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Abstract

This is a journal of field notes by Dr. Charles M. Breder Jr. written during his fieldwork from 1930 to 1935 primarily in Nassau, Bahamas and N.E. United States. The writing details Dr. Breder’s observations of behavior and mating patterns of various fish, with focus on *Exocoetidae*, *Esox*, *Lepomis*, and *Perca*. Breder documents performing similar studies in the Dry Tortugas. His findings show population differences in many common species that might be related to storms and bad weather in many different spawning grounds. Dr. Breder also catalogs an extensive amount of air and water temperatures at all locations.

Introduction by Madelaine Verbeek

This publication is a collection of transcribed field journals of the ichthyologist Charles M. Breder Jr. The journals are part of Mote Marine Laboratory’s Arthur Vining Davis Library and Archives’ special collections. The collection and its digitization are intended to preserve Dr. Breder’s work, as well as make it more accessible.

The following journal covers Dr. Breder’s research in Nassau, Bahamas and N.E. United States during 1930 to 1935. Dr. Breder’s detailed accounts of his experiments and findings provide an invaluable resource to ichthyology. Additionally, Dr. Breder’s personal descriptions of his time in these areas present an illuminating window into Dr. Breder himself.

The primary focus of this journal is on Dr. Breder’s observations of behavior and mating patterns of various fish, with a focus on *Exocoetidae*, *Esox*, *Lepomis*, and *Perca*. Additionally, Dr. Breder describes the photographs and film footage he took of the schools. These resources can also be found in the Arthur Vining Davis Library and Archives’ special collections.

Diary and Transcription

The handwritten diaries of Dr. Breder’s field activities were written in a bound blue notebook in pencil and ink.

The diary was transcribed by hand. Indecipherable entries were noted with “[?]”. Numbers outside the margin of the transcribed text are the page numbers of the original notebook.
The scientific names used in the diary are sometimes different from currently accepted ones. Current accepted names are provided in the footnotes.

REFERENCES


ACKNOWLEDGEMENTS

The editor wishes to thank the Breder Family and the staff of the Mote Marine Laboratory for their assistance. This projected was funded by the Arthur Vining Davis Foundations.
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\(^1\) Written on the journal’s inside cover page.
Trip to Nassau, Bahamas.
1930

Representing American Museum Natural History and.
New York Zoological Society
Guest of Mr. Daniel Bacon at Long Cay.

Feb 7
Cast off Pier 3, Hoboken 4:15 p.m. Heavy fog and light breeze, continued outside of harbor. Sea dead calm. By 9:30 fog lifted and full speed ahead. Moon peeping out through light clouds. Air chilly and damp. Although this ship, S.S. Munarga (?) of the museum line is under U.S. registry the bar is open. Any kind of liquor may he attained by getting a “prescription” from the ship’s doctor which may he had fun the asking. Bar opens 12 miles out.
Turned in 10:00 p.m.

Feb 8
Turned out 8:00 a.m. a fairly heavy sea running with a cold rain. A school of six Tursiops\(^2\) truncatus off port now. Strong south west wind, rain letting up and sun peeping out in streaks. Saw some dark objects flipping at surface about the size of flying fish, may have been young. Rays on large nudibranchs but this is a little far north for either at this season. Gulls abundant. Sun appeared later but hazy and visibility low. Position at 12:00 35º 44’ N, 75º 00’ W, 285 miles from New York. Cause a straight line from Sandy Hook light to Nassau light. Made observation No 1 at 12:40. Air still chilly with a strong breeze. Water still green. Announcement states “enter Gulf Stream about 2:30 (just after passing Diamond Shoal), leave it about 10:00 p.m.” Then outside of the stream praker [?]. Gulls disappearing. Nothing noted seize Porapises [Parexocoetus or Prognichthys?] were seen.
Made observation No 2 at 2:10 p.m. Water still green but with a little bluish tinge. No Exocoetidae as yet. Passed Diamond Shoal light ship 2:30 exactly. Water getting bluer- first piece of Gulf weed seen 3:05.
Wind shifted, more coming from north west- colder. Made observation No 3. Saw but one Exacaetic\(^3\), with dark pectorals and a green body but could not get a good view, just out and in again. On lee side. Gulf mud sparing [?], in wind rows of scattered pieces, all very small. Sea becoming more labored, with a good roll to the ship.
Wind still fushee [?] and hearin [?] seas. No gulf weed on observation No 4 and no life at all except the gulls which still cling to ship. Never saw the Gulf Stream so barren of life- just clear blue water.

---

\(^2\) Accepted genus: *Tursiops*
\(^3\) Accepted genus: *Exocoetidae*
This spot in the stream formally always yielded the largest *Exocoetid*\(^4\) counts, but in warm weather. It seems clear that the gulf weed and *Exocaetids*\(^5\) here are associated. See observations 3 & 4. Likely the same factors control hath. With the shrinkage of the Sagassa [Sargassum?] sea (see government charts) in winter probably the flying fishes range also shrinks to similar dimensions. If this is true then one should expect higher profatianal \(\) counts when we cut out of the Gulf Steam Tomorrow. Sun nearly ready to set at end of observation period 4 but so obscured by heavy clouds as to be uncertain as to its position. Weather very inclement still verging on overcast- even then much more pleasant indoors.

Cleaned off somewhat and warmed up a hit after dark. Turned in 10:45 p.m.

Feb 9. Turned out 8:00. Warmer, wind from south east.

Gulf weed common but irregular in occurrence. Some large patches of dense weed and long wind comes \(\) of small fragments- then long stretches of clean water. The *Exaeaetids*\(^6\) of observation no 5, apparently *Paexoeaetus*\(^7\) seemed to have difficulty getting up and then plunged immediately again. The wind is faintly strong but the cool temperature may have something to do with it. The gulls which had been following us up to last night (Herring gulls) are gone this a.m.

Few *Exaeaetidae*\(^8\) as yet- all *Pouxaeuates*\(^9\), fly extremely short distances. Gulf weed erratic in occurrence. Getting warmer but breeze still stiff.

Position 12:00 noon. 29º 30’ N, 76º 17’ W.

670 miles from N.Y.

Between 12 and 1 noted a number of *Exoeaetids*\(^10\) on windward side, nearly all *Paexoeaetis*\(^11\), a few 4-winged types and a *Halncypselus*\(^12\). Some of the 4-wings with dark pectorals and not more than 3” long. Saw a deep golden *Carangid* about a foot long.

Sp?

During observation No 7 one of the flying fish recurved on wind and crashed into side of ship. The wind is a little abotid \(\) and the flights average somewhat longer.

There is practically no hydroplaning as the strength of the wind lifts the fish at once on emergence.

\(^4\) Accepted genus: *Exocoetidae\)
\(^5\) Accepted genus: *Parexocoetus\)
\(^6\) Accepted genus: *Halocypselus*\)
By the time observation no 8 was made we had gotten into real flying fish territory, although the air was still chilly. May this mud, in addition to the wind have something to do with their short flights? The Cypselurus (with dark wings) of the lee side also crashed into the haul. Observation No 9 made as sun set. (disappeared 5:52). Fawn [?] Cypselurus? Had dark wings (pectorals) with a distinct light edging like bahiensis of the Bingham collection. Cooler again with the sun setting. Sky rapidly clearing of clouds, weather becoming more mild. Turned in 10:00 p.m.

Feb 10. Turned out 6:00. At anchor off Nassau. Ducked by 8:30, met Mr. Bacon & work. Visited town, and looked market over. Large Albula vulpes there for sale. Otherwise just the usual species. Arrived at Long Cay by 1:00 on the Escape. Spent most of the p.m. fixing up a laboratory in the boat house- very satisfactory. Took water samples off the Cay at the boats anchorage (#1 & #2). High water. Stated to repair the gill net for night use but darkness overtook too rapidly for a decent job. The CO₂ sample turned pink on the addition of phenolphthalein indicating a complete absence of CO₂. Analis common, deliberately jump on people and allow them to carry them around. Quite fearless. Had all the apparatus in readiness for work. Turned in 9:45.

Feb 11. Turned out 7:00 len [?] packed the “Divinlood” [?] and got fishing tackle ready in am. Took diatom sample # 1. Visited the reef on the north end of the island. Saw much of the usual reef stuff. Diademas and sea scorpions especially common. Saw a small Gynathorax occulalies¹³. Sabruis [?] saporaton [?] common. Had a Gobiesox sp. Bright maroon red with white makings. These colors very chargeable. (Preserved). Took some photos of reef life. Chitons very common. Found [?] are eaten and by Octopus according to Johnson, the cloud guide. Near the reef we saw a few small Strongylura leaping. On our return some fishermen were sieving off the boat landing. They reported getting little, but had 2 Strongylura raphidona [?] in their net which we preserved.

¹³ No such genus and species; possibly means Gymnothorax ocellatus
These probably represent the sizes taken at Tortugas last summer in the winter season.

Later they returned with a number of large *Caranx crysos* and a single *Strongylura acus* (preserved).

Did some tow netting in the channel.

See Chart (Tow #1). Plankton is rather thick. Made a preliminary examination of the fish eggs and got 2 species, one an elliptical form similar to the Tortugas specimen but with light pink oil glands.

These were dark loosely spawned last night. The others were in their early cleavages and had evidently been spawned only shortly before being taken.

Set the gill net just before dark.

See chart.

Turned in 9:45.

**Feb 12**

Turned out 7:30- Gill net absolutely empty! Untouched!

Spent the morning working in the laboratory on eggs etc. The plankton in most cases is still alive in finger hauls. This stuff seems to line unusually well. Mrs. Bacon & Eak went to town for supplies etc.

Took a tramp through the island and visited the reef again. Made a number of exposures of scenes etc.

The eggs so far collected are common in the following under A, B, C. The pH in the dishes has gone down to 8.1 in less than 24 hours.

(Due to dead plankton organisms?)

In the p.m. visited Noiil [?] Cay- seined with neinnour sein [?]. Catch very poor.


Tried night light but the moon is full and little came about. Saw a few of what might have been *idepatri* (?) *parume* (?). The only other fish were small *erthesina* ?

Turned in 10:30.

**Feb 13**

Turned out 8:00.

Eggs all dead. Spent a.m. getting ready for trip to Berry Island.

Brought gill net in. It held one *Liparis maculatus*, one *Holocentrus adscensionis*, one head of the latter and a large marker of holes where fish went through. Patched for further work. (Preserved catch).

Turned in early. (11:00)
Feb 14

Turned out 6:00.

Started for the Berry Island 9:45. Saw many *Exocoetidae* during the trip. Mostly *Parexocoetus*?

Saw numerous small *Cypselurus furcatus* 2” & lbs. Arrived Whale Key about 1:45. Traveled with *spaur* [?] up and down the coast. Sat [?] a member of strikes and caught the following.

*Sphyraena barracuda* s.l. 620 mm. t.l. 725 mm. ♂ green.

*Mycteroperca venenosa* s.l. 530 t.l. 620. ♀ about halfway ripe. Numerous metallic green parasites in viscera and inside of ovary. Preserved some. Anchored off Frazer Hog Cay about 4:00. Set gill net. Fishermen were seining on beach. They made very small catches about 10 *Caranx* (crysos?); *Culanus* [?] arctifrons [?] only.

This is a very delightful place- somewhat like the Rays off the San Blas erait [?] between Porto Bello and the Gulf

of Darien. Took water samples #6. See chart. While trawling dip netted a small *Cypselurus furcatus*, some size as those taken at Tortugas last year. Spawn all year long?

Tried night light but current was altogether too swift for organisms to hold by.

Tuned in 10:0.0

Feb 15

Tuned out 6:00

Sailed in dary [?] to Whale Key tacking in and about Frazer Hog Cay, Cut [?] Cory [?] and finally landing on an unnamed Cay near the northern tip of Whale Cay called by the natives “Vigilante Cay”. Here there is an interesting form of compacted coral work, laid down like a shale and blacked- (with organic matter?). The layers are horizontal and it suggests a pitch lake. The only fishes seen on this Cay were two small *Cyprinodon*. Although the country [?] is attractive [?] it is exceeding barren of aquatic life. A very pleasant smelling white star shaped flower of small size was in bloom. Saw a “curly-tailed” annelid. A curious little fellow of about 6” that carries his tail over his back in a tight spiral and occasionally unrolls it with emotional

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## Distribution of Exocoetidae

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Factors for division: \((\sum + 2)/2\)

\[ K = \text{Knots} \]

\[ \text{Factor} = \frac{\text{Knots} + 2}{2} \]
Pelagic Eggs.

