9.7

plankton 10
WC 9.5
9.75

ROACH and INKPOT

(an in depth study)

Mary Anne Pleasants
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UNDERC

Roach and Inkpot

In this report I hope to make a comparison or if more appropriate, a contrast of Roach and Inkpot Lakes. This study will cover chemical analyses of the two lakes and their phytoplankton and zooplankton populations.

Tests to determine nutrient levels, alkalinity and acidity were run using Hach Kit methods. These tests were carried out in the better part of the afternoon, the samples having been collected in the morning and then refrigerated. Two quart jars were filled from the epilimnion and two from the hypolimnion. Samples were taken by a Kemmerer sampler dropped to a specific location. The location was generally in the middle region of the epilimnion or hypolimnion so as not to be affected by the fluctuation found around the thermocline. pH was recorded from a pH meter at both epilimnion and hypolimnion, and temperature and O_2 were taken with an O_2 meter at 1m intervals. These three tests were done early in the morning prior to collecting the water samples. An attempt was made to collect all samples on the deepest part of each lake. Wind velocity caused considerable difficulty in maintaining a single position from which to take all samples.

A depth profile was taken on each lake with a depth recorder. Two passes were made across the lake, transecting at what was hopefully the deepest area. The motor was run at a constant, low speed in order to pick up the soundings.

In addition to the water chemistry, plankton tows were also run. A Kemmerer sampler volume of water taken in the epilimnion was allowed to pass through a phytoplankton funnel of small mesh. The sides were then rinsed down with demineralized water and the sample preserved in formalin. A zooplankton tow was also run in the morning. A zooplankton net of wider mesh was pulled approximately 1m under water, from the back of the boat at constant speed for 5-10 minutes.

The contents of the small bottle at the end of the net were preserved, again in formalin, as was the material rinsed from the sides with demineralized water.

This same tow was run again after dark, between 10:30 and 12:00 at night, for the same amount of time as in the morning tow. This sample was also preserved.

The plankton were analyzed the following week to determine kind and number. A specific volume, as determined by the Sedgwick-Rafter cell, was studied under 10x-20x power for a contrast lens microscope or the regular monocular microscope. A Whipple disc was used as a grid system in the ocular microscope. Three passes were made, for a minimum of 10 squares, to determine distribution of the plankton species. All planktonic organisms were counted in both the phytoplankton and zooplankton samples.

In passing over the lake, a brief study of the shoreline was recorded. Knowing the names of only a few tree species, the contrast was made in terms of whether or not conifers were present and whether or not a bog mat was evident.

The presence and variety of macrophytes, emergent or otherwise was also noted, though again, the names are not known. Periphyton samples were taken in some cases by scraping off material from rocks, water lilies, docks, etc. A psammon sample was taken on some lakes along with using an Ekman dredge, but neither sample contained any recognizable species.Also in some lakes any invertebrates or insects found in or about the water were collected for later identification.

A dichotomous key was available in several texts for identification purposes. Among the texts used were A Guide to the Study of Fresh-Water Biology by Needham and Needham, and Taxonomic Keys by S. Eddy and A.C. Hodson. The first was used chiefly for the phytoplankton along with several more specialized texts supplied by the director. The latter was especially helpful in keying out the zooplankton and any other animals found in the lakes. Other texts were used in this area as well, again supplied by the director. Another text used during the two weeks from May 30th to June 11th was the Handbook of Common Methods in Limnology by Owen T. Lind.

Inkpot

Samples from Inkpot were taken on May 31st. The previous day it had been raining heavily. Wind velocity was very high across this small fairly open lake. Temperature was cool and the sky cloudy. At night it was still windy though not as bad, and the temperature was lower.

Along the shoreline was a large quantity of conifers interspersed with a variety of deciduous trees, and some questionable hemlock. The hemlocks were dying in great quantity, having been the primary tree around the edge. The lake itself was strewn with fallen trees of this variety. To the left side, facing into the lake was a bog mat of low shrubs leaving a small open area. Otherwise the trees came right to the edge of the lake. One side of the lake was wide open, where it faced into the very large Plum Lake, of great fame. The force of the wind across Inkpot was greater than would be expected for such a small lake, nearly surrounded by trees.

In terms of macrophytic growth, the primary source was the yellow flowered water lily found just in front of the low bog shrubs, and also close in near the dock.

Inkpot is suppose to have inlets from Moccasin Lake and from there flow into Plum. The inlets were not readily noticeable possibly due to the drought conditions of this spring. The culvert leading from Inkpot to Plum was however more formidable though the water in it was quite low.

Inkpot as its name inplies, is a relatively darkly stained lake though by no means as dark as any one of the bogs.

