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THE BOTTOM ORGANISMS OF LAKE NIPIGON

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THE BOTTOM ORGANISMS OF LAKE NIPIGON

As one phase of the investigation of the available food supply for the fish population of Lake Nipigon, an extensive series of dredging operations was carried out in order to obtain quantitative data in regard to those organisms which live on the bottom of the lake and form the food of those species of fish which feed at the bottom, such as the sturgeon, the whitefishes and the suckers. Special attention was paid to the Mollusca which were found to be one of the most important constituents of the bottom fauna and this part of the work is dealt with by Mr. Adamstone in a separate paper which includes a general account of the apparatus and methods employed in the dredging operations.

The present paper presents the results obtained *in toto* and such particular data for the various groups, other than the *Mollusca*, as it has been possible to bring to completion at the present time.

The following groups of animals were secured in the bottom samples: *Nematoda*, *Acanthocephala*, *Oligochaeta*, *Hirudinea*, *Crustacea*, *Insecta*, *Arachnida* and *Mollusca*. The details concerning the number of specimens of each group obtained in each dredging, as well as information regarding depth and character of bottom, are given in the appended series of tables.

I. Nematoda

The free-living round worms were not very abundant, for a total of only 77 specimens was obtained in all the dredgings. These were about equally distributed on mud and sand bottoms, but were somewhat more numerous in shallower water. The specimens were submitted to Dr.

N. S. Cobb of the U.S. Department of Agriculture, who kindly undertook to identify them. He has reported the following species:

1. *Dorylaimus crassus* de Man.
2. " *speciosus* (n. sp. Cobb mss.)
3. " *canadensis* (n. sp. Cobb mss.)
4. *Mermithidae* several sp.

Two of the species listed, viz., *Dorylaimus speciosus* and *Dorylaimus canadensis*, are new species. There are also several species of *Mermithidae* which have not yet been determined.

II. ACANTHOCEPHALA

This class is represented by five specimens which were dredged up from a depth of 36 ft., off a clay bottom (Series XIV, D. 8). Their occurrence in this particular place is thought to have been accidental, most probably, since all members of the group are parasitic.

III. OLIGOCHAETA

Oligochaetes were obtained very frequently and in the most diverse situations. Identification of the species has not yet been completed so that it is impossible at present to give any details in this regard. An attempt has been made, however, to work out the distribution of the class as a whole and in the following table the average number of specimens per

Depth	No. on Mud	No. on Sand	Total	Av.
0- 3	59	26	85	3.7
3- 6	69	61	130	4.8
9	101	54	155	7.4
12	19	69	88	4.4
15	19	32	51	2.5
18	25	28	53	2.9
21	21	16	37	1.8
24	12	7	19	2.3
27	6+(1 clay)	3	10	1.2
30	9	6	15	1.9

unit area (81 sq. inches) is given for intervals of 3 feet in depth down to 30 feet. Beyond this, specimens were not numerous although some were obtained from various depths down to 178 feet.

From the table it can be seen that the number of individuals was almost the same on mud and sand bottoms. Distribution according to depth is illustrated by the curve, Fig. 1, from which it is evident that the optimum depth for these animals is between 6-9 ft. The fall in the curve shows that they are most abundant in shallow water especially between depths of 3 and 12 feet.

IV. HIRUDINEA

Leeches were uncommon in the material secured in dredging. This, however, was to be expected, since they usually seek more protected situations among stones, and in such places the dredge could not be used. Some shore collections were made but these were not very extensive. Specimens were submitted to Prof. J. P. Moore of the University of Pennsylvania, who very kindly identified them. The species reported are:

1. *Actinobdella triannulata* (n. sp. Moore mss.)
2. *Dina parva* Moore.
3. *Erpobdella punctata* (Leidy)
4. *Glossiphonia complanata* (Linn)
5. *Haemopsis marmoratis* (Say)
6. *Helobdella stagnalis* (Linn)
7. *Nephelopsis obscura* (Verrill)
8. *Piscicola milneri* (Verrill)

Of the eight species listed the first, namely, *Actinobdella triannulata*, is noted tentatively as a new species.

V. CRUSTACEA

Representatives of three sub-classes of *Crustacea* occurred amongst the bottom organisms, including the following:

1. *Branchiopoda*—Order *Cladocera*
2. *Ostracoda*
3. *Malacostraca*—Order *Amphipoda*

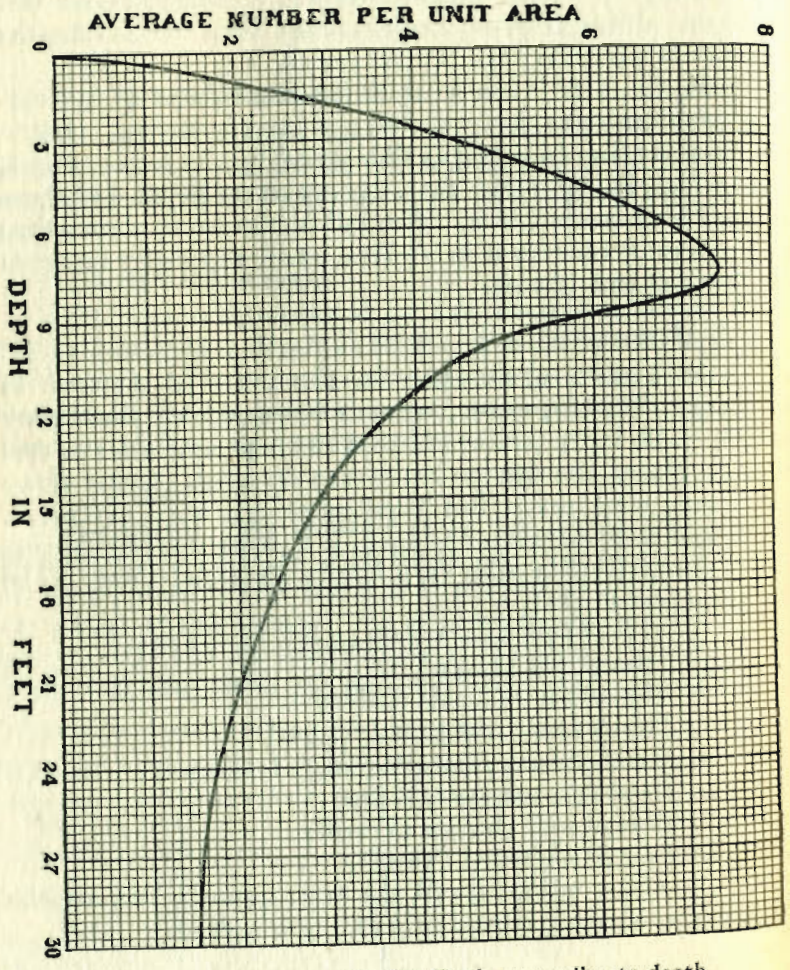

FIG. 1. Curve illustrating distribution according to depth. Oligochaeta.

Cladocera: Very few specimens of *Cladocera* were obtained. This was due, most probably, to the fact that they were usually lost, on account of their small size, in the process of washing and cleaning the material. This was unfortunate especially since some of these forms are important constituents in the food of bottom feeding fish.

Four species were identified, namely:

1. *Alona affinis* (Leydig)
2. *Chydorus sphaericus* var *coelatus* Schoedler
3. *Sida crystallina* (Müller)
4. *Eurycercus lamellatus* (Müller)

2. *Ostracoda:* The *Ostracoda*, like the *Cladocera*, were very frequently lost in washing the samples. However, in some 23 dredgings a number of specimens were found. The different species amongst them have not yet been determined. Examination of fish stomachs showed that in some localities *Ostracoda* must be extremely abundant and may form a very high percentage of the stomach contents.

