four inches, and anal spines of a sunfish, about three inches long. There were also pieces of the shell of a crawfish. The absence of suckers (catostomids) was unexpected. Their pharyngeals would have been as easily picked out as those of the cyprinids, and supposing that their bottom habits protected them, then how about the crawfish?

Of the 113 minnow pharyngeals, 90 were identified as from the golden shiner (*Abramis crysoleucas*), 21, not satisfactorily determinable, were perhaps also this species, and two were from different individuals of the goldfish (*Carassius auratus*). That particular nest of kingfishers was then concerned with cyprinids, of which at a minimum estimate it accounted for 76 individuals, and of these the golden shiner made the greater part, probably almost the entire number.

The golden shiner is probably the most abundant fish in still and slow-moving fresh-waters near New York City, yet it would scarcely figure as largely in the kingfisher's bill of fare were there no discrimination in its favor. There is no obvious reason why the goldfish, which is also abundant, should not be as readily obtained. The writer suspects that the kingfisher selects that fish which in a given region furnishes it the best food supply, and specializes in the capture of the same disregarding other species. It would be interesting to learn if the many kingfishers which hunt

it), have made me hesitate in publishing these notes, but I will give them for what they are worth.

Practically all the specimens studied came from a spring near Haverford, Pa., in which spring both adults and larvae were very abundant, and ten or fifteen could be caught at any time. Some of the larvae were much larger than small adults, my smallest adults being 80-90 mm. long and my largest larvae about 110 mm. long. These larvae were distinguishable from those of *S. bislineatus,* by much larger size and uniform coloration. The smallest seen were as long (50-60 mm.) as the largest larvae of *S. bislineatus* seen and much more robust.

In January of this year I started keeping the larvae alive with a view to watching the transformation. I continued this into the spring with no success, the larvae all dying in a few days, or living on with no signs of transformation.

However, in a series of ten larvae collected on May 20, the largest (110 mm.) showed tinges of red in the ground color and smaller gills. On May 22 this specimen had lost all the filaments of the gills and had taken to lying entirely out of water.

May 23—The gill stumps were shrivelling, the tail fin had gone, and the color was more like that of the adult. A smaller one of the same lot of May 20 (90 mm.) had also lost the tail fin and showed a reddish tinge. The gill filaments also were smaller.

May 24—A (the large one) gills were stubs—eyelid developed—mouth nearly developed—B (the smaller one) eyelids developing—mouth developing—gill filaments ragged.

May 27—A, mouth developed fully—tongue free, gills mere stubs.

May 28—I collected an adult which showed unmistakable signs of having just completed the transformation.

May 29—Not much change in larvae from May 27.

May 31—I killed and preserved the large larva A, and the recently transformed adult of May 28. The gill stubs on A were very small and no longer than their width.

June 1—B has lain out of water for two days. The gill filaments are going.

June 4—B lying out of water all the time. Practicing bucco-pharyngeal respiration. Gill filaments about gone. This specimen was then killed and preserved.

It is thus apparent that *Spelerpes ruber* begins to transform in May. The time of breeding is not known to me and I can find no record of it. The animals remain active all winter in springs. At the time of transformation they are probably well over a year old, as two lots can be distinguished, 80-110 mm. long, and 50-60 mm. long. This would seem to make the duration of the larval period about two years, and would also point to a definite breeding period, probably in the spring and summer. Of course these last statements are simply conjectures.

The question of *Siren operculata* Beauvois arises here. I am of the opinion that before so well established a name as *Spelerpes ruber* be changed, it should be shown beyond the shadow of a doubt that the larva on which Beauvois founded his *operculata* is identical with the larva of *ruber*.

E. R. Dunn,
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NOTES ON AMBLYSTOMA TIGRINUM AT FLAGSTAFF, ARIZONA.

During the month of May, 1913, the writer had good opportunities to study this salamander at an altitude of a little under 7,000 feet.