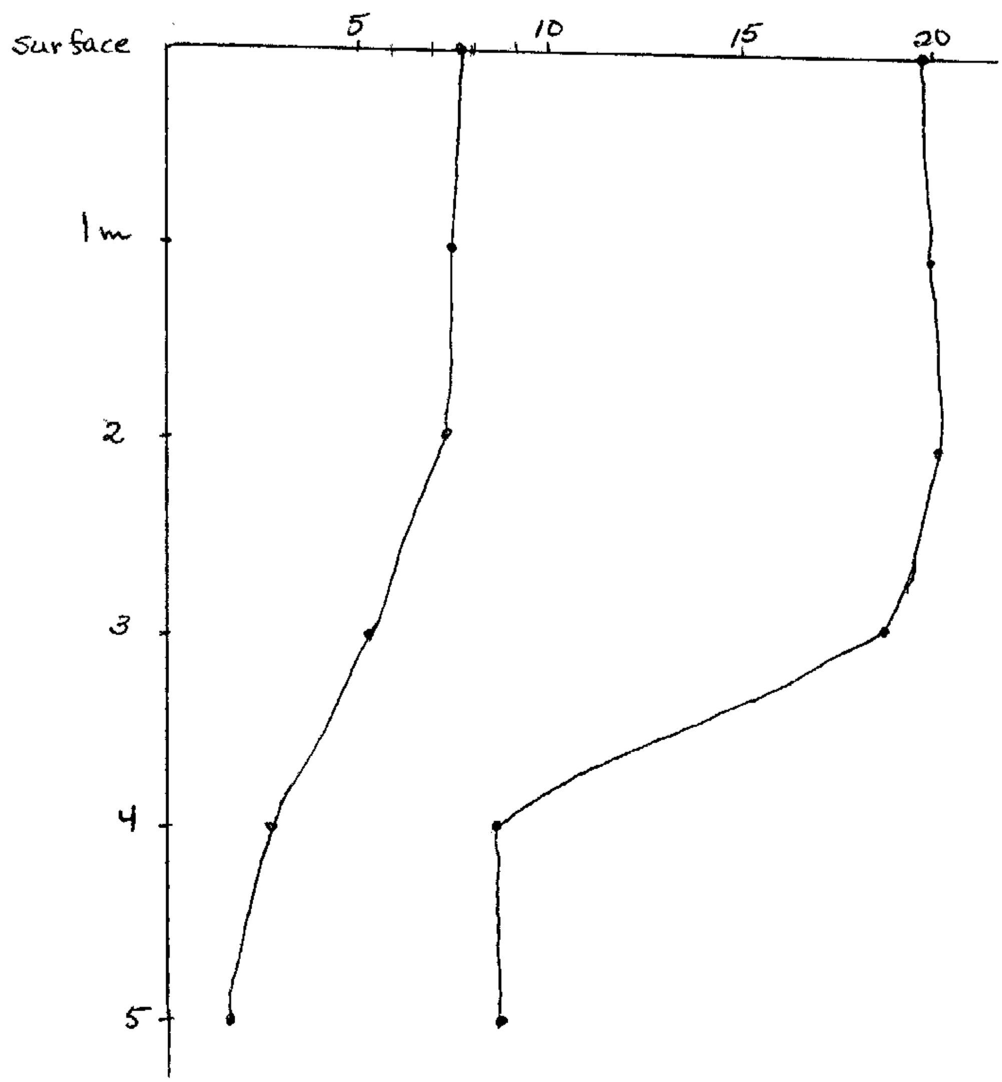
In running the sulfate test, there were no problems with color affecting the results as we experienced with Hummingbird Lake.

We did experience difficulty with our phosphate readings. The first total phosphate readings showed such great discrepancies that it was advisable to run another triplicate test the next day. However, due to a lack of communication the samples had been left out during the night. Our readings showed less variation but in comparison to our first attempt it was quite evident that something had been going on. The epilimnion sample showed a considerable increase in total phosphate while the hypolimnion showed a decrease. Total phosphorus is a measure of both organic and inorganic phosphorus in the lake. Much of the phosphorus in a lake is found in the organic form bound to both living and dead particulate matter. Depending on the condition of the water sample after warming to room temperature and depending on the organisms available for uptake and release of phosphorus a specific change will occur. The value for orthophosphate in the epilimnion was lower than in the hypolimnion, a not uncommon situation once stratification has set in. This would also indicate that phosphorus had been taken up by the greater number of phytoplankton of the epilimnion. Phosphorus is measured by changing it to orthophosphate. Otherwise phosphorus is bound in many forms by metals such as Al or Fe or by living organisms which have a tremendous capacity for absorbing and using phosphates. It would appear that in the epilimnion, refrigerating and then warming of the lake sample created a situation where more phosphate was released and could be measured. Phosphorus is released through the decaying process rather rapidly, but I wouldn't think the time or the material would have been present in great enough quantity in our water samples. No test for determining the phosphate content of a lake is able to measure the total amount since it does appear in more than one form.

Although we didn't solve the problem of discrepancies in values for total phosphate, it still was interesting to see what effect leaving a sample out could make. As near as we could tell there were no other problems with the tests. The epilimnion and hypolimnion were usually different, but not extremely so as would be expected in a fairly shallow lake. In general the data seemed consistent.