3. *Amphipoda:* *Amphipoda* were quite common throughout the southern end of the lake. Three species were obtained:

1. *Pontoporeia hoyi* Smith
2. *Hyalella knickerbockeri* (Bate)
3. *Gammarus limnaeus* Smith

Pontoporeia hoyi Smith

Of the three species, *Pontoporeia hoyi* was by far the most numerous. It was taken in almost all situations and at all depths down to 192 feet. Data pertaining to the distribution of this species are given in the following table and from it the curve, Fig. 2A, has been drawn.

The curve in Fig. 2A shows that this species is not very plentiful in shallow water but it becomes more abundant as the depth increases. This, of course, does not go on indefinitely but after a depth of about 75 ft. is reached, the

distribution becomes more uniform and the maximum is apparently reached between 120-150 ft.

Depth	Total	Av.
0-30	512	3.05
30-60	428	12.23
60-90	305	21.78
90-120	87	21.75
120-150	231	33.0
150-180	85	17.0
180-192	45	.....

Hyalella knickerbockeri (Bate)

In contrast with the preceding species this amphipod was comparatively scarce. Usually it is found, with *Pontoporeia hoyi*, in about equal numbers, but the dredgings in Lake Nipigon yielded a much smaller number of specimens. It was obtained mostly in shallow water but a few specimens were brought up from deeper places. Data with regard to the abundance of this species at various depths are given in the following table.

Depth	Total	Av.
0-3	5	.31
3-6	39	1.5
9	13	.62
12	23	1.15
15	29	1.45
18	30	1.66
21	79	3.95
24	1	.12
27	5	.62
48	3	
90	2	
159	2	

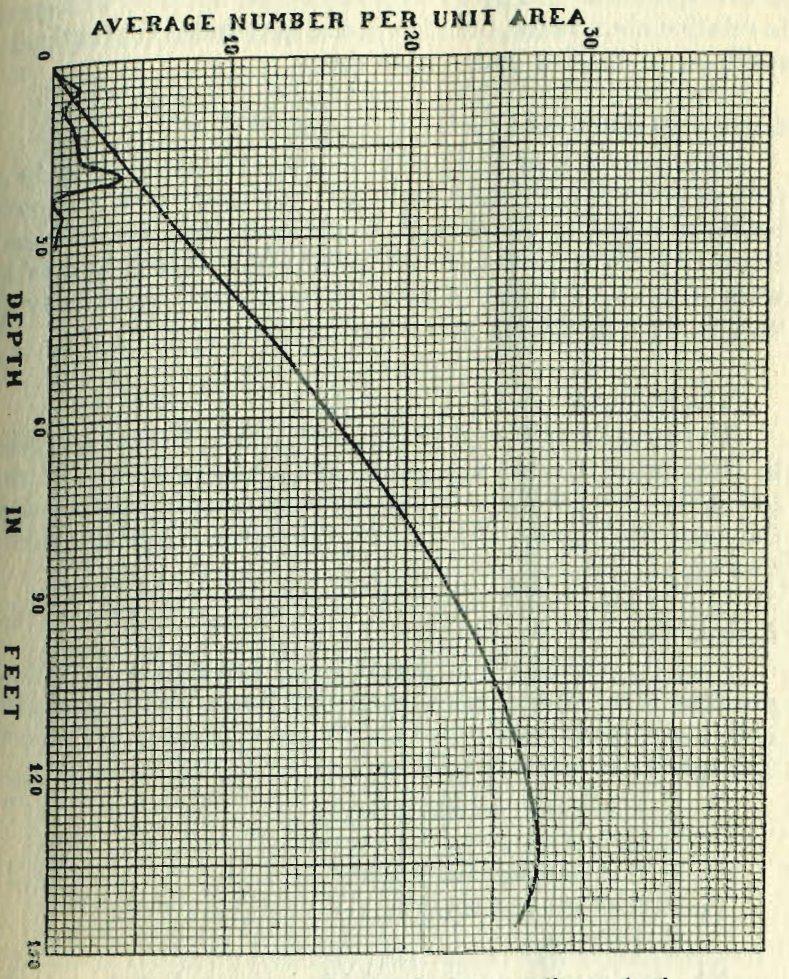

FIG. 2. Curves illustrating distribution according to depth. Amphipoda. A. Pontoporeia hoyi (Upper). B. Hyalella knickerbockeri (Lower).

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urve, Fig. 2B, drawn from the results given above,
at there is a decided difference in the distribution
ecies as compared with the other, not only in regard
e abundance, but also in the fact that it is practically
to shallow water near shore.

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pecies was quite rare and was obtained on only a
sions and then only in the protected channels
islands. A total of 7 specimens was secured and
e from some of the outer Shakespeare islands in
om 3 to 21 feet deep. The species is apparently of
le importance numerically.

VI.

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INSECTA
rval and nymphal stages of several insects occurred
aterial from dredgings, and representatives of the
Orders were found amongst them: *Ephemerida*,
Neuroptera, *Trichoptera*, *Coleoptera*, *Diptera* (chiefly
nidae).

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fly nymphs were found most frequently in bottom
taken from small sheltered bays. The specimens
were identified by Dr. W. A. Clemens who reports
es enumerated below:

Hexagenia bilineata Say
Ephemera simulans Walker
Caenis diminuta Walker
Ephemerella sp.
Baetis sp.

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first three species were fairly common but the remain-
were dredged up on only a few rare occasions. A
of the numbers obtained at different depths is
the following table from which the graphs, Fig. 3,
n drawn.

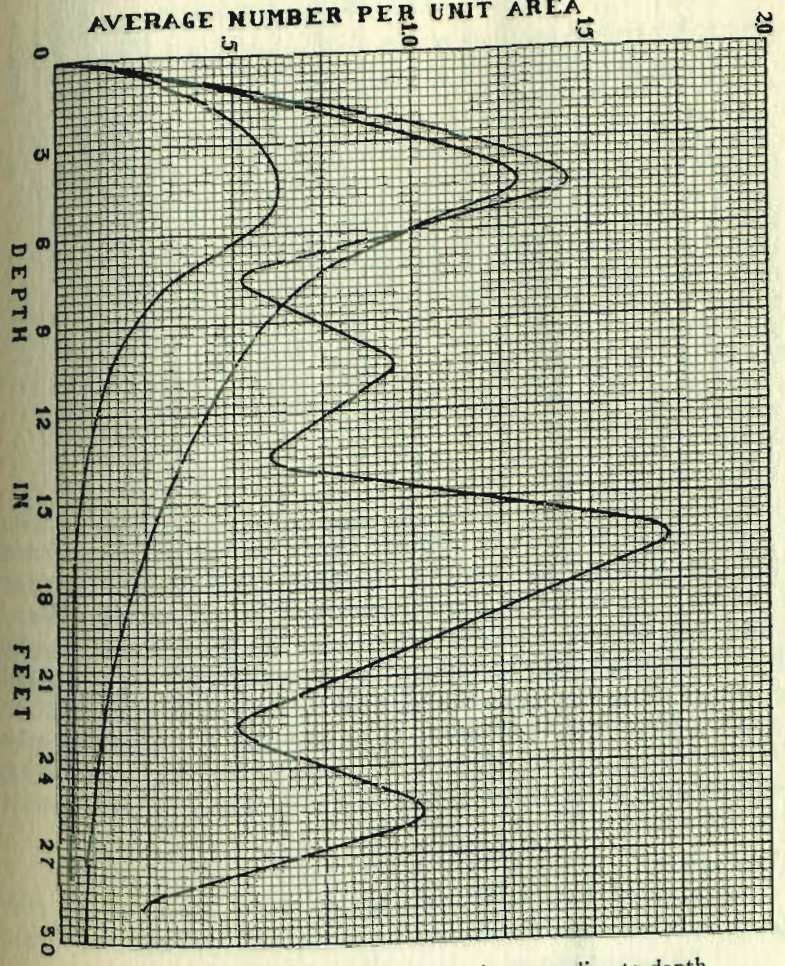

FIG. 3. Curves illustrating distribution according to depth. Ephemerida. A. Hexagenia bilineata (Upper). B. Ephemera simulans (Middle). C. Caenis diminuta (Lower).

