithemia	4
Stauroneis	4
Surirella	2
Synedra	1
Amphora	1
OTHER ALGAE	
Microcystis flos-aquae	51
Anabaena lemmermanni	18
Pediastrum boryanum	17
Botryococcus braunii	12
Aphanocapsa sp.	11
Dictyosphaerium sp.	5
Mougeotia filament	3
Cosmarium sp.	2
Scenedesmus sp.	2
Staurastrum sp.	1
Docidium baculum	1

A comparison of series I with those which follow will show how exclusively a plankton feeder the common sucker is at this stage of its growth. The bottom-haunting organisms were so few in number that most of them might well be considered accidental. Although most of the series show some typical planktonts among the organisms eaten, none were planktonivorous to such an extent as this series. However, the plankton feeding habit has been found to be occasionally resumed even by an adult fish of considerable size.

The preponderance of plankton organisms indicated by the prevalence of such forms as *Daphnia*, *Bosmina*, Copepod nauplii, *Keratella*, *Notholca*, and *Polyarthra* in contrast with the rare occurrence of such typical bottom forms as *Rhynchotalona*, the various species *Alona* and *Canthocamptus*, which were found as isolated specimens in but one or two fish of the entire series. It is also interesting to notice the importance of floating algae and such typical plankton diatoms as *Melosira*, *Tabellaria*, and *Stephanodiscus*.

Limnetic rotifers were by far the most numerous of all the organisms which the suckers of this series had fed upon—especially *Notholca longispina*, which was found in all of the 60 fishes except two, and which constituted from 50% to 75% of the entire food contained in the digestive tracts of 47 individuals. In no other series did the rotifer *Polyarthra trigla* occur, yet here numerous specimens of it were taken from 42 fishes. *Keratella quadrata* was found in 8 fishes of this series, but did not occur in any of the fishes comprising the remaining twelve series.

Several had taken high percentages of *Bosmina longirostris*, two contained Copepod nauplii and adult *Cyclops* to the extent of at least 50%; while in another the diatom *Tabellaria fenestrata* was the most important organism with regard to bulk and numbers.

Series II

The fishes of this collection were taken on July 19, 1921, near the head of Orient Bay. The number in this series was 57, with an average length of 2.3 cm. The smallest was 2.1 cm. in length, while the largest measured 2.6 cm.

CLADOCERA		*Alona affinis*	6
Polyphemus pediculus	48	*Pleuroxus procurvatus*	4
Sida crystallina	40	*Daphnia retrocurva*	3
Acroperus harpae	27	*Ceriodaphnia lacustris*	3
Scapholeberis mucronata	20	*Eurycercus lamellatus*	2
Bosmina longirostris	20	*Pleuroxus denticulatus*	2
Daphnia pulex	13	*Alonella excisa*	2
Alona costata	9	*Drepanothrix dentata*	1
Chydorus sphaericus	9	*Acantholebris curvirostris*	1
Daphnia longispina	8	*Alona guttata*	1
Diaphanosoma sp.	6	*Alona quadrangularis*	1

CLADOCERA—*cont.*	
Chydorus faviformis	1
Leptodora kindtii	1
COPEPODA	
Cyclops sp.	12
Canthocamptus sp.	2
Diaptomus sp.	1
Epischura lacustris	1
Nauplii	1
Ostracoda	16
ROTATORIA	
Notholca longispina	16
Keratella cochlearis	13
Monostyla sp.	5
Tricocerca sp.	2
Lecane luna	2
PROTOZOA	
Difflugia lobostoma	17
Centropyxis aculeata	11
Ceratium hirundinella	9
Euglypha alveolata	6
Arcella vulgaris	5
Cyphoderia ampulla	2
MISCELLANEOUS	
Hydrachnid nymphs	27
Chironomid larvae	17
Chironomid pupae	3
Water beetle larvae	2
Midge adults	2
Oligochaeta podal-spines	2
Ephemerid nymphs	1
Plumatella statoblast	1
DIATOMS	
Tabellaria	22
Navicula	17
Pinnularia	11
Cocconema	9
Melosira	6
Epithemia	4
Cymbella	2
Surirella	1
Stephanodiscus	1
OTHER ALGAE	
Botryococcus braunii	15
Cosmarium sp.	12
Microcystis	11
Pediastrum boryanum	7
Merismopedia sp.	3
Anabaena lemmermanni	3
Oocystis sp.	2
Ulothrix filaments	2
Aphanocapsa sp.	1
Spaerocystis sp.	1
Staurastrum sp.	1
Euastrum sp.	1

In the comparison of series II with series I, the most conspicuous difference is seen to be the immense drop in the importance of the *Rotatoria* and the increased value of *Cladocera* as food.

Polyphemus pediculus and *Sida crystallina* were the species most prevalent in the digestive tracts of these fishes. The former cladoceran was found in 48 of the 57 fishes, and formed at least 75% of the food of 28 individuals and 50% of the food of 11 more of them. Ten of this series had eaten at least 75% of *Sida crystallina*, while in thirteen more the latter species constituted at least one half of the food. Besides the above, two had eaten a high percentage of *Bosmina longirostris*, one of *Daphnia longispina*, and one individual had taken a great number of *Drepanothrix dentata*.

Although the fishes of this series had fed to a great extent upon plankton organisms, there was, in comparison with the series preceding, a much greater number of forms from among vegetation or close to the bottom such as *Ostracoda*, *Chydorus sphaericus*, *Acroperus harpae*, hydrachnid nymphs, etc.

Series III

The four small suckers constituting this series were taken in the Sturgeon River a short distance from its mouth. At this point the bottom of the river is very sandy, and is covered with patches of *Potomogeton*. There is also considerable current. The collection was made on July 12, 1922. The specimens averaged 2.5 cm. in length. Two had a length of 2.6 cm., one 2.5 cm. and one 2.4 cm.

