of very thin calcareous lam-
off. The exterior surface is
is convex. The nucleus lies
ncentric lines encircle it. On
kened ridge lies between the
e the foot was attached.
principally of *Amnicola* and
y fossils in the beds carrying
petrolia. Therefore it can be
esent gastropods that lived in
that the fossils are very sim-
the fact that all living species
. The nucleus of the fossils
and the fossils are a little less
adult specimens of *Viviparus*
No native species of *Viviparus*
cky Mountains. An Eocene
Washington and a Miocene
ently the genus has not been
its on the Pacific coast. Sev-
from the late Cretaceous and
Rocky Mountain region. The
re not known. *Scalez petrolia*
genus *Ampullaria*, especially of
reous opercula, but the fossils
less elongate and fail to show
edge of the area where the foot
distribution of *Ampullaria* also
ot an *Ampullaria*-like mollusk,
cteristically tropical genus lived
ene time.
ed Doctor Hanna discovered a
present the shell of the animal,
core containing several broken,
thin and imperforate, and are
ns, growth lines. At the aper-
ht of 8.5 to 11 millimeters, but
ne height is a little exaggerated.

So far as these crushed pieces go, they are very much like shells of a relatively small *Viviparus*.

The opercula and the less satisfactory crushed shells indicate that these fossils, to which the rather unfortunate generic name *Scalez* was given, represent an extinct group of Viviparidae that had calcareous opercula, although all living representatives of the family have horny opercula, and no other fossil Viviparidae having calcareous opercula have been found. Other families, such as the Naticidae, Ampullaridae and Amnicolidae, embrace genera with horny opercula and also genera with calcareous opercula.

So far these opercula have been found only in cores of cuttings, but it is safe to predict that they will eventually be found at the outcrop of nonmarine beds of Etchegoin age. Their remarkably limited stratigraphic range, on which their value to the oil operator depends, is more probably due to the absence of other nonmarine beds in the upper part of the Etchegoin formation in the Sunset-Midway and Elk Hills fields than to their actual sudden appearance and disappearance. It would not be surprising to find them in other wedges of nonmarine Etchegoin deposits.

NOTES ON THE NAIADES OF THE UPPER MISSISSIPPI DRAINAGE:

III. On the Relation of Temperature to the Rhythmical Contractions of the "Mantle Flaps" in Lampsilis ventricosa (Barnes)

BY N. M. GRIER

Ortmann (Mem. Carnegie Museum 4: 319, 1911) first described the rhythmical wave-like contractions of the lamellae and flaps of the mantle in the gravid female of *Lampsilis ventricosa*. His account includes a description of the position of the shell during the process. The animal orientates itself so that its anterior end is against the current, while the shell is so tilted that the animal almost "stands upon its head". The "mantle flaps", which are ribbon-like prolongations of the lamellar portions of the mantle, are slowly protruded as the creature opens

its shell, and floating freely, commence to contract as described. Coker, Shira, Clark and Howard (Bull. Bur. Fisheries 37: 77–181, 1921) point out the resemblance of these mantle flaps to small fish, and their motion in the current further enhances this resemblance. Since the enlarged marsupia are situated nearby, they suggest that a fish darting at this tempting bait may cause the extrusion of the glochidia and possibly the infection of a host fish. Following the removal of an aquarium specimen from the water, the mantle flaps were immediately drawn into the shell, but when replaced on its side in an aquarium whose bottom was soft mud, I have observed that the animal turned over on its umbones and resumed the rhythmical contractions within half an hour. At first the rate is quite slow as if the creature were "warming up" but rapid acceleration occurs to a maximum rate which seems to be influenced by the temperature. Apparently the animal may continue these contractions for hours at a time, if not disturbed in any way.

As noted by Ortmann (loc. cit.), other members of this genus possess these mantle flaps, but of these species, the contractions of the mantle flaps seem to have been studied only in *Lampsilis siliquoidea* (Barnes) by Howard and Anson (Journ. Parasitology 9: 70, 1922–23). These observers believe with Coker, Shira, Clark and Howard that these undulations are an aid to respiration as well as an attraction to predatory fish. They suggest that this rhythmic action may be related to the fact that these two species are inhabitants of lakes or lacustrine portions of streams where dissemination of the glochidia by current action would be slight. They also believe that the predaceous fish which are the hosts of these mussels may be attracted by the undulations of the mantle flaps.

