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## Notes on the Amphibians of Venango County, Pennsylvania

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Venango County is situated about midway between Pittsburgh and Erie. Much of its 675 square miles has been glaciated, and the general topography is hilly. The Allegheny River flows through the county, and, with its tributaries, has cut deep valleys in the original plateau. The lowest elevation is about 870 feet above sea level, and the highest point just under 1600 feet. The average last killing frost of the winter falls on May 16, and the first killing frost in the fall, October 3. This makes the average growing season 140 days. The record low temperature for Franklin, the county seat, is  $-30^{\circ}$  F. (although at my home it once unofficially reached  $-35^{\circ}$  F.) The record high is  $106^{\circ}$  F. The average annual precipitation amounts to 41.25 inches. The short growing season probably affects the sizes of cold-blooded vertebrates, particularly snakes, as I can think of several species which do not grow as large here as they do in places where the summer is longer, although there may be other factors involved.

### SALAMANDERS

#### 1. MUDPUPPY—*Necturus maculosus maculosus* (Rafinesque)

Specimens were collected from Sugar Creek and Big Sandy Creek in Venango County. They are not nearly so numerous, apparently, as *Cryptobranchus* in these streams. We used to take many from the outlet of Edinboro Lake in Erie County, with fishing lines baited with worms. In the days when spearing suckers was possible, mudpuppies were observed in abundance in Erie County streams by torch light, but they were carefully avoided, as they were distasteful objects to remove from the spear.

#### 2. HELLBENDER, WATERDOG—*Cryptobranchus alleganiensis* (Daudin)

Since 1932, my brother David and I have caught over 750 hellbenders; about 650 of them from a stretch of Big Sandy Creek about three miles in length. This commercial collecting has apparently diminished their numbers considerably, as they are much more difficult to collect on that stretch of the stream at present. Originally one could find a specimen under almost every suitable rock. In daytime collecting, rocks must be turned over, and as this is rather strenuous work, considering the size of a rock it takes to shelter a specimen, it is easier to catch them at night when they are prowling about the bed of the stream. I believe that we never found two specimens under the same rock. One night the two of us collected 51 in three hours; on another occasion, alone, I caught 36 in two and one half hours. The largest specimen we took measured  $22\frac{1}{2}$  inches in total length. In Big Sandy Creek,

specimens rarely grow over 20 inches long. Specimens less than a foot long are never in evidence, a situation that has always puzzled us. They are probably active every month of the year. We have collected them in every month except January, February and March, at which times the creek is usually frozen over or the water is too high and roily.

Their feeding habits probably vary a little with the season, but there is no doubt that crayfish make up a very high percentage of their food. On April 28, 1941, 7 adults regurgitated 17 whole crayfish, many parts of others, 1 helgramite, 1 small sucker, 1 shiner and two other small fishes.

On May 23, 1932 we caught a hellbender that had a 7" sucker part way down its throat. The sucker was probably dead when picked up. In two days 8 adults regurgitated 35 crayfish and many parts of others.

On June 25, 1932 we dissected 27 hellbenders. None contained any vegetable matter, 3 had empty stomachs, 3 had small stones in their stomachs, 1 had a 4" sucker, another a 2" sucker, another a 2" shiner. 24 each had the remains of from 1 to 5 crayfish. Some hellbenders caught on May 22, 1932, regurgitated crayfish, 60 hours after being caught, that showed very little sign of digestive action. Apparently digestion is slow.

On August 15, 1932, we dissected 5 males and 5 females, and found but few crayfish and little digested matter.

On December 4, 1941 we temporarily placed 4 hellbenders in each of 3 five gallon buckets. The following day two of the buckets contained no regurgitated material, the third contained a sucker about 5" long, three other small fishes, and two crayfish.

On December 9, 1946, 12 specimens were dissected. 3 contained whole crayfish in their stomachs, 4 had from 1 to 4 crayfish claws in each, and 5 were empty.