Depth (ft.)	No. of Dredgings	*Hexagenia bilineata*			*Ephemera simulans*			*Caenis diminuta*			*Ephemerella* sp.	*Baetis* sp.
		Sand	Mud	Average	Sand	Mud	Average	Sand	Mud	Average		
0-3	18	7	4	.65	6	4	.60	1	6	.41	..	..
3-6	27	4	35	1.44	32	3	1.55	12	5	.37	4	1
6-9	21	1	10	.52	8	4	.62	2	5	.33	..	..
9-12	20	1	18	.95	2	5	.35	..	3	.10	..	..
12-15	20	1	11	.60	7	1	.40	2	..	.10	..	..
15-18	18	5	26	1.72	6	2	.44	..	..	0	..	..
18-21	20	1	19	1.11	2	..	.11	..	1	.06	..	..
21-24	8	0	4	.5	0	1	.12	..	..	..	..	..
24-27	8	2	2	1.12	1	..	.12	1	..	.12	..	..
27-30	8	..	2	.25	..	..	..	..	..	..	..	..
30-33	6	..	..	..	1	..	.16	..	..	..	..	..
33-36	..	..	..	..	..	..	..	..	..	..	..	..
36-39	..	..	..	..	..	..	..	..	..	..	..	..
48	..	..	..	..	..	..	..	..	2	..	..	..

From the table it is evident that the species *Hexagenia bilineata* prefers a muddy bottom, whereas the species *Ephemera simulans* is most abundant in sandy situations. The latter as well as *Caenis diminuta* are most numerous in shallow water, as can be seen from the curves, Fig. 3, and their optimum range is between depths of 0-9 feet. The other species, *Hexagenia bilineata*, is apparently fairly uniformly distributed over all depths between 5-25 ft., this being probably the significance of the very irregular curve representing the species.

Trichoptera

A total of 116 caddis fly larvae were obtained in the dredgings, amongst these were representatives of nine families:

Rhyacophilidae
Hydropsychidae
Psychomyidae
Polycentropidae
Limnophilidae
Sariscostomatidae
Mollanidae
Leptoceridae
Phryganidae

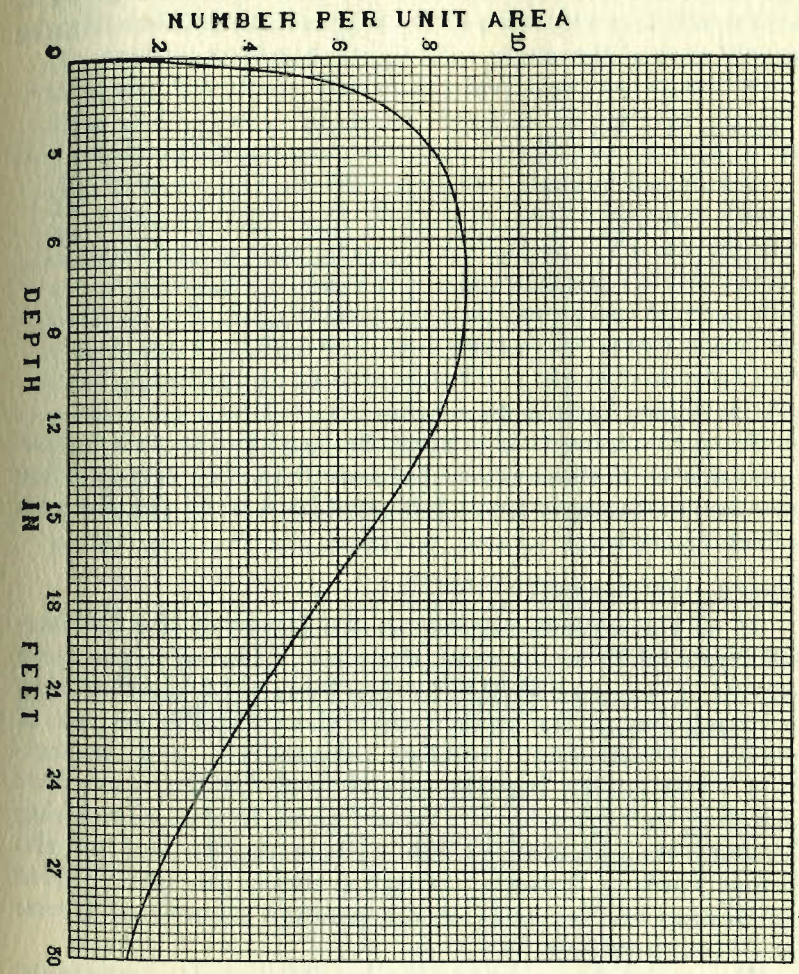

FIG. 4. Curve illustrating distribution according to depth. Trichoptera.

The specific determinations have not yet been completed and hence no data will be given at present concerning them. The average numbers taken at various depths are given in the table below and from it the graph, Fig. 4, illustrating the distribution of the order with depth has been drawn.

Depth	No.	Av.	Depth	No.	Av.
0-3	12	.66	24	1	.12
3-6	22	.81	27	4	.50
9	18	.86	30	3	.37
12	18	.90	39	1	..
15	15	.75	45	2	..
18	14	.78	48	1	..
21	5	.25	..	..	..

From the curve it is evident that caddis larvae are most numerous in shallow water between 0-18 feet deep. They were found mostly in small protected bays or in the channels between islands.

Diptera—Chironomidae

Of all the bottom organisms, the larvae of the *Chironomidae* proved to be the most abundant. Owing to the large amount of material obtained it has been impossible to bring to completion at the present time the details in respect of specific distribution, relative abundance and importance. The results here presented deal for the most part with the group as a whole. Table I gives the data concerning the numbers obtained at the various depths and on the various kinds of bottom. Graph 5 shows the quantitative distribution on the basis of the average number of larvae per 15-foot intervals.

The results show that in a total of 228 dredgings extending to a depth of 180 feet, 3723 larvae were obtained, this being an average of 16 per dredging, that is, per 81 square inches. In some cases as high as 159 larvae were obtained from the above unit area.

About two-thirds of the dredgings, that is 168, were taken in water less than 30 feet in depth and in this range the largest number of *Chironomidae* were found to occur, namely 3225, which is an average of 19 per 81 square inches. Between the depths of 30 and 60 feet the number of larvae tended to decrease but there was a marked increase again between 60 and 75 feet. In water beyond 75 feet in depth the number of larvae was relatively small, but even at a depth of 178 feet eight were obtained in a single dredging.

Table II is given to illustrate the distribution of species as obtained in four series of dredgings. No specific names are used because some of the identifications are tentative and because it is thought that several species are new to science. Life history studies will be necessary in many cases before identifications can be completed. It is probable that certain species are characteristic of certain limited ranges of depth, while others are widely distributed. Species 1, for example, evidently occurs only in shallow water and is abundant there; species 22, on the other hand, is doubtless a deep water form, while species 6 was found at depths from 12 to 150 feet.