Inkpot

	Temperature (°C)	O_2 ppm
Surface	19.9	7.85
1 m	19.9	7.75
2 m	20.0	7.70
3 m	19.1	5.80
4 m	9.5	2.70
5 m	9.5	1.60



Inkpot

Water Chemistry

	Epi.	Hypo.
Methyl Orange Acidity (as $CaCO_3$)	0 mg/l	0mg/l
Phenolphthalein Acidity (")	10 mg/l 12.5 mg/l	15 mg/l 12.5 mg/l
Alkalinity (as $CaCO_3$)	50 mg/l 50 mg/l	65 mg/l 70 mg/l
Apparent Color (445 nm)	50 units	45 units
True Color (in units of true color)	40 "	30 "
Calcium Hardness (as $CaCO_3$)	40 mg/l 45 mg/l	60 mg/l 55 mg/l
Total Hardness (")	70 mg/l 70 mg/l 75 mg/l	90 mg/l 80 mg/l 85 mg/l
Nitrate (as mg/l Nitrate/N_2)	.4 mg/l .4 mg/l	.25 mg/l .30 mg/l
Phosphate:		
Ortho (as mg/l phosphate)	.075 mg/l .155 mg/l .140 mg/l	.22 mg/l .055 mg/l .235 mg/l
Total (")	.075 mg/l .145 " .225 "	.07 mg/l .11 " .72 "
Second Try	1.30 " 1.20 " 1.30 "	.08 " .09 " .13 "
Specific Conductivity	105 μMhos/cm	140 μMhos/cm
Sulfate (as Sulfate)	8 mg/l 9 mg/l	6 mg/l 8 mg/l
Samples taken at:	2 m	4 m
pH	6.7	6.75

Inkpot

Phytoplankton
(per liter lake water)

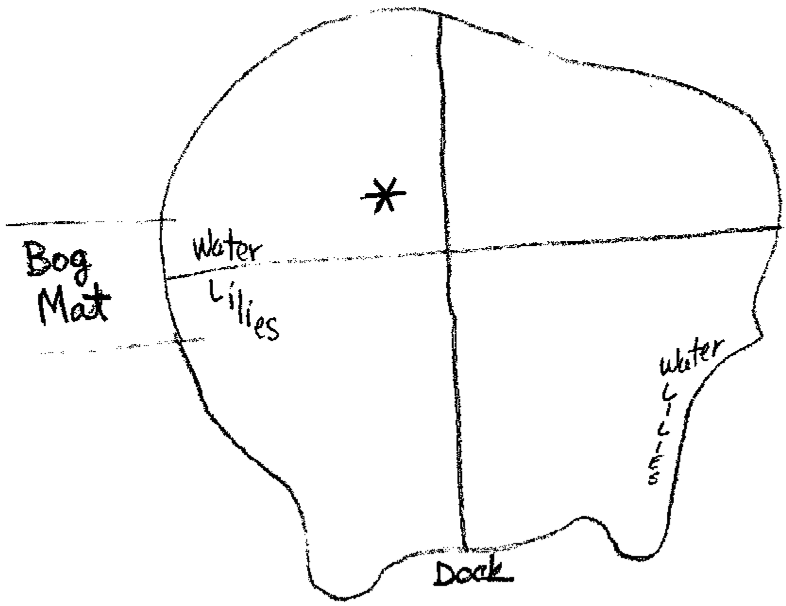
Green Algae:	Scenedesmus	49155/l
	Ulothrix	5655/l
	Protococcus	8265/l
	Chlorella	9570/l
	~~Unknown~~	435/l
Diatom:	Asterionella	10^5/l
	Nitzschia	435/l
	Fragilaria	2175/l
B-G Algae	Anabaena	7395/l
Desmid	Staurastrum	870/l
	Gonatozygon	435/l
Protozoan:	Peridinium	33060/l
	Ceratium	2610/l
	Dinobryon	10^7/l
	~~Unknown~~	1305/l
Rotifer:	Ploesoma	13485/l
	Polyarthra	10875/l
	Keratella	6960/l
	Kellicottia	435/l
	Trichocerca	870/l
Copepod:	Nauplius	2610/l
	Cyclops	1305/l
Cladoceran:	Bosmina	435/l
	Ceriodaphnia	435/l

Zooplankton
(per Sedgwick-Rafter cell)
(5 min. tow)

		(262 ml) Day	Night (267 ml)
Cladoceran	Bosmina	64/ml	3072/ml
B-G Algae	Anabaena	14912/ml	12288/ml
Protozoans	Dinobryon	1.3×10^6/ml	1.7×10^6/ml
	Peridinium	768/ml	896/ml
Diatom	Asterionella	—	4160/ml
Rotifer	Asplanchna	64/ml	—
	Asplanchnopus	640/ml	1664/ml
	Trichocerca	960/ml	256/ml
	Keratella	256/ml	1024/ml

Inkpot

* Samples Taken Here



The depth profile for Inkpot seems to have been misplaced. From my recollection it was shaped like a bowl. From the dock out, it dropped off rather rapidly reaching a maximum of 5m. This same basin shape was true going the other way as well.