CLADOCERA	
Ceriodaphnia quadrangula	4
Alonella nana	4
Alonella rostrata	3
Alona guttata	3
Alona costata	3
Chydorus sphaericus	3
Acroperus harpae	2
Rhynchotalona falcata	2
Alona affinis	2
Monospilus dispar	1
Alona quadrangularis	1
COPEPODA	
Canthocamptus	4
Cyclops	3
Nauplii	3
OSTRACODA	4
ROTATORIA	
Lecane luna	2
Monostyla sp.	1
Diurella sp.	1
Colurella sp.	1
Diaschiza sp.	1
PROTOZOA	
Cyphoderia ampulla	3
Arcella vulgaris	3
Centropyxis aculeata	3
Difflugia pyriformis	3
Euglypha alveolata	2
Campascus	1
Hyalosphenia elegans	1
MISCELLANEOUS	
Chironomid larvae	2
Hydrachnid nymphs	2
Chironomid pupae	1
Caddis larva	1
Ephemerid nymph	1
Oligochaeta podal-spines	1
DIATOMS	
Pinnularia	3

DIATOMS—*cont.*		OTHER ALGAE	
Navicula	3	*Closterium*	4
Surirella	2	*Cosmarium*	4
Cocconema	1	*Merismopedia*	3
Epithemia	1	*Docidium baculum*	2
Pleurosigma	1	*Penium*	1
Nitzschia	1	*Euastrum*	1
Cymbella	1	*Micrasterias*	1
Amphora	1	*Scenedesmus*	1
Stauroneis	1	*Microcystis flos-aquae*	1

It will be seen that all of series III had been feeding among vegetation or close to the bottom. There is an almost complete absence of typical plankton organisms, as would be expected where there was considerable current. In the interesting assemblage of *Cladocera* of the family *Chydoridae*, the presence of many specimens of *Alonella rostrata* is noteworthy.

Series IV

One sucker, 2.6 cm. in length, taken at Black Sturgeon Lake on July 20, 1922, constitutes this series.

CLADOCERA
Alona affinis
Alona costata
Chydorus sphaericus
Alonella nana
Acroperus harpae
Pleuroxus procurvatus

COPEPODA
Canthocamptus
Cyclops
Nauplii

OSTRACODA

ROTATORIA
Notholca foliacea
Lecane luna
Monostyla sp.
Colurella sp.

PROTOZOA
Centropyxis aculeata
Cyphoderia ampulla

MISCELLANEOUS
Chironomid larvae
Hydrachnid nymph
Oligochaeta podal-spines

DIATOMS
Pinnularia
Navicula
Cocconema
Cymbella
Epithemia
Tabellaria

OTHER ALGAE
Cosmarium
Closterium
Docidium baculum

This fish had been feeding under conditions similar to those of the four in the list preceding.

Series V

The twenty-eight fishes of this series were taken from rather shallow weedy water on July 23, 1922, at Gull Bay. Their average length was 2.7 cm., but they ranged between 2.3 and 3.2 cm.

CLADOCERA		ROTATORIA	
Acroperus harpae	27	*Monostyla* sp.	19
Alonella nana	26	*Notholca foliacea*	9
Alona costata	24	*Notholca striata*	6
Rhyncholalona falcata	20	*Trichocerca multicrinis*	2
Chydorus sphaericus	18	*Colurella* sp.	2
Alonella excisa	15	*Lepadella* sp.	1
Alona affinis	12	*Lecane luna*	1
Sida crystallina	10	*Keratella cochlearis*	1
Bosmina longirostris	9		
Monospilus dispar	8	PROTOZOA	
Ilyocryptus sp.	6	*Difflugia lobostoma*	21
Alonella exigua	5	*Difflugia pyriformis*	18
Alona guttata	3	*Difflugia acuminata*	18
Alona rectangula	3	*Centropyxis aculeata*	13
Alona quadrangularis	3	*Lecquereusia modesta*	3
Pleuroxus denticulatus	3	*Cyphoderia ampulla*	3
Eurycercus lamellatus	3	*Euglypha alveolata*	2
Scapholeberis mucronata	2	*Campascus* sp.	1
Alonella rostrata	1	*Epistylis*	1
Daphnia longispina	1		
Bosmina longispina	1	MISCELLANEOUS	
Polyphemus pediculus	1	Chironomid larvae	22
Macrothrix laticornis	1	Hydrachnid nymphs	18
Camptocercus rectirostris	1	Ephemerid eggs	11
Leydigia quadrangularis	1	*Oligochaeta* podal-spines	11
Ceriodaphnia sp.	1	*Tardigrada*	5
		Chironomid pupae	3
COPEPODA		*Hyalella knickerbockeri*	3
Cyclops	23	Chironomid eggs	2
Nauplii	21	*Aphis* sp.	2
Canthocamptus	18	Corixid nymph	1
		Corethra larva	1
OSTRACODA	21	Caddis larva	1

MISCELLANEOUS—*cont.*	
Ephemerid nymph	1
Thrips sp.	1
DIATOMS	
Pinnularia	15
Navicula	14
Cocconema	14
Epithemia	8
Cymbella	6
Tabellaria	4
Surirella	3
Amphora	1
Fragillaria	1
OTHER ALGAE	
Closterium sp.	19
Cosmarium sp.	11
Merismopedia sp.	7
Scenedesmus sp.	3
Euastrum sp.	2
Pediastrum boryanum	2
Penium sp.	2
Aphanocapsa sp.	2
Microcystis flos-aquae	1
Anabaena lemmermanni	1
Dictyosphaerium	1

The element of pelagic organisms entering into the menu of this series of suckers is very small. The few specimens of *Bosmina*, *Daphnia*, *Polyphemus*, *Keratella cochlearis*, etc., seem lost in the vast assemblage of bottom forms. Four of this series had eaten about 75% of Chironomid larvae.

Series VI

This series consists of twenty suckers collected on August 3, 1922, near the head of Orient Bay. Their average length was 2.8 cm., and their range of size between 2.4 and 3.2 cm.