TABLE I

Depth	No. of dredgings	Total No. of larvae	Average per dredging	Average per dredging per 15 ft.		
				Mud	Sand	Clay
0-15	106	2153	20.3	26.1	16.3	0.0
15-30	62	1072	17.3	26.5	9.6	15.0
30-45	22	236	10.8	12.1	11.0	1.5
45-60	13	78	6.0	8.0	3.0	0.0
60-75	8	115	14.7	20.1	1.0	5.0
75-90	6	13	2.2	1.5	..	2.5
90-105	2	5	2.5	5.0	..	0.0
105-120	2	6	3.0	6.0	..	0.0
120-135	1		5.0	5.0	..	0.0
135-150	6	38	4.6	4.6	..	4.6
150-165	4	6	1.5	1.0	..	2.0
165-180	1	8	8.0	8.0	..	0.0

CHIRONOMIDAE: TABLE II

	Depth	Sp. 1	Sp. 2	Sp. 3	Sp. 4	Sp. 5	Sp. 6	Sp. 7	Sp. 8	Sp. 9	Sp. 10	Sp. 11	Sp. 12	Sp. 13	Sp. 14	Sp. 15	Sp. 16	Sp. 17	Sp. 18	Sp. 19	Sp. 20	Sp. 21	Sp. 22	Sp. 23	Sp. 24	Sp. 25	Sp. 26
Series II																											
1	7 ft.	..	4	..	..	1	..	1	..	..	..	1	..	..	..	..	..	..	2	..	..	..	..	1	..	..	1
2	45	..	..	1	..	..	..	1	..	..	..	1	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..
3	120	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4	162	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5	93	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6	72	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7	60	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8	12	11	..	..	..	1	..	2	..	..	..	2	..	..	1	..	..	..	..	3	..	..	..	..	..	1	..
9	11	2	3	..	..	4	..	5	..	1	..	3	..	..	6	..	..	..	11	2	1	..	..	..	..	..	..
Series III																											
1	6	18	..	3	1	1	..	1	..	1	..	3	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..
2	12	6	..	1	..	2	1	1	1	1	..	1	..	2	1	1	1	..	..	..	..	..	..	..	..	..	..
3	21	3	..	..	..	..	..	1	..	..	1	1	2	..	..	..	1	..	..	..	3	..	..	..	..	..	..
4	45	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Series IV																											
1	12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2	21	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
3	27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4	30	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5	48	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6	159	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..

CHIRONOMIDAE: TABLE II—*Cont.*

	Depth	Sp. 1	Sp. 2	Sp. 3	Sp. 4	Sp. 5	Sp. 6	Sp. 7	Sp. 8	Sp. 9	Sp. 10	Sp. 11	Sp. 12	Sp. 13	Sp. 14	Sp. 15	Sp. 16	Sp. 17	Sp. 18	Sp. 19	Sp. 20	Sp. 21	Sp. 22	Sp. 23	Sp. 24	Sp. 25	Sp. 26
Series V																											
1	150	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..
2	150	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3	156	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
4	163	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..
5	80	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6	96	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7	78	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8	45	..	..	..	..	..	5	..	..	..	..	1	..	..	..	..	..	2	..	..	..	..	8	1	1	..	..
9	84	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..
10	192	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

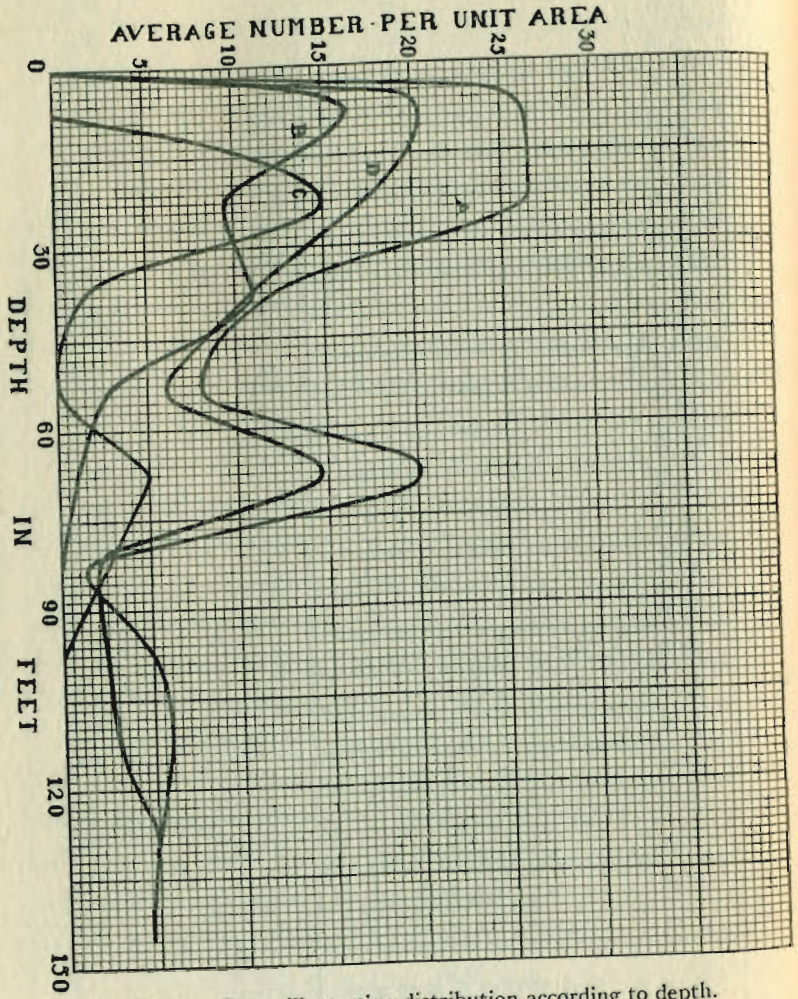

FIG. 5. Curve illustrating distribution according to depth. Chironomidae. A. On mud bottom.
B. On sand bottom.
C. On clay bottom.
D. On all bottoms.

The curves would seem to graphically illustrate this point also, in that, on the various kinds of bottom there are depths at which larvae were especially abundant, doubtless representing associations of species.

The number of larvae on the bottom of the lake of course is not constant over any extended period of time during the open season. Throughout the summer and autumn large numbers of larvae are maturing, pupating and adults emerging. Eggs are being deposited and larvae hatching. No doubt considerable numbers of small, newly hatched individuals were lost in the processes of sifting materials and the actual numbers on the bottom were slightly larger than the results obtained would indicate. It is evident, however, in spite of the fluctuations in numbers, that the supply of larvae available as food for fish is always large. This would be expected of course in view of the large numbers of species with their extended periods of emergence, and is confirmed by the dredging results. Adults were observed in large numbers during the three months spent on the lake.

As a preliminary experiment for obtaining some information regarding the extent of this life history cycle, a tent trap covering 540 sq. inches of water surface was constructed and set out at various times. The results obtained were as follows:

STATION 1. Depth of water 5 ft., 10 yds. from shore.
July 15, 96 hrs., windy and rain, 17 adults and 9 pupae.
Aug. 1, 9 hrs., day, windy, clear, 1 adult.
Aug. 2, 13 hrs., night, calm, clear, 8 adults.
Aug. 16, One dredging, bottom sandy, 19 larvae = 127 per 540 square inches.

STATION 2. Depth of water 8 ft., 50 yards from shore.
Aug. 4, 12 hrs., night, clear and warm, 1 adult.
Aug. 5, 12 hrs., day, wind and rain, 0 adults.
Aug. 16, One dredging, bottom—debris, sand, stones; 39 larvae = 260 per 540 square inches.

STATION 3. Depth of water 10 ft., 80 yards from shore.
Aug. 9, 12 hrs., night, windy and rainy, 50 adults.
Aug. 16, 12 hrs., day, calm, clear and cool, 90 adults.
Aug. 19, 9 hrs., day, windy and cloudy, 5 adults.
Aug. 16, One dredging, bottom—debris, sand and stones; 54 larvae = 360 per 540 square inches.

The results obtained at Station 3 are perhaps the most satisfactory and give some idea of the extensive emergings which may take place.

In Lake Nipigon the *Chironomidae* are very important economically in that the larvae form one of the most important sources of fish food. The following fish have been found to feed more or less extensively on the larvae and to some extent on the pupae and adults: sturgeon, northern sucker, common sucker, two minnows (*Notropis hudsonius* and *Couesius plumbeus*), common whitefish, round whitefish, ciscoes, trout perch, young small mouth black bass, young yellow perch and ling. One whitefish, 28 cm. in length, taken June 30, contained 354 larvae, constituting approximately 70% of the stomach contents. A sturgeon, taken June 24, had eaten at least 331 larvae. Percentages in bottom-feeding fish ranged as high as 96%. The *Chironomidae* thus play a very significant rôle in the economy of the lake.