Roach

One of the most noticeable characteristics of Roach Lake is the clearness of its water. It is a large lake with two bay-like areas, one fairly shallow. The day we took our samples, May 30th, the weather was unfavorable. It rained for a good part of the morning and was rather cold. At night it was only lightly raining, but the fog was very thick. It made the shoreline barely visible. Around the edge the primary, recognizable tree was the birch. Conifers were virtually absent from the thick woods surrounding the lake. Like Inkpot, one corner of the lake gave way to low shrubs, indicating the presence of a bog. The lake also supported two small islands and near to one of the islands was a mat similar to a patch of closely cropped lawn. The shore itself alternated between sand and gravel in shallow areas, and decaying vegetation, leeches and mud in deeper areas. The depth profile indicates that in very deep areas the bottom is much firmer. From our tracings it appears to be no deeper than 35 feet. At the mouth of the smaller bay, for a considerable distance out, was a surprisingly shallow, gravel area. The second, larger bay was deeper than the first, though to what extent we were not certain.

The macrophytes of Roach Lake are of three types. Easily recognized was the yellow flowered water lily, found in several areas. Another one was a small green plant with three leaves similar in shape to  This plant was also found out of the water, but in a less elongated form, similar to the cyclomorpho-sia Ceratium. The third form was very grasslike, not matted but long, thin blades, the tops of which floated on the water.

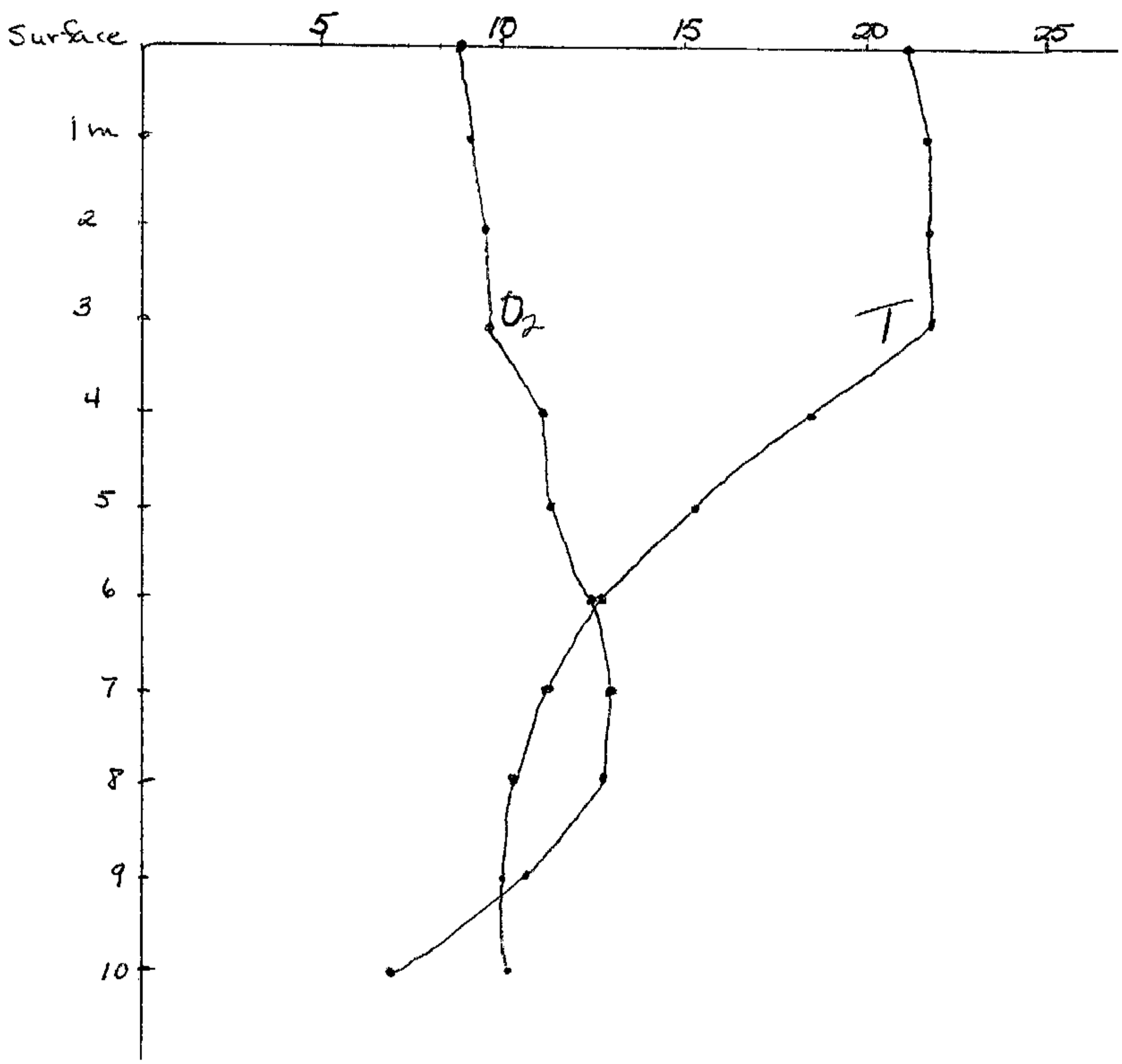
This form was even more numerous than the water lilies.