CLADOCERA	
Rhynchotalona falcata	17
Chydorus sphaericus	15
Alona costata	12
Alonella nana	11
Monospilus dispar	9
Pleuroxus denticulatus	8
Ilyocryptus acutifrons	8
Bosmina longispina	6
Alona affinis	5
Alona quadrangularis	3
Eurycercus lamellatus	3
Acroperus harpae	3
Daphnia longispina	3
Drepanothrix dentata	3
Latona setifera	2
Sida crystallina	1
Acantholeberis curvirostris	1
Ilyocryptus sordidus	1
Polyphemus pediculus	1
Alona rectangula	1
Alona guttata	1
Alonella exigua	
COPEPODA	14
Canthocamptus	10
Nauplii	9
Cyclops sp.	2
Epischura lacustris	

OSTRACODA	12
ROTATORIA	
Monostyla sp.	16
Diurella sp.	10
Lecane luna	9
Notholca striata	7
Keratella cochlearis	5
Colurella sp.	4
Bdelloid rotifers	3
Notholca longispina	2
Trichocerca sp.	1
Notholca foliacea	1
PROTOZOA	
Difflugia pyriformis	13
Cyphoderia ampulla	11
Euglypha alveolata	10
Campascus sp.	8
Lecquereusia modesta	7
Arcella vulgaris	6
Difflugia constricta	6
Centropyxis aculeata	5
Difflugia corona	4
Difflugia acuminata	2
Pontigulasia spectabilis	2
Nebela dentistoma	1
Sphenoderia lenta	1
Ceratium hirundinella	1
MISCELLANEOUS	
Chironomid larvae	13
Hydrachnid nymphs	10
Sponge spicules	5
Chironomid pupae	4
Ephemerid nymphs	3
Tardigrada	2
DIATOMS	
Pinnularia	14
Navicula	14
Melosira	10
Fragillaria	10
Epithemia	9
Coccomema	7
Tabellaria	6
Cymbella	5
Surirella	5
Nitzchia	5
Pleurosigma	2
Amphora	2
Stauroneis	2
Synedra	2
OTHER ALGAE	
Cosmarium sp.	11
Merismopedia sp.	8
Pediastrum boryanum	6
Oocystis sp.	5
Closterium sp.	5
Staurastrum sp.	5
Microcystis flos-aquae	5
Chroococcus sp.	4
Micrasterias sp.	4
Euastrum sp.	4
Aphanocapsa sp.	3
Docidium baculum	3
Penium sp.	3
Hyalotheca sp.	3
Botryococcus braunii	2
Anabaena lemmermanni	2
Coelastrum sp.	2

As in the preceding series this is a list mainly of organisms living either among aquatic vegetation or close to the bottom, with only a scattering of typical planktonts.

Series VII

This collection of fifty suckers was taken from a small bay immediately south of the one known as McL. Bay.

As the bay from which this collection was made was very small and open to the north-east, east winds may have brought about an invasion of typical open water planktonts, thus accounting for their preponderance in the food of the fishes in this series. The individuals of series VII averaged 2.9 cm. in length, while their variation in size was from 2.5 to 3.3 cm.

CLADOCERA	
Bosmina longirostris	47
Polyphemus pediculus	34
Alona costata	18
Chydorus sphaericus	18
Daphnia longispina	14
Alonella nana	14
Leptodora kindtii	11
Alona affinis	7
Alona guttata	4
Sida crystallina	4
Daphnia retrocurva	3
Acroperus harpae	3
Pleuroxus procurvatus	2
Ceriodaphnia sp.	1
Ilyocryptus sp.	1
Alonella excisa	1
Alona quadrangularis	1
Alona rectangula	1
COPEPODA	
Cyclops	19
Canthocamptus	16
Nauplii	6
OSTRACODA	19
ROTATORIA	
Keratella cochlearis	37
Lecane luna	9
Notholca longispina	7
Notholca foliacea	5
Monostyla sp.	4
Notholca striata	2
Lepadella sp.	1
Colurella sp.	1
Diurella sp.	1
Diaschiza sp.	1
PROTOZOA	
Difflugia lobostoma	41
Codonella sp.	14
Centropyxis aculeata	8
Cyphoderia ampulla	6
Euglypha alveolata	4
Lecquereusia modesta	4
Difflugia constricta	3
Difflugia pyriformis	3
Difflugia acuminata	2
Arcella vulgaris	2
Campascus sp.	2
Difflugia corona	1
MISCELLANEOUS	
Chironomid pupae	18
Chironomid larvae	11
Oligochaeta podal-spines	11
Hydrachnid nymphs	7
Ephemerid nymphs	1
Corixid nymphs	1
Chironomid eggs	1
Chironomid adults	1
DIATOMS	33
Epithemia	21
Pinnularia	18
Cocconema	15
Cymbella	15
Stephanodiscus	11
Navicula	

DIATOMS—*cont.*		OTHER ALGAE	
Surirella	5	*Botryococcus braunii*	25
Synedra	2	*Cosmarium* sp.	10
Pleurosigma	2	*Anabaena lemmermanni*	9
Stauroneis	2	*Ulothrix zonata*	2
Fragillaria	1	*Scenedesmus* sp.	1
Tabellaria	1	*Merismopedia* sp.	1
Amphora	1	*Staurastrum* sp.	1

The organisms eaten by the fishes of Series VII may be characterized as typical planktonts with a strong infusion of bottom-living types. Limnetic species are decidedly in the lead in all groups except diatoms, and even here we find that fifteen of the suckers had taken *Stephanodiscus*.

Among the *Protozoa*, *Difflugia lobostoma* and *Codonella* lead, while in the *Rotatoria*, the pelagic *Keratella cochlearis* heads the list.

The presence of a number of chironomid pupae may be another indication that these fishes had not been feeding near the bottom, as the pupae of chironomid midges frequently approach the surface in numbers just before the emergence of the adult flies. These pupae formed at least 90% of the food of two fishes of this series and a high percentage in four more. They occurred in eighteen members of this series.

In respect of the open water *Cladocera*, it is interesting to note that eleven of the suckers had eaten *Leptodora*. One individual had eaten a considerable number of them, and it seems strange that so large and active a planktont should be taken by suckers as small as those comprising this series. *Bosmina longirostris* formed over 50% of the food of thirty-six individuals, while *Polyphemus pediculus* was of equal importance in ten more of this series.

Series VIII

This series of 31 small suckers was taken on July 27, 1921, near the head of Orient Bay. The average length of the fishes constituting this series was 3.2 cm. They ranged from a length of 2.6 cm. to 3.4 cm.

