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Title

SEASONAL VARIATIONS IN THE ABUNDANCE OF VARIOUS PLANKTON FORMS OF FLORENCE LAKE, BRITISH COLUMBIA

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Seasonal Variations in the Abundance of Various Plankton Forms of Florence Lake, British Columbia.

by

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Although considerable study has been made of the plankton of lakes in British Columbia from various standpoints, only one investigation (Cultus lake, Ricker, 1938) has dealt with the variations in abundance of species from month to month throughout the course of a year. It seemed of interest, therefore, to follow the plankton cycle in Florence Lake on Vancouver island through a twelve-month period. This paper gives the species observed in the plankton and the relative abundance of the more important forms.

The author wishes to acknowledge his indebtedness to the following: Dr. C. McLean Fraser who suggested the problem and guided the progress of the work; Mr. B. Wm. Neal who collected most of the samples; Dr. G. C. Carl who rendered valuable assistance in identifying many of the species; and Dr. W. A. Clemens and Professor J. R. Dymond for assistance with the preparing of the manuscript for publication.

FLORENCE LAKE

Florence lake is located ten miles W.N.W. of Victoria, B.C., at latitude 48°27'36", longitude 123°30'45" with an elevation of approximately 200 feet above the sea level.

It occupies a small oval basin one half of a mile long and one sixth of a mile wide; bordered on the west and north by a hill of altitude 500 to 600 feet; on the east by a rise of about 100 feet.

The shore line is fairly regular. The greatest depth sounded (summer readings) was 20 feet. The average depth was 12 - 15 feet. The western shore shelves most quickly, due to its bordering along the foot of the hill. Extensive shallow areas of from 2 - 4 feet extend out from the southern and northern shores to a distance of 50 - 60 feet. At the southern end the depth is 12 feet about 100 feet from the shore; at the northern end it is approximately 6 feet. The general direction of the wind is from the south and west which may account for the large extent of the shallow areas at the northern end of the lake. In general the 4 - 6 foot depth along the eastern side extends 30 - 40 feet from the shore and is marked by an area of Nuphar polysepalum, which becomes wider at the northern and southern ends of the lake.

Throughout the year the lake may have a rise and fall of 5 - 7 feet. During 1933-34 the fall in level was over 5 feet; in 1934-35 a drop of over 6 feet occurred.

Florence lake probably belongs to the third class of temperate lakes (Welch, 1935); viz., "Temperature of bottom water very similar to that of the surface water, circulation continuous except when frozen."

Ecological Zonation. The following zones may be recognized:

1. The shore margin zone.

   (a) An encroaching area of Ledum groenlandicum. This extends from the north-west border, thinning out along the east-south-east border where a bank of rock slopes into the lake; widening

again towards the east and south and becoming extensive along the south and south-west border.

(b) A Typha area along the south-west margin, mingled to some extent with the Ledum.

(c) A rocky area along the central western shore.

2. The immediate offshore zone.

(a) A Nuphar area growing on a mucky rank-smelling ooze.

(b) A small area of Myriophyllum growing in black mud along the central region of the eastern shore.

3. The outer offshore zone.

This consists of a Potamogeton area at the south-west and north-east corners of the lake extending out beyond the Nuphar area to a depth of 12 feet.

4. The central zone.

This consists of the open portion of the lake beyond the rooted aquatic vegetation. The bottom of the lake in this zone consists of ooze consisting in part of decaying plankton and other organic materials.

In general the lake has the appearance of gradually drying up. The area of Ledum is gradually extending outwards, while the Nuphar areas, particularly along the eastern shore, are becoming smaller. This may be due in part to the exposure of the roots of many of them during the low water level experienced during the last few years. Brasenia, an indicator of soft water, (Ricker, 1934), forms a fringe outside the Nuphar areas, along the south and north-east borders.

METHODS EMPLOYED

A six-inch diameter net of #25 bolting silk to which was attached a 20 c.c. vial, was used in making the collections. A few drops of formalin was used as a preservative.

The net was drawn through a definite distance for each of five stations and vertically at a sixth.

Stations:

1. 250 feet along the east shore at the southern end outside of a reedy area.
2. 400 feet at the southern end along the outside border of a lily bed and above Potamogeton.
3. 450 feet along the rocky shore.
4. 300 feet at the southern end of the lake above a bed of Potamogeton, outside a reedy area which merged into an area of water lilies.
5. 500 feet from the centre of the lake.
6. Vertical haul from the centre of the lake.

