

call

- VI. Taken July 29, 1895. Depth of haul, 25 ft. Killed and preserved in formalin.
  - VII. Taken July 12, at night. Surface skimming, using a No. 2 Bolting Cloth net. Killed and preserved in 10 per cent. formalin.
  - VIII. Taken Aug. 1, 1895, at 9 a. m. Depth of haul, 10 ft. Killed in Flemming's fluid. Preserved in 70 per cent. alcohol.
  - IX. Taken Aug. 7, 1895, at 4 p. m. Depth of haul, 110 ft. Killed in Flemming's fluid. Preserved in 70 per cent. alcohol.
- I, II, III, IV, V, VI, VII, VIII are from Turkey Lake or Lake Wawasee; IX is from Tippecanoe Lake.

DECAPODA.

The following crayfishes from Turkey Lake were identified by Mr. W. P. Hay, of Washington, D. C.:

- Cambarus blandingii acutus* Girard.
- Cambarus propinguis* Girard.
- Cambarus virilis* Hagen.

ON A SMALL COLLECTION OF MOLLUSKS FROM NORTHERN INDIANA. BY R. ELLSWORTH CALL, M. D., PH. D.

The mollusks herewith reported on were collected by the members of the Indiana University Biological Station during the past summer. The region is sufficiently well characterized in the report of Dr. Eigenmann, the Director of the Station, and it is necessary here only to allude to its salient features.

The locality is on the divide separating the drainage areas of the Great Lakes and the Wabash River. In certain places the two drainages are practically identical and thus afford opportunity for the intermingling of the two faunas. The lakes and streams are all well within the limit of glaciation in former ages and their beds and shores are boulder-covered or lined. The bottoms of shallower portions of the lakes are gravelly or muddy, while the deeper portions are either muddy or sandy. Corresponding with these physical factors are certain features of molluscan distribution and modification, which it is the object of these notes to adduce and emphasize.

UNIONIDÆ.

*Anodonta decora* Lea. Two specimens of this form were found, both of which were obtained in Syracuse Lake. The specimens were very much more fragile and far thinner than is usual for this species, even when secured from lakes and ponds. The epidermis is quite pale, the lines of growth crowded, and the nacreous deposit very white. Forms from sluggish flowing streams in southern Indiana and elsewhere in the Ohio basin are very highly colored, both interiorly

and without. As in other members the habitat does not appear to be her deposits of calcareous matter, in unfavorable to the normal develop

*Anodonta ferussaciana* Lea. (mens from Syracuse Lake.

The resemblance of these shells indeed. The lake form is lighter men from the creek.

*Anodonta ferdinanda* Lea. Three from Turkey Creek.

The shells submitted are ve ultimately, be separated from the same locality the lake form fragile. A very interesting fact species and *Sphaerium* from the s deep water are very much thin Also, those which are found on tl than those on the southern bea ing winds, which are from the gravelly than the northern. Th favor thicker development of the they need greater powers of res habitat and this finds expression shells which live at the lake's bo waves and being deeply imbed thinner shells.

*Margaritana calceola* Lea. A

This specimen is a very char the inner surfaces of the valves marked in the type specimens v itana deltoidea Lea are synonyms

*Margaritana rugosa* Barnes. Creek, all of which are charact

*Unio coccineus* Lea. One sp

The nacre of this shell is c which fall under this form, th often found in collections labe

by the characters of the cardinal teeth and the rounded, unangulate character of the posterior slope. In *Unio rubiginosus* there is a well marked ridge extending quite to the posterior margin. The flat and white nacreous form also may occasionally be seen in collections as *Unio gouldianus* Lea, now a well recognized synonym.

*Unio fabalis* Lea. Twelve specimens from Tippecanoe Lake.

This is one of the smallest of our *Unios*. The shells submitted do not present any variant features other than the very light coloration so characteristic of all the lake shells which we have seen. *Unio lapillus* Say is a synonym.

*Unio gibbosus* Barnes. This form is represented by three specimens from Turkey Creek. These are all much thinner and lighter than the same species from the Ohio and Wabash rivers, in both of which it is a common shell. It seems to be very abundant in certain of the lakes of northern Indiana, notably Lake Maxinkuckee. The nacre of these three individuals is very dark purple. Similar shells to these probably have led to the reference of *Unio campdonata* Solander to the western fauna.