CLADOCERA	
Drepanothrix dentata	26
Alonella excisa	23
Chydorus sphaericus	21
Acantholeberis curvirostris	20
Rhynchotalona falcata	18
Alonella nana	17
Pleuroxus denticulatus	11
Alona quadrangularis	11
Alona costata	9
Alona affinis	9
Acroperus harpae	8
Eurycercus lamellatus	4
Sida crystallina	3
Ophryoxus gracilis	2
Graptoleberis testudinaria	2
Monospilus dispar	2
Polyphemus pediculus	2
Leptodora kindtii	2
Ilyocryptus spinifer	1
Kurzia latissima	1
Alona guttata	1
Chydorus faviformis	1
COPEPODA	
Cyclops	29
Canthocamptus	19
Nauplii	19
OSTRACODA	19
ROTATORIA	
Keratella cochlearis	27
Monostyla sp.	23
Notholca striata	18
Trichocerca lata	18
Diurella sp.	14
Trichocerca sp.	10
Lecane luna	8
Notholca longispina	7
Notholca foliacea	7
Bdelloid rotifers	7
Colurella sp.	4
Trichotria pocillum	2
Gastropus stylifer	1
Diaschiza sp.	1
PROTOZOA	
Cyphoderia ampulla	28
Difflugia lobostoma	25
Centropyxis aculeata	23
Arcella vulgaris	22
Lecquereusia modesta	8
Nebela dentistoma	1
Peridinium sp.	1
MISCELLANEOUS	
Hydrachnid nymphs	20
Chironomid larvae	17
Tardigrada	3
DIATOMS	
Pinnularia	28
Surirella	17
Navicula	16
Cocconema	11
Melosira	7
Epithemia	5
Tabellaria	3
Stauroneis	2
Cymatopleura	2
Pleurosigma	1
Amphora	1
OTHER ALGAE	
Oocystis sp.	17
Closterium sp.	15
Microcystis flos-aquae	13
Cosmarium sp.	12
Chroococcus sp.	9
Pediastrum boryanum	8
Staurastrum sp.	6
Euastrum sp.	4
Micrasterias sp.	4
Dictyosphaerium sp.	3
Anabaena lemmermanni	2
Docidium baculum	2
Penium sp.	2
Xanthidium sp.	2
Scenedesmus sp.	1
Merismopedia	1

It is at once evident that these fishes had fed close to the bottom as there are very few strictly plankton-living forms in their food. Almost the only open-water species at all numerous were *Keratella cochlearis* and *Difflugia lobostoma*.

This series contains several *Cladocera* of rare or unusual occurrence in the other series, such as *Drepanothrix dentata*, *Acantholeberis curvirostris*, *Graptoleberis testudinaria*, and *Chydorus faviformis*.

Other peculiarities are the considerable number and variety of rotifers and the abundance of the rhizopod, *Cyphoderia ampulla*.

Series IX

This series is represented by one sucker 3.2 cm. in length taken in Ombabika Bay, on August 10, 1922.

CLADOCERA
Alonella nana
Alonella rostrata
Chydorus sphaericus
Chydorus globosus
Acroperus harpae
Alona costata
Alona guttata
Eurycercus lamellatus
Macrothrix laticornis
Daphnia longispina

COPEPODA
Cyclops
Nauplii

OSTRACODA

ROTATORIA
Lecane luna
Monostyla sp.
Diurella sp.

PROTOZOA
Centropyxis aculeata

MISCELLANEOUS
Chironomid larvae
Hydrachnid nymph
Plumatella statoblast

DIATOMS
Cocconema
Cymbella
Navicula
Pinnularia
Epithemia
Pleurosigma
Surirella
Stephanodiscus

OTHER ALGAE
Closterium
Cosmarium
Docidium baculum
Dictyosphaerium
Pediastrum boryanum

It is very evident that this fish had been feeding among weeds or close to the bottom. The commonest organisms which it had taken were *Acroperus harpae*, *Alonella nana*, and *Alonella rostrata*. The last-mentioned species was found more plentifully in the food of this particular fish than in any other examined.

Series X

Two suckers were taken at South Bay on August 4, 1921. Number one was 3.3 cm. long, while number two was 3.3 cm. in length.

Number one had fed entirely on plankton, as *Bosmina longirostris* constituted at least 99% of the material in its digestive tract. The only other organisms found were two rotifers (*Trichocerca multicrinis*) and one individual each of the rhizopod *Difflugia lobostoma*, and the diatoms, *Cymbella* and *Navicula*.

Number two had in all probability been feeding close to the bottom in rather shallow water, where there would be a slight intermingling of the surface forms with those typical of ooze and weeds, as shown by the following record.

CLADOCERA
Pleuroxus denticulatus
Alona costata
Alona affinis
Alona quadrangularis
Chydorus sphaericus
Drepanothrix dentata
Bosmina longirostris

COPEPODA
Cyclops
Canthocamptus

OSTRACODA

ROTATORIA
Keratella cochlearis
Notholca foliacea

PROTOZOA
Difflugia constricta
Difflugia corona
Pontigulasia spectabilis
Lecquereusia modesta
Cyphoderia ampulla
Centropyxis aculeata
Campascus sp.

MISCELLANEOUS
Chironomid larvae
Sponge spicules
Oligochaeta podal-spines

DIATOMS
Epithemia
Pinnularia
Cymbella
Cocconema
Surirella
Stephanodiscus

OTHER ALGAE
Botryococcus braunii
Scenedesmus sp.

Series XI

This series consists of 25 suckers taken on August 15, 1921, near the head of Orient Bay. Their average length was 3.7 cm. The series variation in length was between 3.1 and 4.0 cm.