The lake is large, clear and ideal for swimming. Its size creates favorable strong winds, even though the surrounding trees are thick and protective. This lake is however twice as deep as Inkpot, so the wind would not have as great an effect.

In running the chemistry tests on Roach, our main problem was with alkalinity. Our initial pH reading had given a value of 6.8 for the epilimnion so it seemed inconsistent to be getting a zero alkalinity reading. After trying several variations on the test with still no results, we redid our pH with a more accurate meter and obtained a 4.8 reading. The test can not be used for such a low pH, since the indicator doesn't measure that far down. The only conclusion is that the alkalinity is zero. The other tests caused no problems. Again the epilimnion and hypolimnion were usually very close in value for all the tests. The data seemed consistent.

Roach

	Temperature	O_2
Surface	21	8.6
1 m	22	8.7
2 m	22	9.3
3 m	22	9.3
4 m	18	11.1
5 m	15	11.2
6 m	12.5	12.4
7 m	11	12.6
8 m	9	12.5
9 m	8.5	9.6
10 m	8.5	6.7



Roach

Water Chemistry

	Epi.	Hypo.
Methyl Orange Acidity (as $CaCO_3$)	0 mg/l	0 mg/l
Phenolphthalein Acidity (")	25 mg/l 30 mg/l	25 mg/l 27 mg/l
Alkalinity (as $CaCO_3$)	0 mg/l	0 mg/l
Apparent Color (as units of true color)	7 units	7 units
True Color (") (445 nm)	2 units	2 units
Calcium Hardness (as $CaCO_3$)	5 mg/l 5 mg/l	5 mg/l 5 mg/l
Total Hardness (")	10 mg/l 10 mg/l	10 mg/l 10 mg/l
Nitrate (as mg/l Nitrate/N_2)	.5 mg/l .6 mg/l	.5 mg/l .5 mg/l
Phosphate:		
Ortho (as mg/l phosphate)	.045 mg/l .035 mg/l .215 mg/l	.045 mg/l .040 mg/l .055 mg/l
Total (")	.22 mg/l .32 mg/l .51 mg/l	.24 mg/l .23 mg/l .00 mg/l
Specific Conductivity	17.6 μMhos/cm 17.9 "	17.6 μMhos/cm 17.9 "
Sulfate (as mg/l Sulfate)	17 mg/l 16.5 mg/l	7 mg/l 6.5 mg/l
Samples Taken at:	2 m	8 m
pH	4.8	4.8

Roach

Phytoplankton
(per liter lake water)

Desmid:	③ Closterium	23200/l	② Volvox
Diatom:	① Asterionella	20000/l	⑤ Fragilaria
Green Algae:	Unknown	15200/l	
Protozoans:	⑥ Peridinium	162400/l	
	Dinobryon	1.5×10^6/l	
Rotifer:	Unknown	2400/l	
Copepod:	Nauplius	800/l	

(187ml) Zooplankton (Day)
(per Sedgwick-Rafter cell)
(10 min. tow)

Diatom:	Asterionella	2560/ml	
Protozoans:	Peridinium	18176/ml	
	④ Dinobryon	10^6/ml	
	② Ceratium	1536/ml	⑨ Cyclopoid
Rotifer:	Keritella	192/ml	
	Trichocerca	320/ml	
Copepods:	Osphranticum	128/ml	
	Questionable Osphranticum	256/ml	
	Orthocyclops	448/ml	
	⑥ Eucyclops	640/ml	① Asplanchna
	Limnocalanus	64/ml	
Cladoceran:	⑧ Diaphanosoma	64/ml	
	⑦ Bosmina	320/ml	Brachionus