A About 6 mm. Smooth shell unmarked, pale yellow oil glandule
B Elliptical about 1.6 mm long. Pink oil glandule
C Very similar to “A’ but diameter .8 mm. oil glandule relatively smaller.

Continued from page 9

distances. Photographed. Very tame and evidently curious about us. Had lunch here and then sailed to the month of the creek on Whale Cay and worked up it. In one branch a few fishes were seen, mostly, Gerrids. Etc. On another branch there were Strongylura notatas (about 2 day) from 10” – 18” Got a single specimen. Other fishes in this place as usual but scarce.

Here an Amerira[?] scampered about and another curly-tailed annelid climbed up on the graflex[?]. Photographed. This one had lost his tail but curled his brown colored partly regenerated new one.

After lesing[?] here sailed by Pigeon Cay and then squared away for Thompson Cay. Got too much to the windward (more Cockroach Cay) and not paying any too much attention passed the point of Thompson Cay mistaking it for Frazer’s Hog Cay! By sun down were entirely lost. No moon- little clothes, etc. – no food. Wind died down. After messing around till the moon got up finally made the “Escape” at 1:00 a.m.

See list of fishes.

Had dinner and turned in.

Saw a Parexocoetus – like fish. Pale with an all yellow head in mangrove

Continued from page 9

scrapes.

After all this night activity saw not a single Handfish leap in the moon light. Various land + marsh bird voices could be heard on the Cays at night.

Feb 16

Turned out 8:30

Pulled gill net. It held 1 small Concharheis[?] (preserved) 1 badly[?] eaten Echeneis naucrates and a lot of coral fragments etc. A small Pteryphrene historia came aboard the skiff ¾ “long. Walked over to the far side of Thompsons Cay. Took some pictures of the bay[?] of it. Saw a small Spheroides[?] (2") (spengleri[Spengleri?] ?) analis[?] (brown headed) common.

14 No such genus; possibly means Gerridae
15 Accepted name Strongylura notata
16 Accepted name Pterophryne histrio
17 Accepted name Sphoeroides
In the p.m. did some tailing [?] off Frazer's Hog Cay.

Got 4 *Sphyraena barracuda* (3')
1 *Scomberomorus maculatus* (3')
2 *Epinephelus striatus*

s.l. 540 mm. t.l. 650 mm. ♀ partly developed. Food a digested paste.

Many parasites in organs.
1 *Epinephilus hancrei* [?]

s.l. 470 mm. t.l. 540 mm. ♂ green. A partly digested *Fistularia* in stomach.

Parasites exceedingly numerous.

Rain and wind started. Went back to anchorage. This increased to a gale by midnight.

Feb 17

Turned out 6:00.

Gale still on, seas high. Air temperature 22.0° C, weather too hard to do anything but stand by. By noon it started to about end- the sun come out, wind still fairly high.

In the p.m. the rest of the part [pack?] went ashore, I wrote etc. In the a.m. saw sea hieds [?] through the rain. (Snipe (7), gulls (1), man of war (1)). These are the first seen on the trip. Driven in from the open sea? Took sample #8.

Last night tried the night light again but the current here is far too swift for organisms to hold a position.

Tuned in 9:00. More rain and wind.

Feb 18

Turned out 6:30. Wind but no rain.

Visited both creeks between Thompson and Chub Cays. Got around in first. This craft has too much draft. Anchor brought up a white *Gobiesox.*

Established base in other creek.

Visited a small side creek at low tide. It smelled strong of swamp and took sample #9 there. Spread gill net across opening and then worked seine above it.

Got several *Strongylura notata notata* and a large number of some *Gambusia-*like fish.

In doing this the following got caught in the gill net

Gerres cinereus 110, 110 mm. s.l.
_Eucinostomus gula_ 100, 102, 102, 108, 107, 98 mm. s.l.
_Lutianus apodes_18 115 mm.
_Mugil curema_ 224, 220 mm.

A large shark of some sort was sighted in the main creek.

This is by far the most “fishy” place so far seen here.

On the way over caught a 3’+ Barracuda trolling.

---

18 Accepted name, *Lutjanus*
A rain squall cut short our fishing activities, left the gill net spread on the by [?] mar [?] day [?] creek matched [?] to wait for the rising tide.

Tried the night light. Got 2 Balistes vetula, 2 young eels etc. Fauna poor. Also got a Strongylura rapidana\(^\text{19}\) about 12" long.

Tuned in 9:00.

Feb 19

Turned out 6:00. Found the following in gill net (2 sharks, 1 with a sucker and some miscellaneous small fish). All preserved except longer shark which was ♂ of the species preserved (about 3' long). (idyperpyra [?] brenivastuis [?]).

Got under way for Nassau at once- had a rough passage arriving at Nassau dock at 2:00 p.m.

Flying fish were fairly common and in spite of the high seas and strong breeze, flew well. One flew at least ten feet high.

Accounts at Nassau tell of a general bad storm and worry on our account. Made for Long Cay and put up for the night, Mr. Bacon, staying in Nassau. High and ineating [?] winds. The British cruiser "Durham" put to sea to avoid difficulties.

Feb 20

Wind still high but the worst is over.

Turned out 8:00.

Unpacked the "Escape" and went to Nassau to look over the town and have her fixed in some minor repairs.

Mr. F.P. Sands took Mr. Work and myself about the town and eninors [?] in his car. It is a quaint place and probably O.K. if one has friends.

Slept on board at the dock.

Feb 21

Turned out 7:00.

Continued to look the town over and met Mr. Wilson former collector at the Tortugas; had a chat with him.

The harbor is full of wind blown weed and saw the following fishes (the first seen the harbor).

<table>
<thead>
<tr>
<th>Fish</th>
<th>Size</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongylura rapidana</td>
<td>1&quot;</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Hepsetia stipes</td>
<td>1 1/2&quot;</td>
<td>100</td>
</tr>
<tr>
<td>Jenkinsia</td>
<td>1&quot;</td>
<td>1+t</td>
</tr>
<tr>
<td>Balistes sp.</td>
<td>2&quot;</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Nudibranch</td>
<td>16&quot;</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Medusa (purple)</td>
<td>4&quot;</td>
<td>1 (1)</td>
</tr>
</tbody>
</table>

\(^{19, 20}\) Accepted name, raphidoma

17
Made back to Long Cay leaving Mr. Bacon in town just before sun down.
The weather is still squally and unsettled.
Turned in 10:30

Feb 22
Turned out 6:00.
Started to get ready to leave.
Rambled over the Cay taking photographs of various objects of interest.
Turned in 10:00

Feb 23
Completed packing and gathered a number of live hermit crabs to take back.
Mr. & Mrs. Bacon came over from Nassau.
Spent the rest of the day fixing last minute things.
Turned in 10:30.

Feb 24
Turned out 7:00.
Got stuff together and took it to Nassau by noon. Went aboard and sail on.
Murangr [?] 5:30.
Turned in 9:00

Feb 25
Made flying fish observation #1. Gulf weed “manual” [?] but fish very few.
Position at noon.
29° 44 N. 76° 00 W.
Made observation #2 at 3:15 Gulf weed as in No #1 but wind shifted to Portlaw [?]. Not in gulf Stream yet and population low- no other life seen at all!
Turned in 10:00.

Feb 26
Turned out 7:00.
Passed Diamond Shoal 8:00- well out of flying fish territory- see observation #3.
Saw a Mackerel Shark (?). Gulls have now picked us up. There is a predictable roll and a strong wind but the air is still warm.
Position at noon.
36°16’ N. 74° 51’ W.
396 miles in 24 hours.
Afternoon getting colder- futa [?] nest etc.

Feb 27
Docked.
<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Date</th>
<th>Hour</th>
<th>Locality</th>
<th>Wind</th>
<th>Sky</th>
<th>Barometer</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Feb 10</td>
<td>5:30 P.M.</td>
<td>Boots anchorage (surface)</td>
<td>E. N. E.</td>
<td>Oceacast</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Feb 10</td>
<td>5:30 P.M.</td>
<td>Boots anchorage (bottom 5 feet)</td>
<td>E. N. E.</td>
<td>Oceacast</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Feb 12</td>
<td>12:30 P.M.</td>
<td>Narrow Bank (surface)</td>
<td>E. N. E.</td>
<td>Clean</td>
<td></td>
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<tr>
<td>4</td>
<td>Feb 12</td>
<td>5:00 P.M.</td>
<td>North Cay (surface)</td>
<td>E. N. E.</td>
<td>Oceacast</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Feb 12</td>
<td>5:00 P.M.</td>
<td>North Cay (bottom 10 ft)</td>
<td>E. N. E.</td>
<td>Oceacast</td>
<td></td>
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<tr>
<td>6</td>
<td>Feb 14</td>
<td>5:00 P.M.</td>
<td>North Cay (surface)</td>
<td>E. N. E.</td>
<td>Clean</td>
<td></td>
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<tr>
<td>7</td>
<td>Feb 15</td>
<td>1:00 P.M.</td>
<td>North Cay (surface)</td>
<td>S.E.</td>
<td>Clean, partly cloudy (afternoon)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Feb 15</td>
<td>1:00 P.M.</td>
<td>North Cay (surface)</td>
<td>N.E.</td>
<td>Clear</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Feb 17</td>
<td>5:00 P.M.</td>
<td>North Cay (surface)</td>
<td>N.E.</td>
<td>Cloudy</td>
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<tr>
<td>10</td>
<td>Feb 19</td>
<td>3:00 P.M.</td>
<td>North Cay (surface)</td>
<td>N.E.</td>
<td>Clean</td>
<td></td>
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<tr>
<td>11</td>
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<td>9:00 A.M.</td>
<td>Boots anchorage (bottom 5 feet)</td>
<td>N.E.</td>
<td>Clean</td>
<td></td>
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<tr>
<td>12</td>
<td>Feb 20</td>
<td>9:00 A.M.</td>
<td>Boots anchorage (surface)</td>
<td>N.E.</td>
<td>Clean</td>
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This table for laboratory samples. See chart.
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<th>pH</th>
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<th>CO₂</th>
<th>Temperature</th>
<th>Alkali Reserve</th>
<th>Chlorides</th>
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<td>2.15420</td>
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<td>2.07720</td>
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<td>4.22</td>
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<td>—</td>
<td>—</td>
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All made on Feb 22 (Field No. two)
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<th>Date</th>
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<th>Locality</th>
<th>Wind</th>
<th>Sky</th>
<th>Barometer</th>
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<td>Feb 12</td>
<td>9:00 a.m.</td>
<td>Off Labray.</td>
<td>East</td>
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<tr>
<td></td>
<td>Bahama Sea Water</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>------</td>
<td>-----------------</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>pH</td>
<td>Sp.G.</td>
<td>O₂</td>
<td>CO₂</td>
<td>Temperature</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>8.3</td>
<td>1.0262</td>
<td>25.0</td>
<td>23.9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Oyster Bay
1930.

June 15 Visited Daniel Bacon. Spent p.m. & evening looking over place.

June 16 Aboard S.S. Querida. Visited Eatons Creek. A nice place but very barren of fish life. Black mussels abundant. Poked in and about creeks, ditches etc. Saw a few Killies and nothing else. The shore life is good however. Woods comes down to water line and is full of shore birds. Oyster beds marker off all over. A little lobstering done. Saw some Spanish lobster boats operated by a naturaliged [?] spainard.

Innumerable starfish were about these parts.

June 17 Returned to N.Y. in the a.m.

Block Island- 1930

July 17 Arrived greenfoat [?] L.el. with Mr. Bacon and Mr. Smith to meet Querida 6:20 p.m. Water practically cleaner & greener than in Sandy Hook Bay. Turned in 11:00

July 18 Turned out 7:00 and made for Montauk Point. Ran out ESE to look for swordfish. Sea became choppy and weather cloudy- Ran for Block Island. Saw a few Tursiops. Anchored in Harbor and visited town. Xiphaes being caught- saw several fish heads – gills unusual – examine. Many fish ponds on island – snapping turtles and pond lilies - red winged blackbirds etc.
Heavy fog with falling glass 8:00 p.m.  
5' *Sphyrna zygaena* ashore. Large *Centropristis* swimming off Montauk.  
Turned in 10:00.