Surface samples were taken once a month at noon, at five P.M., and at midnight from stations 2, 3, and 5, and at noon and 5 P.M. from stations 1, 4 and 6, during 1934-35 in an attempt to find if variation in quantity or character of the plankton existed in the various ecological zones of the lake. No samples were taken during September, 1934, nor during January, 1935; in the latter case the freezing over of the lake prevented the taking of collections.

An attempt was made to determine vertical movement in plankton by taking hauls in the morning and evening from all stations, and one at midnight from stations 2, 3, and 5.

Collections were made on the following dates: July 13, Aug. 28, Oct. 7, Nov. 11, Dec. 28 (1934), Feb. 23, Mar. 30, Apr. 27, May 31, June 26, July 27 (1935).

Methods employed in making the counts

Samples were allowed to settle and were then reduced to a 10 c.c. volume. Each 10 c.c. haul was examined under a low power binocular to determine the presence of the Crustacea and the larger Rotatoria.

For making the counts a 1 c.c. cell marked off into 1/15 c.c.'s was used. A total count was made of all crustaceans, of the rotifers Asplanchna and Synchaeta and the incidental forms, and the larger algal forms (e.g. Anabaena). One-fifth of a c.c. was used as a unit volume to be counted for all other forms. The total counts were recorded as the number present in 1 c.c. of the original 10 c.c. volume of plankton obtained from a 500 foot tow. This method was applied to all tows.

Whenever the abundance of plankton made a 1 c.c. count of the 10 c.c. volume impractical, the total volume was made up to 20 c.c. of which 1 c.c. was examined and the results recorded as numbers present in a 1 c.c. sample of the original 10 c.c. volume; i.e. the cladocerans are multiplied by 2 and the algae by ten.

Grouping of the algal forms

The following grouping of algal forms of similar make-up was employed to facilitate counting.

Gloeocapsa which included Microcystis (Clathrocystis), Aphanocapsa, Merismopedia, Coelosphaerium.

Micractinium (Richteriella)

Selenastrum which included Selenastrum, Ankistrodesmus, Quadrigula, Elakatothrix gelatinosa.

Sphaerocystis which included Sphaerocystis and Gloeocystis.

Some difficulty occurred in the placing of some of the unicellular green algae, some of which may have been included among the Gloeocapsa group when

they should have been placed in the Sphaerocystis group.

No attempt was made to make separate counts of the various forms of the diatoms and desmids present. The dominant form in each month was recorded.

RESULTS

A list of the organisms with the combined counts of the more important forms from stations 2, 3, and 5, is given in table 1. The presence of the other forms is indicated as given in the legend below the table. The counts of the stations 1, 4, and 6 are not included for the following reasons:

1. Hauls were taken from them only twice a day as compared with three times a day from stations 2, 3, and 5.

2. When the weather was calm some variation in the numbers of organisms from the various stations is noted. Their omission is not believed to be of significance.

3. Even though not included in the results, they may be used as a check on the wind effect. When the wind blew, a piling up of the organisms was observed at the station toward which the wind blew. A general redistribution of the organisms throughout the waters of the lake took place when the wind died down. A general picture of the numbers of organisms, and their season variation can be sufficiently obtained from the total hauls from stations 2, 3, and 5.

4. The vertical hauls from station 6 did not reveal the presence of any organisms at the depths that were not found at the surface, and are therefore disregarded. Hauls from various depths might have shown that some organisms were more abundant at the depths than at the surface.

A decided piling up of the organisms at some stations, probably due to the wind effect, is noted for the following tows:

A slight piling up of the organisms from the centre toward station 4 from the morning till the evening occurred during August; in December a piling up of the organisms from the centre toward station 1 is noted in the morning hauls, a redistribution throughout the lake

is seen in the later hauls; in March a piling up from the centre toward station 1 and 2 occurs, with a redistribution toward midnight; in May from the centre toward station 2 and 3 till after the evening haul; in the morning hauls for June a slight piling up is noted toward station 1. Any statements made regarding the vertical movements of the organisms takes the above into consideration.

DISCUSSION OF RESULTS

No determinations of temperature, chemical conditions, or light penetration were made. Any discussion on the organisms met with is therefore limited to observations on seasonal fluctuations in numbers, differences in occurrences as between stations and for times of the day. It is neither necessary nor desirable to deal with each species and so only a few of the more abundant ones are selected for discussion.