CLADOCERA	
Alonella nana	22
Bosmina longirostris	20
Chydorus sphaericus	18
Pleuroxus denticulatus	18
Rhynchotalona falcata	15
Alona affinis	13
Alonella excisa	12
Ilyocryptus spinifer	11
Monospilus dispar	10
Alona quadrangularis	9
Alona costata	6
Alona guttata	4
Alona guttata var. *tuberculata*	1
Kurzia latissima	1
Eurycercus lamellatus	1
Alonella exigua	1
Sida crystallina	1
Polyhemus pediculus	1
Leptodora kindtii	1
COPEPODA	
Cyclops	18
Canthocamptus	11
Nauplii	5
OSTRACODA	15
ROTATORIA	
Keratella cochlearis	22
Notholca longispina	16
Diurella sp.	16
Monostyla sp.	10
Lecane luna	5
Notholca foliacea	5
Lepadella sp.	4
Colurella sp.	1
Trichotria pocillum	1
Diaschiza sp.	1
Notholca striata	1
Bdelloid rotifers	1
PROTOZOA	
Difflugia lobostoma	21
Centropyxis aculeata	21
Cyphoderia ampulla	11
Euglypha alveolata	9
Arcella vulgaris	8
Lecquereusia modesta	7
Ceratium hirundinella	2
MISCELLANEOUS	
Hydrachnid nymphs	10
Chironomid larvae	6
Caddis larvae	2
Tardigrada	2
Chironomid pupae	1
Hyalella knickerbockeri	1
Oligochaeta podal-spines	1
Snail fragments	1
Ephemerid eggs	1
DIATOMS	
Pinnularia	25
Epithemia	21
Navicula	18
Surirella	13
Melosira	12
Cocconema	11
Tabellaria	9
Stauroneis	7
Cymbella	5
Amphora	3
Synedra	1

OTHER ALGAE	
Cosmarium sp.	15
Oocystis sp.	13
Desmidium sp.	11
Closterium sp.	9
Penium sp.	7
Pediastrum boryanum	5
Microcystis flos-aquae	5
Micrasterias sp.	4
Euastrum sp.	4
Docidium baculum	3
Staurastrum sp.	3
Xanthidium sp.	2
Merismopedia sp.	2
Aphanocapsa sp.	2
Dictyosphaerium	1

Although the organisms taken by series XI are mostly representative of the bottom fauna and flora, it contained a number of typical planktonts such as *Bosmina longirostris*, *Keratella cochlearis*, *Notholca longispina*, *Difflugia lobostoma*, and *Melosira*.

Series XII

A collection of thirty-four suckers was made on August 12, 1921, at Lone Wolf Harbour, on Shakespeare Island. This small bay was well protected, narrow, and shallow, and contained a fairly abundant growth of aquatic plants. The fish averaged 4.0 cm. in length, but varied between 3.2 and 4.9 cm.

CLADOCERA	
Chydorus sphaericus	29
Acroperus harpae	29
Alonella nana	21
Pleuroxus denticulatus	20
Eurycercus lamellatus	20
Alona costat	18
Bosmina longirostris	16
Alona affinis	16
Alona quadrangularis	10
Alonella excisa	8
Leydigia quadrangularis	5
Alona rectangula	4
Chydorus globosus	4
Alona guttata	3
Daphnia longispina	3
Diaphanosoma sp.	3
Latona setifera	2
Daphnia retrocurva	2
Macrothrix laticornis	2
Alonella exigua	1
Monospilus dispar	1
Ilyocryptus sp.	1
Leptodora kindtii	1
COPEPODA	
Cyclops sp.	28
Canthocamptus sp.	26
Nauplii	10
Epischura lacustris	2
Diaptomus sp.	1
OSTRACODA	25
ROTATORIA	
Monostyla sp.	22
Keratella cochlearis	17
Lecane luna	11
Notholca striata	10
Notholca longispina	7
Diurella sp.	3
Bdelloid rotifers	3

Colurella sp.	1
Mytilina mucronata	1
Notholca foliacea	1
Trichocerca sp.	1
Lepadella ehrenbergii	1
PROTOZOA	
Lecquereusia modesta	22
Difflugia lobostoma	21
Centropyxis aculeata	21
Difflugia pyriformis	18
Difflugia constricta	15
Difflugia acuminata	13
Campascus sp.	13
Euglypha alveolata	13
Difflugia corona	11
Codonella sp.	5
Pontigulasia spectabilis	5
Arcella vulgaris	4
Ceratium kirundinella	4
Nebela dentistoma	2
Sphenoderia lenta	1
Nebela collaris	1
MISCELLANEOUS	
Chironomid larvae	26
Oligochaeta podal-spines	25
Chironomid pupae	12
Daphnia ephippia	9
Ephemerid nymphs	6
Hydrachnid nymphs	5
Sponge spicules	5
Statoblasts	3
Caddis larvae	2
Pontoporeia hoyi	2
Ephemerid eggs	1
Sphaerium	1
Small spider	1
DIATOMS	
Epithemia	23
Pinnularia	28
Cocconema	22
Navicula	18
Cymbella	14
Melosira	14
Stephanodiscus	13
Surirella	11
Campylodiscus	9
Tabellaria	9
Pleurosigma	8
Nitzschia	3
Stauroneis	3
Amphora	2
Synedra	2
OTHER ALGAE	
Cosmarium sp.	20
Botryococcus braunii	19
Oocystis sp.	16
Hyalotheca sp.	11
Anabaena lemmermanni	9
Bulbochaete sp.	5
Microcystis flos-aquae	5
Mougeotia filament	4
Pediastrum boryanum	3
Euastrum sp.	3
Docidium baculum	3
Ulothrix filament	3
Closterium sp.	3
Aphanocapsa sp.	2
Chaetophora filament	1
Zygnaema filament	1
Tribonema filament	1

Although the fauna and flora represented in the above series is certainly rich and varied, the plankton element is of much less importance than in the series preceding. The increased amount of insect food in this series is due to the fact that, being larger, they have an increased capacity for feeding upon such organisms.

This series contained a greater number of *Chydorus globosus* and *Leydigia quadrangularis* than any other group of suckers examined, one fish having eaten a considerable number of the latter.

Series XIII

Three suckers were taken on June 6, 1922, from the Pustagone River near its mouth. Their average length was 5.4 cm. They measured 5.2, 5.4, and 5.8 cm. in length.