Ceriodaphnia

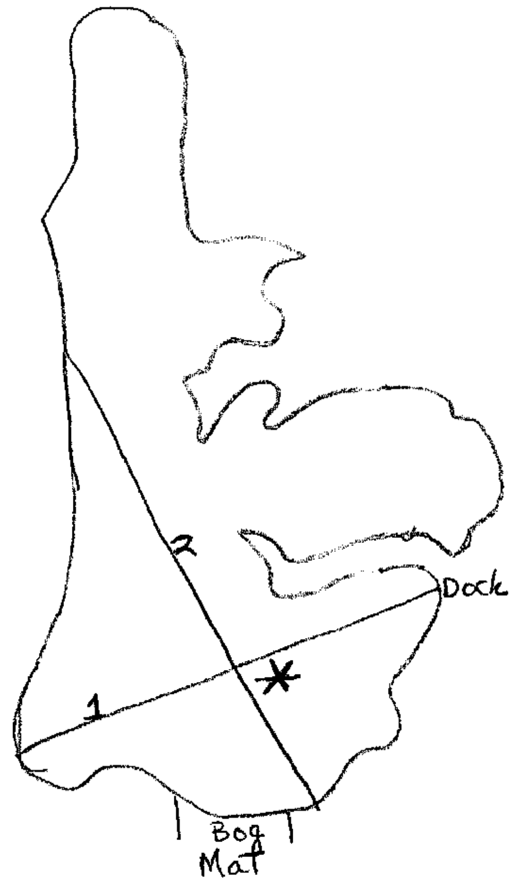
Roach

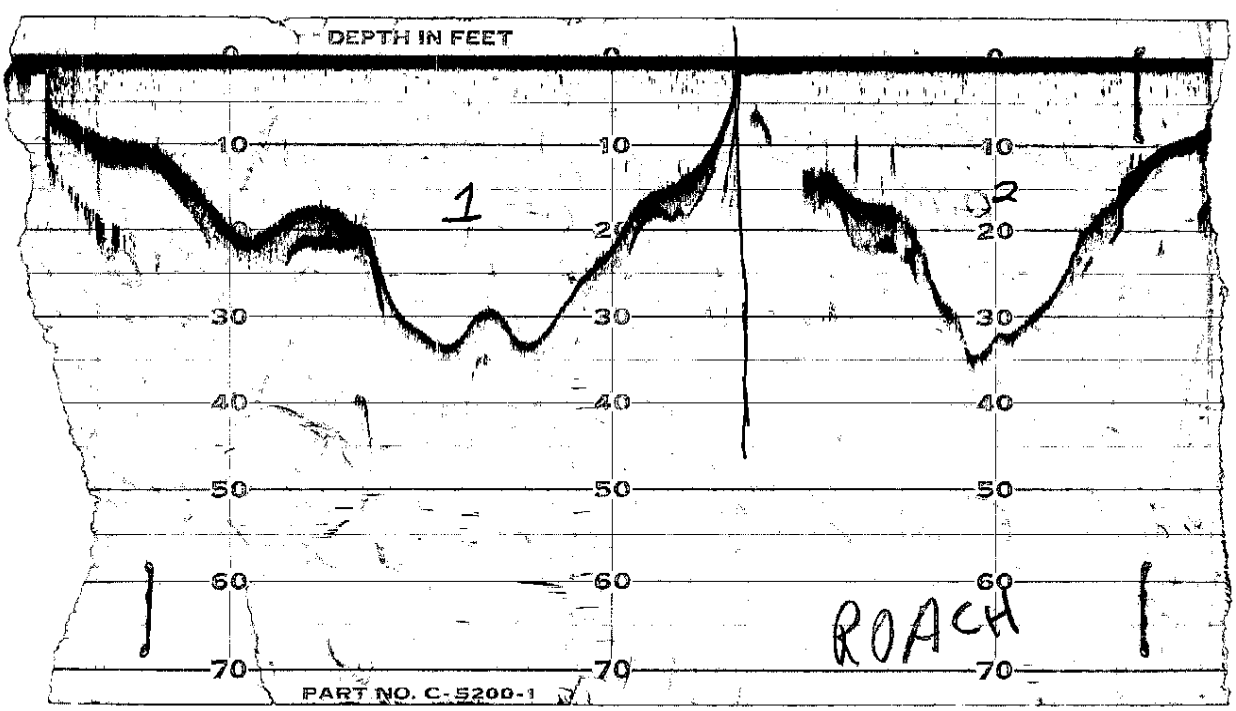
(165ml) Zooplankton (Night)
(per Sedgwick-Rafter cell)

Diatom:	Asterionella	256/ml
Protozoans:	Peridinium	9152/ml
	Dinobryon	10^5/ml
	Ceratium	128/ml
Rotifer:	Keritella	704/ml
	Trichocerca	256/ml
Copepod:	Osphranticum	128/ml
	Questionable Osphranticum	320/ml
	Eucyclops	128/ml
	Cyclops	882/ml
	Nauplius	320/ml
Cladocera:	Bosmina	3776/ml
Ostracod:		320/ml

Roach

* Samples Taken Here





Discussion

Originally this comparison would have been made of Roach and Plum rather than Inkpot. Plum was, I gather, almost a perfect opposite to Roach. Since Plum was unavailable I shall see what Inkpot, a lake which flows into Plum , has to offer.