**July 19**  
Turned out 7:00. Clear but S. E [E or W?] wind still fresh [?]. Spent the a.m. ashore looking the island over, an interesting place. Mr. Nagusi [?] place recommended us a stopping place. Wind *freshing* [?]- not even good for shore seeing. Spent p.m. around resting from hike over land.

**July 20**  
Turned out 7:00. Went about 50 miles S.E. in search of *Xiphias*. Sea fairly rough. Saw none. Got sea sick. Saw 3 *Sphyrna zygaena* about 5' long and 1 loggerhead about 4'.  
The fishermen’s boats apparently got little or nothing also. Sea smoothed out by the time we got back 6:00 p.m.  
Turned in 10:00.

**July 21**  
Turned out 7:00. Clear and smooth.  
Fishermen all say there are no *Hippocampus* in there waters, or any small fish other than *Killies*.  
Spent the day in search of *Xiphias* again.  
Sea smooth, delightful. No swordfish seen but a number of sharks, mostly *Sphyrna zygaena* from 5 to 8'. Also what may have been a *Prionace glaucas*?  
All very shy difficult of approach.  
Saw a small Loggerhead.  
The fishermen are getting little- about 6 fish to 20 boats. These *Xiphias* average about 200 lbs dressed [?] and bring 17¢ a lb to the fishermen.  
Turned in 9:00.

**July 22**  
Turned out 7:00.  
Seined in the small corner at the south of the harbor entrance. Much crustacean life. Few fish. But the following species.

*Nemidia* sp.  
*Fundulus heteroclitus* ripe  
*Fundulus majalis* young ½ to 1"  
*Pseudopleuronectes americanus* (2" many) 1 6"  
*Myxocephalus aenaeas?* (2)  
Also got 1 *Pectin* [?].
On the way out of this cove saw six *Naucrates ductor* about a hany [?] (not more than 3" long).

Spent the p.m. coming over to Fort Pond Bay.
Pound nets are here (6). Much fishing. Large *Centropristis* are held in pen 2000 or over, also end. Fish are brought in in live wells.

About the dock saw *Stenotomus* large, *Leptocephalus conger* large, *Laphapsetta* [?] very large, *Tautoga* small.

Swimming about were nervous small species. *Tautogolabrus* abundant, *Syngnathus fuscus*, *Pseudopleuronectes*, Barracuda (*Slyraena borealis- 2") 6 of these, *Menidia*.

Sea horses are reported as absent from here

Turned in 9:00

July 23


At the markets saw other fishes brought in

(Continued 33)

Continued on page 33

Species of Fishes recognized in the field – Bahamas

1. 21 *Albula vulpes*
2. *Haemulon album*
3. *Haemulon plumeri* 22
4. *Culanus* [?] hanjonado [?]
5. *Balistes vetula*
6. *Epinephelus striatus*
7. *Holocentrus adscensionis*
8. *Scarus vetula*
9. *Halocentrus adsencaris* 23
10. *Epinephelus ascencanis* 24
11. *Caranx ruber* 25
12. 26 *Scomberomorus regalis*
13. *Scomberomorus cavalla*
14. *Lutianus griseus* 27
15. *Gabirs* [?] saporaton [?]

21 Dr. Breder drew a line from #1 to #15 and labeled them “market”
22 Accepted name *plumieri*
23 Accepted name *Halichoeres radiates*
24 Accepted name *Epinephelus adscensionis*
25 Accepted name *rubber*
26 Dr. Breder drew a line from #12 to #13 and labeled them “dried”
27 Accepted name *Lutjanus*
16. Abudefduf saxatilis
17. Pomacentrus leucostictus
18. Lutianus apodus
19. Haleachors livitatus
20. Strongylura raphidoma
21. Gymnothorax ocellatus
22. Atherina stipes
23. Caranx crysols
24. Strongylura acus
25. Strongylura notatas
26. Scarus taeniopeterus
27. Sowheromorus [?] nourlutis [?]
28. Epinephelus Ionaci [?]
29. Pterophryne histrio
30. Echeneis naucrates
31. Fistularia
32. Carcharhinus
33. Spheroiades
34. Sphyraena barracuda
35. Trachinotus
36. Caranx latus
37. Mugil curema
38. Gerres cinereus
39. Eucinostomus gula

25 Accepted name Stegastes levcostictus
29 Accepted name Lutianus
30 Accepted name crysos
31, 32 Accepted name Strongylura
33 Accepted name Spheroiades
Prionotus carolinus, Xiphias gladius (2), Pomatomus saltatrix.

This should be a good place for the "seahorse" to come. The Centropristis are handsome. All ripe here just now will full gonads. ♂’s extremely brilliant.

The pond nets yield Scanber ealies [?] in quantities. Porgies are large and bright. The list of attainable fishes should include the following.
Sea bass- large + brilliant
Porgies
Sea Robin
Pilot fish- small and gaundy [?]
Cunners [?] - Large + brilliant
Lobster
Conger Eels- Large

Turned in 9:30.

July 24
Turned out 7:00.
Sailed for Greenport.
Arrived 5:00.
Turned in 10:00

July 25
Took early train to N.Y.

Block Island- 1931, -1-

June 20
Arrival New London 10:05. Sailed to Block Island.
Swordfish do not run much before July 4 although some are being taken S.E. of here about 2 hairs [?]. One boat is supposed to have taken 25 so far.
Some small herring is abundant in the “Salt Pond”. Saw a squid catch one. Fred caught few Merluccius helaearais [?] about 1’ s.l. on hard clam bait and flounder hooks.
A warm pleasant day, wind springing of somewhat at sundown. Aboard yacht Quesida: Mr. Bacon, Fred & Perry, turned in 11:00

June 21
Examined piles & rocks at low tide (hath[?]) for sea urchins. Got only 5 but water fill off little.
Walked about Block Island.
Turned in 11:00

June 22
Examined piles and rocks for sea urchins 8:00 a.m. (low water). Got 46 and shipped to N.Y. aquarium.
Fred in fishing got Pseudopleuronectes 34 (small), Tautogolabrus (large ripe ♀) Examined some of the pound net catches. They are getting most by Scomber scombrus, some Poronotus triacantus, Merluccius bilinearis (which are discarded) squid (also last.) Raja eglanteria, Cyclopterus lumpus

34 Accepted name Pseudopleuronectes
about 8 inches. There seem to be absolutely no more Limulus here abouts. A few Phycis chuss\textsuperscript{35}. No spheroides seen.

Get sail for Montauk point 3:45.

Fair breeze. Anchored Montauk Island Pond (Private harbor) 7:30.

Turned in 10:00.

June 23- Rain. Fishermen here saw Xiphias struck in as close as 12 miles from the point yesterday. Thunnus reported from off shore- the earliest record attending to the coral [?] people. Looked around. Montauk point and Fort Pond Bay. Codfish are still being caught in small numbers.

June 24- Fished off Montauk Point in a.m.

Seahorses, Cunners [?], Pollock 1-12", Puffer -2, Common skate 2.

Returned and took 2:30 Train for N.Y.

Block Island 1931, -2-

July 9 Arrived Montauk 7:00 P.M. with Mr. Bacon & Mr. Smith. Picked up by Querida with Perry and Fred. A “well” at the Casino dock held many good sized Centropristis, some Raja erinacea and a few myoxocephalus octodecemspinous. Only a few xiphias have been taken on harpoon. The now forward [?] “stunt” is too take them tralling [?] with rod and reel as is done in Florida for Sailfish.

Turned in 11:00

July 10 Turned out 7:30 and fished off Montauk point for about one hour. Got 13 Centropristis medium size, some ripe.

Saw another boat get two Raja erinacea sailed over to. Block Island as weather was not suitable for sword fishing. Lead lined for flounders in Sut Pond harbor- got none. Last trip these were common here as were Lake and Common. Examined 7 Centropristis as follows 3♀, 4♂ all had eaten fishes (anchovies ?). 1 a small rock crab and all were dead ripe- one ♂ running.

Turned in 10:00

July 11 Turned out 8:00. Cloudy, lening [?]

Went ashore saw fishermen with many adult Seawher colias [?]. Also one Sarda relax [?]!! About 22"long. Said to be caught frequently here abouts. Few sword fishermen went out today.

\textsuperscript{35} No such genus and species; possibly means Urophcis chuss
In the p.m. examined some other trawl catches. One had a *Carcharias lettaalis* [?] ♂ about 7 feet long. Some very large *Paralichthys dentatus*. Fred caught a *Mustelus canis* (about 2’). Saw several *Squalus* (about 3’) from the trawls. Many skates of various species.

Visited East harbor- very few *Xiphius* caught- worst season in years.

Saw *Clupea* (about 3”) scratching themselves on submerged (floating) pieces of Eel-grass. Very similar to the Dry Tortugas. *Strongylura claes* [?]. Although most often entirely submerged the net infrequently leapt clear as did the other species of the south. The action was clearly of the same sort.

Saw one Cod (3’) in trawls.

Tuned in 10:30.

**July 12**

Steamed about 3 hours SSW in search of *Xiphius*. Saw none- got badly sea sick.

Mr. Bacon got a *Prionace glauca*. Sea pencil data on page 41. This fish a ♂ had some chunk of meat (from a passing vessel?) and a fish (sea bass?)

Continued on page 41

Summer Fishes Block Island.

---

*Xiphius gladius* – harpooned commercially

*Sphyra zygaena* - common

*Centropristis striatadus* [37] – common, large ripe.

*Fundulus heteroclitus*

*Fundulus majalis*

*Prionace glauca*

*Menidia Menidia*

*Pseudopleuronectes americanus* – common.

*Myxocephalus aenaeas*

*Stenotomus chrysops*

*Leptocephalus conger* – large – common.

*Laphapsetta nerculuta* [?] – large

*Tautoq onitis* – not especially common.

*Tautogolabrus adspersus* – very common

*Syngnathus fuscus*

*Sphyraena borealis*

*Raja erinacea*

*Raja eglanteria*

*Phycis tenuis*

*Phycis chuss* [38]

*Scanber seambrus* [?]

*Naucrates ductor*

---

[36] Dr. Breder checked every name on this list leaving a check, plus, and dot on the left hand side of the column

[37] Accepted species name *striata*

[38] No such genus and species; possibly means *Urophcis chuss*
Prionotus carolinus
Pomatomus saltatrix
Merluccius bilinearis
Sphoeroides maculatus
Paratus triavonithera [?]
Cyclopterus lumpus

Pollachius virens

Myxocephalus octodecemspinosus
Thunnus thynnus reported off – shore
Mustelus canis
Dasyatis centrura
Ammodytes americanus
Cynoscion regalis
Scomber colias
Opsanus tau
Gadus callarias

Achirus fasciatus
Sarda relax [?] 
Carcharias littoralis
Squalus acanthis
Raja diaphones [?] 
Paralichthys dentatus

Clupea harengus
Sarda sarda

8'10" T.L. Prionace glauca ♂
Snout 8 ½ “
Nostril 4 ½”
Width at nostril 6”
Pect. Insect 22”
Pert 24 ½”
Put in mer [?] Lobe 9”

Got back to Salt P and about 5:00. Photoed the shark.
July 13  Came once to Montauk Point in the a.m. and took 2:30 train for N.Y. Mary [?] dirigible [?] at Fort Pond Bay anchored on SS Patakee

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Montauk Point 1932

July 11-  “Cannon Ball Express” 3:55 p.m. to pick up “Quesida” in artificial harbor. With Mr. Bacon & M. Smith. High, drag, hat [?] west wind.
    Got aboard at about 7:00 p.m.
    Turned in 10\textsuperscript{00}

July 12-  Turned out 7:30.
    Anchored off Montauk Point in several nearly [?] spots [?] and angled. Got the following.

    \begin{itemize}
    \item \textit{Mustelus canis} 1 ♂ large
    \item \textit{Raja erinacea} 1 small.
    \item \textit{Ctenolabrus adspersus} 1 medium
    \item \textit{Phycis chuss} \textsuperscript{39} about 12 medium. These fish were ripe.
    \item \textit{Centropristis striata} 5 ♀, 2 ♂ differing as described previously from – Chris Planee [?].
    \end{itemize}

    They contained Rock Csahs [?] only.