*Unio iris* Lea. Two characteristic specimens from Turkey Creek. Like its near relative—which is probably also a synonym—*Unio varioborari* Lea, this shell occurs most commonly and abundantly in creeks and other small streams. It most affects soft muddy bottoms in rather still waters.

*Unio lutcolus* Lamarek. Ten specimens from Syracuse Lake; seven specimens from Turkey Creek.

This species is the most widely distributed shell of the family. It occurs in every stream, lake and pond in Indiana in which shell life of any sort occurs at all. It is also the most abundant *Unio*, and, correlated with abundance and wide distribution, is a range of variations that are of the greatest import in evolutionary processes. All the shells submitted, particularly those from Syracuse Lake, are well covered, posteriorly, with carbonate of lime in heavy masses. The lake specimens also have beautifully marked green rays widely separated over a polished disk, thus constituting them the form to which Anthony gave the name of *Unio distans*. The epidermis usually has the peculiar coloration of forms which live in muddy bottoms, though in the lake specimens the epidermis is, for some hidden chemical reason, quite red posteriorly. This peculiar coloration has often been noticed in shells submitted to us from the lake region of Northern Indiana.

*Unio occidentis* Lea. Nine characteristic specimens from Turkey Creek. None present features different from shells found elsewhere in the State.

*Unio pressus* Lea. One specimen from Turkey Creek.

A great many shells of this species are found in various places in Indiana. They present a peculiar diseased or pathological character altogether unlike the condition of the common *Unio*. In this instance the shells are usually distorted and imperfectly developed during the next season, corresponding to the abnormal physiology of *Unio*, a field of pathology.

These shells are intermediate between *Unio rubiginosus* Lea. They are seldomly found, and, on the other hand, they resemble the common river form. The whole genus is pathological.

*Sphaerium rhomboides* Pr. This form is found in Lake, in muddy bottom and is much thinner than usual.

*Sphaerium solitatum* Pr. This form is found in all smaller than common and is much smaller than common and is found in Park.

*Anniella posata* Say. This form is found in Tippecanoe Lake. Neither of these forms has characters different from the common *Unio*.

*Campeloma decisum* Say. This form is found in Tippecanoe Lake; thirteen, one of which is found in Park.

There is no difficulty in making the discovery of *Campeloma decisum* differs from both the common *Unio* and *Campeloma integrum* Dek. which is best illustrated in the polished epidermis, with the genus. Reversed forms

rounded, nonangulate character is a well marked ridge extending white naced form also may *Unio* Lea, now a well recognized

Tippecanoe Lake. The shells submitted do not present coloration so characteristic of *Unio* Say is a synonym.

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from Turkey Creek. Like its *Unio norichuacii* Lea, this shell and other small streams. It es.

Syracuse Lake; seven specimens

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s from Turkey Creek. None in the State. reek.

A great many shells of this species have been seen from time to time from various places in Indiana. Very many of them, as this one well does, present a peculiar diseased or pathologic condition of the cardinal teeth not altogether unlike the condition exhibited by the interior surface of *Margaritana calceola*. In this instance the cardinal teeth are nearly destroyed and are represented by distorted and imperfect vestiges. It would be interesting indeed if the Station, during the next season, could investigate this phenomenon as a study in the physiology of *Unio*, a field yet uncultivated.

*Unio rubiginosus* Lea. Two specimens from Turkey Creek, one of which is pathologic

These shells are intermediate between *Unio trigonus* Lea and typical *Unio rubiginosus* Lea. They are somewhat more trigonal than the latter shells are commonly found, and, on the other hand, are less heavy and trigonal than the ponderous river form. The whole group is sadly confused and needs painstaking revision.

#### CORBICULADEÆ.

*Sphaerium clumboides* Prime. A single specimen only was taken, from Turkey Lake, in muddy bottom and in comparatively deep water. The specimen is very much thinner than usual.

*Sphaerium solidatum* Prime. Ten specimens from Turkey Lake. These are all smaller than common and quite heavy; they came from the beach at Vawter Park.