Variations in numbers between the stations may be due to vertical migration, to evasion of the net during the day (Ricker, 1938) or dispersal of numbers by current across the lake (Welch, 1935). Any statements made regarding the movements of the plankters takes both the wind effect and the above statement into consideration.

Cladocera.

Ceriodaphnia reticulata (Jurine). This species shows a decided abundance in August and October with a few individuals present in July and November. Tee peak probably occurred in September; during August the forms encountered were principally young ones. Foerster (1925) reports this form as early as June. During August the peak of accumulation was found at station 2 with diminishing

numbers toward the north end of the lake. Conditions may have been suitable for this species at station 2 and the prevalent wind from the S.W. scattered the individuals across the lake. There was an indication of a rise to the surface in the night hauls during august.

Daphnia longispina var. hyalina Leydig. This plankter occurred from October to April with a peak in February. In Cultus lake Ricker (1938) found Daphnia pulex abundant from May to July.

Some indication is shown of a rise to the surface during the afternoon and a settling during the night in the summer. From all the October hauls, taken on a calm day, an increase in the number of this organism taken in the surface hauls occurred at midnight. During the winter there is an indication of a continuation of the movement observed in October. This was especially noticed during February when large numbers were taken at midnight from the centre of the lake. This reaction was continued till May.

The greatest numbers throughout the year were taken from the centre of the lake. This would indicate a tendency on the part of the organism to remain in the deeper reaches of the lake.

Several forms of D. longispina were noted. During July 1934, the form of D. longispina var. hyalina was seen. With advance of the season a sharper curvature of the head occurred; a gradual return to the rounded form of head was seen toward the following summer. During June, 1935, the decided mendota and galeata forms were found. During June and July, particularly from the centre hauls, many had a coronet of 3 or 4 spines on the head. At least one individual was seen in July which had a decided depression on the curve of the crest in which was a blunt projection. Whether these forms are seasonal variations or variations in form of different races is as yet undecided (Woltereck,

1932).

Bosmina longirostris (O.F. Müller) and B. longispina Leydig. Although Bosmina was present throughout the year, the greatest numbers occurred during July to October with a peak in August. Ricker (1938) reports spring and autumn peaks for B. obtusirostris in Cultus lake. In spite of wind effect a rise to the surface was found in July and August at stations 2, 3, and 5. In the hauls made in October, the numbers at the surface showed little variation during the day but a slight increase in the numbers from the centre haul, over those from the other stations, is shown during the night.

Pleuroxus denticulatus Birge, Chydorus sphaericus (O.F. Müller), Alonella nana (Baird), and Holopedium gibberum Zaddach were never abundant in the plankton of Florence lake. Chydorus and Alonella were found most frequently during the winter and early spring. Only a rare individual was taken from the centre of the lake, the majority were from the weedy stations, especially station 2.

Diaphanosoma brachyurum (Lieven). This form was of infrequent occurrence. Its range corresponds to that given by Eddy, (1934); i.e. July to September. In August, 1934, the greatest number was obtained from station 4 at 5 P.M. due to the same piling up of plankton organisms as shown above.

Copepoda.

Diaptomus washingtonensis Marsh. The greatest number of adults were taken during October and November and most of these were taken from the centre of the lake and along the deeper water of station 3 in spite of the piling up effect of the wind toward the centre and the East shore of the lake. Insufficient numbers of these were obtained in the surface tows to make any statement regarding the diurnal movements. Welch (1935) and Foerster (1925) report that

most species of Diaptomus inhabit deeper waters of the lake. During February and March females with eggs were observed; during May and June many individuals were young, particularly in the night hauls.

Cyclops bicuspidatus Claus. Two peaks occur, a low one in August, October and November, and a high one during the period of spring maximum in March. During February, May, June and July, more were obtained from the midnight hauls than during the day. Any variation in the numbers from the various stations during the day can be accounted for by wind action. Ricker (1938) found a spring maximum for this species in Cultus lake. A very few individuals of C. phaleratus were observed.

Nauplii. The highest peak occurs in May with smaller peaks in October, February and March. A minimum occurs in June followed by a slight increase during July. This series of peaks could well be due to the differences in periods of abundance of the various species of organisms whose nauplii are found in the lake. In general, the greatest numbers were obtained from the hauls in shallow areas. The same piling up at the various stations is noted here as with the other organisms above.