    The ashore fish were caught on squid bait. But one commercial fisherman was about. He said the bottom fishing had gone to feinel [?] hereabouts.

    On the return toured a two boat net of quarter inch mush to try to locate intermediate sized fishes.
    But nothing, outside on inside the point. Anchored in the artificial harbor.

    6:00 p.m. Took some 16 mm mains [?] of Montauk Point Light.

    At sundown small \textit{scomber scombrus} were abundant in breaking schools. All about the yacht anchorage. A few were caught in hook a line. They measured as follows, inches in standard lengths, 5 5/8" -3; 5 ½" -5; 5 3/8" -1; 5 ¼" -2; 5" -1.

    Turned in 10\textsuperscript{30}.

July 13  Turned out 7\textsuperscript{00}. A beautiful day clear, calm and very light S.W. breeze.
    Went about 20 miles due South of Montauk Point in search of \textit{Xiphias}.

\textsuperscript{39} No such genus and species; possibly means \textit{Urophcis chuss}
Saw none. Thirty other boats appeared not to be having any great degree of success either. Saw 2 *Caretta caretta*, 1 large *Sphyma zygaena*, 1 *Carcharias littoralis*? large and 1 small Whale in distance.

Turned the *crase* [?] tow net extensively but got nothing at all except a few pieces of sea weed.

Returned in Montauk Point about 5:00 p.m. head in the general direction of Oyster Bay to make some connienite [?] point by night fall.

A strong breeze sprung up suddenly and we turned in to the yacht harbor again.

Turned in 11:00

July 14  

Turned out 5:30 and started for Oyster Bay.

N to N.W. wind.

Stopped at Natletuck and had a swim.

Saw a large *Syngnathus fuscus* swimming near the surface. Further along saw a large school, 30 or more, of the harbor porpoise. The water thereabouts was full of a large maroon *medusa* about 10" across with long tentacles.

Arrived Oyster Bay about 7:00 p.m.

Mrs. Bacon came aboard for the evening. Turned in 10:30

July 15  

Turned out 6:30 and took train to N.Y.

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Wood’s Hole 1932

Aug 24  

Took 6:00 p.m. New Bedford steamer “Praidence” with S.W. Smith. Smooth sea, clear weather.

Aug 25  

Arrived about 6:00 a.m. and went abroad “Querida” at Piece & Kilhurms [?] Boat yard at Fair Haven to await the arrival of Mr. Bacon. Sun bright but air somewhat foggy. Mr. Bacon came aboard about 10:30 came across *Buuyaids* [?] Bay and anchored in Quick’s Hole in the night of Naushon Island. Went ashore. Not more than 50 yards from the shore is a fresh water pond of over 5 acers in extent (see chart). It is separated from the ocean by Dunes of 25 to 30 feet high. In it are many water lilies (white) not unlike those of Block Island. Caught some *Rona* tad poles and some *Fundulus* (*diaphanous* - ?) Both are numerous as well as various aquatic insects- *Dytiscus*, *Notonecta* etc.

Very young fish, presumably the ashore species about 3 mm long were numerous also.

Sailed down to Hedley Harbor and reached there at sundown. Fished for Bluefish on the way down- no luck.
Took 2 photos - one of the Lilly pond and the other of the frath [?] collected on the lee shore - took a sample of scrap analysis.

Aug 26

Turned out 8:00

Made over for Woods Hole. Went ashore and visited a bit. Saw Neshitt, Pierson, Parr, Schraeder, Gaffein and some of their families.

In the p.m. Neshitt came off for a little fishing. Cunners [?], Porgies, Sea bass and fluke [?] were included in the catch.

Turned in 11:00

Aug 27

Turned out 8:00 Went ashore and hid good [?] by to the rays [?]. Went down to Tarpaulin Cove on Naushon Island took a swim there and strolled through the woods, a fine place. Went on and through Quick’s Hole to Cuttyhunk Harbor. Went ashore on Cuttyhunk - a vast picturesque place. Mr. D’s hithelag [?]

Turned in 11:00

Aug 28

Turned out 8:00 steamed over to Point Judith. Anchored inside the breakwater. Quite rough coming across and had a head wind. Ruled [?] around the artificial harbor. Took some photos of gulls and the sunset. Turned in 10:00.

Aug 29

Turned out 6:00 and set sail for Block Island. Came across in fast time. Saw numerous schools of small fish leaping - Scomberesox saurus [?] A many [?] then were at least one Strongylura and clearly larger fish were cutting into them from below.

Spent the p.m. ashore. Fishing is rather poor here. Scomber scombrus and Bluefish running. The remarkable influx of mackerel in N.Y. harbor is unknown here or at Woods Hole.

Swordfish fishing is poor.

Turned in 10:00

Aug 30

Turned out 8:00. Sailed out of Block Island harbor. Wind fueled [?] so poured [?] over to Montauk Point. Fished just off Montauk light. The entire catch measured as followed.

Tautogolabrus adspersus, 10 ¼, 10 ¼, 10 ¾” s.l.

The last was 12 ½ t.l.

Stenotomus chrysops, 10, 7 ¼, 8 ½, 8 ¼, 9 ¾, 11 ½” s.l.

The last was 14 ¼ t.l.

Centropristis striata 8 ¾, 8 ¼, 9, 8 ½, 9 ¼, 8, 10 ½” s.l.

The last was 13 ½ t.l. none of there were of the large “green- level” type – all small and blackish

Came into the artificial harbor before sundown. Turned in 11:00 no little
Mackerel about as last time.

Aug 21. Turned out 5:00 and returned to N.Y. by train. Rain.

Oyster Bay

Oct 7 Arrived after dark with Mr.B.- Put up at La Casiter [?].

Oct 8 Spent the a.m. around the house and yachts. “S. – boat” race in p.m. -4th.

Menidia common in scattering schools about anchorage.

Oct 9 Mr. ^ H.C. Smith, Mr. Bacon and myself set out for Point Jefferson about 11:00 a.m.

Light breezes. Aboard “Quesida”.

Many boat fishing snapper blues [?] off Oyster Bay. Headed first for Pricis [?] Bend where the Cruising Club of America were holding their annual Rundinais [?] - but too late so squared away. Saw several Harbor Porpoises. Trawled for Bluefish without success. Put in at Point Jefferson for the night.

Oct 10 Sailed to the artificial harbor at Fort Band [?] Bay. Ducks abundant- all over [?] Sound. Mostly [?] coats [?] and shags [?]. Some Loons. Trawled for Bluefish unsuccessfully. Turned in 11:00.

Oct 11 N.E. wind, cloudy, high seas. Stayed in harbor. In a.m. walked over to the Fort Pond fishing village. Bluefish mostly being taken now.

Caught a few small sea bass, cunmes [?] and flute fish in the harbor.

Got the 5:25 train for N.Y. Mr. Smith and Bacon staying once till tomorrow.
Barnegat Bay- 1933

May 27- Left N.Y. aquarium with Ethel about 1:30
Drove via Staten Island Ferry through Freehold, Manhattan to Beach Haven. Arrived about 5:15.
Put up at the “Ocean House”.
Visited the Beach (Ocean side). Large numbers of dead Hippa (?) of extremely large size are about. Few have any life in them. Squalls were somewhat of an annonae (?) end by 7:30 a steady rain set in. Many teens (?) were about and a few planes.
Found two well dried skate eggs-

May 28 Turned out 6:30 alternately overcast, rain and sunshine. Looked over the sand spit beach from Barnegat Lighthouse to Halgate (?).
Found innumerable skate eggs like the ashore 2. All had either hatched being open at the flat end INSERT DRAWING or were filled with
sand although apparently not opened. How? Found also 2 eggs of a larger kind

Skate egg size\(^{40}\)
Breder 1929
R. erinacea.
2 X 2 ½
R. diaphanous.\(^{41}\)
2 ½ X 1 ¾
R. stabelfonis [?]
5 ¼ X 2 ¾

A single pound net was seen on the Oceanside. Opposite were a large number of *Mustelus canis* and a single large *Sphoeroides maculatus* on the beach.

At Holgate point near some surf a large *Sphoeroides maculatus* were aware of the same and a large number of *Raja eglentris*. The makers of the smaller egg cases? *Limulus* were crawling (♂ & ♀ together) and apparently nesting. Saw not a single fish caught or any small fry swimming about.

Spent the p.m. exploring the Pine Barrens. Went as far South as New *Gretmee* [?], into the state

\(^{40}\) Dr. Breder wrote this paragraph in pencil in the left hand column below the skate egg drawing.

\(^{41}\) No such Genus, might mean *Fundulus*. 
forest (Bass Reinee [] Resenation []) and as far west as Cedar Bridge, crossing and recrossing the country side. Stopped at every stream and examined its shore etc. here also saw not a single fish!
The water was of cause [] brown or in some cases nearly black with eidu [] stain. Insects abundant. Not an attractive place to camp- mostly swamp but pretty with sphagneum [] moss.
Heard Quail and an occasional Raja eglanteria. This does not appear to be a good place for life history photographs.

 Returned to the beach and for dinner at 7\textsuperscript{00}.

May 29

Turned out 8\textsuperscript{00}. Hazy and damp. Sun out and hat [half?] at [of?] moon. but cool & damp in p.m. Spent the entire day “Exploring”. Went through Lebanon State Forest and from there to Mt. Mysey [].
All the creeks visited were dark with Cedar stain and not a single fish could be seen. At a point near Mt. Mysey [] a large number of tadpoles and a few Rana piforeis [] were seen. Trampled through the woods at Pale Bridge Brench [] (between Mt. Mysey [] and the Burlington- seen counties [] line.
Here a few fence liyards [] were about.
The shore was so marshy that nothing could be seen under water. Cow lilies were in bloom and an occasional Rona catesbeiana could be heard.

Zig-zaged back and forth to Tanis [] Rinus [] and Lake Road. Then ran to shore from Seaside Heights to Point Pleasant Beach, then back zig-zaging to Ocean Gate, Lanaka [] Harbor, Forked [] Reines [] and finally back to Beach Haven [].

Was well chilled by this time. Little in the way of fish field studies can be expected here- everything is against such work- not a single fish being seen at all even in laealithis [] that at first look good enough!

May 30

Heavy fog and rain. Rains sudden and muddy. Drove home without any observations worthy of note.
Pound Ridge Reservation 1933

June 11  
*Lepomis auritus* nesting in *Waceahuck* (?) Creek.  
There is a fair flow and the nests are widely scattered and all in the “lea” of large rock.

Other species seen: *Catostomus commersoni, Erimyzon sucetta, Hatrapis* (?) (?).  
*Micropterus salmoides, Rhinichthys atratulus*.  
This stream had the appearance of a Trout Stream that had warmed up and been invaded by pond fishes.  
Plasmodium of my *cetoyira* (?) seen in considerable abundance.

June 18  
Returned to photograph the ashore nests.  
A storm in the intervening time had dust (?) named (?) them all. Covered with silt and no nesting fish.  
Plasmodium gone. Saw a large Wolf Spider early young on her back (covered completely).

Willow, Oyster Co. N.Y. 1933

June 30-  
Visited Bronsons. Their creek contained *Salvelinus fontinalis*- all sizes to their forward (?) *Catostomus commersoni, Rhinichthys atratulus, Baleosersn nigrin* (?)  
July 4  
and a single *Campostoma anomalum*. Very young *Catatstanus* (?) and *Rhinichys* about (spurned (?) need (?) more than a month ago.
Visited a line [?] stane [?] gernary [?] near Rosendale which had greatly filled with water (underground stream?). Blind fishes reported by Matines [?] – but more could be found – of course. Report also states the Lelenburth [?] found blind shrimp there – none found.

The *Catostomus* “hole up” in the day- 50 or more fish. At night they disperse and only an occasional one could be found by flash light.

*Bufo* heard calling a few times. *Rana catesbeiana* calling, and *Rana clamitans* calls off and on all summer. *Clemmys insculpta* saw to 11 & 14 years by the rings. There Musk Rats seen swimming in broad day light at one- aine [?]