#### FRESH-WATER UNIVALVES.

*Anatrola porota* Say. Eight specimens of this small univalve were obtained in Tippecanoe Lake. Neither it nor others of the univalves found present any characters different from shells found in streams throughout the State.

*Campeloma decisum* Say. Five dead specimens from Turkey Lake.

*Campeloma integrum* Dekay. One dead specimen from Turkey Creek.

*Campeloma rufum* Haldeman. About twenty specimens from Tippecanoe Lake: thirteen, one of which was reversed or sinistral, from Turkey Creek.

There is no difficulty in recognizing these several forms, though tyros annually make the discovery that there are no valid species but one. *Campeloma rufum* differs from both the others constantly by the outlines of the whorls, the shape and color of the aperture, the pink character of the apical whorls, a feature which is best illustrated in the very young and which is a constant character, and in the polished epidermis, which presents a character seen in no other member of the genus. Reversed forms are not uncommon, but yet may be justly considered

rare. The type of the genus is a reversed specimen of *Campeloma ponderosum* from the Ohio River, taken by Rafinesque near Louisville, Ky.

*Planorbella campovadata* Say. Very abundant in all parts of Tippecanoe Lake.

*Helisoma trivolris* Say. Two specimens from Turkey Lake; three specimens from Turkey Creek. The form submitted from Turkey Creek is a very large one, and is rather heavy in texture. The species must be very abundant in favorable localities.

*Limnophysa humilis* Say. Five specimens of this small limnæid were obtained along the shores of Turkey Lake.

*Limnophysa caperata* Müller. A single specimen of this common form only was secured. It came from Turkey Lake.

*Physa anellaria* Say. Four specimens taken alive, entirely white, from Turkey Lake. This shell is usually honey yellow in coloration, but these specimens were a snow white.

*Physa gyrina* Say. Only two specimens of the "tadpole" physa appear in the collections, and these came from Tippecanoe Lake. It is one of the most widely distributed and most abundant of the Limnæida.

*Goniobasis pulchella* Anthony. Nine specimens from Turkey Lake; very abundant in Tippecanoe Lake, from which many dead specimens were submitted. This form is widely distributed throughout Indiana. Sometimes associated with it is *Goniobasis livescens* Menke, a form decidedly characteristic of the lake drainage.

*Pleurocera subulare* Lea. Very abundant in Lake Tippecanoe, from which many dead examples were seen.

*Valvata tricarinata* Say. A single specimen from Tippecanoe Lake.

#### LAND MOLLUSCA.

*Limax campestris* Binney. Four specimens of this widely distributed form were obtained from Vawter Park.

*Succinea obliqua* Say. This species is represented by ten alcoholic specimens. All taken at Vawter Park.

*Zonites arborens* Say. Three alcoholic specimens from Vawter Park.

None of the univalves present features worthy of special mention. The whole collection is rather the result of incidental work than of careful collecting, and is to be taken as somewhat indicative of the wealth of molluscan life in favored localities in Indiana. It is submitted as a local contribution, in the form of a special report, that may help to a general knowledge of Indiana mollusks. Cincinnati, Ohio, November 3, 1895.

THE O

I received for identification Professor Eigenmann. The collection; the following species

1. *Coloperys maculata* States and is usually abundant rivulets of spring water.

2. *Heterocera americana* extends over a wide eastern marked form known in the I. *H. California*. Flies late, scarlet patches at the base of conspicuous insect.

3. *Eoalbatrus haysi* W now appeared in Illinois, In

4. *Eoalbatrus signatus*

5. *Eschma elephas* Say *aschmas* fly late in the season. resemble one another so close females can not be separated

6. *Anax junius* Drury.

7. *Trautonia lacustris* Hag

8. *Libellula basalis* Say.

9. *Libellula pulchella* Dr

10. *Plathemis trilineata*

11. *Celithemis cripinosa* D

12. *Diptax vicina* Hager

our latitude. In central Ohio November 8.

13. *Mesothemis simplicifoli*

14. *Pachypterus longipennis*

I am surprised at the absence of the above species present. Collecting in the species of both groups.