In this case, the behavior of *L. siliquoidea* was observed in running water at a temperature of 73° F. (22.8 C.) in a cement aquarium. They noted "regular undulations of two rapidly succeeding waves lasting two seconds, each taking approximately a second to pass from the outer ventral lobes to the eyespots." This would indicate a contraction rate of from 16–20 waves per minute, since the intervals between the undulations averaged 4–5 seconds. The marsupium withdrew following

disturbance of the water an
made any response. Ortn
that the contractions follow
perhaps 2–3 in a second,
water must be produced ov

My own observations hav
temperature on the rate of
ventricosa as shown in the
served was kept in an cem
any disturbance of the wate

Temperature
14.5° C.
19° C.
20.5° C.
21° C.
22.5° C.

In the first observation, a
duced the number of contr
noted also that the marsupi
traction rate of 121 per m
which checks that of Ortma
between the contractions as

If we accept as most prob
cited that this device serves
distribute the glochidia, wc
which lowers or raises the r
crease or diminish the reacti
of the same temperature a
kinds of animals may be
On the other hand the devic
ing such a purpose, undoul
complete aeration of the cro
glochidia for oxygen rising
greater rate of contraction.
is worthy of a fuller study

disturbance of the water and invariably before the mantle lobes made any response. Ortmann merely states for *L. ventricosa* that the contractions follow one another in quick succession—perhaps 2–3 in a second, remarking that a lively current of water must be produced over the protruded marsupia.

My own observations have principally to do with the effect of temperature on the rate of these rhythmical contractions in *L. ventricosa* as shown in the following table. The specimen observed was kept in an cement aquarium and there was little if any disturbance of the water.

Temperature	Average Number of Contractions per Minute
14.5° C.	63
19° C.	108
20.5° C.	112
21° C.	121
22.5° C.	128

In the first observation, a slight disturbance of the water reduced the number of contractions to 52 per minute. It was noted also that the marsupia did not fully protrude until a contraction rate of 121 per minute was reached, an observation which checks that of Ortmann. No resting interval was noted between the contractions as was pointed out for *L. siliquoidea*.

If we accept as most probable the suggestion of the observers cited that this device serves to attract the predatory fish which distribute the glochidia, we may conclude that a temperature which lowers or raises the rate of contractions also tends to increase or diminish the reaction time of these fish which are also of the same temperature as the environment. Thus the two kinds of animals may be kept in the relationship indicated. On the other hand the device, while easily conceivable as serving such a purpose, undoubtedly also contributes to the more complete aeration of the crowded marsupia, the demands of the glochidia for oxygen rising with the temperature, hence the greater rate of contraction. At any rate the apparatus described is worthy of a fuller study from the histological and physiolog-

ical standpoint. I am indebted to Messrs. Joseph Berwick and Irving Fountain for aid in making these observations.

DARTMOUTH COLLEGE, Hanover, N. H.

THE LAST WORD ON ANCYLASTRUM

BY TOM IREDALE[1]

Burrington Baker's conclusion (NAUTILUS, Vol. XXXIX, 1925, 47) that "*Ancylastrum* does apply to the Tasmanian group" may be refuted by extracts from the literature without entry into disputatious matters as to whether the previous exponent erred or otherwise.

Bourguignat published in the Journ. de Conch., Vol. IV., 1853, a paper entitled "Notice sur le genre *Ancylus*." This paper appeared in the part dated Feb. 15, 1853, beginning on p. 55. At p. 60 he gave a "Description du genre" in which the diagnosis stated "présentant un sommet mousse, obtus, ou aigu, plus ou moins incliné à droite (*ancylastrum*) ou à gauche (*velletia*)."

Thus the two sections, *Ancylastrum* and *Velletia* comprise one genus *Ancylus*.

Then followed a "Division du genre Ancyle" and first Beck's division into *Ancylus* and *Acroloxus* is quoted. The composition of the second part is demurred to and as there was no definition the name was rejected.

Gray's division into two genera is then considered and "*Velletia*, dont le type seraît l' *Ancylus lacustris* de Müller," is remarked upon thus: "Cette division est bonne . . . mais nous ne pensons pas que ce caractère isolé soit suffisant pour autoriser la création d'un genre, et nous ne conserverons l' appellation *Velletia* qu' à titre de simple division du genre *Ancylus*."

The other division was *Ancylus* of Gray and Beck with *A. fluviatilis* as type.

Then the whole matter is simply explained thus: "Quant à nous, nous adoptons la division du genre en deux coupes.

[1] By permission of the Trustees of the Australian Museum.