CLADOCERA		DIATOMS	
Acroperus harpae	2	*Cocconema*	3
		Cymbella	3
ROTATORIA		*Epithemia*	3
Monostyla sp.	1	*Navicula*	3
Colurella sp.	1	*Pinnularia*	2
		Tabellaria	1
PROTOZOA		*Surirella*	1
Euglypha alveolata	2		
Difflugia pyriformis	1	OTHER ALGAE	
		Closterium	3
MISCELLANEOUS		*Docidium baculum*	2
Ephemerid nymphs	3	*Cosmarium*	1
Hydrachnid nymphs	3	*Penium*	1
Chironomid larvae	3	*Micrasterias*	1
Chironomid eggs	2	*Bulbochaeta* sp.	1
Dytiscid larvae	1	*Ulothrix filament*	1
Chironomid pupa	1		
Oligochaeta podal-spines	1		

These three fishes had fed mostly upon ephemerid nymphs and chironomid larvae. Over 75% of their food consisted of these insects. The remainder of their food consisted chiefly of ooze, diatoms, desmids, and a few other organisms. *Acroperus harpae* was the only cladoceran present. Suckers of this size and larger were found to feed to a great extent upon the larvae and nymphs of various aquatic insects.

The variations in the food of the common sucker at different sizes may be seen by comparing the series in the following resume:

Series I. Average length 1.9 cm. Plankton organisms with only a trace of bottom-haunting species.

Series II. Average length 2.3 cm. Plankton organisms with a strong infusion of ooze and weed-loving types.

Series III. Average length 2.5 cm. Bottom forms with only a trace of typical planktonts.

Series IV. Average length 2.6 cm. Similar to the preceding series.

Series V. Average length 2.7 cm. Weed- and ooze-inhabiting species, with only a trace of pelagic forms.

Series VI. Average length 2.8 cm. Similar to the preceding series.

Series VII. Average length 2.9 cm. Typical planktonts with a strong infusion of bottom fauna and flora.

Series VIII. Average length 3.2 cm. Bottom species with a very few pelagic forms.

Series IX. Average length 3.2 cm. Similar to the preceding.

Series X. Average length 3.5 cm. The smaller fish had fed entirely upon plankton, and the larger individual had taken bottom organisms with a sprinkling of typical planktonts.

Series XI. Average length 3.7 cm. Bottom-haunting species mingled with a considerable number of true planktonts.

Series XII. Average length 4.0 cm. Bottom forms with very few planktonts among them.

Series XIII. Average length 5.4 cm. Entirely bottom organisms.

With the exception of the first and last series, *Cladocera* were the most important organisms. In series I the rotifers formed the bulk of the food, while chironomid larvae and ephemerid nymphs were most important in series XIII.

CONCLUSION

The common sucker (*Catostomus commersonii*) is largely a carnivorous fish in Lake Nipigon. Although in some instances a considerable amount of ooze and diatoms was

found to have been taken, the bulk of the food proved to be animal matter.

For the sake of convenience it may be advisable to divide the early life of this fish into three periods in accordance with the nature of its food:

(1) Rotifer-eating stage. Length 1.9 cm.
(2) *Cladocera*-eating stage. Length 2.3 to 5.0 cm.
(3) Insectivorous stage. Over 5.0 cm. in length.

During the rotifer-eating period of its life the common sucker is almost entirely planktonivorous. At this time of its life the mouth is not ventrally located as it is in the adult stage, but is situated more at the tip of the snout, so that this fish is then well adapted for pursuing actively swimming organisms.

When the fish has reached a length of from 2.3 to 5.0 cm., it may feed either on true planktonts or on bottom-haunting forms of life. It will be seen that the series between I and XIII show considerable fluctuations in this respect. Some of the series appear to have fed more in the open water, some near the bottom or among plants, while others may have sought their food under both of these conditions. *Cladocera* are the dominant food organisms at this stage of the sucker's life, because of their convenient size and by reason of their immense numbers.

In spite of the fact that *Mollusca*, *Amphipoda*, *Cladocera*, and diatoms frequently form a high percentage of the food of suckers having a length greater than 5.0 cm., the fact that insect remains considerably outnumber all of these seems to justify calling this the insectivorous stage.

A discussion of the importance of various organisms as food for the sucker may be of value.

Crustacea

At least one-half of the food of the common suckers in the series II to XII inclusive consisted of micro-crustacea of the sub-class *Entomostraca*. Of these there were three groups, *Cladocera*, *Ostracoda*, and *Copepoda*, which were of primary importance. *Cladocera* were vastly more numerous

than either *Ostracoda* or *Copepoda*, both as species and as individuals, otherwise it might be better to call the second period an entomostracan-eating period.

Forty-two species of *Cladocera* were found to have been used as food. Several species, which undoubtedly would be taken also, have been found in various parts of the lake. The following table will show the relative abundance and importance of *Cladocera* in the food of these fishes.

Owing to eccentricities in the abundance and distribution of the *Cladocera* certain families are of much greater importance as food, for the fish under consideration, than others. This may be best shown by arranging them into four groups according to their distribution:

Group (*A*). Species almost universally distributed among weeds or close to the bottom in all of the shallower parts of the lake.

Group (*B*). Species which move in swarms or schools in the open water.

Group (*C*). Species which are common locally, but are of uncertain and irregular distribution.

Group (*D*). Rare and infrequent species.

Group (*A*). This group consists entirely of the family *Chydoridae*. In all of the series these *Cladocera* were present, and they formed an important percentage of the food in most of the series, the only exceptions being those which had fed in open water and series XIII, which had eaten aquatic insects. The following list shows the twelve species of this family which were most abundant together with the number of suckers which had taken them.

