

a larva at this period less than three centimeters long or more than four, while some of the bright red ones are only five centimeters long, that is, two inches. Now in the national collection I found larvæ yet with remains of gills, and some of these larvæ were two and three-fourths inches long. These were from Jersey City, N. J. Not long ago Prof. Gage sent me a specimen for examination, which he had taken at Wood's Holl, and this one is fully as large as those I have mentioned. The smallest red specimens mentioned by Prof. Gage are two inches long. Some of the red specimens seen by me at Washington were only an inch and a half, an inch and three-quarters, and one only an inch and five-sixteenths long. Here we have evidence of very great variation in the size of the larvæ at the time of transformation. I believe also that there is, during the transformation, a considerable shrinkage in the size of the whole body. Such shrinkage occurs during the transformation of *Ambystoma microstomum*, and probably of most salamanders.

Thus, while we are gradually getting at a correct knowledge of this interesting animal, the green triton, or newt, it is a good subject for further study.

THE PROPER SYSTEMATIC NAME OF THE PRAIRIE RATTLESNAKE. By O. P. HAY.

THE BLIND CRAYFISHES OF INDIANA. By W. P. HAY.

THE CRUSTACEA OF INDIANA. By W. P. HAY, M. S.

The following list of the crustaceans of Indiana is to be regarded as a first contribution to the knowledge of this interesting group. Although it represents the labor of quite an extended period, the labor was confined mostly to the central part of the state, and to the larger forms; and there still remains the great multitude of microscopic forms only a few of which are here numbered. It is for the purpose of directing the attention of the

Indiana Academy to this interesting and much neglected part of our fauna that this paper is written.

Cambarus argillicola Faxon. Very common in central Indiana. It is very similar, both in appearance and habits, to its near relative, *C. diogenes*. Like this latter species, *C. argillicola* burrows and raises mud chimneys at the mouth of its hole. It is apparently of smaller size than *C. diogenes*, the largest specimen measuring barely $2\frac{1}{2}$ inches from the rostral spine to the end of the tail. The bearded hand spoken of by Dr. Faxon in his monograph is hardly a constant feature. Indeed, of all the specimens which have come under my notice at least half, without distinction as regards sex, were without the beard. The eggs are laid in the early spring, often, it seems, before the females retire to their burrows. A small female bearing eggs was taken from a pond April 2, and a female with young was dug from a burrow April 20. The burrows were excavated in the tough clay, near a pond, to a depth of about $2\frac{1}{2}$ feet.

Cambarus bartonii Fabricius. This species will probably be found to occur throughout the state. It is much more common, however, in rocky localities than elsewhere. It is a cave-loving species, occurring in nearly every one of the caverns of southern Indiana. I have often observed both it and *C. pellucidus* in the same cave.

Cambarus blandingii Hagen. A number of specimens from English Lake seem to be this species, though they may be the following, which is reported by Dr. Faxon.

Cambarus blandingii var. *acuta* Faxon. This species is reported from Wheatland, Knox county.

Cambarus diogenes Girard. In early spring this is the most conspicuous crayfish, both by its abundance, large size, and fine coloration. The females far surpass any other species in the different colors, which are beautifully blended. As they are strictly a burrowing species, they are to be found only during the breeding season, which begins about the first of April. At this time they are very common, even in the daytime. At night they are abundant. Thirty-five large specimens were collected in one evening, April 2, 1892. Of this number twenty-nine were males and six females. A number of females found in copulation were separated from the rest to observe the time elapsing before the eggs were laid. The first eggs were laid April 18, while another specimen of the same lot, with well developed but unlaid eggs, was killed and dissected April 20.

After the breeding season they retire to their burrows, and for the rest of

the year their presence is known only by the chimneys which they raise over the mouth of the holes.

Cambarus immunis Hagen. This species is exceedingly abundant during the summer in muddy ponds. They burrow into the mud on the drying up of the ponds. I have never observed them in running water.

Cambarus pellucidus Tellkamp. The common blind crayfish occurs in many of the caves of southern Indiana. They are usually small, the largest I have ever seen, among 40 specimens, being barely 2 inches in length. They are kept from extinction only by the inaccessibility of their home. They are very conspicuous when in the water, and are very easily caught. When startled they are utterly at loss where to go, and often dart out upon the shore. I think it may be safely said that as a rule they grow spinier as one advances southward, although there are exceptions. A female collected in Wyandotte Cave is almost without spines; but three specimens from a small cave near there are exceedingly spiny.

Cambarus pellucidus var. *testii* Hay. This crayfish, although at first thought to be a distinct species, is probably only a variety of the preceding, characterized by the entire absence of spines. There are no teeth on the rostrum or spines on the sides of the carapace, things never lacking in the common species. The type specimens, 12 or 13 in number, were collected in Mayfield's cave, near Bloomington. They have since been received from Truett's cave, in the same county.