From such slight evidence, it would seem possible that more fishes are taken in the cooler months, probably due to greater inactivity of crayfish at that time. Feeding is probably also curtailed in extremely hot weather. Like many other salamanders, however, the hellbender does not seem to be greatly discomfited by near-freezing temperatures. Although I have never taken any from sluggish, warm water streams, they can stand fairly high temperatures for a time at least. On several occasions we have kept them for a month or more in the middle of the summer, in a 55 gallon steel drum with an open top and three or four inches of water in the bottom. This water must have reached a temperature of at least 75° F. for 12 hour periods. The water was changed once or twice a week. I have never observed a hellbender out of water on its own volition, but they will live at least a few days out of water, if kept cool and moist. We ship them in damp sphagnum moss with a fair amount of success.

We have taken hellbenders from Sugar Creek and East Sandy Creek in Venango County and from the Allegheny River in Warren County. I have not taken any from our smaller trout streams. Generally speaking, they seem to prefer streams that are large enough to sustain small-mouth bass, and bass

and hellbenders are there probably for the same reason . . . crayfish are more abundant and more easily caught.

Egg laying takes place about the first of September for this locality. Egg counts from ten females, made on June 25, 1932, were from 350 to 900. It is possible that we counted the eggs for two seasons, however. The eggs ranged in size from less than 1 mm. up to 5 mm. in diameter.

On December 12, 1946, I counted the eggs from five females. One 18 inch specimen contained 245 eggs 2 mm. and over, 87 eggs 1 mm. and under, and 2 large 5 mm. eggs. I suspect that the large eggs were left over from the current season, and that the others represent the supply for two more summers. One other specimen contained 3 large eggs; another, 2. These large eggs were unconnected with the other egg masses. Four of the hellbenders contained from 155 to 455 of the 2 mm. and over sized eggs. The eggs under 1 mm. were not counted.

I know of several persons who have eaten the flesh of the hellbender and pronounced it good. We tried it once, and found it palatable, but quite tough. The toughness may have been due to improper cooking, or to the age and condition of the hellbender, however.

### 3. RED SPOTTED NEWT, RED EFT—*Triturus viridescens viridescens* Rafinesque

On the night of April 4, 1947, I saw a newt with a small whole worm in its mouth. There were many newts present at the pond. In a 15 gallon aquarium in which I kept some *Natrix sipedon compressicauda*, I introduced a couple of newts in the aquatic stage. The aquarium was divided into half dry area and half water, and was placed upon the window of my bed room. One night I heard several small squeaks from the cage. The following night, upon hearing the sounds again, I arose to investigate. I traced it to one of the newts, which was out of water on a stone. The faint squeaks came in series of two or three each, at intervals of from one to ten minutes apart. It was repeated on at least fifteen different occasions that night. Whether this sound was voluntary, or not, I can't say. The movement of the newt's throat gave the suggestion that it might have been a cough, or caused by other respiratory difficulty, but the impression I received was otherwise. The voice is so faint that it would not ordinarily be heard out of doors, or anywhere where conditions weren't very favorable.

The pond from which I collect most of my aquatic salamanders got very low in the summer of 1946, but while the water was still clear, newts were present in abundance. I collected 60 of them for an experimental worker, two-thirds of which were males. In the early spring of 1947 there were many newts in the pond, once again at its highest stage. In the summer of 1947 the water reached a very low stage in the pond, almost to where there was nothing but mud and algae. I netted a number of sunfish fry, with the intention of saving them to restock the pond later, but got no newts whatsoever. It is possible that they leave the pond when the water becomes too muddy, or, if late in the season, hibernate in the mud.

I have taken a few specimens of the red eft stage in Venango County, usually on forest roads, but they do not seem to be abundant.