Chydorus sphaericus	134	*Alonella excisa*	61
Alonella nana	117	*Pleuroxus denticulatus*	43
Acroperus harpae	105	*Alona quadrangularis*	40
Alona costata	104	*Eurycercus lamellatus*	34
Rhynchotalona falcata	74	*Monospilus dispar*	31
Alona affinis	67	*Alona guttata*	22

These figures probably give a fairly accurate account of the relative abundance of these twelve species, which are

Cladocera	Series I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	Total 316
Sida crystallina	9	40			10	1	4	3			1			68
Latona setifera						2						2		4
Diaphanosoma sp.	3	6										3		12
Daphnia pulex		13												13
Daphnia retrocurva	6	3					3					2		14
Daphnia longispina	48	8			1	3	14		1			3		78
Scapholeberis mucronata		20			2									22
Ceriodaphnia lacustris		3												3
Ceriodaphnia quadrangula			4											4
Ceriodaphnia sp.					1		1							2
Bosmina longirostris	38	20			9		47			2	20	16		152
Bosmina longispina					1	6								7
Ophryoxus gracilis							2							2
Acantholoberis curvirostris		1						20						21
Drepanothrix dentata		1				3		26		1				31
Ilyocryptus spinifer								1			11			12
Ilyocryptus acutifrons						8								8
Ilyocryptus sordidus						1								1
Ilyocryptus sp.					6		1				1			8
Macrothrix laticornis					1				1			2		4
Eurycercus lamellatus		2			3	3		4	1		1	20		34
Camptocercus rectirostris					1									1
Kurzia latissima								1			1			2
Acroperus harpae		27	3	1	27	3	3	8	1			29	2	104
Leydigia quadrangularis					1							5		6

Cladocera	Series I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	Total 316
Alona guttata		1	3		3	1	4	1	1		4	3		21
Alona guttata var. *tuberculata*											1			1
Alona affinis	1		2	1	12	5	7	9		1	13	16		67
Alona quadrangularis		1	1		3	3	1	11		1	9	10		40
Alona costata	2	9	3	1	24	12	18	9	1	1	6	18		104
Alona rectangula					3	1	1					4		9
Graptoleberis testudinaria								2						2
Rhynchotalona falcata	2		2		20	17		18			15			74
Pleuroxus procurvatus		4		1			2							7
Pleuroxus denticulatus					3	8		11		1		20		43
Chydorus globosus									1			4		5
Chydorus faviformis		1						1						2
Chydorus sphaericus		9	3	1	18	15	18	21	1	1	18	29		134
Alonella rostrata			3						1					4
Alonella nana			4	1	26	11	14	17	1		22	21		117
Alonella excisa		2			15		1	23			12	8		61
Alonella exigua					5	1					1	1		8
Monospilus dispar			1		8	9		2			10	1		31
Polyphemus pediculus		48			1	1	34	2		1	1			88
Leptodora kindtii		1					11	2			1	1		16

apparently available among aquatic plants and ooze at all times and in large numbers.

Group (B). The *Cladocera* comprising this group are mostly open water planktonts. The species of *Daphnia* and *Ceriodaphnia*, *Scapholeberis mucronata*, *Diaphanosoma brachyurum*, *Sida crystallina*, *Bosmina longirostris*, *Polyphemus pediculus*, and *Leptodora kindtii* are typical representatives. The number of fishes shown in the table to have eaten members of this group is not a very reliable indication of the abundance or distribution of these species, owing to the fact that *Cladocera* of this group move in bodies or swarms, which are influenced greatly by slight changes of light, temperature, etc. For this reason they are often spoken of as periodical planktonts. When a young sucker encounters one of these swarms, it is apt to gorge itself to such an extent that its digestive tract will be found to contain very few other organisms. Quite frequently when a series of suckers were seined in a particular locality, one, two or several fishes would be found to contain immense numbers of some plankton cladoceran, while the others would have fed upon bottom-haunting *Chydoridae*. Owing to the greater or less uncertainty in their distribution, they are probably of less value as food than those of group (A) which can be taken whenever the fish feeds at lower levels.

Group (C). The members of this group are still more uncertain in their distribution than those of the preceding. The species of *Simocephalus*, *Latona setifera*, *Drepanothrix dentata*, *Acantholeberis curvirostris*, *Streblocerus serricaudatus*, the species of *Ilyocryptus*, *Leydigia quadrangularis*, *Camptocercus rectiroctris*, *Graptobeleris testudinaria*, *Pleuroxus procurvatus* and *Alonella exigua* are examples. Some of these were found to be common locally in certain parts of the lake and in adjacent weedy ponds and sluggish creeks. Doubtless they are common enough at times and in certain restricted localities to be of considerable importance.

Group (D). This group consists entirely of rare and infrequent forms which were found only a few times during two summers of active collecting and in some instances but

once or twice, or which were eaten in small numbers by one or two of the fishes. Some species which are apparently rare in Lake Nipigon are common enough in other bodies of water. For instance, *Holopedium gibberum*, *Ophryoxus gracilis*, and *Kurzia latissima* were found only a few times. Forms such as *Lathonura rectirostris*, *Chydorus faviformis*, and *Chydorus globosus* were of rare occurrence in Lake Nipigon as they are in most localities. It is, however, possible for one person to examine so few fishes and to collect material from so few places in a body of water so large as Lake Nipigon that it is quite conceivable that many or all of these species may be common locally.

Ostracoda

These crustaceans were taken from 134 of the 316 suckers. Although they occurred in all of the series except I and XIII, no fish had eaten a great number of them. They probably represent about a dozen species.

Copepoda

Next to *Cladocera* this proved to be the group of crustaceans of greatest importance as food.

The bottom-haunting *Canthocamptus* was taken whenever the fishes fed among vegetation or close to the bottom. Four species of this copepod were found, namely, *Canthocamptus staphylinoides*, *C. staphylinus*, *C. minutus* and *C. hiemalis*. Of these *C. minutus* and *C. staphylinoides* occurred most frequently.

Several species of *Cyclops* were of common occurrence, but none were determined specially. Although not occurring in numbers comparable with many of the *Cladocera*, this copepod is a very valuable organism as a source of fish food, as it has a very wide distribution in the lake, being as common in open water as among weeds. One sucker of series I had taken a high percentage of this entomostrocan.

The family *Centropagidae* were of little importance to the series of fishes under consideration. *Epischura lacustris*

and a few individuals of *Diaptomus* sp. were occasionally found. Four species of *Diaptomus* were determined from Lake Nipigon, but the few individuals taken from the suckers were in too poor a state of preservation to permit of identification. As these fishes feed frequently upon *Bosmina*, *Daphina*, and other free-swimming planktonts, there would appear to be no reason why *Epischura* and *Diaptomus*, which have similar habits should not be consumed frequently and in considerable numbers. The nauplii and metanauplii of the various *Copepoda* are of great importance to the sucker during its rotifer-eating period. Fifty-eight of the sixty fishes comprising series I had taken them. They were found to have been eaten to a certain extent in all of the series except XIII.