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**Hackettstown N.J. 1933**

July 23

Drove to the hatchery. The small mouthed black bass are through spawning. The young are nearly two inches long.

A few “wild” *Eupomotis gibbosus* were still on their nests in the bass ponds.

A pair of *Fundulus heteroclitus* (!) in the pond pends [?] with a large stack of *F. diaphanous* were spawning.

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**Oyster Bay 1933**

July 28-

Left N.Y. by train with Mr. Bacon. 4:57 p.m. Spent the evening talking and going over the grounds. Turned in 10:30.

July 29-

Turned out 8:00. – Went to Greenwich Point for a.m. S- boat race. Saw some shark fin momentarily. At the Searuika [?] Yacht Club duck [?] a *Tautog onitis* of about 12” was in shallow with anid [?] the sedge [?] gross. Reports show [?] it that they have been numerous picking mollusks off the rocks.

Have been home, now, for several weeks.
July 30- Turned out 8:00. – Went to “Sand City” creek for the day and had a good “soaking”. Day very hot. Only *Fundulus heteroclitus* seen. Oysters in the creek. Saw an oyster drill laying eggs on an oyster shell. Shape of egg shells

Turned in 11:00.

July 31- Left for city 8:10. Still very hot.

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Marthas Vinyard

Aug 25 Arrived Greenport by train with Mr. Bacon and Smith. Boarded “Querida” about 6:30 p.m. Light southerly breezes in the wake of a disastrous storm that wreaked havoc along the coast- 47 dead reported. The object of this trip is to check up on the reported shark scare. Phase [?] seen on other trips are listed here for *confourisan* [?]:-

1930
July 18 1 5’ *Sphryna zygaena* –dead- Black Island.
July 20 3 5’ “ 20 miles S.W. Block Island.
July 21 a number mostly “ “
    1 *Prionace glacus* 42’ “

1931
Gene [?] 20-24 – none
July 11 1 7’ *Carecharias taunus* ♂ Black island- pound nets
    3’ *Squalus acanthias* “ “ “
    2’ *Mustelus canis* “ harbor
12 1 8’10” *Primace glacus* off Block Island. (Caught)

1932
July 12 *Mustelus canis* off Montauk Point
July 13 *Carecharias taunus*? 20 miles off “

[*Sphryna zygaena*] “ “ “

42 Accepted name *glauc*
Aug 26

Turned out 6\(^0\)0. Went to Plum [?] Gut [?] and tried Blue fishing. Got none. Other boats there got but 2 so far as could be seen.

A school of ‘puffin’ pig [?] porpoises were seen there and a solitary individual.

“Steamed” to Fort Pond Bay. Inquired about unusual abundance of sharks. Got negative replies. But one “pound” of sea bass were to be seen. Little daring [?] here. Bluefish by hand line and Cuttlr [?] fish by pound nets.

Tried fishing off Montauk Light. Got 3 medium porgies only. Saw 2 \textit{Aluterus schoepfii} and 3 \textit{Sphoeroides maculatus} at Fait [?] Pond!

Put in the artificial yacht harbor for the night. Talked with one fishing guide. He said sharks were more abundant last year. Saw 47 in one spot. This year the most he saw was 17, mostly Hammerheads and are Blue shark.

Another guide, C. Thompsen said they were abundant this year. Hammerhead, Sand, Blue, Thresher and Mackerel off about 15 miles south of Montauk light.

Swordfish are not being caught.

\textit{Tunch} [?] are not highting [?]

Aug 27

Turned out 7\(^0\)0 made off S.E. to look for sharks etc. Saw nothing before a distance of 10 miles was reached.

Then \textit{Sphyrna} began to appear.

Saw in all seven [?]. Possibly 2 were other species (not seen too well). None were even within striking distance. Saw one school of porpoises. \textit{Tunny} [?] were not uncommon. After running off about 15 miles headed for Block Island.

Reached the West Harbor about 4\(^0\)0. Went to the East Side of the Island to talk to fisherman. Their views were mixed concerning the abundance of sharks this year. All saw Hammerheads and Blues.

\textit{Few Xiphias} are being taken now- just stragglers. Bob Jackson of Cutly hunk [?] is reported to have a long list of \textit{Xiphias} abundance. All the Fishermen tell of \textit{Xiphias} going off in deep Gulf Stream months [?] in winter and being caught by trawls.

\textit{Marlines} are reported about- new to the fisherman we talked to.

From the pound nets saw the usual stuff. Nothing of note except that there is an unusually fine run of Bluefish.

\textit{Had a good swim in the west harbor just as the sun went down. Fred caught 3 flounders at the anchorage. (Pseudopleuronectes )}

\textit{Menidia} in harbor (large and very small)

Aug 28

Visited the small light in Block Island
harbor that was seined in July 22 1930. It was then chueked with Yastera. Now not a single blade can be seen. It is gone from here as elsewhere.

Spent the day going from Block Island to Menemsha Bight – 36 miles. (Just evetaf Guy Head) and saw absolutely nothing in the way of fish life. A few gulls were about. In this trip with we practically skirted the 25 fathom cantaur. Went ashore at Menemsha and looked the town over extremely picturesque. Nicely wounded hills and many song birds. Not a bad place to spend a week. A heavy fog set in just after arrived.

Aug 29

Turned out 8\(^{00}\) Rain and fog. Rain stopped and fog lifted. Went to Tarpaulin Cove. Had lunch there without going ashore. After lunch went to Woods Hole. Went ashore and looked around without looking up the biological erard. Went to Hadley Harbor for the night. Clear with a N.W. breeze. Air full – like.

Aug 30

Bright warm sunshine. Tried hattar fishing off Wee Packet. But, Tautog onitis, 1 Tautogolabrus adspersus, 4 Stenotomus chrysops.

Went to Quick’s Hole for lunch and a swim excellent. Saw a single dried Raja erinacea egg. Sailed to Cutty Hark. Sat there about 6\(^{30}\).

Aug 31

Sailed to New Bedford. Light breeze. Saw a number of schools of Menhaden and one sea turtle (?). Looked over the Whaling museum in the p.m. Got the 7:45 bout for New York. S.S. New Providence.

Sept 1

Arrived N.Y. 6:45.
Ameiurus nebulosus 5” crawling out of the mud. The place looks promising. Also examined the brook in Tibbetts Brook Park- this place too disturbed by people?

April 15- Visited Dean’s site again. Still no action. This very cold spring is probably delaying things- even if they are still here.

April 28- Visited again (with Ross Nigrelli)- no sign of Lampreys.

April 31- R. Nigrelli visited this place alone- no evidence of Lampreys.

May 6- R. Nigrelli again visited this place and inquired of boys catching sunfish and saw or learned nothing of Lampreys.

Palisades Interstate Park – 1934

May 6- Drove along the seven – lakes drive. At Lake Tiorati near the administration building (about 100 yards West of it) there was a large school of Fundulus diaphanous. This would appear to be the pre-canmnuhan [?] of ecologists. Air 79º Water 63º (in the shallow shore region). This fish all headed toward shore in apparent response to a counter current near the bottom caused by a strong on shore wind.
In one of the small streams further on *Erymyyan* was seen in an early attempt to spawn? 1 ♀ (?) – 6" ± and 2 ♂s (?) – 4" ± the latter following the fuener [?] about but no clean evidence of a nest could be noted.

Further along *Catostomus commersoni* was noted dispatching in a similar fashion-

1 ♀ (?) – 10" ± and 5 ♂s (?) – 6" ±.

This day was unusually hot-suddenly after a cool spring. The only other fish noted were a few *Rhinichthys* settled about. The temperature in the creek was also 63º.

Sparta, N.J. 1934

May 19  Nutored [?] and put up at Penybryn, - Tent caterpillars excessively numerous. At Lewellen Lake- across road from the hotel- Sunfish close to shore- *Expanotis* [?] ? 10' offshore 2' deep. Temp H₂O 70º- air 78º. Below dam [?] of lake a few doctess [?] (? were barely seen. No other fish life.

May 20  Nutored [?] about in the a.m. All decent streane [?] "crawling" with anglers [?] after trout. Saw not a single fish in the streams or on a line. Photoed the tent caterpillars near the hotel. Beance [?] Run on toward Newton is an attractive stream. Last night heard Leopard frogs (*Rana palustris*) calling- very late? - and one *Hyla versicolor*. There are *Bufo* tadpoles in the hotel goldfish foeral [?]. Today marks the opening of the pickle fishing season and the upper end of Lake Hopatcong and the Rockaway River well full of anglers [?].

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Pound Ridge 1934

June 3-  Visited Waechuck [?] Creek. – The water rather high and a stiff breeze raffled [?] senforce [?]. Temperature 75º F. Saw a nearly dead *Micropterus dolomieu* about 2" long. Saw groups of some cyprinid-less than 1" long. Sp.? Spotted a few splashes of larger fish- *Micropterus* or *Lepomis*? A few anglers [?] about. – no large meinous [?] seen.

*Accepted name* Erimyzon
June 23- Put up at the “River View” for a rest.

June 24- In Lenafoe [?] Lake there are Large-mouthing Black Bass- Last year’s fish (?). Fingerling Brook trout in a tributary to Cherry Brook near the Wolf Hollow Golf course.

June 25- Visited the Hackettstown Hatchery. The Black Bass are just off their nests- the last ones leaving. Sunfish (*Eupomotis*) have not yet started. *Fundulus* (*heteroclitus*? – from salt water) in spawning in condition. The sunfish are cruising around close to shore in bright colors- all♂? – They chase one another short distances and then follow one another about at a respectful distance. – usually after those going furthest shoreward.

July 6- Guests of the Hactshoens [?].

Visited site of sunfish nests at 9\(^{30}\). These at canoe landing. All small fish- 4-5” over all. Each nest with a fish on it- facing in any direction- nests circular except 2 along and half under a large log- these lunate. Water only a few inches deep. The fish somewhat timid to face into the light but then seemed to accept it as a regular source of illumination. In one case another fish, presumably a♀and presumably primarily attracted by the light, approached. The guarding♂tried to caunt[?]her by virtue of the electric light! It would seem that at night these fishes simply rest on their nest- but how do they hold the position? Some seemed to be actually resting on the bottom. In all large stones were present. These should be “land marks” for intact recognition.

July 7- Visited ashore place at about 7\(^{00}\) a.m.- light still weak.- Several species spawning. All appear to be *Eupomotis gibbosus*. And all small as noted. Positioned[?] typical♀on side.♀’s with vertical hand[?]fohose[?],♂’s with brilliant colors – no vertical hands[?]. With H.d.H made chart of nests pages 82-83. These show all nests and sizes, also approximate spacing. Figures all in inches and feet. Nest measurement in the following order, inside diameter (bottom of

Continued on page 84
dish, outside diameter (lip of ride around nest), depth of water to center of nest. All nests had attending males except a few which were only partially built (?) and abandoned. No nests under dock. Numerous ♀’s waiting to be courted were congregated there. ♂’s at times would swim under after them (in an attempt to induce them to the nest?).

No nests deeper than 22”. There is a tendency for the larger ones to be in the deeper water.

Drove all around lake- saw no nests deeper than 22”. Near the dam took 2 photos one of a pair spawning and a general view in which a pair were spawning also. Took a photo of one nest, nearly perfectly circular near the hatching beach in sand. Took two views of the site of the preceding chart. Sunfish nests occur all about this lake wherever the ground is at all suitable – and on some that seems very unsuitable- with few exceptions.

Below in the dam in a hole were seen all the fishes known to occur in the lake.

1  *Catostomus commersoni* 6”±
2  *Erimyzon sucetta* 2” ±
3  *Abramis chrysalecus* [?] 7-8”
4  *Hatrafris canntus* [?] 5-6”
5  *Ameiurus nebulosus* 4-6”

6  *Eupomotis gibbosus* 2-8” (some of these were much larger than any species in the lake)
7  *Lepomis auritus* 7-8”
8  *Micropterus salmoides* 3”±
9  *Micropterus dolomieu* 3”±
10  *Perca flavescens* 5-6”
11  *Fundulus diaphanous* 3”-4”
12  *Esox niger* 8-9”

The sunfishes at this place were not breeding although much larger than those in the lake which were.