4. SPOTTED SALAMANDER—*Ambystoma maculatum* (Shaw)

5. JEFFERSON'S SALAMANDER—*Ambystoma jeffersonianum* (Green)

The pond mentioned in connection with *Triturus* is located in Irwin Township, Venango County, on the farm adjacent to our nursery on State Highway Route 8, about 13 miles south of Franklin. The area of the pond varies from a few square feet in its near-dry stage, to about 4000 square feet when it is completely full in the spring. It is bordered by a few cat-tails, and near by is a clump of trembling aspen. It is surrounded otherwise by fields under cultivation or in meadow, and the nearest wood-lot is about 150 yards away. It was formed by digging limestone for agricultural use. Digging commenced about 100 years ago and continued intermittently up until about 1936. The water was usually siphoned out in the summer to facilitate digging. The greatest depth of the water at its highest stage is about 10 feet. The pond is about 1300 feet above sea level.

The pond became a convenient breeding place for many species of amphibians, as there were no other ponds for several miles. Recent strip mining operations for coal have provided a number of new ponds, the nearest of which is within a quarter of a mile. The strip mining operations are a blot on the landscape, but they will undoubtedly favor amphibian life.

I collected my first *Ambystoma* at this pond in 1931, and have made a great many trips to it since then. In the last 16 years I have walked over one hundred miles from my house to the pond and back, most of the trips on cold, rainy or snowy nights. Most of the trips were made in an effort to answer some of the following questions on *Ambystoma maculatum* and *jeffersonianum*: How early did they arrive at the pond? How long does it take them to reach the pond? From how far do they come? How long do they stay? Do they travel by some instinct or blunder upon the pond by accident? Some years it was impossible for me to be at the pond on the earliest favorable date, and at other times I couldn't visit it frequently enough to establish a probable date when they were last in evidence at the pond.

In 1931 I first visited the pond on April 16 and saw one *maculatum*. On the night of April 17 I observed one of each species; both were about 30 feet from the pond and apparently headed away from it. On April 18 I noticed one *maculatum* close to the pond, going toward it, and finally into it. On the next four nights I saw both species in the pond. On April 22, I caught one *maculatum* which was the last specimen observed. I visited the pond until April 29. The minimum of time that the salamanders could be found at the pond was 6 days for *maculatum* and 5 for *jeffersonianum*, although it was probably much longer.

In 1932 I observed the first *jeffersonianum* on March 30, the first *macu-*

*latum* on April 1. The eggs of *maculatum* started to hatch on April 21 while adults were still present. On April 25 I saw 6 *maculatum*, two of which were out of the water. I saw one *jeffersonianum* in the water on April 24 and caught another 300 yards from the pond on April 30. The minimum time these species were present in the pond in 1932 was at least 30 days for *jeffersonianum* and 25 for *maculatum*. Of course it must be understood that individual specimens may not remain in the pond for this long a period.

In 1933 I visited the pond on March 6. It was frozen except for a narrow margin at the edge. A shallower portion of the pond was completely thawed out. The nights had been very cold since February 24, and I was at the pond at 7:45 P.M. I saw 7 *jeffersonianum* and caught 2 of them. They could scarcely have reached the pond that night unless they come from the immediate vicinity (a fence row grown up with brush comes close to the pond across a field). If they came from any of the wood lots they must have done so during the night of February 24 or before. I searched the woods, fields, and roads, but could find none traveling. On March 7 I found a *jeffersonianum* about 200 yards away from the pond, apparently heading toward it. It was about 8 P.M. and the air temperature was 39° F. The nights from March 22 to 29 were freezing, and unsuitable for amphibian travel. On the 30, I caught 7 *maculatum*, four of them in puddles away from the pond, one of which was about 300 yards away. On April 3 I saw 2 *maculatum* in a puddle in a rut made by a car, apparently headed away from the pond. There were several *jeffersonianum* observed in the pond. In 1933 it is probable that *jeffersonianum* was in the pond from February 24 until April 3, or 39 days, *maculatum* for at least 20 days. The last *maculatum* was observed, out of the pond, on April 5.