Amphipoda.

Hyalella azteca Saussure. While not usually included as a plankter, Hyalella was found in the plankton at night from June to August, even in the hauls taken from the middle of the lake. It appears to be a heliophobe, preferring the dark shadows of the Nuphar areas in shallow water during the day, but after dark it was found throughout the waters of the lake. In the Nuphar and weedy regions it occurred in large numbers, as many as fifty being found on a quarter of a decaying lily pad.

Rotatoria.

The lake possessed a rather large number of rotifers in the plankton and during the year a periodicity was observed for the various forms. The dominant species were: Polyarthra trigla Ehr., Keratella cochlearis Gosse, Gastropus stylifer Imhof and Conochilus unicornis Rouss.

Asplanchna priodonta Gosse was most abundant in the autumn, reaching its greatest abundance in December. Ricker (1938) reports maximum numbers in May or June in Cultus lake.

Conochilus unicornis Rouss. This rotifer was practically absent from November to April. It was fairly evenly distributed during the summer months with greatest numbers during June. The greater numbers were obtained from the central station over deep water than from shallow water stations. These results correspond with those of Foerster (1925).

Gastropus stylifer Imhof. While considerable numbers occur throughout the year, a decided peak is reached in October. During October, in spite of the wind effect, a greater number were obtained in the noon hauls. In all cases more were obtained from stations 1, 2, and 3 than from the centre, indicating its greater abundance in the shallower regions of the lake.

Keratella cochlearis Gosse. A peak of abundance occurred during March, April and May with a smaller peak in August. Ricker (1938) found somewhat similar peaks in Cultus lake. During the winter a larger size of the animal and a greater prominence of spines were observed. The greatest numbers were obtained from the shallow water of station 2. Foerster (1925) reports a similar predominance in shallow water. This is a true plankton rotifer and was found fairly evenly distributed throughout the waters of the lake. A vertical migration is indicated. In the hauls made during August, while fewer were found in

the morning hauls from station 2, more were found at 5 P.M. and still more at midnight. This would not be the case if the wind action were the cause as the piling up at station 4 and a lessening at station 2 would have been the result.

During November the centre hauls would indicate that such a vertical movement was non-existent. During March the greatest numbers appeared at the surface in the evening hauls in spite of heavy wind effect. In general there is an indication of a rise to the surface toward midnight in the April hauls; this may possibly be due to currents. In May the greatest numbers were obtained in the early morning hauls from all stations in spite of wind action.

Keratella quadrata (Muller) is an example of a species reaching its abundance during the late winter and early spring, in this case during February and March. It was entirely absent during the late spring and summer months.

Trichocerca cylindrica (Imhof) (Rattulus) rose to a peak between August and October with indications of its presence in July and November. It was fairly well distributed throughout the waters of the lake during its cycle. In August, 1934, a greater number were taken in the midnight hauls from stations 2, 3 and 5 in spite of wind effect. This would strongly suggest a rise to the surface during the night.

Polyarthra trigla Ehr. The data indicate a late summer and autumn abundance although considerable numbers were present in all months. Ricker (1938) for Cultus lake shows spring and autumn pulses, the former usually being the greater.

Protozoa.

Ceratium hirundinella (O.F.M.). This species reached a decided peak in May and was entirely absent in November and December. Ricker (1938) reports

greatest numbers in Cultus lake in September. A similar seasonal change in shape as reported by Welch (1935) is observed, viz., the more compressed winter form giving place to the summer form with widely spread spines.

Dinobryon sociale Ehr., The cycle for this species is as follows: few in the plankton during August, a pulse in October, a practical disappearance during the winter, an increase during February with the highest peak in April, a decline during May, an increase in June and a trace during July, 1935.

Peridinium sp. A high peak of abundance occurred in April and a smaller one in October. A rather good representation was present throughout the year.

Algae.

Anabaena occurred from May to December with a peak in June.

Aphanocapsa group. There appear to be two pulses for this group, one in March and a more pronounced one in October. Microcystis was the most abundant and persistent form. At the end of May it formed one-sixth of the total number in the group and then it increased to a peak in July and remained fairly abundant during the autumn. Aphanocapsa reached its greatest abundance in May and June and remained fairly common throughout the summer and autumn. Coelosphaerium was fairly common in June and July.