In the evening it rained very hard and most of the night.

July 8- The nests have been nearly all silted up during the rain and wind. By noon few fish were seen on their nests. They were all off in deeper water and apparently had abandoned their nests. The water temp. about the shore- apparently all around the lake was the same as yesterday 81°. Air temp 100 p.m. 65.5°. Water at end of canoe dock 82°. Air temp 200 71° in creek feeding lake 67°. A few nests were seen with eggs in it- all abandoned. One that was matid [?] with eggs yesterday was empty this a.m. - washed out by storm or eaten out because of abandonment?
About 3:00 p.m. the sun began to pop out again. Revisited the place near the dam. As the sun came and the sunfish became active. The sky was full of passing clouds and consequently the light irregular. To this irregularity in light the fish were amazingly reactive. Tested by the western exposure meter they receded from their nests orken the light values fell below 700 except those actually on their nests which then simply sat still. When it reached 1,000 they became very active - fighting, seeking mates, and cleaning nests. Those that retired as the light "fueled" tended to aggregate peacefully but loosely. This reaction was seen at least a dayen times. Does light or radiant heat cause the effect? – certainly not temperature as that remained the same.

In the creek feeding the lake were seen *Rhinichthys atratulus, Catostomus commersoni* (same of this year) and *Erismyza sucetta* (also of this year) and small *Eupomotis* apparently not breeding.

- Took a photo of a yellow jackets nest exposed by roadside.
- At dusk revisited the bridge (dam) and the hatching heack. Took 4 photos by plush light by the dam. Each nest with a fish. Active against others even in the fading light.
- Visited the canoe dock after dark. Fish back on the nests. Some not actuned and nests mostly destroyed. A few new ones constructed.

*Bufo* called at night.

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**July 9**

Revisited all the sited in the a.m. Conditions essentially as last night. Water to rippled for photography. A breeze blowing into the hatching beach shore gone that place a temp of 82°. Elsewhere it was 81° as before. Drove back to N.Y. before noon.

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**Sparta, N.J. 1934**

**July 14**

Lewellen Lake low – no water over dam. – but creek filled by seepage. The lake is exceedingly full of young L.m.b.bass. 1” – 1 ½”. Two large well formed but empty nests were found. The spawning season was evidently between May 19 and July 14 – (some species just off nests at Hackettstown June 25) June 1 – to 15 should be about right.
Saw to large nests of *Eupomotis gibbosus* even with a fish. These larger (the usual size) than the Pines Lake fish. Smaller sunfish were seen— as large as the smaller breeders of Pines Lake. These were apparently immature.

In the center of the lake a large school of some fish were breaking water and creating a general disturbance— *Abramis*?

Later visited Lake Montauk. A small "garden pool" heavily planted with fish contained. *Micropterus salmoides* large 12-15" and small ¾" (this year) *Eupomotis gibbosus* large (nesting) and *Lepomis auritus* and/or *pallidus* (not nesting but resting in large close aggregates.) Some small also mated 2” – last years? Which hatched [?] the *Eupomotis* nesters. The bottom was joined [?] with flat rocks so the nest were as sketched.

Later visited Lake Montauk. A small "garden pool" heavily planted with fish contained. *Micropterus salmoides* large 12-15" and small ¾" (this year) *Eupomotis gibbosus* large (nesting) and *Lepomis auritus* and/or *pallidus* (not nesting but resting in large close aggregates.) Some small also mated 2” – last years? Which hatched [?] the *Eupomotis* nesters. The bottom was joined [?] with flat rocks so the nest were as sketched.

The lake people also contained sunfish nests in sheltered spots but the numerous motor boats churned up a "sea" on all exposed places. Several sunfish seen dead.

Also 2 herring of some kind. Did not look like *Dorosoma* [?]. – more like *Pinalalus* [?]. Possibly east and from a fishermen (*Clupea*?). About 10" long.

July 15

Visited Lewellen Lake and took the following measurements and photos. *Eupomotis gibbosus* nests.

<table>
<thead>
<tr>
<th>Depth”</th>
<th>Inside dia”</th>
<th>Outside dia (ridge)”</th>
<th>Photo</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>11</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>7 ½</td>
<td>10</td>
<td>13</td>
<td>#11</td>
</tr>
<tr>
<td>8 ½</td>
<td>15</td>
<td>18</td>
<td>#12</td>
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<td>6 ½</td>
<td>10</td>
<td>12</td>
<td>#6</td>
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<td>6</td>
<td>11</td>
<td>13</td>
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</tr>
<tr>
<td>5 ½</td>
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<tr>
<td>6</td>
<td>19</td>
<td>21</td>
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<td>8</td>
<td>14</td>
<td>17</td>
<td>#7</td>
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<td>4 ½</td>
<td>11</td>
<td>13</td>
<td></td>
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<tr>
<td>9</td>
<td>18</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>
Lepomis auritus nests

14  24  27  #3
13  22  24
11  24  28  #4 Occupied by 4" Eupomotis gibbosus

Micropterus salmoides nests

22"  36"  40"  #1 and 2 Occupied by 6" Eupomotis gibbosus

#5 Later occupied by 7" Lepomis auritus

Compare sizes of Eupomotis nests with those of Pines Lake. The fish larger. The depths the same with a tendency for the smaller fish to be closest to shore in the most shallow water.

Innumerable now breeding specimens the size of the breeding Pines Lake fish about-also a few Lepomis of the same size.

Many nests of Micropterus salmoides but mostly too far from shore to measure satisfactorily, although in not deep water. The one measured is typical. The reason for the excellent presentation of these nests is that sunfish make use of them.

Photographed a Eupomotis using such a nest. Later a slightly large Lepomis was using it. That it was not the latter’s nests is evident by its size.

A Eupomotis occupying a Lepomis nest was also photoed.

Temp. 76º air 79º H 2O.

The sunfish were all cruising about looking for mates (?). This lake teams with Micropterus.

A few small Fundulus diaphanous seen. ¾ “ – 1 “.

A ribbon snake seen but absolutely no turtles.

Seen frogs and pickerel frogs about. Two 1’ pickerel seen.

Spent the p.m. with Newmens and had a swim.

July 16-

Visited Lake Montauk and photographed the nest sketched on page 89- #8 and #9. – Eupomotis. The other sunfishes in the pond are L. pallidus not L. auritus.

Took a hike through the glen- a hemlock grove. An old trout stream (to craen [?] – like ashore [?] ?). Saw a recently used nest (?) of Salvelinus (?). Also

a very few young fish that might have been this species. Much further along on this stream lurreun [?] we noted fishermen angling for trout last trip larrenn [?].

Drove home in the p.m.
Delaware Water Gap 1934

July 21- Rulp [?] up at Rinetue [?] House with the Roddans. 
Young Large-mouthed Bass in Lake Lenape. 
Bull frogs calling. White water lilies in bloom.

Sparta, N.J. 1934

July 28- Rain until about 100 p.m. Lewellen Lake still saw [?] hardener [?] – no important gain in level. 
Measured more sunfish nests- as follows.

<table>
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<tr>
<th>Depth&quot;</th>
<th>Inside dia&quot;</th>
<th>Outside dia.&quot;</th>
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<tr>
<td>29</td>
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<td>28</td>
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<td>7</td>
<td>11</td>
<td>16</td>
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<tr>
<td>5 1/2</td>
<td>14</td>
<td>18</td>
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<tr>
<td>6 1/2</td>
<td>-</td>
<td>12</td>
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<td>8</td>
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<td>15</td>
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<td>16</td>
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<td>7</td>
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<td>17</td>
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<td>3</td>
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<td>10</td>
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<td>6</td>
<td>10</td>
<td>16</td>
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<td>5</td>
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<tr>
<td>5</td>
<td>-</td>
<td>14</td>
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These represent nearly all the well-defined nests between the hatching beach and the first place [?].
The season is apparently about over and numerous decadent [?] nest may be seen.
Along the retaining wall of the lake Eupomotis was found nesting in the shelter of once hanging cement work. The fish would disappear within a aenace [?] when too disturbed. No hehanian [?] like this had been noted before.
The nest site is illustrated in section on the next page.
A few *Lepomis auritus* (1 ¼") of this year were noted hanging about this vicinity. *Micropterus salmoides* were noted, both adult and this years. The latter up to about 2".
Two gold fish pounds on the hotel property were studied. One contained 12 2" fish the foal [?] about 5X10, feet. These were without shelter on differential environment. They remained at all times in a well formed school, following each other about but usually in the middle. A disturbance on the shore would make them come- to get fed? In the larger pool about 10 X 20. There were a variety of water lilies in bloom. The fish 15 in number (from 2 ½ to 4") also remained in a school sometimes striking out single file in following each other. Once there formed an independent school but this seen (3 min) joined the main herdy [?]. Once a single fish got “last” but soon returned. Contrary to a recent article in Ecology these fish are distantly schooling except when the entrance is too small. This is well past spawning season.

Later drove through some back country roads S.W. of Sporte [?].

After dinner revisited Lake Montauk. The sunfish nest figured on page 89 is still occupied.
The Lepomis pallidus are still doing nothing.
Other nests of Eupomotis are essentially scattered about as described on page 89.
Katydids out – just a few.

July 29

Visited Tlenaellen [?] lake. Reved [?] around it and studied all sunfish nest that could be found. The following measurements were taken.

From Swing Hole to 1st fence – measured yesterday.
1st to 2nd-fence- none except old abandoned ones. Fishes about, more or less in schools – “past evibirn [?]”
2nd to 3rd fence-

<table>
<thead>
<tr>
<th>Depth”</th>
<th>Inside</th>
<th>Outside</th>
<th>Blanks the same</th>
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<tr>
<td></td>
<td>dia”</td>
<td>dia.”</td>
<td>condition as described</td>
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<tr>
<td>17 1/2</td>
<td>24</td>
<td>27</td>
<td>on page 95.</td>
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<tr>
<td>10</td>
<td>-</td>
<td>13 &lt;- Used in model exp.</td>
<td></td>
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<tr>
<td>12</td>
<td>15</td>
<td>18</td>
<td>All were with</td>
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<tr>
<td>10</td>
<td>-</td>
<td>12</td>
<td>Eupomotis gibbosus</td>
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<tr>
<td></td>
<td>Far side of lake</td>
<td>Also old decedent[?] nests.</td>
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<tr>
<td>11 ½</td>
<td>-</td>
<td>12</td>
<td>Fishes on nests not</td>
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<tr>
<td>9 ½</td>
<td>-</td>
<td>11</td>
<td>very aggressive. The</td>
</tr>
<tr>
<td>5 ½</td>
<td>-</td>
<td>9</td>
<td>2 Lepomis nests described on</td>
</tr>
<tr>
<td>9 ½</td>
<td>-</td>
<td>12</td>
<td>page 90 empty or abandoned.</td>
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<td></td>
<td>15</td>
<td>25</td>
<td></td>
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</table>
Tested for sex recognition with an oval piece of cardboard on the end of the steel ruler. After initial fright of the boat etc. The guarding male would pursue the cardboard for short distances (same size as fish) especially if it was maned [?] so as to simulate a chased fish. Guing [?] over nest and not retreating induced the fish the bite it once. Reeling on side and shaking (like ♀ geuiner [?]) caused ♂ to come up beside it as if to spawn. Tried on other fishes and induced fright only. Boat too much disturbance or reactions too weak because of nearness to end of season?

Temp of water 79.5º F. The goldfish were spawning this a.m. contrary to statement on page 97. Saw them and found eggs in hath perals [?]. Henerr [?] previous statement still stands [?] – check later in season.

Saw 2 painted Yurvlus [?] in Lewellen Lake and 1 wood turtle near Rachel’s Pound yesterday. The first hereabouts.

Outline of model fish- common gray cardboard.

Sky over east: drove back in p.m.

Aug 4- Visited this place to check on nests. Saw a few Eupomotis gibbosus and Micropterus salmoides but none on nests. Saw a few old nests that had seened [?] their purposes and were disintegenting [?].
Sparta N.J – 1934

Aug. 12  Sunfish nesting all over. Weather rainy- few fish seen.