In 1934, incomplete records show *jeffersonianum* to have been in the pond for a minimum of 7 days, *maculatum* for 12 days.

In 1940, the first favorable night for migration to the pond was on March 29. I saw the first *jeffersonianum* on March 30, two specimens, which probably couldn't have come far. I observed the first *maculatum* on April 7, and noted none subsequently.

In 1941, the first suitable night was that of March 31, when I observed four male *maculatum* and three males and three females of *jeffersonianum*. All of them were found on the dirt road, or the ditches bordering it, that separates the nearest woods from the field containing the pond, about 150 yards distant from the pond. I made a mark on the road near one specimen of each species, and then continued hunting. I left them undisturbed for ten minutes, then returned to find that the *maculatum* had not moved at all, and the *jeffersonianum* a distance of only two feet. On May 7 occurred the first rain since a drizzle on March 31. I caught one *maculatum* from the pond. The latter species must have been in the pond for at least 37 days.

In 1942 the first possible night for migration occurred on March 16. I then

observed two *jeffersonianum* on the above mentioned road, and seven in the pond; also one *maculatum* in the pond. Of the *jeffersonianum* five were males and four females. On the night of April 3 I observed both species in the pond. Both were present in 1942 for at least 18 days.

In 1946 I visited the pond on the first thawing nights of the spring, March 4 and 5. On the 5th I saw 3 *jeffersonianum* in deep water. On March 8, I saw 4 *maculatum* in the pond and 1 emerging from the woods 150 yards away. I caught 7 *jeffersonianum* and saw many more. March 8 was the first rainy night, preceded by several warm nights.

The first favorable night in 1947 occurred on March 24. The pond was still frozen except for a narrow margin of a couple of inches along its perimeter. I caught a *jeffersonianum* on top of the barely wet ice, 18 inches from shore. I observed specimens on April 4, 7, and 11. By the 20th they were apparently gone.

On January 1, 1948, occurred a thunderstorm with copious rainfall. The ground had previously been frozen sufficiently to imprison any salamanders wherever they might be. Thawing on December 31 and January 1 was sufficient to release them for migration if they were so inclined. The pond was only half full from the previous summer's drying out, and there was about three inches of water over fairly thick ice. No animal life of any kind was observed. It is probable that *Ambystoma* must hibernate a certain length of time before instinct calls them to renew their activities.

I have never observed adults of either species in the daytime, in or out of water. Late in the summer of 1932 I saw a larval *Ambystoma* eating a small tadpole. In 1934 I kept a specimen of *maculatum* in a fish bowl containing sand on the bottom, with enough water to cover the salamander's body. The temperature was fairly uniform from 65-70° F. The specimen was caught on April 10, and died on August 5, living for 117 days without any food. I have kept both species alive for periods of a year, by putting them in a five gallon bucket with damp sphagnum moss, kept in a cool dark place. When it occurred to me, I threw in a few small worms, sometimes months apart. These were apparently eaten, as when none were introduced for long periods, the salamanders became emaciated, but regained plumpness when sufficient worms were supplied.

On the night of March 21, 1933 the temperature became as low as 24° F. I was keeping 10 *jeffersonianum* and 3 *maculatum* in a wash tub, temporarily, in about an inch of water. I forgot to take them indoors overnight, and they became frozen in the ice, the water freezing almost solidly to the bottom of the tub. I let them thaw out very gradually. They were held in the ice for five hours, after which five of the *jeffersonianum* were dead, and all the rest living.

I once placed some *Ambystomas* in an aquarium with some flat-tailed water snakes (*Natrix s. compressicauda*). The snakes ate two *jeffersonianum* but the *maculatum* they would not eat, although several grasped the specimens in their mouths temporarily.