Gloeocapsa group. This group formed by far the larger proportion of all algae found in the plankton. The range of Chroococcus extends from April till October; Gloeocapsa appeared later than the above form and was more abundant during the summer. Peaks in abundance were noted in December and April.

Chamaesiphon sp., Gloeotrichia echinulata and Lyngyba were rare among the Myxophyceae as were Dactylococcus sp., Dimorphococcus lunatus and Selanastrum among the Chlorophyceae.

Sphaerocystis group. A pulse is evident in April following a period of very low numbers in February and March. The species continue in considerable abundance throughout the summer and autumn, reaching a peak in December.

Desmids. Representatives of this group were seldom found in the plankton but were more numerous in the mossy areas along the margins of the lake during the months of April, May, June and July. Staurastrium limneticum var. cornutum, S. crenulatum, Kanthidium antilopaeum, K. subhastiferum and Sphaerozosma sp. were fairly common. Representatives of the genera Arthrodesmus, Closterium, Cosmocladium, Docidium, Eusastrum, Hyalotheca, Micrasterias were rare.

Diatoms. In general two peaks were noted. One for the fall and a very high one in the spring. During December there was a bloom of Asterionella; this lasted till April with the height of the bloom in February. Meridion, Navicula and Pinnularia were fairly common throughout the year while Cymbella was rare.

SUMMARY

Florence lake is apparently in a transitional stage between a lake and a swamp as is indicated by the large extent of marshy edges at the northern, eastern, and southern borders together with the extension of the Ledum areas. The general shallowness, the greatest depth being 20 feet, and the average 12-13 feet, is another indication of the transitional stage of the lake.

Seasonal variation occurred in all organisms examined. The occurrences may be indicated as follows for the more important species:

Present throughout the year, though not necessarily equally or co-incidentally abundant. Bosmina longirostris, Keratella cochlearis, Polyarthra trigla, Peridinium, Daphnia longispina.

Peak during (Dec.), Jan., Feb., March, (April). Keratella quadrata, Peridinium, Asterionella.

Peak during (March), April, May, June, (July). Cyclops bicuspidatus, Ceratium, Dinobryon, Gloeocapsa, Sphaerocystis.

Peak during (June), July, Aug., Sept., (Oct.). Bosmina, Ceriodaphnia reticulata, Diaphanosoma brachyurum, Conochilus unicornis, Trichocerca cylindricus, Anabaena, Aphanocapsa group.

Peak during (Sept.), Oct., Nov., Dec., (Jan.). Diaptomus washingtonensis, Asplanchna priodonta, Gastropus stylifer, Polyarthra trigla, Sphaerocystis group.

Variations in the numbers of organisms were found for different parts of the lake on the same day. This may have been due to the effect of the wind drifts, or the more weedy and protected areas affording more favourable habitat for certain of the organisms.

Indication of a vertical movement was observed in some of the plankters; viz., Ceriodaphnia reticulata, Daphnia longispina var. hyalina, Keratella cochlearis, and Trichocerca cylindrica.

Seasonal variation in the form of the organism was noted in Daphnia longispina var. hyalina, Ceratium hirundinella, and Keratella cochlearis.

Some species were more abundant in one region of the lake than another; e.g. Ceriodaphnia reticulata, Pleuroxus denticulatus, Chydorus sphaericus, Alonella nana, Holopedium gibberum, and Gastropus stylifer in the shallow weedy areas; Daphnia longispina var. hyalina, Diaptomus washingtonensis, Conochilus unicornis, and Trichocerca cylindrica in the deeper regions of the lake.