Cambarus propinquus Girard. This is apparently the common species throughout the state. In the central portion it is very abundant at all seasons of the year, being almost invariably found in running water. The median carina on the rostrum, one of the characteristic marks of the species, may vary from a long ridge to a mere papilla-like elevation. The color in life is a dingy dark olive. The tips of the chelæ are sometimes red, and the spines on the rostrum brown.

Cambarus putnami Faxon. In his "Monograph on the American Astacidae," Dr. Faxon mentions the probability of this species occurring in the southern part of the state. I have specimens taken between Paoli and Wyandotte cave, in the summer of 1888.

Cambarus rusticus Girard. This species, which is very like *propinquus*, is tolerably common. It has been collected at Madison and at Indianapolis.

Cambarus sloanii Faxon. The only known locality for this species in Indiana is in the region about New Albany.

Cambarus virilis Hagen. Is very common and widely distributed in the northern part of the state. I have also found it at Irvington.

Palæmon ohionis Smith. The river shrimp has been taken in large numbers in the Ohio at Lawrenceburg. It will probably be found to occur in the lower Wabash and possibly some of the other large streams in the south of the state.

Allorchestes dentata Smith. This small crustacean was taken on one occasion from a small pool along Fall creek, north of Indianapolis. It has also been observed by Prof. S. A. Forbes in northeastern Indiana.

Crangonyx gracilis Smith. Very common in stagnant water in central Indiana. I have never observed it in the streams. Early spring is the best collecting time for this crustacean, as it then attains its largest size.

Crangonyx packardi Smith. I have not yet collected this species, but it is said to be common in the southern portion of the state.

Crangonyx mucronatus Forbes. This interesting species, I think, will be found to occur over a large portion of Indiana. I have found it under logs in a swamp near Irvington, have taken it from at least one well in the vicinity, and have observed and collected it in nearly every cave in Monroe, Lawrence, Crawford and Harrison counties.

Mancasellus tenax Harper. An exceedingly large and abundant species which may be found in early spring in the water courses. I have often observed it in stagnant water, but in running water, as at the mouth of a tile drain, they may be collected by the hundreds.

Asellus communis Say. This species appears to take the place of the preceding species in the ponds. I have rarely observed it in running water, but in early spring it is very common in the ponds about Indianapolis.

Asellus stygius Packard. This interesting blind *Asellus* I have found in two wells, three or four miles north of Irvington. It is also very common in the caves, but does not appear to grow to so large a size as those taken from the wells.

Scyphacella putea W. P. Hay. This very curious and remarkable crustacean is as yet undescribed, but is here included. The type specimens were obtained from a well in Irvington. Soon after the specimens were taken the well was cleaned, and no crustaceans have been observed since. Its nearest relative is *Scyphacella arenicola*, a salt water crustacean.

Branchipus vernalis Verrill. In the central portion of the state, about Irvington, this beautiful crustacean is very abundant. In one sweep of the

net I have taken over a hundred of them. It has also been taken at Bloomington, Ind.

Branchipus gellidus W. P. Hay. Abundant at times about Irvington. It was described February, 1883, in the American Naturalist, from specimens collected in the early spring of that year. On the drying up of the ponds it disappeared, and although careful search was made every winter after, it was not seen again till April, 1892, when it was again found to be common. It is much smaller than *B. vernalis*, and seems to congregate in little groups of 15 to 20. They are very delicate and die soon after capture.

Euphiloscia elrodi Packard. This is the only "sow-bug" described from the state, although several species are common.

Diaptomus sanguineus Forbes. At times so common as to give the pond water a pinkish color. I have observed it only about Irvington.

Daphnia rosea Sars. Very abundant, in company with other species, in ponds about Irvington.

Ceriodaphnia quadrangula. Common, in company with other species, in ponds about Irvington.

Ceriodaphnia cristata Birge. Occurs frequently with the two preceding species.

Cyclops parvus Herrick. Collected from ponds about Irvington.

Cyclops insectus Forbes. Collected from ponds about Irvington.

It will be seen that so far thirty-one species of crustaceans have been collected from the state. A little careful search would doubtless more than double the number.

NOTES ON ELAPS FULVUS. By A. J. BIGNEY.

About two years ago a very beautiful snake was taken to the drug store of V. W. Bigney, at Sunman, Ripley county, Indiana; it having been found near Milan, in the same county. It was preserved in alcohol and a little more than a year ago it was sent to me for identification. After carefully examining it I pronounced it to be the *Elaps fulvius*, or bead snake, belonging to the order of the Harlequin snakes.

A careful study has revealed some interesting facts. The order to which this snake belongs is very widely distributed, being found not only in North America but also in Southern Asia, Australia, South America, and the isles