To summarize on some of the habits of *maculatum* and *jeffersonianum*, after a period of hibernation, when the ground is sufficiently thawed out in the spring, they head toward a pond, probably the first night that the air temperature is above freezing. This usually occurs during a rain, perhaps incidentally, as rains are common with above freezing temperatures in February and early March. I have seen them traveling on nights when it wasn't raining. They remain in the pond for an indefinite period, that may be over a month, as a species. As individuals the time spent at the pond is possibly much less. When leaving the pond they are probably more particular about choosing a rainy night, as it is later in the season, and the vegetation is likely to be dried out so that they can't keep moist. It is probable that the specimens reaching a pond first leave it earlier than those that reach it later. I have noticed no difference in the arrival or departure dates between the sexes. I believe that when they are ready to leave, the salamanders crawl out of the water a little ways, and if it is too dry, or too cold, they return.

It is doubtful whether they travel any great distance to the pond. All of the specimens I have seen out of water travel very slowly, and the fact that they may be found at a pond so very soon after it is physically possible for them to travel, indicates that at least the early arrivals must have hibernated close to the pond. I have examined the pond many times in the late fall and early winter in an attempt to ascertain if any *Ambystoma* spent the winter in the pond, but I have never seen them then. (Incidentally, I have never taken *Ambystoma opacum* in Venango County.)

It is probable that some instinct prompts them to the direction they are to travel, and that they do not find the pond by accidental wandering. The fact that they are so very rarely seen anywhere in the open except in the vicinity of a pond, and that they may be observed in such numbers in the pond, would discount accidental discovery. Only once have I found a specimen in the summer. It was a *jeffersonianum* and was found in a rotten log about 300 yards from the pond, in our woods. From the numbers observed at the pond in the spring, and from the deduction that they can't travel great distances in the short space of time they have in which to reach it, it seems odd that they are not more frequently met with in the summer, particularly when one searches, as I have, over much presumably favorable habitat such as rotten logs and stumps, slab piles, sawdust heaps, and other litter.

6. DUSKY SALAMANDER—*Desmognathus fuscus fuscus* (Rafinesque)

This species is fairly common in Venango County.

7. MOUNTAIN SALAMANDER—*Desmognathus fuscus ochrophaeus* Cope

I have taken more specimens of this than the former in Venango County.

8. RED-BACKED SALAMANDER—*Plethodon cinereus cinereus* (Green)

This species is very common, and may readily be collected anywhere in forest land, under rocks, fallen trees, and other similar cover. I have also collected one in sphagnum moss in association with *Hemidactylum*.



9. SLIMY SALAMANDER—*Plethodon glutinosus glutinosus* (Green)

The slimy salamander is sometimes called the spotted salamander by the uninitiated. I have collected some from forest land, and caught one in our own basement.

10. FOUR-TOED SALAMANDER—*Hemidactylium scutatum* (Schlegel)

One specimen was taken from under a slab on a woods road near South Sandy Creek, and another from sphagnum moss near Scrubgrass Creek.

11. PURPLE SALAMANDER—*Gyrinophilus porphyriticus porphyriticus* (Green)

I have taken this species from springs and small runs, and one specimen from sphagnum moss. On April 15, 1939 I was fishing in Dennisons' Run for trout. On a small hook baited with a worm, I was surprised to catch a large specimen from rather swift water.

12. RED SALAMANDER—*Pseudotriton ruber ruber* (Sonnini)

I have taken a number of specimens, both larval and adults, from Venango County. On July 26, 1939 I caught one while it was crossing the concrete highway between Pearl and Bullion, in the rain.

13. TWO-LINED SALAMANDER—*Eurycea bislineata bislineata* (Green)

I have collected a few specimens from the county.

14. LONG-TAILED SALAMANDER—*Eurycea longicauda longicauda* (Green)

This species is probably a little more common than the preceding. I have made no effort to collect extensively any of the *Plethodontidae*.

## FROGS AND TOADS

The following notes on frogs and toads consist mostly of dates when each species were first taken for the year mentioned. In most instances, the date given was the earliest that the call of the species was noted; in a few cases they were taken on that date but may have been present earlier. For *Bufo*, practically all of the dates represent the first night they were heard calling in this vicinity. A short distance farther south, frogs emerge a few days earlier, and in the latitude of Pittsburgh, about 60 miles south, they may emerge from one to two weeks earlier.