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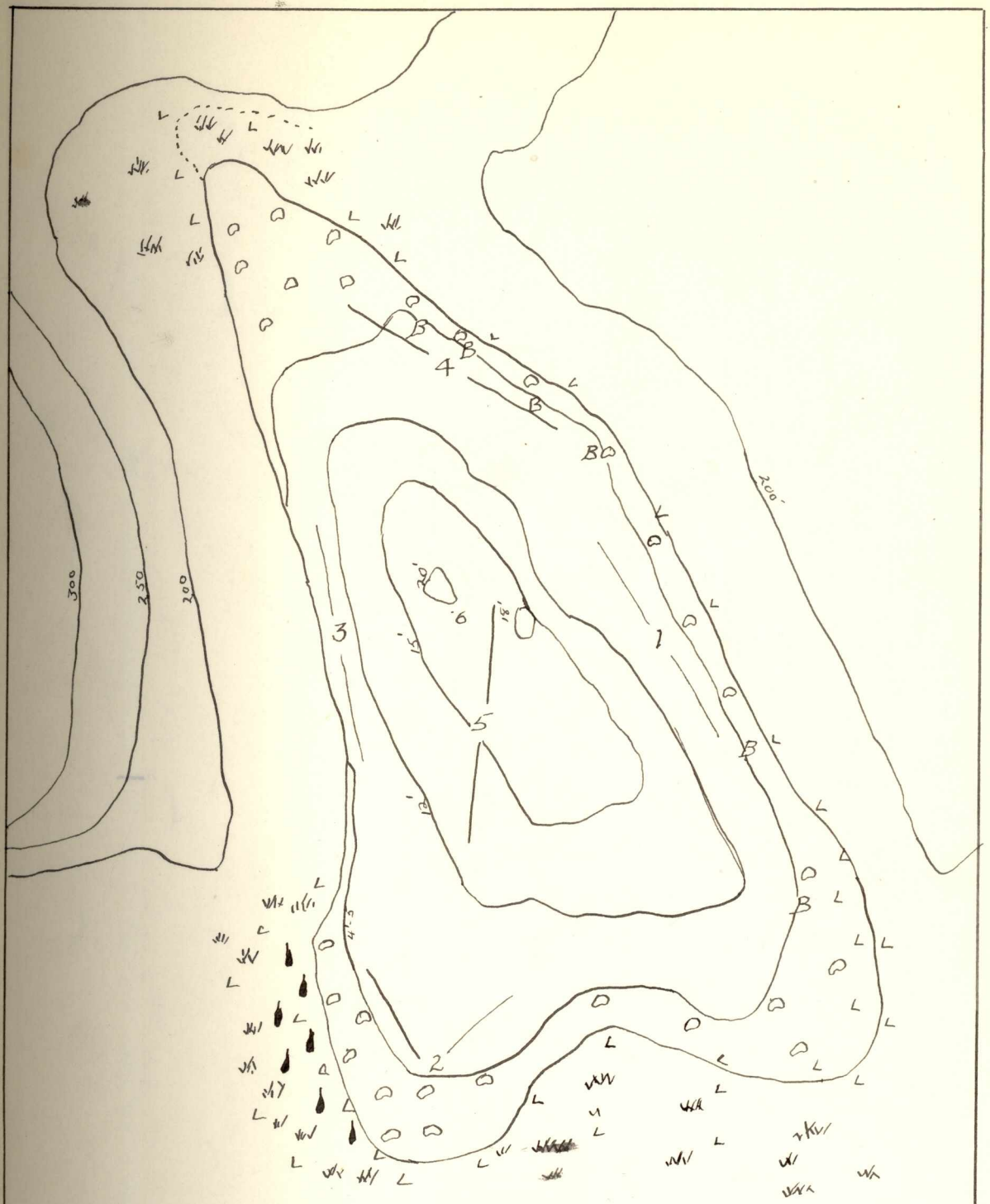

Legend:-

- Typha
- Marsh
- Station
- Waterlilies
- B Brasenia
- L Ledum

—FLORENCE LAKE—

contour Map

Scale 12" = 1 mi.

Table 1. Numbers of plankters, Florence lake, B.C., August, 1934, to July, 1935.

	1934				1935					
	Aug. 28	Oct. 7	Nov. 11	Dec. 28	Feb. 23	Mar. 30	Apr. 27	May 31	June 26	July 2
Ostracoda	12	2				4	12		1	
Copepoda										
Canthocamptus					2	47	68	16	2	+
Cyclops bicuspidatus	95	79	72	24	79	251	233	190	20	5
Diaptomus washingtonensis	2	16	9	+	3	2+	24	40	22	6
Nauplii	560	1093	326	207	1373	1228	366	5257	24	164
Cladocera										
Bosmina longirostris and longispina	161	36	21	15	2+	16	4	16	9	44
Ceriodaphnia reticulata	1583	660	4							1
Daphnia longispina var. hyalina	21	77	77	10	192	30	67	8	+	10+
Diaphanosoma brachyurum	14	4								11
Holopedium gibberum	4									
Pleuroxus denticulatus	16	50	17	5	+	+	5	11	4	+
Malacostraca										
Hyalella azteca	49	12			1+	13			3	8
Hydracarina	1	3+				2+	2	+	1	1+
Rotatoria										
Asplanchna priodonta	69	97	103	624	6	12	27		1+	4+
Chromogaster ovalis	+	+	+				+	+	+	+
Collotheca libera	80	950	206	22	2			81	45	76
Colurella bicuspidata		4						1		2
Conochilus unicornis	420	293	11		10			353	595	75
Diurella porcellus)	8	6		8					2	
" stylata)										
Euchlanis dilatata		10		2+			4			
Gastropus stylifer	820	5613	127	360	126	65	348	159	239	72
Keratella cochlearis	6200	1378	1494	3056	2944	12244	8101	8291	746	315
" quadrata		+	42	55	775	488				