Palisades Interstate Park. 1934

Nov 3.  Visited a swampy area not far from the boat of the dam retaining Lake Tiorati. Collected newts there. Also *Umbra pygmaea*. Common and large. A few *Abramis chrysoleucas* there. 2 ½ “ and schools of small ones ¾ “ or less. Late for such small sizes. Beaners [?] are working here. Spent much of the a.m. here. Some ice on this pond.

After lunch visited the ponds near the old Luty insect station. Collected in the 3 “Beaner [?] Ponds” by the railroad. In the lower one got little (a few newts) but did not work it very hard. In the middle one got a fair number of newts and the following fishes.

- *Eupomotis gibbosus*. ½” – 1 ½”
- *Micropterus salmoides*. 2” – 3”
- *Anblaphites rupestris* [?] 1” ± (2 spare [?])
- *Abramis chrysulcas* [?]. 1”

In the upper pond got in addition to these specimens *Umbra pygmaea*. From earlier studies here we known Black Bass spawn in the middle pond. – Keep *Umbra* down? When did *Ambloplites* come to this pond? See note books for 1925 and 1926. This trip make with R. F. Nigrelli.

Kensico Lake etc – 1935

Feb 16  Visited a variety of places on the N.Y. City Water Dept Property with Deputy Commuis [?] Forster. Examined the screens at the Lawner [?] Chloinatiy [?] building. They held a large number of “sawbellies” last years. (small) and the year before (large). All the latter,
some [?] are [?], was a nearly ripe ♂.

Seemed a good sample for study.

Other fish on the screens were few:
- *Perca flavescens* 120, 100, 130, 130, 145, 132, 125 and
  160 mm [?] s.l. (the last a ripe ♀).
- *Catostomus commersoni* 140 mm s.l.
- *Osmerus mordax*! – one large fish preserved.

The upper end of this lake is a feine [?] place and here the young sawbellies congregate in summer. Also sunfish, catfish, and black bass callut [?].

*Craton [?] Renin [?] Reserair [?]* is supposed to be full of *Osmerus*. Carp attempt to reach it for spawning (?).

Many people were fishing through the ice on Wampus Pond for pickerel.

Visited springs at *Brysen [?] and at Canelus [?] agnew [?]* for trout planting sites. They look pretty good.

According to the gate keeper the sawbelles only stick on the screens in numbers during Jan. and Feb.

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Fed 22-

Visited Faunstock Park with *Comnus [?] Forster [?] and family. To examining [?] possibilities of the C C.C. new lake under construction. Poison Pond (Pelton Pond) feeds it and hillside springs. The farmer [?] said to hold *Brook [?] tsarct [?] and Pickerel in fair numbers. They desire to weed out the pickerel and plent [?] rain have trout. The general look of the place more suggests pond fish, but the summer temperatures should be determined.

Stopped off at *Tensica [?] and took another sample of sawbellies. They were not so numerous as the first time. The only other species seen was *Perca flavescens* 90, 85 mm. s.l. 115 ♂ ripe with running [?] smelt [?], 140 ♀ full and nearly ready to spawn.

Two lakes near *cuenel [?]* are reported to be noted for their Lake trout.

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March 2- Visited the screens at Kensico and calculated more *Pomolobus pseudoharengus* for study. The only other fish on the screens were about half a dozen yellow perch. The *Pomolobus* were about as numerous as last time.

Visited the inlet to Kensico. Ice beginning to leane but no fish life evident. Gulls and Black ducks about as before. Deer, fox and rabbit tracks common.

Visited Wampus pond which is draining; a good seing batran but with some deep “quicksand” mud holes. A dense growth of *Patamgetan* here.

Stopped at Mr. Cafpis house and Mr. Townsend.

Visited Henlack Reservoir. Fishermen catching smelt through the ice in large numbers. These fish should spawn in two weeks or a month. They bite well and are full of roe.

March 9 Visited screens at outlet. *Pomolobus pseudoharengus* still there in approximately the same questions.

Yellow perch were there again- few in number.

*Mutian* pictures were taken, - S. Dunton. R. Nigrelli.

Saw a muskrat at Bean race. *Ralus* about in some numbers. One young cock pheasant.

Fish and Black ducks at Kensico inlet.

March 16 Visited screens and took a sample of *Pomolobus*. They are much fewer in number than last time. *Perca flavescens* if anything a little more numerous- dead ripe

*Mutian* pictures were taken as last time- also clam in the pit where the screens one drawn from (S.C. Dunton and Mr. Faster).
Spring like and haleny [?] weather – heard one *Hyla* pickeing [?] near Van Cortlandt Park.

Spawning of early fishes should commence now at any time. Returned early. Mr. *Faster* [?] got from W. *Walfire* [?] some numerous for his trout. They were originally supposed to home [?] come [?] from Wampus Pond. They were *Abramis chrysalus* [?], *Catostomus commersoni* (about 2-3”), *Eupomotis gibbosus* (1 to 2”), *Baleasarna almstedii* [?] (2”).

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Wampus Pond 1935

March 28- Ice gone. Temp of water 44º. Rain. Aquarium collecting. This place since drainage is a soft mud hole- practically unsinkable.

The only fish taken were.

*Micropterus dolomieu* 1
*Perca flavescens* 3 running mult [?].
*Erimyzon oblongus* 2 – 4” ±

Painted, musk turtles and newts common.

*Schileades* [?] -2 grams.

March 30- Temp of water 46º- Fair [?].

Tried further seining. No fish. Mr. *Forster* [?] said he saw a pickerel and a sheie [?].

Set a lyke [?] in the p.m.

Visited also Hennock Reservoir.

The smelt run was reported as starting on the 25th. No fish or eggs could be found however but they are usually only to be seen at night. Gone pratlar [?]. *Foster* [?] reported a small run at 8:30 p.m. of mostly small (5”) fish.

March 31- Visited the dyke [?] onet [?] in the p.m. It contained over 10 large *M. dolomieu*, several perch and other fish. Left all contents in net far further

Catching – set 4 other dykes [?].

Visited the shore of Kensico just below the narrow bridge. Water here 45º F. Things still very quiet. No evident fish activity.
Byram Lake 1935

April 6- Visited Bryam Lake. Temp off deep shore 43º, in shallows 46º. No sign of spawning fish. – newts abundant, especially in upper part (macenthend pond). Eggs and specmatapheus [?] of Ambystoma common in some place. Saw an angler catch 2 Salmo irideus (18”) near dam. (First day of season) one musk turtle seen on bottom. Frogs calling; mostly peepers.

Visited Kensico at inlet. Some minaus [?] (sp?) in brook. No other fish life.

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Byram Lake 1935

April 20- Visited a variety of places with the Hartshaens [?]. At the upper end of Kensico and saw the minnows mated last time (Notropis sp?) One had a large sore on its flank and another a gash (crayfish work). A 8” pickerel Esox americanus [?] lay nearby.

No Pomolobus have appeared as yet.

At Bryam Lake saw an E. neticulater [?] of about the same size. Also one of this year, about 1” long already. Must have been spared just as the ice left. Could find no yellow perch spawn at either place.

Temp in shallow places of Byram 60º. In deeper places 55º F.
Small Sunfish
perch up brook

Ducks here

Wood Turtle here

Tadpoles

Bear Tracks

72° Tadpoles

Spring

49° Pines

Bass Nest

Bass here

Water burry Core

Painted Turtles here

Telegraph Polas

Ticked Yellow Perch often here

Rocks

Road

Kensico Reservoir
Kensico Lake 1935

May 18- Visited Waterbury Cove of Kensico Lake with Mr. Foster [?]. Temp of water.
   A small hillside spring (inside) 49º
   Shallow shore at upper end 73º
   Feeding stream 60º
   This place is cut off from the Lake pealoer [?] by a road on rip- rap [?]. There is probably no means of entrance or egress for ordinary pond fishes.
   Saw numerous Perca flavescens along road [?] shore.
   “many” small Eupomotis of last year 1” to 2” all over the place. None larger.
   Saw a number of young Micropterus salmoides – last year 2” to 4”. Saw 2 adults about 16” near what was evidently just the start of a nest.
   Saw what may have been one m. dolomieu – 3”
   “several” Esox reticulatus
   Nothing was seen that may have been a minnow.
   A pair of Black Duck were raised. – may be nesting here. Numerous deer tracks were about.
   Found the new tracks of wand [?] turtfull [?] end the maker, a large ♀ at the end of it about 20’ from shore.
   This looks to be a good place to work as it is full pasted [?] against all trespassing.
   See sketch map on page 122. – opposite

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Kensico Lake 1935

May 25- Waterbury Cove with Ethel, dog, and Nigrelli’s.
   The brence [?] of Black Duck still there. Black bass M. salmoides more numerous and evident than last week. Other conditions about the same. The “nest” seen last week silted up. A new one similar to it near the left telegraph pale of pay 122 medium sized Lepomis auritus monted [?].
   Horse Shoe Bend- a brace [?] of black duck with young. No Pomolobus to be found as yet.
   The numerous premeusehy [?] seen in the “ditch” still there. No other fish life.

   Byram Lake- Common ten fish [?] chrd [?] l.m b. bass (last years seen near dam. At the upper end more of the same: little activity. Temp. 66º.
   There is a large culnect [?] connecting Waterbury Cove with Kensico under the road. Saw once a dayen[?] l. m. b. bass (?) swim out of it.
Kensico Lake 1935

May 26-
Mr. Forster
Kensico at Bear Gutter outlet. 64°. *M. dolomieu* nesting. – 4 seen in about 100’. A large snapping turtle in Bear Gutter and carp *soaking* in mud.

Waterbury Cove- 70°- yesterday’s nest in *lorged* and the whale shore lined with new ones. Fish active. *S. salmoides*.

*Mr. Caffinstaube*- Carp seen splashing in *scramfy* area visible from his house.

Titieus inlet- lagoon in west side of *ront*? 22 - 69°.

Carp probably spawning. – much splashing. Saw *M. dolomieu* and *E. gibbosus*. A grehe (?) had a nest?

Croton Falls outlet- The last year in May 27 a large concentration of carp were seen by Mr. Forster. None whatever this time. Saw *S. furia* ?, *S. irideus* ?, *M. salmoides* ?, *C. commersoni* ?, 57°.

Lake Gilead. 65° many large *M. dolomieu* nesting. Saw *L. auritus*, *M. salmoides* (last years – 1) and a large lake trout 23” over all caught by a fisherman. Very thin and poor. The bass (hath species) just starting spawning.

Nests not finished or ♀’s in evidence. Lake Gilead is a beautifully clean cold pool.

On sawmill parking saw a Raccoon trying to cross the road. All cars stopped.

May 28
-S. Dunton.

Waterbury Cove- Large mouthed black bass still in the early stages of nesting. Temp 72°. One fish photoed (manies [?]).

The right maxillary abnormal – probably had been hooked.

Saw a King Bird catching insects (?) on the water, almost like a Petrel.

Horseshoe Bend 66° - no fish life evident but the minnows in the ditch and a few small *Lepomis auritus* and *Fundulus diaphanus*. Saw the Black duck and brood again- 12 young.

Byram Lake. As last time. Saw a young *Esox reticulatus* about 2” long. These were some nests in one of the coves. Both *M. salmoides* and *L. auritus* were about. A painted turtle pulled in its neck every time a nearby bull frog croaked.
The upper tip of Byram Lake, cutoff by the road was full of the nests of *Eupomotis gibbosus*. An early date? The temp. here 70º. In the lake proper [?] on the other side of the road 67º. Some of the nests were already well formed.

The surface of Kensico was so rough that the nests near Bear Gutter of *M. dolomieu*, if still there could not be seen. While photographing in Waterbury Cove, it was noted by Huth [?] that when the sun came out the male *M. salmoides* was much bolder and more apt to rest over it nest. The passage of a cloud usually caused a retreat to deeper water. If it was a large one the fish might reduin [?] before it became brilliant again. This is like the sunfish absenatine [?] of last year. It may be that passing clouds act like any passing shadow and that many of them have a cooling effect (on radiant heat) that discouraged activity.

A string of freshly dead yellow perch spawn was found east up on the shore in the horseshoe bend. There were obviously spawned recently.

Kensico Lake – 1935

June 1- Waterbury Cove- water turbid 70º. Bass nest photoed last time all silted over. No fish in evidence.

Upper Byram Lake- 71.5º Sunfish still on nests but not very active. The particularly attractive nest was still without an occupant.

