

and was brought up from a
temperature about 51° Fahr
the *C. Krebsi* Mörch of the
area.

other to the list of Mediter
anely or by closely related
attention to which had been
repeated. Among them are:

Mediterranean.
C. corrugatum,
L. sanguinea,
G. adriatica,
W. gussoni,
A. celtica,
L. cuneata,
C. decussata,
V. novemcostata,
L. tenera,
Z. crispata,
P. anomioides.

without stretching the com-

PSILIS FIMBRIATA.

ON.

ressed. Dorsal line incurved
in somewhat obtuded, and
curved. Basal margin nearly

Posterior margin broadly
without sculpture. Posterior

The greatest diameter of
ridge. Sides flattened, and
middle. Behind the posterior
raised line, enclosing a tri-
beak) which is sculptured

with small pustules arranged in upcurved lines. Epidermis
yellow, horn color, sometimes obsolete rayed, on the posterior slope.
The shell would seem to be nearly smooth, but in all the specimens
seen there are numerous irregular, radial, pit-like impressions and
concentric striae, and shallow sulci. The radial impressions or pits,
extend through the shell, and are visible inside and out. Hinge
ligament, stout and rather long. Muscle scars well marked, separate
in front, confluent behind. Teeth stout, double in the left, and
single in the right valve. Beak cavities shallow, with a row of
muscle scars running downward, forward and onto the base of the
cardinal tooth. Nacre white, flesh color or dark purple, very
irregularly laid on, and very thin. Except in old shells, the pris-
matic structure extends far beyond the nacre, and the epidermal
layer, in turn, extends still further.

Length 80, height 47, diameter 25 mm.

Habitat: Valles River.—Collected by MR. A. A. HINKLEY.

A cotype in coll. A. N. S. Phila., measures, length 81, height 51,
diam. 22 mm.

The shell is not related very closely to any species that I know of.
In fact I am undetermined whether to place it in *Lampsilis* or in
Nephronaias. In the absence of any data regarding the animal, it
is provisionally placed in *Lampsilis*. Mr. Hinkley informs me that
it is near to, if not identical with an undescribed species labeled by
Mr. Chas. F. Simpson as *Lampsilis salinasensis*, which however Mr.
Simpson has not described, and which he informed me, he does not
intend doing.

The prismatic layer is $\frac{3}{16}$ inch wide at the edge in some cases.
This peculiarity accounts for the *pitting*, and numerous irregular
sulcations being, it is evident not normal, but the result of numer-
ous accidents which befall the extremely delicate edge of the shell.

Plate 12, two upper figures represent the type specimen; lower
left-hand figure is a young shell.

THE GRAVID PERIODS OF UNIOS.

BY CHARLES H. CONNER.

About four years ago, I began to collect systematically data rela-
tive to the gravid periods of Unios. Some of the results are pre-
sented herewith, in the hope that they will be of interest.

The scene of most of my observations has been along the Delaware river and Big Timber creek, in the vicinity of Newbold and Washington Park, New Jersey.

All along the extensive flats there mussels abound, and their empty shells lie scattered along the banks in thousands.

For the purpose of these observations I have made it a point to patrol that section at low tide some time during every month of the year.

The work has been attended by many disadvantages, otherwise I should have been able to present a complete record of the matter.

The varying periods during which the glochidia are extruded by the various species, tends (so it appears to me) to effect their distribution; those spawning when fish are migrating, for instance, would have their distribution extended farther, or more rapidly than other species. Of the species hereabouts, *Unio complanatus* (Sol.), has given me the best results for the labor expended. My records show that they are gravid but once annually, from April-May to July-August, or, approximately, during four months of the year.

I have found *Lampsilis radiatus* (Gmelin), and *Unio nasutus* (Say) gravid all the year around. Both appear to spawn in June and November, if not also at other times. All the individuals do not spawn at the same time. On June 22, 1907, I found some *U. nasutus* with the gills half empty, and some still full.

Anodonta cataracta (Say) is gravid about eight months in the year, the interim occurring during the warm period (May-October). I have found them gravid as late as May 27, and as early as October 13. I have found them spawning the latter part of December, to the early part of January* which indicates approximately, as is the case with *U. complanatus*, a gravid period of about four months.

I have had the good fortune to discover the use of the byssus also. I isolated a gravid specimen in an aquarium, and when the glochidia were extruded, using a magnifying glass, I discovered several of them, with the valve opened wide, hanging suspended by the byssus, from the *Anacharis canadensis* plants with which the aquarium was stocked.†

From further observations it appears that they hang thus sus-

* NAUTILUS, Vol. XIII, pp. 142.

† April 19, 1905, *Anodonta cataracta*, Say.

ended, and when a passing fish touches means of the hooks, and the glochidium ing. I observed frequently the sudden made, and I afterwards found glochidia a

A NEW ZONITOID SHELL FROM THE MIDGE

BY T. D. A. COCKER

Although fresh-water shells (*Lymnaea*) are abundant in the Florissant shales, extremely rare. In 1906 we found a supplementary condition. The 1907 expedition preserved specimen which is referred to

VITREA FAGALIS n. sp.

Diameter 7 mm.; with seven and a half first three not increasing at all, but having about 340 micromillimeters; the fourth 357 m.; the fifth with diam. about 39 broad as the inner ones; the seventh m. Last whorl very smooth and shining, not whorls delicately striate, with the exception a half, which are quite smooth. Spire regularly ascending to the apex. No interbe seen. One example, with reverse; on showing that it probably lived in the pro-

This shell appears to be a *Paravitrea*, v *Vitrea andrewsæ*. In the number of ventral lamellæ, it is like *V. placentula*; but more closely coiled than in that species, a much closer and less regular.