Besides the orders of Insecta which have been considered in more detail, specimens of a few others were obtained. These include:

Neuroptera—*Sialidae*
Coleoptera—{*Dytiscidae*, *Chrysomelidae*}
Odonata

The occurrence of these organisms seems to have been more or less incidental in dredging operations although they were certainly abundant and widely distributed. However, the number secured in bottom samples in this season was so small that no statement can be made in regard to them.

VII. ARACHNIDA

In a number of situations specimens of water mites (*Hydracarina*) were dredged up. The total, however, was small and since identifications have not yet been completed details will be given in a future report.

VIII. MOLLUSCA

Details concerning the species, abundance and distribution of this group are given in another paper.

CONCLUSIONS

I. Study of the bottom fauna of Lake Nipigon has revealed an abundant and varied population of many different kinds of organisms, and it has been found, with few exceptions, that the shallow waters of small protected bays or the channels between islands were most productive of these animals. The open lake was relatively unproductive. These facts are apparently quite in accord with observations made in other bodies of water which have been studied in a similar manner.

II. Although the data at hand, as a result of the first season's study, are perhaps not quite extensive enough to allow of making general statements in regard to the abundance of some of the animals found on the lake bottom, it is desirable, nevertheless, that some estimate of the number of organisms available on a unit area of the bottom should be made. In the following table the average number of animals of each of the various groups is given for a unit area.

	Av. per sq. yd.	Av. per sq. metre
Mollusca	138	165
Oligochaeta	51	63
Amphipoda	131	160
Ephemerida	20	25
Trichoptera	8	10
Chironomidae	253	303
Animals of all kinds	630	753

III. The results given in the table indicate a rich source of food supply for fish and the fact that it is drawn upon very extensively by several species has been amply demonstrated by the examination of stomach contents.* The common whitefish (*Coregonus clupeaformis*), which is the most abundant and most important commercial fish in the lake, feeds almost exclusively upon bottom organisms. The sturgeon (*Acipenser rubicundus*), also important commercially, is likewise a bottom feeder. Three other species, although not marketed at the present time, depend almost entirely upon this source. These are the round whitefish (*Coregonus quadrilateralis*), the common sucker (*Catostomus commersonii*), and the northern sucker (*Catostomus catostomus*).

The importance of the evaluation of the bottom fauna in any body of water in any undertaking relating to fish production becomes quite evident when its importance as fish food is taken into consideration.

*The results of the examination of stomach contents of various species of fish are given in another paper in the series.

ORIENT BAY AT MACDIARMID — Series II

Dredging	1	2	3	4	5	6	7	8	9	Totals
Depth (in feet)	7	45	120	162	93	72	60	12	11	..
Character of Bottom	Coarse Grit	Grit on Clay	Clay	Mud	Mud	Sand	Rock	Sand	Sand	..
Distance from Shore (yds.)	10	30	75	175	600	1200	1400	1800	1900	..
Mollusca	16	..	..	..	..	..	..	11	21	48
Chironomidae	12	5	..	1	2	1	..	26	32	79
Ephemeridae	1	..	..	..	..	..	..	..	..	1
Amphipoda	..	3	5	36	25	4	..	..	..	73
Oligochaeta	3	..	..	1	1	..	..	7	47	59
Nematoda	..	..	..	..	..	..	..	1	..	1
Totals	32	8	5	38	28	5	..	45	100	261

SAND POINT BAY	Series III				SANDY RIVER TO N. SHAKESPEARE	Series IV					
											Totals
Dredging	1	2	3	4	1	2	3	4	5	6	..
Depth (in feet)	6	12	21	45	12	21	27	30	48	159	..
Character of Bottom	Gravel	Gravel	Sand	Mud	Clay	Sand	Sand	Sand	Sand	Mud	..
Distance from Shore (yds.)	30	60	120	440	150	250	850	1200	2800	4550	..
Mollusca	6	5	4	..	..	4	..	16	10	..	45
Chironomidae	33	37	14	1	..	2	1	3	..	1	92
Trichoptera	3	1	1	..	..	1	..	..	..	..	6
Ephemeridae	4	..	1	..	..	..	..	..	..	..	5
Amphipoda	13	3	4	4	..	13	..	..	..	6	43
Nematoda	1	..	..	..	..	..	..	..	..	1	2
Oligochaeta	2	3	7	..	..	..	..	1	..	..	13
Hydracarina	1	..	1	..	..	1	..	..	..	..	3
Totals	63	49	32	5	..	21	1	20	10	8	209

SHAKESPEARE ISLAND TO SANDY RIVER	Series V										
											Totals
Dredging	1	2	3	4	5	6	7	8	9	10	..
Depth (in feet)	150	150	156	163	80	96	78	45	84	192	..
Character of Bottom	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Gravel	Clay	Mud	..
Distance from Shore	50 yd	100 yd	200 yd	400 yd	800 yd	1 mile	2 miles	3 miles	3¼ miles	6 miles	..
Mollusca	..	..	..	..	..	..	..	8	..	1	9
Chironomidae	3	..	1	3	..	..	1	23	..	..	31
Amphipoda	36	10	25	8	3	13	21	6	28	45	195
Ostracoda	..	..	..	1	..	..	..	..	..	..	1
Oligochaeta	..	..	1	..	..	..	..	..	1	..	2
Nematoda	..	..	..	1	..	..	..	..	..	..	1
Trichoptera	..	..	..	..	..	..	..	2	..	..	2
Totals	39	10	27	13	3	13	22	39	29	46	241

SAND POINT BAY (Off McColeman's Dock) Series VI

Dredging	1	2	3	4	5	6	7	8	9	Totals
Depth (in feet)	6	9	12	14	15	15	15	15	16	..
Character of Bottom	Sand	Sand	Sand	Sand	Sand & Gravel	Sand	Sand & Gravel	Sand & Gravel	Sand & Gravel	..
Distance from Shore (ft.)	75	100	150	175	200	225	250	275	300	..
Mollusca	..	..	3	1	3	1	..	6	15	29
Chironomidae	6	6	8	12	1	..	4	5	18	60
Amphipoda	..	..	..	4	..	..	..	..	12	16
Oligochaeta	..	..	1	4	..	..	..	..	3	8
Ephemeridae	..	..	..	..	..	..	1	1	..	2
Hydracarina	..	..	..	..	..	..	..	..	..	..
Totals	6	6	12	21	4	1	5	12	48	115

SAND POINT BAY (Off McColeman's Dock) Series VI

Dredging	10	11	12	13	14	15	16	17	Totals
Depth (in feet)	15	21	27	39	53	60	69	75	..
Character of Bottom	Gravel	Gravel	Mud	Clay	Clay	Mud	Mud	Clay	..
Distance from Shore (ft.)	330	375	450	600	750	900	1200	1500	..
Mollusca	6	1	3	..	..	..	..	..	10
Chironomidae	4	4	10	..	..	2	7	5	32
Amphipoda	..	..	..	13	11	7	21	25	77
Oligochaeta	1	1	5	..	..	1	..	..	8
Ephemeridae	..	..	1	..	..	..	..	..	1
Hydracarina	..	..	2	..	..	..	..	..	2
Totals	11	6	21	13	11	10	28	30	130