Since last time there have been rains and cold snaps. Kensico may have backed up into Waterbury cove whereas Byram probably did not into upper Byram. Which can account for the temp. diff.
June 9- Conditions in Waterbury Cove and Byram Lake essentially as last visit. No activity on nests.

A large number of big snapping turtles have been caught in Wampus Pond.

Hands [?] have report that at Pines Lake a single half heated sunfish nest (?) but with no fish was seen on June 2- the first this year. A few fish were seen swimming about.

June 14- S. Dunton.

At Waterbury Cove the bass are all off their nests. No swarms of young to be seen at all.

Temp 82°.

*Leptomis auritus* are occupying all the old bass nests and have others of their own.

They were actively mating. Only one *E. gibbosus* with a half made nest was seen. The *L.auritus* are all small in size.

The bass are mostly at the head of the pond and some actually in the creek.

Since last visit we have had much sunshine and warm weather.

Large shiners [?] were leaping, bright yellow (♂′s?) *A.chrysalunes* [?] Bryam Lake.

At the upper (cutoff) end. Algae has gotten the better of the place and although *E. gibbosus* is spawning it does not seen to be very active.

In the cove at the lower end however these were two sunfish nests (one of each spines) both connected bass nests. Temp here also 82° F. In the main body of the lake the temperature was 73° in the surface layers.

Large mouthed bass successfully spawned in this lake. There were 3 families in the cove with their parents. One estimated at 2,000 young fish.

Six small (5") Rainbow trout were also in this cove which could not be below 73° in the
coolest part.

200' feet of marine film was exposed of *L. auritus* in old bass nests and spawning young *M. salmoides* with parent fish.

At the upper end of Bryam (cutoff) some old bass nests were noted which had not been seen before. They were in deep water.
Kensico Lake 1935

June 23- Visited Waterbury Cove. (rain nearly every day since last week). Sunfish nests mostly silted. ♂’s clearing them at and trying to mate with wandering females. No young bass to be seen. One school of 2" yellow perch about. Temp H₂O 82º.

Byson Lake. The young bass are out in the lake peaper (?) and breaking up. No adult fish seen guarding them. The stripes of the young L.m. bb in evidence. Saw a s.m.b. trying to feed on them. Both sunfish nests in cove deserted. Temp in cove 82º in lake peaper (?) 73º.

Wampus pond full of turtles and large bull frogs. Dykes (?) catching Chub suckers, sunfish Ameiurus, Esox americanus, and reticulatus. Bass had attempted to spawn here but the soft mud had chucked (?) them apparently. Sunfish (Eupomotis) new at it. Some were seen digging “Chimneys” at least a foot deep in the soft ooze. When the fish worked they are completely hidden in the cloud they raise; when not their back pakes (?) though the haze. See figure on page 136. Abramis (last years – 2") jumping all over lake. Temp 73º.
School of Pomolobus pseudoharengus

School of young M. dolomieu

82°

Eupomotus nest

Old Bass nest

Gatehouse

Inflow of Catskill Water

Stagnant Creek where there were formerly Cyprinids lived

Kensico Res.

Circled numbers refer to page 149 for notes. Squared numbers refer to page 151 for notes.
Kensico Lake 1935

June 30

Waterbury Cove- The water somewhat higher than on last visit. Rain on the 27th. A few new sunfish nests. The♂’s timid no♀’s seen. The season about over with various abandoned nests. Saw one♂ pursue a large-mouthed black bass about 6X his length. The bass net retreated rapidly although it could have swallowed the *Lepomis*. Temp 80º

*Byram Lake*- Water in cove and lake peaper [?] bath [?] 80º. One sunfish on nest in cove only, the other left. No trout to be seen. At the upper end of lake the algae is in a thick matt. No nests noted- but they started early here.

*Horseshoe Bend*- In cove below gate house 2 sunfish nests- poorly formed and the♂’s not very attentive. – one of *Eupomotis* and one of *Lepomis*. Also an old bass nest seen. Not far from it a school of young small mouths. There were about 10 mm long. The school was scattered – almost broken up with each fish heading a different way- an aggregation- not a school proper. These fish were all very dark in color, nearly black. Their small size as compared with the young large-mouths in Byram Lake is probably associated with the lower temperature of this catskill fed lake although in this particular cove the surface temperature was 82º.

Elsewhere in the lake it was only 61.5º.  

*Pomolobus pseudoharengus* has appeared at the upper end. Just below the turbulence cause by the inflowing water there was seen an aggregation of them about 100’ in diameter. They were continually breaking water and flashing in the sun. There must have been several thousand. There were probably feeding or may have actually been spawning. Although the group was constantly shifting about and changing shape the dark hocks [?] of the top layer sharned [?] them to be substantially in a true school formation. Some of the school out lines were as below.

A very large small-mouthed bass was seen to come up from below and catch one near the surface with apparent ease.
None were to be seen in the flow of the inlet, nor could other schools be found on a slow drive around the lake shore.

The two black duck families are still there, one in which the young are nearly as large as the mother.

The minnows have disappeared from the now stagnant creek. This place is now weedy and **scrampy** [?] and turbid.

Apparently Kensico is not a good sunfish place, or at least an account of its low temperature they are much delayed. The general turbidity probably does not help but clearly s.m.b. bass can successfully spawn here.

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**Kensico Lake 1935**

July 4-

Set 100’ gill net where *Pomolobus* were seen last trip. No success- net to light?

Mesh to large? 1 ¼ “ stretched.

Mr. Foster caught a 19” small-mouthed bass at the inflow (Horseshoe bend).

Although all spawning is over it was a ripe ♀. The oneris [?] were hemorrhagic, the spleen unusually large, the gall bladder full and inlayed, the stomach empty. Apparently the eggs were in the early processes of being absorbed.

A sunfish, that had been caught by an angler was in the same general condition. Perhaps this unusual season presented a number of ♀s from spawning.

All sunfish are off their nests and the young bass well settled.

But monies [?] of Mr. F. catching the ahere [?] bass and of one of the black duck families.

*Pomolobus* was about but not in the concentration of last trip.

Mr. and Mrs. Forster and Tom Hawley were with us.

Temp at shore line 75º, in open water 72º at inlet of Cattskill water 61.5º

Young schools of *Aneiusus* [?] are reported from Wampus Pond.

None of the game[?] wardes [?] seemed to see *Pomolobus* before last trip data but all none seen them in various places in the same general location since then.

Young fish, apparently *Fundulus diaphanus* were about.
Kensico Lake- July 1935

July 6- Visited Wampus pond. – Musk turtles and large leaches very much in evidence. Look some manius [?] of dragon flies. Could not get to visit the reported Catfish schools because of the unavailability of a boat.

Visited Byram Lake- The two sunfish nests photographed some time ago still evident but not attended. Sunfish seen leaping around and chasing one another (past canhial [?] centrifugal influence?)

Visited Horseshoe bend. Set gill net about 5 h to lecne [?] overnight. No sawbellies seen but then we were not there very long. Ducks in evidence.

With Ethel

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Kensico Lake 1935

July 7- Drew gill net set last night at Horseshoe bend. It caught absolutely nothing! The fishermen say that the bass are running unusually small this year. Took some pictures of another duck brood.

Visited Wampus pond to search for Ameiurus broods. Found one, rather small. (A. nebulosus).

This was close to shore and the fish had evidently not been out of the nest long. A single parent attended. She (or he?) was not more than 14 cm over all, surly last years fish. Immediately no larger specimen have been taken in the dykes [?] there. But hath [?] stills and manies[?] of the brood and the parent. A small sunfish 5cm hid in a nearly by rack [?] cremier [?] and every so often when the catfish was away wont [?] rush out and catch a one. The guarding parent was as timid as usual for such fish and hid most of the time in a rock cavity, presumably the one that had sheltered the nest. It definitely seemed to avoid inspity [?] the bread [?] if the sun was too bright, which made photography difficult.

The attempts of sunfish at nesting in Wampus may still be seen but the makers here apparently left. (See page 136).
Saw some small fish that were apparently young *Abramis* (1 cm long). Temp 82°.

Visited Waterbury Cove. – a single *Lepomis auritus* still on nest. The remainder apparently dissected.

Ethel.

Kensico Lake 1935

July 17- Went to Horseshoe Bend at 7:30 with Mr. Bacon, Bridges, and Nigrelli. Seemed far sawbellies at night fall, with a 100’ seine. Saw a few schools about but managed to get not a single fish of that species. Did get the following however.

- *Aplites salmoides* numerous young up to 6”
- *Perca flavescens* numerous young up to 1”
- *Bulesena ulenildti* (?) a few adults.
- *Notropis* sp. 1 adult?
- *Amphilupitis rupestsis* (?) several up to 4”
- *Lepomis auritus & Eupomotis gibbosus*

See map on page 138. The circled numbers indicate hauls. And got all the ashore species over clean bottom.

3 but only *Perca* and *Bulesena* (?) over thick mud that nearly broke the seine. This is *alumn* (?) settled *detrited* (?) according to Mr. Brown and is reddish in color.

4 represents where sawbellies were seen breaking water.

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Kensico Lake 1935

July 21- Seined in Horseshoe bend with Nigrelli, Bridges and Janes. Preserved the following (lengths mm standard length)
<table>
<thead>
<tr>
<th></th>
<th>Species</th>
<th>Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Eupomotis gibbosus</strong></td>
<td>100, 90, 88, 86, 80, 90, 77, 95, 88, 80, 50, 42, 48</td>
</tr>
<tr>
<td>2</td>
<td><strong>Lepomis auritus</strong></td>
<td>115, 89, 97, 82, 42, 45, 45, 47, 46</td>
</tr>
<tr>
<td>3</td>
<td><strong>Lepomis pallidus</strong></td>
<td>118</td>
</tr>
<tr>
<td>4</td>
<td><strong>Esox americanus</strong></td>
<td>160, 180, 194</td>
</tr>
<tr>
<td>5</td>
<td><strong>Aplites salmoides</strong></td>
<td>75, 80, 78, 80, 30</td>
</tr>
<tr>
<td>6</td>
<td><strong>Micropterus dolomieu</strong></td>
<td>85, 85, 34, 30, 31, 32, 27, 30, 28, 30, 31, 30, 28, 33, 33, 32, 28, 34, 27, 28, 27, 28, 28, 29, 24, 30, 28, 27, 25, 28, 26, 27, 26, 27, 28, 25, 24</td>
</tr>
<tr>
<td>7</td>
<td><strong>Perca flavescens</strong></td>
<td>29, 31</td>
</tr>
<tr>
<td>8</td>
<td><strong>Belasanna almstedti</strong></td>
<td>48, 37</td>
</tr>
<tr>
<td>9</td>
<td><strong>Fundulus diaphanous</strong></td>
<td>48 ♂ 57, 56 ♀</td>
</tr>
<tr>
<td>10</td>
<td><strong>Abramis chrysaleucas</strong></td>
<td>74</td>
</tr>
<tr>
<td>11</td>
<td><strong>Notropis whipplei</strong></td>
<td>69, 63, 65, 62, 63, 64, 62, 64, 53, 55, 45, 45, 41, 40 and one ♂ of 68 with full Breeding dress and pearl organs.</td>
</tr>
</tbody>
</table>

Added to these are the following species taken or seen at other times

<table>
<thead>
<tr>
<th></th>
<th>Species</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td><strong>Esox reticulatus</strong></td>
<td>19</td>
</tr>
<tr>
<td>13</td>
<td><strong>Ambloplites rupestris</strong></td>
<td>20</td>
</tr>
<tr>
<td>14</td>
<td><strong>Pomolobus pseudoharengus</strong></td>
<td>21</td>
</tr>
<tr>
<td>15</td>
<td><strong>Cristaner manycash</strong></td>
<td>22</td>
</tr>
<tr>
<td>16</td>
<td><strong>Ameriurus nebulosus</strong></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td><strong>Schilheades gyrurus</strong></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td><strong>Morone americana</strong></td>
<td></td>
</tr>
</tbody>
</table>

Although the intention was to catch *Pomolobus* none were seen, let alone caught. Some- population Tunsend [?] said he had not seen any recently but that they were breaking water in Rye Lake.

Seine hauls were made as indicated in the markers on page 138