15. AMERICAN TOAD—*Bufo terrestris americanus* Holbrook

First date calls were heard: April 25, 1932; April 10, 1933; April 27, 1935; April 28, 1940; April 12, 1941; April 15, 1942; April 5, 1947. Dates of the last nights of calling are much more difficult to record. In 1940 the last call was noted about May 26. The same date was recorded for 1941. In another pond, near Bullion, my brother and I collected 77 specimens in thirty minutes

on May 1, 1940. They are never very numerous in the pond near my home. The habitat is probably not as suitable.

On August 23, and again August 24, 1946, I caught immature *americanus* that measured 8 mm. in length, about a quarter of a mile from the nearest pond.

16. EASTERN CHORUS FROG—*Pseudacris nigrita triseriata* (Wied)

First dates collected or heard: March 30, 1932; March 31, 1933; April 9, 1934; April 4, 1940; March 31, 1941; March 17, 1942; March 8, 1946; April 4, 1947. On March 8, 1946 a specimen was caught crossing the highway in the rain, before any were heard calling at the pond. There were no species of frogs present at the pond up until that date. In 1934 *Pseudacris* was more common at the pond than *Hyla c. crucifer*. Before then, and more particularly since then, they have been decidedly fewer than *crucifer*.

17. SPRING PEEPER—*Hyla crucifer crucifer* Wied

First dates: April 16, 1931; March 30, 1932; March 30, 1933; April 2, 1934; April 6, 1940; March 31, 1941; March 17, 1942; April 4, 1947. In 1934 they quit calling about the first of May. In 1933 they started to scatter from the pond about May 2, although some were still calling in the vicinity. On April 13, 1933 one could hear feeble calls when the air temperature was 30° F. On April 22 of that year, the weather became cold, and there was an inch of snowfall on the ground. The temperature was 32° and it was snowing and raining at the same time. The *Hylas* were sitting out of the water, but their calls were feeble and infrequent.

18. BIG TREE FROG—*Hyla versicolor versicolor* LeConte

First dates: May 27, 1931; May 22, 1933; May 26, 1941; May 24, 1940.

19. BULL FROG—*Rana catesbeiana* Shaw

Bull frogs were never found in the pond near my home. They are present in most of the larger streams of the county, and I have collected them from the Allegheny River and Big Sandy Creek. On August 10, 1932, at Milton, Pennsylvania, I saw a house cat carrying a frog in its mouth, either of this or the following species.

20. GREEN FROG—*Rana clamitans* Latreille

My notes on this species are scant. I have found them at the pond as early, at least, as April 19, and they are present in the pond throughout the summer as long as any water remains. If they hibernate in the pond, they emerge rather late, as they are not ordinarily seen early in the spring.

21. PICKEREL FROG—*Rana palustris* LeConte

On April 19, 1931, pickerel frogs were observed in great numbers en route to the pond. They were still present on May 25. Adults are not found at this pond in the summer months, but newly transformed specimens are very numerous. First dates observed: March 30, 1932; April 3, 1933; April 9, 1934; April 6, 1940; April 3, 1942; April 11, 1947.

22. LEOPARD FROG—*Rana pipiens* Schreber

This species is rare at the pond, and throughout this part of Venango County it is much less common than *palustris*. I caught an immature specimen at the pond in 1932, and an adult on April 7, 1940.

23. WOOD FROG—*Rana sylvatica sylvatica* LeConte

First dates: April ?, 1931; April 2, 1932; April 5, 1933; April 7, 1940; March 31, 1941; March 16, 1942; March 8, 1946; April 5, 1947. On March 8, 1946 a specimen was caught half way between the woods and the pond. *Sylvatica* appears to stay at the pond a much shorter period than the other species.