BAY EAST OF COOKE POINT

Series VIII

Dredging	1	2	3	4	5	6	7	8	9	10	Totals
Depth (in feet)	15	15	18	21	21	18	23	30	33	48	..
Character of Bottom	Sand	Sand	Sand	Sand	Gravel	Rock	Sand & Rock	Sand & Rock	Sand & Gravel	Mud	..
Distance from Shore (yds.)	100	150	200	250	325	400	550	880	1100	1800	..
Mollusca	2	3	1	3	1	5	..	3	..	..	18
Chironomidae	7	23	12	40	32	10	..	24	5	14	167
Amphipoda	3	3	..	..	..	..	..	5	1	8	20
Oligochaeta	4	11	1	2	1	1	4	4	2	7	37
Nematoda	..	6	..	1	..	2	..	2	..	5	16
Trichoptera	..	1	1	..	..	..	..	..	..	..	2
Hydracarina	..	..	..	1	1	..	..	..	..	1	3
Ephemeridae	..	..	..	1	..	..	..	..	..	..	1
Totals	16	47	15	48	35	18	4	38	8	35	264

BLACKWATER BAY

Series IX

Dredging	1	2	3	4	5	6	7	8	Totals
Depth (in feet)	8	9	18	21	21	27	30	33	..
Character of Bottom	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand	..
Distance from Shore (yds.)	275	300	370	450	525	600	700	880	..
Mollusca	..	..	..	1	..	5	7	2	15
Chironomidae	1	10	..	3	14	4	2	11	45
Amphipoda	..	..	2	2	..	2	10	3	19
Oligochaeta	..	..	..	..	1	..	1	..	2
Nematoda	..	..	..	..	..	..	2	..	2
Ephemeridae	1	..	..	..	..	..	..	..	1
Hydracarina	..	..	..	..	..	1	..	..	1
Totals	2	10	2	6	15	12	22	16	85

BLACKWATER BAY

Series X

Dredging	1	2	3	4	5	6	7	8	Totals
Depth (in feet)	12	21	24	27	29	36	39	39	..
Character of Bottom	Sand	Gravel	Sand	Sand	Sand	Sand	Sand	Sand	..
Distance from Shore (yds.)	50	100	150	200	300	700	900	900	..
Mollusca	..	4	..	1	..	8	..	9	22
Chironomidae	8	19	4	2	1	5	2	5	46
Amphipoda	1	..	1	..	..	..	..	..	2
Oligochaeta	..	2	..	..	..	..	1	..	3
Trichoptera	3	..	..	..	..	..	..	..	3
Totals	12	25	5	3	1	13	3	14	76

SOUTH SHAKESPEARE ISLANDS

Series XI

Dredging	1	2	3	4	5	6	7	8	Totals
Depth (in feet)	3	6	27	48	48	54	51	30	..
Character of Bottom	Rock	Sand	Clay	Ooze	Ooze	Ooze	Ooze	Ooze	..
Distance from Shore (yds.)	5	15	80	200	400	600	800	900	..
Mollusca	4	53	..	..	..	..	..	1	58
Chironomidae	11	13	15	5	..	4	9	..	57
Amphipoda	..	..	20	32	9	63	89	2	215
Oligochaeta	3	2	1	2	1	18	10	1	38
Nematoda	..	1	..	1	..	1	..	..	3
Ephemeridae	1	5	6	3	..	..	..	2	17
Trichoptera	..	3	1	1	..	..	..	1	6
Hydracarina	..	..	..	1	..	..	..	..	1
Totals	19	77	43	45	10	86	108	7	395

EAST SHAKESPEARE ISLANDS — Series XII

								Total
Dredging	1	2	3	4	5	6	7	..
Depth (in feet)	6	15	21	21	21	18	15	..
Character of Bottom	Sand among Rocks	Sand	Mud	Algae	Algae	Sand	Sand	..
Distance from Shore (yds)	15	50	100	200	400	800	1000	..
Mollusca	4	15	6	8	12	25	15	85
Chironomidae	13	30	5	67	45	28	23	211
Trichoptera	1	8	..	..	..	4	..	13
Ephemeridae	4	3	..	1	..	5	4	17
Amphipoda	..	70	16	62	..	96	33	277
Oligochaeta	1	2	..	..	1	7	..	11
Nematoda	..	..	..	..	..	1	..	1
Hydracarina	..	..	..	..	..	6	..	6
Totals	23	128	27	138	58	172	75	621

NORTH SHAKESPEARE—HAT MOUNTAIN — Series XIII

									Totals
Dredging	1	2	3	4	5	6	7	8	..
Depth (in feet)	3	15	18	24	33	57	63	69	..
Character of Bottom	Sand	Ooze	Mud	Ooze	Gravel & Sand	Mud	Mud	Mud	..
Distance from Shore (yds.)	15	80	130	430	530	730	900	1100	..
Mollusca	..	18	15	29	1	1	..	..	64
Chironomidae	3	59	46	98	32	10	28	3	279
Amphipoda	12	3	3	20	5	4	18	2	67
Oligochaeta	1	7	3	3	2	1	..	..	17
Nematoda	..	1	..	1	1	..	5	..	8
Trichoptera	..	2	4	1	..	..	..	..	7
Ephemeridae	..	..	..	1	1	..	..	..	2
Hydracarina	..	2	..	..	..	..	..	..	2
Totals	16	92	71	153	42	16	51	5	446

McL. BAY — Series XIV

									Totals
Dredging	1	2	3	4	5	6	7	8	..
Depth (in feet)	3	3	6	6	9	15	30	36	..
Character of Bottom	Wood Debris & Mud	Mud	Mud	Mud	Mud	Mud	Sand	Clay	..
Distance from Shore (yds.)	15	40	75	150	200	250	350	450	..
Mollusca	4	7	33	15	85	2	..	..	146
Chironomidae	7	..	30	2	49	6	7	3	104
Amphipoda	..	..	3	..	..	..	..	1	4
Oligochaeta	20	..	4	..	27	4	..	3	58
Nematoda	3	..	1	..	..	..	..	..	4
Tabanidae	2	..	..	..	..	..	..	..	2
Ephemeridae	..	3	2	3	2	..	..	..	10
Trichoptera	1	..	..	1	2	..	..	..	4
Hirudinea	1	..	..	..	..	..	..	..	1
Hydracarina	..	..	2	..	..	..	..	..	2
Neuroptera	..	..	1	..	..	..	..	..	1
Acanthocephala	..	..	..	..	..	..	..	7	7
Totals	38	10	76	21	165	12	7	14	343

FOOT OF ORIENT BAY — Series XV

											Totals
Dredging	1	2	3	4	5	6	7	8	9	10	..
Depth (in feet)	12	3	2	5	3	5	9	69	51	27	..
Character of Bottom	Gravel	Sand	Sand	Sand	Sand	Sand	Sand	Mud	Mud	Mud	..
Distance from Shore (yds.)	..	100	200	300	400	550	700	800	900	1000	..
Mollusca	3	..	..	10	11	5	32	5	..	13	79
Chironomidae	..	2	1	3	4	11	11	53	27	15	127
Amphipoda	..	..	..	..	1	..	..	1	1	10	13
Oligochaeta	..	..	..	..	5	2	3	1	2	1	14
Nematoda	..	..	..	..	..	..	2	..	..	1	3
Ostracoda	..	..	..	..	..	..	1	2	..	..	3
Ephemeridae	..	1	..	1	..	1	1	..	..	..	4
Trichoptera	..	2	..	..	1	2	..	..	..	..	5
Totals	3	5	1	14	22	21	50	62	30	40	248

BLACKWATER BAY — Series XVI

Dredging	1	2	3	4	5	6	7	8	9	Totals
Depth (in feet)	12	21	21	21	39	90	117	147	178	..
Character of Bottom	Sand	Mud & Gravel	Mud & Gravel	Mud & Gravel	Mud	Clay	Mud	Mud	Mud	..
Distance from Shore (yds.)	50	150	250	350	450	550	650	750	1000	..
Mollusca	..	1	..	4	7	2	..	..	..	14
Chironomidae	3	8	9	3	8	9	6	6	8	60
Trichoptera	..	..	..	..	1	..	..	..	..	1
Amphipoda	..	..	4	..	..	36	44	19	12	115
Oligochaeta	..	..	..	..	..	3	..	3	3	9
Nematoda	..	..	1	..	..	..	..	2	2	5
Hydracarina	..	..	..	..	..	..	1	..	..	1
Ostracoda	..	..	..	..	..	2	..	3	..	5
Totals	3	9	14	7	16	52	51	33	25	210