Lastly, parasitic species of *Copepoda*, such as *Ergasilus*, may return good for evil by serving as food while in the nauplius and metanauplius stages. Also the adult males occasionally appear in the plankton, and may thus be taken as food.

Amphipoda

Amphipoda were of little importance to the fishes of the thirteen series studied. Single individuals of *Hyalella knickerbockeri* were taken from three fishes of series V, and one from a sucker in series XI. Small specimens of *Pontoporeia hoyi* were found in two suckers of series XII.

Rotatoria

The pelagic species of rotifers have been discussed in connection with the food of series I. Most of the series contained at least a few typical planktonts such as *Keratella cochlearis* and *Notholca longispina*. The importance of wheel animalcules as food is shown by the following table:

ROTATORIA	Series I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	Total 316
Keratella cochlearis	54	13			1	5	37	27		1	22	17		177
Monostyla sp.	11	5	1	1	19	16	4	23	1		10	22	1	114
Notholca longispina	58	16				2	7	7			16	7		113
Diurella sp.	5		1			10		14	1		16	3		50
Lecane luna	6	2	2	1	1	9	9		1		5	11		47
Notholca striata					6	7	2	18			1	10		44
Polyarthra trigla	42													42
Notholca foliacea	2			1	9	1	5	7		1	5	1		32
Trichocerca lata								18						18
Colurella sp.			1	1	2	4	1	4			1	1	1	16
Edelloid rotifers	2					3		7			1	3		16
Trichocerca sp.		2				1		10				1		14
Keratella quadrata	8													8
Lepadella sp.					1		1				4			6
Diaschiza sp.			1			1		1			1			4
Trichotria pocillum								2			1			3
Trichocerca multicrinis					2									2
Mytilina mucronata												1		1
Gastropus stylifer								1						1
Lepadella ehrenbergii												1		1

An erroneous idea of the importance of the various rotifera might be arrived at from a cursory reading of the above table. For instance, although both *Keratella cochlearis* and *Monostyla* sp. were found in a greater number of fishes than *Notholca longispina*, the latter organism was extremely important in the food of the fishes in series I.

Lecane luna and several species of *Monostyla* were found in nearly all of the series, but have comparatively little food value owing to their small size as compared with *Entomostraca*, coupled with the fact that they never occurred in numbers sufficient to form a high percentage of the food.

Protozoa

The unicellular animals may be of considerable importance as food owing to their enormous numbers, especially among aquatic vegetation and on the surface of the ooze. As the various ciliate, flagellate, and amoeboid species leave no trace of their presence, there is no way of determining their actual abundance. We do know that in any collection of ooze and aquatic plants they are even more numerous than the rotifers. The tests or shells of about twenty species were found in the suckers studied and as the loricate forms are much less numerous than the species without a covering, a great number of species must be available. It may well be that this group of organisms rank next in importance to the *Cladocera*, if not to the whole of the *Entomostraca*, as a source of food for these fishes. The abundance and importance of the species having a test or lorica may be seen from the following table:

PROTOZOA	Series I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	Total 316
Diffugia lobostoma	1	17			21		45	25			21	21		147
Centropyxis aculeata		11	3	1	13	5	8	23	1	1	21	21		108
Cyphoderia ampulla		2	3	1		11	6	28		1	11			63
Diffugia pyriformis			3		18	13	3					18	1	56
Arcella vulgaris		5	3		3	6	2	22			8	4		53
Lecquereusia modesta					3	7	4	8		1	7	22		52
Euglypha alveolata			2		2	10	4			9		13	2	42
Diffugia acuminata					18	2	2				1	13		35
Ceratium hirundinella	18	9				1						4		33
Camposcus sp.		6	1		1	8	2			1		13		32
Diffugia constricta					6	3			1			15		25
Codonella sp.	2						14					5		21
Diffugia corona						4	1			1		11		17
Pontigulasia spectabilis						2		1	1			5		9
Nebela denistoma						1		1				2		4
Sphenoderia lenta						1						1		2
Nebela collaris												1		1
Hyalosphaenia elegans		1												1
Peridinium sp.							1							1

Insecta

Although what may be considered the insectivorous stage in the sucker's diet is not reached until after a length of 5.0 cm. is attained, all of the series showed the remains of insects present to a greater or less extent, particularly of the larvae and pupae of the chironomid midges. Occasionally, as in the case of a few individuals in the Gull Bay series, chironomid larvae formed a high percentage of the food, but this was rather exceptional. In a few instances, chironomid pupae were taken in numbers. Next in importance were ephemerid nymphs and caddis larvae. Terrestrial insects such as *Thrips* and *Aphis* were found very rarely.

Other Animal Food

Oligochaeta worms must form a considerable percentage of the food at times owing to their abundance in ooze and amidst the aquatic vegetation, but as they at once disintegrate when eaten, leaving only their podal-spines it is impossible to form an estimation of their real food value. *Oligochaeta* podal-spines are easily detached and are found everywhere in the ooze so that their presence in a sucker may not even indicate the devouring of one of these annelids.

Nematoda were found in almost every fish, and although, in the great majority of cases, they were parasitic species, there is no doubt that a number of free-living species are taken as food along with the other aquatic organisms.

Mollusca were of no importance to any of the series under consideration, although quantities of snails and small pelycepods often occur in suckers after a size of 5.0 cm. is reached.

Water mites were rather unusual as adults, but the six-legged nymphs occurring commonly among plants and ooze contribute an important addition to the food.

Heterogeneous forms of animal food such as fragments of insects and other *Arthropoda*, cladoceran ephippia, statoblasts of *Bryozoa*, bits of sponges, and eggs of various organisms collectively form an appreciable portion of the food of these fishes.

Plant Food

Many species of unicellular *Algae* including diatoms are taken along with the zooplanktonts and contribute a considerable amount of food material. Filamentous *Algae*, on the other hand, are very infrequent. In many cases, in the areas from which suckers were collected, there were large masses of *Mougeotia*, *Spirogyra*, etc., and the rocks were covered with thick mattings of *Ulothrix*, but only an occasional filament would be found among the stomach contents of the fishes.