The resemblance of the Florissant form to the southeastern states has already been *Vitrea fagalis*, and the previous finding similar direction.

pended, and when a passing fish touches them they fasten upon it by means of the hooks, and the glochidium is wrenched from its mooring. I observed frequently the sudden jump which my goldfish made, and I afterwards found glochidia attached to them.

A NEW ZONITOID SHELL FROM THE MIOCENE, FLORISSANT COLORADO.

BY T. D. A. COCKERELL.

Although fresh-water shells (*Lymnea*, *Planorbis* and *Sphaerium*) are abundant in the Florissant shales, terrestrial species are extremely rare. In 1906 we found a species of *Omphalina*, in a fragmentary condition. The 1907 expedition has yielded a better-preserved specimen which is referred to *Vitrea*.

VITREA FAGALIS n. sp.

Diameter 7 mm.; with seven and a half closely coiled whorls, the first three not increasing at all, but having a uniform diameter of about 340 micromillimeters; the fourth barely larger, diam. about 357 m.; the fifth with diam. about 391 m.; the sixth twice as broad as the inner ones; the seventh much larger, diam. 1 $\frac{3}{4}$ mm. Last whorl very smooth and shining, not or hardly striate, but inner whorls delicately striate, with the exception of the apical whorl and a half, which are quite smooth. Spire gently convex, the sides regularly ascending to the apex. No internal lamellæ, so far as can be seen. One example, with reverse; on a slab with a leaf of *Fagus*, showing that it probably lived in the proximity of that tree.

This shell appears to be a *Paravitrea*, very close in all respects to *Vitrea andrewsæ*. In the number of whorls and absence of internal lamellæ, it is like *V. placentula*; but the whorls appear to be more closely coiled than in that species, and the radial sculpture is much closer and less regular.

The resemblance of the Florissant flora to that of the uplands of the southeastern states has already been noted; the discovery of *Vitrea fagalis*, and the previous finding of *Omphalina*, point in a similar direction.

the long tooth of *appressa* and *perigrapta*, or vestige of it. *P. a. tryoniana* differs from *P. depressa* with a tendency to angular parietal tooth and especially in the sculpture. *P. appressa* has raised points scattered over the upper surface. Delicate specimens upon the base also, and may be seen on the base in some specimens, developed. In *P. tryoniana* there is no trace of the sculpture being like that of *P. appressa*.

gmanica n. subsp.

Shell fragile, somewhat transparent, pale. The sculpture throughout (except near the apex) with short striae removed and often in large part lost from old specimens. Rib-striae of the typical form are much weakened. Lip narrow, no parietal tooth. Alt. 8.7

Clingman Dome, Great Smoky Mountains, N. C., collected by Messrs. Ferriss, Clapp, and myself, author, 1899.

Described by me, Proc. A. N. S. Phila., 1900, p. 127.

Differentiated from the typical form of *wheatleyi* by its more solid form prevalent in the mountains generally, and from the form of Roan Mt. by its more solid form. It was found from the summit of Clingman's Dome at the "Balsams," near the western end of the mountain, the ordinary *P. wheatleyi* replaces it. *rewsæ altivaga*.

MAX AGRESTIS IN COLORADO.

T. D. A. COCKERELL.

In 1904, I was surprised to find *Agriolimax* in a vacant lot in the town of Boulder, Colorado. In confirmation of the establishment of this slug in Colorado. The specimens are much darker than those in England, and those I collected are reproductions:

(1.) Mut. *rufescens*, Dumont and Mortillet. Reddish, without any distinct spots or lines. Sixteen specimens.

(2.) Mut. *brunneus*, Taylor. Very dark-brown; one or two are so nearly black that they could be taken for mut. *niger*, Morelet. Eight specimens.

(3.) Mut. *semirufus*, nov. Head and mantle rufous; body posterior to mantle almost black. Two specimens. This indicates that the coloration of the head and mantle, and that of the body, may be separately inherited, though more frequently the color of the animal above is uniform.

The common English forms *pallida* Schrenk, and *reticulata* Müller, are absent.

MARGARITANA MARGARITIFERA IN PENNSYLVANIA.

BY CHAS. H. CONNER.

A few weeks ago, I had the pleasure of receiving a few specimens of *Margaritana margaritifera* Linnæus, which were taken from Still Creek, near Quakake, Schuylkill Co., Pa. As I believe this species of fresh-water mussels has not been reported living in Pennsylvania, I send you this note.

Mr. Frank M. Ebert, who kindly forwarded the specimens to me, states that they are found in the several streams of the vicinity. He and others have taken a great quantity of pearls of all sizes and grades from them. Though Mr. Ebert has collected the species for some time, he informs me that he has never found a gravid specimen.

The foot and gills of the specimens examined are brownish, the rest of the body being white.

NOTES AND NEWS.

ARION CIRCUMSCRIPTUS, JOHNS. (FASCIATUS NILSS., pars).—Last June I found this European slug in abundance on Goat Island, Niagara Falls, N. Y. It appears to be an addition to the fauna of New York, but Dr. N. L. Britton, to whom I mentioned the occurrence, said he was sure he had heard some report of it. The specimens were of the usual grey color, with narrow bands and a slight keel. In 1887 I searched the same locality, but at that time the *Arion* was apparently absent.—T. D. A. COCKERELL.