SECOND CHANNEL W. OF NIPIGON RIVER — Series XVII

Dredging	1	2	3	4	5	6	7	8	Totals
Depth (in feet)	18	18	12	12	12	3	27	28	..
Character of Bottom	Mud	Mud	Mud	Mud	Mud	Sand	Gravel	Mud & Sand	..
Distance from Shore (yds.)	25	75	150	250	350	550	750	1150	..
Mollusca	5	12	19	26	15	7	33	1	118
Chironomidae	35	37	55	17	18	154	9	12	337
Ephemeridae	6	4	5	6	2	8	4	..	35
Trichoptera	..	1	7	..	..	1	3	2	14
Amphipoda	3	..	9	6	..	..	6	2	26
Oligochaeta	4	8	4	..	8	9	1	7	41
Ostracoda	..	..	..	..	3	1	..	..	4
Hirudinea	..	1	1	..	..	1	1	..	4
Hydracarina	..	..	1	..	..	2	..	..	3
Neuroptera	..	..	1	1	..	..	..	..	2
Coleoptera	..	..	..	1	..	1	..	..	2
Totals	53	63	102	57	46	184	57	24	586

SOUTH BAY (West Shore)	Series XVIII				SOUTH BAY (West Shore)	Series XIX			
Dredging	1	2	3	4	1	2	3	4	Totals
Depth (in feet)	1½	3	6	6	2	4	5	5	..
Character of Bottom	Sand	Sand	Mud & Gravel	Mud & Gravel	Mud & Sand	Mud	Mud	Mud	..
Distance from Shore (yds.)	25	50	75	200	15	25	40	65	..
Mollusca	..	..	24	10	45	15	24	6	124
Chironomidae	50	3	22	40	35	2	25	10	187
Trichoptera	..	..	..	..	2	..	2	..	4
Amphipoda	..	1	3	5	..	..	2	1	12
Ostracoda	..	..	4	..	..	..	..	..	4
Oligochaeta	5	..	7	9	14	1	5	5	46
Nematoda	1	..	..	..	..	..	..	..	1
Hirudinea	..	..	2	..	..	..	..	1	3
Hydracarina	..	..	6	1	..	..	..	..	7
Cladocera	1	..	..	..	..	..	..	..	1
Coleoptera	..	..	..	..	..	..	..	1	1
Tabanidae	1	..	..	..	1	1	..	..	3
Totals	58	4	68	65	97	19	58	24	393

SECOND BAY WEST OF NIPIGON RIVER	Series XX									
Dredging	1	2	3	4	5	6	7	8	9	Totals
Depth (in feet)	5	18	18	33	33	33	12	6	5	..
Character of Bottom	Mud	Mud	Mud	Mud	Mud	Mud	Mud	Mud	Mud	..
Distance from Shore (yds.)	15	50	150	250	300	350	400	450	550	..
Mollusca	23	2	2	..	..	..	11	11	..	49
Chironomidae	159	24	38	41	31	23	47	28	12	403
Ephemeridae	5	1	..	..	..	..	9	9	1	25
Trichoptera	1	..	..	..	..	..	2	..	..	3
Amphipoda	10	3	16	36	42	34	2	2	..	145
Ostracoda	4	..	..	..	1	..	..	..	..	5
Oligochaeta	12	5	..	5	7	2	1	4	1	37
Nematoda	1	..	..	4	2	..	..	..	..	7
Hirudinea	3	..	..	..	1	..	..	..	..	4
Hydracarina	7	1	..	..	..	..	..	1	..	9
Coleoptera	1	..	..	..	..	..	..	..	..	1
Totals	226	36	56	86	84	59	72	55	14	688

BEAR CREEK — Series XXI

	1	2	3	4	5	6	Totals
Dredging	..	..	..	..	..	..	..
Depth (in feet)	18	9	9	9	9	9	..
Character of Bottom	Mud	Mud & Debris	Sand & Debris	Sand	Sand	Sand	..
Distance from Shore (yds.)	20	300	600	900	1300	1700	..
Mollusca	1	2	..	..	..	1	4
Chironomidae	5	2	..	..	7	1	15
Ephemeridae	..	..	..	..	..	1	1
Trichoptera	..	1	1	..	1	..	3
Ostracoda	..	..	..	..	4	..	4
Oligochaeta	..	..	..	..	12	1	13
Totals	6	5	1	0	24	4	40

NORTH SHAKESPEARE BAY — Series XXII

	1	2	3	4	5	6	7	8	9	Totals
Dredging	..	..	..	..	..	..	..	..	..	..
Depth (in feet)	4	18	18	36	24	15	9	6	2½	..
Character of Bottom	Mud	Mud	Mud & Gravel	Mud	Mud	Mud	Mud	Sand	Sand	..
Distance from Shore (yds.)	10	60	110	210	610	710	760	810	849	..
Mollusca	47	5	2	6	..	3	8	36	..	107
Chironomidae	15	27	13	2	8	26	15	6	46	158
Trichoptera	2	2	..	..	..	..	..	..	..	4
Ephemeridae	8	3	2	..	1	6	4	9	1	34
Amphipoda	1	3	3	1	11	2	..	1	..	22
Oligochaeta	4	3	1	..	1	..	3	..	2	14
Nemutoda	..	..	2	..	..	..	..	..	1	3
Hirudinea	2	..	..	..	..	..	..	1	..	3
Hydracarina	..	..	..	1	1	1	2	..	..	5
Odonata	..	..	..	..	..	1	..	..	..	1
Tabanidae	..	..	..	..	..	..	..	..	1	1
Totals	79	43	23	10	22	39	32	53	51	352

NORTH SHAKESPEARE ISLANDS — Series XXIII

									Totals
Dredging	1	2	3	4	5	6	7	8	..
Depth (in feet)	5	17	21	21	15	9	42	42	..
Character of Bottom	Gravel among Rocks	Sand	Sand	Sand	Sand	Sand	Mud	Mud	..
Distance from Shore (yds.)	10	40	40	60	100	130	230	380	..
Mollusca	2	15	1	..	..	60	..	3	81
Chironomidae	5	16	9	12	3	7	4	13	69
Ephemeridae	9	6	1	..	1	6	..	..	23
Trichoptera	1	1	..	2	..	6	..	..	10
Coleoptera	..	..	..	1	..	..	1	1	3
Neuroptera	..	1	..	..	..	..	..	..	1
Oligochaeta	1	1	1	1	..	..	3	..	7
Hirudinea	..	..	6	1	..	1	..	..	8
Hydracarina	..	..	1	..	..	2	..	..	3
Amphipoda	1	2	6	5	..	13	7	8	42
Totals	19	42	25	22	4	95	15	25	247

ORIENT BAY (At Macdiarmid) — Series XXIV

										Totals
Dredging	1	2	3	4	5	6	7	8	9	..
Depth (in feet)	6	39	90	150	87	69	63	11	9	..
Character of Bottom	Sand	Mud	Mud	Mud	Mud	Mud	Clay	Sand & Clay	Mud	..
Distance from Shore (yds)	10	30	60	160	800	1000	1100	1500	1700	..
Mollusca	9	2	..	..	..	2	5	15	7	40
Chironomidae	8	3	1	5	2	13	5	7	7	51
Ephemeridae	3	1	..	..	..	..	..	..	..	4
Amphipoda	..	4	67	61	32	21	28	..	..	213
Oligochaeta	7	..	..	6	2	5	3	8	10	41
Nematoda	..	1	..	1	..	2	1	..	..	5
Hirudinea	1	..	..	..	..	..	..	..	..	1
Hydracarina	..	..	1	..	..	..	..	..	..	1
Totals	28	11	69	73	36	43	42	30	24	356