In an overview, both Roach and Inkpot shall be assumed to be low productivity lakes. In Roach this is more easily seen. The lake itself is very clear, indicating that an algal bloom as we found in Tenderfoot, would not occur here. The phytoplankton in a lake is at the bottom of the food chain, and their quantities determine to a great extent the characteristics of the lake. A low algal concentration indicates a low zooplankton population which in turn affects the planktivores. In our zooplankton and phytoplankton tows it is evident that Roach has only a few plankton representatives. The phytoplankton is poorly represented by only Closterium and Asterionella. What is seen in great quantities and heavy densities are the protozoans or dinoflagellates- Peridinium and Dinobryon. The presence of flagellated forms indicates predation pressure. The advantage of motility has shifted the plankton community from a non-motile form. When the predation pressure is low and with the right light, temperature and turbidity you will often see in larger quantities the unicellular greens. An increase in the numbers of zooplankton very often shifts a unicellular community to the colonial form. Asterionella has a star-like shape, which makes ingestion more difficult. Dinobryon is also found in colonial form. In Roach the Dinobryon colonies were smaller, averaging between 7 and 13 per colony. Each individual cell was larger than the Dinobryon cells found in Inkpot. Inkpot Dinobryon had much larger colonies, averaging 30-50 cells per colony, and each cell was small.

The unknown green algae found in the phytoplankton sample of Roach was a long filamentous form. This too is an advantage under high predation pressure. In the zooplankton tow, we see yet another protozoan. This is the cyclomorphic Ceratium which grows long spines when the pressure gets too great. It is this cyclomorphic form that is found in Roach Lake. Both Ceratium and Peridinium are known to be more tolerant of varying chemical characteristics. As a conseqence they are found nearly everywhere.

In summary, looking at the phytoplankton community, we see primarily colonial or filamentous forms. Some of the flagellated protozoans can migrate diurnally if necessary, and in general they all have the advantage of motility as an escape mechanism. The phytoplankton seem then to indicate a high predation pressure.

Except for Dinobryon however, their numbers are not great. It may be this factor, rather than that the zooplankton are in large numbers that accounts for the high predation pressure. A low productivity lake could give rise to such a situation.

A look at the nutrient levels of Roach lake shows low phosphate levels. Phosphate is very often the limiting factor in a lake system. It is the addition of phosphate which creates the algal blooms seen as pollutants in Hypereutrophic lakes. Even in non-polluted waters phosphate can reach levels of greater than 200 mg/l. Usually in natural waters that are yet uncontaminated you would see 10 to 50 μg/l P. Wetzel in his text Limnology has developed a table that describes lakes by their phosphate levels. A value of 30-100 μg/l total phosphorus would define a eutrophic lake. Greater than 100 μg/l total phosphorus is termed hypereutrophic. From this evidence it is likely that Roach is not limited by its phosphate content.

The truth of this depends on whether we can trust our phosphate reading. So much can affect these values, and it would be more consistent to find Roach limited by phosphate.

Another possibility is that nitrogen is limiting, but this is not nearly so common as phosphate limitation. A good indication of low nitrogen is the presence of N-fixing blue-greens. The blue-greens in general do better under low nutrient conditions. There are no blue-greens present in this lake however. Roach nitrate levels are only half as much as in Tenderfoot, and the sulfate levels are considerably higher. Even phosphate levels are close to that of Tenderfoot lake. Tenderfoot we determined to be highly productive.

So, since nutrients seem to be limiting, we should look at some other data. The pH of Roach lake is 4.8. This is an important consideration. Seeing such a low pH, one should look next at the hardness and hence the buffering capacity of Roach lake. The buffering system is primarily based on bicarbonate. In our test for alkalinity we were, in effect, testing for the bicarbonate and $CaCO_3$ alkalinities. Roach lake gave a zero alkalinity reading. The total hardness fell, according to Wetzel, in the range defined as oligotrophic. In effect, Roach lake seems to be poorly buffered. At a pH of 4.8, one will find primarily free CO_2. Without the bicarbonate and carbonate ions to help neutralize any addition of acid, the pH of the water will continually change. Two years ago the pH was recorded at 5.0. Acid levels become dangerous at levels below 4.5. This is seen clearly in bogs. Most organisms thrive best under conditions of higher pH values and higher Ca hardness levels. Desmids are able to grow in acid water and in Roach lake they are represented by *Closterium*.

The low specific conductance upholds the theory that Roach contains few ions. A clear, oligotrophic lake would exhibit a low specific conductance since it wouldhave a high resistance.

So we see a very soft water lake with a very poor buffering system, no alkalinity, and hence a poor receptacle for the maintenance of algal populations. Roach is then an example of a lake with available nutrients, but the chemistry of the water prevents maximum utilization of these resources.

The next thing is to look at the zooplankton which would feed upon the phytoplankton community. Roach is a fish lake, a factor which has an immediate effect on the zooplankton population. Fish tend to choose the larger zooplankton, primarily copepods and cladoceran. The zooplankton density is fairly small with the highest numbers found to be the smaller rotifers and Bosmina. Yellow Perch is found in Roach lake, and it is known that they are unable to remove zooplankton smaller than 1.3 mm. In a fish lake one usually sees a greater quantity of rotifers than the larger cladoceran and copepods. In Roach there seems to be a large number of copepods as well. This may be due to the quick, jerky movements of the copepods which makes them harder to catch than the slow moving cladoceran. Bosmina is one of the smallest cladoceran so its presence is understandable.