	Aug. 28	Oct. 7	Nov. 11	Dec. 28	Feb. 23	Mar. 30	Apr. 27	May 31	June 26	July 27
Lepadella patella			1		2	2		21		
Monostyla lunaris)*	24	33	9	4	4			5		2
" bulla)										
Notholca longispina	6			2		2	6	28		3
" striata acuminata					17	8				
Ploesoma truncatum	48	28	6	2	2	1			6	
Polyarthra trigla	670	1266	776	620	235	440	215	766	311	146
Trichocerca cylindrica	1200	570	5							45
Synchaeta sp.	2	104	98	8	130	160	2	14	1	
Protozoa										
Arcella vulgaris)	88	123		23	38	18		6	2	4
" discoides)										
Ceratium hirundinella	368	397			31	306	509	17761	2226	482
Dinobryon sociale Ehr.	+	29325	low		11552	51210	119050	low	8705	2015
Epistylis sp.									1	35
Mallomonas**					40	1870	619	26	228	216
Peridinium	5090	151104	93175	86379	91583	108954	425533	24724	462	486
Vorticella campanula	960	161	13	6				8	2232	15
Desmidaceae	644	718	282	1792	848	1906	3594	795	297	389
Bacillariaceae										
Asterionella formosa	+	+	F	A	A	C	F	+	+	+
Campylodiscus	+							+	+	+
Ceratoneis arcus	F	+	+	+	+	+	+	+	+	+
Fragilaria	+	+	F	C	A	F	F	+	F	+
Stauroneis	+	+	+	C	+	+	+	+	+	+
Tabellaria fenestra	+	+	+	+	+	+	F	F	F	+
Rhizosolenia criensis	+									
Total Bacillariaceae	3710	5395	6772	16248 / 181120(Ast.)	7037 / 84440(Ast.)	10825 / (over 1/2 Ast.)	10010	9481 / (Chiefly Ast.)	1686	1214
Myxophyceae										
Anabaena lemmeranni (?)	89	66	11	4				1	310	5
Aphanocapsa Group	4893	8074	710	3730	2180	4892	3596	2567	1144	2675
Aphanocapsa	F	F	F	F				A	A	F
Coelosphaerium	+	+	+						F	F

	Aug. 28	Oct. 7	Nov. 11	Dec. 28	Feb. 23	Mar. 30	Apr. 27	May 31	June 26	July 27
Merismopedia							+	+	R	
Microcystis	F	+	F	+	+	+	+	+	F	C
Gloeocapsa Group	4557	7424	2853	17475 (Mostly Gloe.)	2373 (Mostly single)	2102	22054	5677	3130	7929
Chroococcus	F	+					A	C	C	F
Eucapsis	F	+						+	F	F
Gloeocapsa	C	+					+	+	C	C
Chrysophyceae										
Mallomonas					+	A	C	R	F	F
Chlorophyceae										
Eudorina elegans	+	F	+	+	+	+	F	+	+	+
Golenkinia				+	60	165	483	505	90	
Micractinum pusillum		347	2587	49505	18165	2045	1513	48	651	178
Pediastrum boryanum							+	25	41	
Selenastrum Group		963	3297	706	241	1171	2123	167	394	676
Ankistrodesmus							F	F		
Elakatothrix						A				
Quadringula						+	+	+		
Sphaerocystis Group	1464	3169	1375	6813	58	20	5604	2069	964	3537

Legend: The numbers refer to the total counts made from 1 c.c. sample of the 10 c.c. volume from Stations 2, 3, and 5. Gleo. (Gleocapsa) and Ast. (Asterionella) refer to the predominating form in the group in which they were included. V - very abundant; A - abundant; C - common; F - fairly common; R - rare; + - present.

* Mostly M. lunaris

** Not counted before February.