NAONAN IDS.	Series I	NIPIGON HOUSE	Series VII		MACDIARMID HARBOUR		Series XXV	
								Totals
Dredging	1	1	2	3	1	2	3	..
Depth (in feet)	150 (?)	144	36 (?)	..	9	8	5	..
Character of Bottom	Mud & Shells	Clay	Mud	..	Mud	Mud	Mud	..
Distance from Shore (yds.)	800	800	125	..	100	75	25	..
Mollusca	..	..	3	..	37	3	2	45
Chironomidae	3	11	10	..	42	39	9	114
Trichoptera	..	..	..	..	1	..	..	1
Ephemeridae	..	..	8	..	..	..	..	8
Amphipoda	13	47	9	..	7	..	2	78
Oligochaeta	3	..	..	..	28	17	6	54
Nematoda	..	..	1	..	..	1	..	2
Hirudinea	..	..	..	..	1	..	..	1
Cladocera	..	..	..	..	..	..	1	1
Hydracarina	..	..	..	..	..	1	..	1
Totals	19	58	31	..	116	61	20	305

ORIENT BAY AND NORTHWARD (East Shore)						Series XXVI				
										Totals
Dredging	1	2	3	4	5	6	7	8	9	..
Depth (in feet)	9	18	8	12	18	24	27	48	129	..
Character of Bottom	Sand	Sand	Sand	Sand	Gravel	Sand	Sand	Sand	Mud	..
Distance from Shore (yds)	30	60	85	130	230	280	330	380	430	..
Mollusca	8	6	1	..	..	..	1	4	..	20
Chironomidae	9	6	46	4	2	2	6	6	5	86
Trichoptera	..	1	..	..	..	..	..	..	..	1
Amphipoda	..	..	..	2	..	..	..	..	45	47
Ostracoda	..	..	2	..	..	..	..	..	..	2
Oligochaeta	8	14	22	..	1	3	2	8	14	72
Nematoda	..	..	..	..	..	..	1	..	..	1
Totals	25	27	71	6	3	5	10	18	64	229

VIRGIN ISLANDS — Series XXVII

										Totals
Dredging	1	2	3	4	5	6	7	8	9	..
Depth (in feet)	6	12	15	15	15	12	9	5	3	..
Character of Bottom	Sand	Sand	Sand	Sand	Sand	Mud on Sand	Mud on Sand	Mud on Sand	Mud	..
Distance from Shore (yds)	10	50	100	150	200	300	400	500	600	..
Mollusca	96	14	1	3	10	12	10	31	213	390
Chironomidae	48	1	9	..	15	28	32	49	43	225
Trichoptera	2	1	..	..	..	2	..	..	1	6
Ephemeridae	7	..	..	..	1	1	..	7	..	16
Amphipoda	..	..	..	..	1	..	..	..	..	1
Ostracoda	..	..	..	..	..	..	..	1	..	1
Oligochaeta	21	3	2	3	5	2	10	5	12	63
Nematoda	..	..	..	..	..	..	..	..	3	3
Hirudinea	7	..	..	..	..	..	..	..	2	9
Hydracarina	2	..	..	1	..	1	..	1	4	9
Totals	183	19	12	7	32	46	52	94	278	723

McINTYRE BAY (South End) — Series XXVIII

										Totals
Dredging	1	2	3	4	5	6	7	8	9	..
Depth (in feet)	1	3	9	12	15	18	21	24	24	..
Character of Bottom	Sand	Mud on Sand	Mud & Gravel	Mud & Sand	Mudon Sand	Mud	Mud	Mud	Mud	..
Distance from Shore (yds)	25	75	125	175	225	325	425	525	625	..
Mollusca	4	1	17	12	6	6	6	3	8	63
Chironomidae	8	21	3	2	..	14	1	2	16	67
Trichoptera	..	1	1	1	..	..	1	..	..	4
Ephemeridae	..	1	2	3	..	3	1	1	..	11
Amphipoda	1	..	2	5	12	9	27	5	1	62
Oligochaeta	1	2	..	..	2	..	7	3	2	17
Hirudinea	..	..	..	..	1	..	..	..	..	1
Hydracarina	..	..	..	..	..	..	..	..	2	2
Odonata	..	..	..	..	2	..	..	..	..	2
Totals	14	26	25	23	23	32	43	14	29	229

McINTYRE BAY (East Side among Islands)

Series XXIX

									Totals
Dredging	1	2	3	4	5	6	7	8	..
Depth (in feet)	3	6	12	18	18	21	21	15	..
Character of Bottom	Mud	Mud	Mud	Mud	Mud	Mud	Mud	Mud	..
Distance from Shore (yds.)	10	60	110	160	210	260	310	360	..
Mollusca	16	8	3	3	6	10	5	9	60
Chironomidae	14	11	23	22	38	40	100	4	252
Trichoptera	2	..	..	..	..	..	..	1	3
Ephemeridae	2	2	2	2	7	7	6	6	34
Coleoptera	..	1	..	..	..	..	..	..	1
Neuroptera	..	..	..	1	2	1	2	..	6
Amphipoda	3	..	3	10	9	31	12	2	70
Oligochaeta	6	..	4	1	..	6	6	1	24
Nematoda	..	..	..	2	..	..	1	..	3
Ostracoda	..	..	..	..	..	1	9	..	10
Hydracarina	..	..	..	..	1	..	..	..	1
Totals	43	22	35	41	63	96	141	23	464

McINTYRE BAY (North End)

Series XXX

							Totals
Dredging	1	2	3	4	5	6	..
Depth (in feet)	6	9	9	21	45	48	..
Character of Bottom	Mud	Mud	Mud	Mud	Mud	Mud	..
Distance from Shore (yds.)	30	80	130	180	230	280	..
Mollusca	47	17	9	2	2	..	77
Chironomidae	6	15	5	2	9	1	38
Trichoptera	2	3	..	..	..	..	5
Ephemeridae	10	7	3	5	1	..	26
Amphipoda	3	7	4	1	105	30	150
Oligochaeta	6	3	..	1	3	9	22
Ostracoda	..	1	..	..	..	..	1
Odonata	..	4	1	..	1	..	6
Hydracarina	1	1	..	..	..	..	2
Hirudinea	1	..	..	..	..	..	1
Cladocera	..	1	..	..	..	..	1
Coleoptera	..	..	1	..	..	..	1
Neuroptera	..	1	..	..	..	..	1
Totals	76	60	23	11	121	40	331

GROS CAP	Series XXXI					ALEXANDER ID. Series XXXII				
										Totals
Dredging	1	2	3	4	5	1	2	3	4	..
Depth (in feet)	3	9	15	24	30	1	4	6	9	..
Character of Bottom	Mud	Mud	Mud	Mud	Mud	Mud	Sand	Sand	Sand	..
Distance from shore (yds.)	10	35	60	110	210	10	25	50	100	..
Mollusca	38	38	5	5	..	3	50	52	20	211
Chironomidae	18	38	121	24	5	15	40	44	26	331
Trichoptera	1	3	3	..	..	..	..	2	..	9
Ephemeridae	6	1	1	2	1	..	2	3	3	19
Amphipoda	1	7	10	..	2	..	..	10	6	36
Ostracoda	1	..	6	..	..	..	..	2	2	11
Oligochaeta	3	3	5	3	1	2	4	21	5	47
Nematoda	..	..	..	..	..	..	6	..	..	6
Hydracarina	..	..	..	..	..	..	..	2	1	3
Hirudinea	..	..	..	..	..	..	..	..	1	1
Neuroptera	..	..	..	..	..	..	..	1	..	1
Cladocera	..	..	..	..	..	..	1	..	..	1
Coleoptera	2	..	..	..	..	..	..	..	..	2
Totals	70	90	151	34	9	20	103	137	64	678

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