Vertical migration is best exhibited by the cladocerans. In response to predation pressure, they will spend the daytime down near the substrate where the light is poor, and at night, they will migrate upward, again under the cloak of poor visibility. In the night zooplankton tow on Roach lake, this migration is quite evident in Bosmina. Its density jumped dramatically to a high nightime level. The distribution of both the rotifers and the copepods was generally the same as in the day.

An interesting factor of such a clear lake is that the light intensity is greater farther down. In taking our temperature and O_2 readings we noticed an increase in O_2 at a fairly deep level. This data was taken twice primarily because the first O_2 meter was working poorly. In both, however, we saw this low bulge. The plankton must be staying lower down, below a deep thermocline either because of the temperature or light intensity or both.

I began this section with a statement that Roach and Inkpot both seemed to be low productivity lakes. This was true with Roach, but it may not be true with Inkpot.

Inkpot, unlike Roach, is a fairly dark lake. Its true color is 30-40 units as opposed to Roach's 7 units. Organic debris is often responsible for the dark color in lakes. Decomposing matter is often a good indication of productivity.

The nutrient levels, like those of Tenderfoot and Roach, are high. The phosphate levels are too high to indicate a limiting factor. Sulfate falls within the same limits of the other two lakes leaving only nitrates as questionable. I was unable to find any sort of value for determining whether nitrate is limiting

X at values around .3 mg/l Nitrate/N_2, so again the criterion is the presence of N-fixing blue-greens. The only blue-green algae present in Inkpot is Anabaena, and Anabaena is known to have a N-fixing capacity. Its numbers are however so small, and the added presence of so many forms of green algae, would indicate that nitrogen is probably not limiting.

The next step is to look at the buffering capacity. Inkpot has a pH of 6.75, a value well in the range of a well buffered lake. Its acidity is lower than Roach and in accordance it has a much higher alkalinity level.

From this test it was seen that Inkpot has a sufficient amount of $CaCO_3$ and bicarbonate for the maintenance of life. Its ability to neutralize acid input, keeps balanced the inorganic carbons of the system. Compared to Tenderfoot, the alkalinity of Inkpot is from 10-20 mg/l $CaCO_3$ greater. The hardness, both Ca and total, is also greater in Inkpot than in Tenderfoot. From Wetzel 25 mg/l $CaCO_3$ for a hardness value is considered to be a eutrophic lake. Specific conductance upholds this claim. For all these categories, the hypolimnion has higher values than the epilimnion. The nutrient levels of the hypolimnion seem to be lower however. Inkpot is a small, relatively shallow lake, a maximum of 5m, only half as deep as Roach. Although the surface area is small, the fetch is great, primarily because it opens on to Plum. Turnover and continual mixing would prevent a build up of nutrients in the lower layers. Although from the temperature data the lake does appear to be stratified, the hypolimnion to epilimnion ration is fairly low. It exhibits a low, sharp thermocline, and a resultant drop in O_2 around 3-4 meters.

The size and shape of the lake is often an indication of how productive a lake may be. A deep lake with a minimal littoral zone is often a low productivity lake, as opposed to a shallow lake with a wide littoral zone.

From the chemistry then, it would appear that we have a relatively productive lake, similar in many ways to Tenderfoot. Does the plankton community uphold this statement?

Inkpot has a much greater variety of planktonic species than does Roach. There is a considerable number of green algae, a form that does best when the nutrient levels are high. Scenedesmus is in greatest quantity among the green algae. In the

Diatoms we see a large number of Asterionella and a few Fragilaria. Again, this is the pattern used to avoid predation. The protozoan representatives are identical to those found in Roach. All flagellated forms have an added advantage against predation. The Dinobryon species found here is different from that found in Roach, as I described earlier. Wetzel claims that some species of Dinobryon are adapted to low phosphorus lakes, and some to high. In this case both lakes have fairly high phosphorus levels. In general the variety and density of the phytoplankton population is greater than Roach.

Inkpot is also a fish lake. It exhibits even better the effects fish can have on the zooplankton population. Here we see rotifers, Bosmina and other small Cladoceran, and only the Nauplii of the Copepod. In the zooplankton tow, only rotifers and Bosmina are present. This lake, being considerably smaller, probably has a more effective fish population than Roach. The variation between the night and day zooplankton tows again shows that the Cladoceran are inclined to vertical migration. Although they haven't really been able to determine whether or not the rotifers do migrate vertically, it would appear from Inkpot data that they do have that tendency. It is not seen in the same degree as the Cladoceran migration, however.

And so my initial statement was wrong. We seem to have a low productivity lake opposing a fairly productive lake. In appearance the two lakes are quite different, but it is a study of the chemistry and plankton communities which proves this fact. This then proved to be not a comparison but rather a contrast of two lakes - Roach and Inkpot.