

AMBLYSTOMA TIGRINUM ON LONG
ISLAND. II.*Records of Larvae.*

Investigation concerning the larval stages of this species during the past season were restricted to one station, namely the I. Hudson Estate near Syosset, which comprises about 100 acres, situated in the hilly or moraine region of Long Island. With the highest elevation, about 200 feet on the western part of the estate, drainage is through the eastern part, where in meadow and woodland there are several small permanent ponds and in the spring and early summer numerous temporary pools.

On the first visit to the region, May 31st, both the ponds and pools were examined thoroughly, the results showing an abundance of aquatic life, including spotted and painted turtles, several species of frogs, tadpoles, waternewts and a great variety of aquatic insects. In addition some of the permanent ponds have been stocked with gold fish; others contain yellow perch and sunfish. Larvae of *Amblystoma*, more or less common, were found only in the temporary pools. This observation was verified on subsequent visits.

Condensed field notes and notes on captive specimens are as follows:

May 31st, 1915. Pools in woodlands, with very muddy water on account of cattle, are swarming with tadpoles of *Rana sylvatica*. Caught six larvae of *Amblystoma tigrinum* from 2 to 3 inches long. In color they are dark olive green above, heavily mottled, and uniform dull white below. Fins on tail and back are broad, blade-like and translucent. Head is large, wider than body. Eyes prominent, iris golden yellow, pupil black. Gills long and feathery, three on each side, carried upright and forward when the larvae are resting. Limbs on small

specimens are short and feeble, on large ones rather large and stout. In the woodland or muddy pools the larvae frequently come to the surface for air.

In a deeper and clearer pool, in an adjoining meadow, specimens of larvae ranging in length from less than 2 to over 4 inches, could be readily discerned as they came up for air, though less frequently than those in the muddy pools, or as they remained stationary, supported by a blade of grass or some other slight object, perhaps ten inches below the surface. Averaging larger in size, the larvae in this pool also display without exception, a brighter color of olive green and their general appearance suggests small pike. Only two specimens of moderate size were captured. The entire catch of the day died on the way home and has been preserved in fluid.

June 15th. Second Visit to Hudson Estate. Water in the pools is much lower. Caught nine larvae, 3 to 3½ inches long, in muddy pools, and six 2½ to 4 inches long, in clear pool. In an aquarium at the Museum the larvae proved voracious feeders, preferring tadpoles (*Rana sylvatica*) to earthworms and caterpillars. Small larvae had to be separated from larger ones of their own kind to prevent cannibalism.

June 19th. Largest larva measures 4½ inches. Absorption of gills is beginning.

June 21st. Third visit to Hudson Estate accompanied by Mr. Deckert of New York Zoological Park.

Muddy pools in woodlands had dried up with the exception of one, still containing a few gallons of water. Two Green Herons and a number of Purple Grackles were observed feeding at this pool. The remaining water was alive with tadpoles, well advanced in development, and larvae of *A. tigrinum*, some with gills partially absorbed, others still normal. 32 were counted. Diligent search for specimens

which had completed their metamorphosis failed. In the clear, meadow pool which though reduced still showed a considerable volume of water, Mr. Deckert captured ten specimens of larvae, 3 to 4 inches long. None of these showed traces of transformation.

June 24th. Absorption of gills and fins on largest aquarium specimen ($4\frac{1}{2}$ inches) is proceeding rapidly. Color is much darker.

July 12th. During a two weeks' absence all but two of the larvae died while undergoing transformation. The largest living specimen measures $4\frac{1}{2}$ inches, the smaller one, $3\frac{1}{4}$ inches. Both show only traces of gills; fins have been absorbed. Limbs are large and stout. Color above grey-black; below slate colored.

July 20th. The two living specimens have been transferred to a vivarium with wet, pebbly bottom and rock-shelter. They feed sparingly on earthworms and toad tadpoles. Gill slits are entirely closed. Dull yellow blotches in irregular arrangement begin to appear.

August 15th. Metamorphosis complete. Color pattern same as adults. Food, principally earthworms, is taken freely. Both specimens are sleek and plump.

September 13th. Large specimen total length $5\frac{5}{16}$, tail $2\frac{1}{4}$ inches. Small specimen total length $4\frac{5}{16}$, tail $1\frac{3}{4}$ inches.

October 18th. Large specimen total length $5\frac{7}{8}$ inches. Small specimen total length $4\frac{7}{8}$ inches.

February 17th, 1916. Large specimen total length 6, tail $3\frac{1}{4}$ inches. Small specimen total length $5\frac{5}{8}$, tail 3 inches.

Pending investigations to be continued during the coming season and especially needed concerning breeding habits and early stages, it has been thought best to publish a brief statement of the information obtained so far, in the hope that others, interested in

the subject, may share in the investigations and thereby render as complete as possible the detailed account on this salamander to be published later.

GEO. P. ENGELHARDT,
Brooklyn, N. Y.

WINTER ACTIVITY OF AMBLYSTOMA PUNCTATUM, BAIRD

At noon, Dec. 23, 1911, Manchester, Maine, I found a medium-sized adult crawling on the snow. A warm rain had fallen the night before, but it had cleared off warm and the mercury stood at 42 degrees F. at the time. There was about three inches of snow left on the ground.

The place was on the south slope of a hill in open pasture, about one-eighth of a mile from a little swampy stream. The animal had evidently come from this stream but I doubt if it was going to any definite place, for it was crawling towards a ridge of high land where there was no open water within a quarter mile.

Probably the warm weather had aroused it from hibernation, but why it should have started off across country on the snow is not so clear.

PHILIP H. POPE,
Manchester, Maine.

GREEN FROG ACTIVE IN DECEMBER

On December 18th, 1915, I saw a full grown green frog (*Rana clamitans*) hopping along the edge of Swan Creek pond, one mile east of Patchogue, N. Y. It was somewhat sluggish in its movements, and I readily caught it. There were no excavations by which it could have been thrown up from the mud. The day was warm and rainy, but there had been a cold spell a few days previously.

WM. SANWALD,
Patchogue, N. Y.



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