

NEW FOSSIL LAND AND FRESH-WATER MOLLUSKS FROM THE REYNOSA FORMATION OF TEXAS

By WILLIAM B. MARSHALL

Assistant Curator, Division of Mollusks, United States National Museum

A lot of fossil mollusks and fossil teeth of mammals submitted for examination by the Roxana Petroleum Corporation of St. Louis, Mo., through John C. Myers of their office at Houston, Tex., was accompanied by the following data:

Surface samples of rock containing fossils located in south central De Witt County, Tex., along the Guadalupe River. These samples are thought to be in place, and occur in what is known as the Reynosa Formation of Tertiary Age.

De Witt County is northeast of central Texas. The Guadalupe River crosses it near its middle, and continuing its southeasterly course finally reaches San Antonio Bay on the Gulf coast. "In 1890 Penrose described a deposit of limestone containing many pebbles and cobbles under the name 'Reynosa limestone,' from the town of Reynosa, Tamaulipas, Mexico. This limestone overlies what was then called the Fayette sand at Reynosa, directly across the Rio Grande from Hidalgo, Tex. Penrose found recent shells embedded in the surface exposures of this formation, and thinking it was Recent included it in his 'post-Tertiary' formations."¹

The name "Uvalde formation" proposed by Dumble in 1891 for another part of the same formation is no longer in use.

The fossil teeth included in the sending were submitted to Dr. J. W. Gidley, of the division of vertebrate paleontology of the United States National Museum, who says they belonged to extinct horses and rhinoceri and indicate that the deposit is probably of the Pliocene series. The fact that the mollusks are all extinct helps to confirm the belief that the formation belongs to the Pliocene.

The molluscan fossils are in poor condition, but one is sufficiently well preserved to show that it is a land shell, probably of the genus *Polygyra*. The others are bivalves, most of them internal casts. Some of them retain part of the beak sculpture, the character of which proves beyond doubt that they are pearly fresh-water mussels.

¹A. C. Trowbridge: Professional Paper U. S. Geological Survey, No. 131-D, p. 98, 1923.

Additional proof that they belong in this group of mollusks is found in the general form. Their abundance indicates that the Reynosa formation was of fresh-water origin. The land shell was probably fossilized after being washed into the water, or perhaps it lived on plants on the surface and dropped in and became fossilized. The fossils are composed of chalky calcium carbonate. The matrix is of the same kind of material, somewhat more compact, and in parts composed of calcite in the form of small crystals. A few small pebbles, probably of quartz, are included in the matrix.

The literature relating to the Reynosa formation is quite extensive. Two of the most recent papers are:

1923. A. C. TROWBRIDGE: A geological reconnaissance in the Gulf Coastal Plain of Texas, near the Rio Grande (U. S. Geological Survey, Professional Paper 131-D, pp. 98-100). Regarding fossils he says (p. 100): "No fossils have been found in the Reynosa formation except the remains of land snails, crayfish, jack-rabbits, and a few other animals which have become embedded in the surface as the limestone has been dissolved and redeposited, and except the fossils originally deposited in the formations from which the gravel was derived."
1924. ALEXANDER DEUSSEN: Geology of the Coastal Plain of Texas west of the Brazos River (U. S. Geological Survey, Professional Paper 126, pp. 102-108). He says (p. 103): "No fossils have been found in the formation."

Footnotes to these two papers give references to many other papers relating to the subject.

Three of the mussels and the land shell retain enough of their features to warrant the descriptions given below.

PLICONAIAS, new genus

Shell subquadrate. Beaks with a number of wavy concentric undulations. Posteriorly each undulation is completed by a fine straight threadlike riblet running across the posterior dorsal area toward the beak. Anteriorly the undulations nearly fade out but are indistinctly completed by faint riblets curving toward the beak. Posterior portion of the shell with several rude plications running obliquely across the surface and of the pattern found in the plicate North American naiades such as *Amblema costata* Rafinesque; *Megaloniaias gigantea* Barnes, *Plectomerus trapezoides* Lea.

Type.—*Pliconiaias popenoei*, new species, described below.

Plicate naiades are found in the Upper Cretaceous formation of Wyoming and Utah, but do not belong to this genus.

PLICONAIAS POPENOEI, new species

Plate 1, Figures 1, 9

Shell subquadrate (posterior dorsal portion lost but evidently the form of the shell approximated that of *Amblema costata* Rafinesque).

Anterior margin regularly curved, rounding into the ventral margin, which is slightly curved but subparallel to the dorsal margin. Beak set far forward, about 10 mm. behind the extreme anterior end and 56 mm. in front of the extreme posterior end. A distinct lunule under the beak. Beak ornamented with a number of concentric, waving undulations, the main portion of each subparallel to the dorsal margin and strongest on the posterior ridge. On the posterior area a fine, nearly straight, threadlike line runs from each undulation in the direction of the beak. Anteriorly, irregular, nearly obsolete lines curve from the undulations to the beak. Posterior ridge high; anterior ridge not differentiated from the general surface of the shell. Concentric sculpture consisting of many deeply impressed lines of growth, with indications of fine concentric striae between them. Posterior half of the shell with several very prominent plications, set obliquely across the surface, parallel to the posterior ridge. In front of these are indications of several other plications which have become obsolete or which did not develop. On the posterior area of the young shell are several fine lines running from the ridge to the posterior margin. These may indicate the flutings found on the posterior area of many plicate naiades, but which can not be seen in this specimen because part of the later shell is broken away.

The type (Cat. No. 370999, U.S.N.M.) measures: Length, 66 mm.; height, 47 mm.; diameter, if both valves were present, would be about 36 mm.

As pointed out in the description of the genus *Pliconaias*, this shell is very closely related to the plicate North American naiades and may be the ancestor of some or all of them. The sculpture of the beak is such that the loss of a few undulations would convert it to the style found in *Amblema*, while an increase in their number and irregularity might produce the kind found in *Megalonaias* and *Plectomerus*.

The species is named in honor of Willis P. Popenoe, of the United States Geological Survey.

EONAIAS, new genus

Fresh-water mussels of the family Unionidae, having the beaks with numerous V-shaped loops, which are nearly regularly spaced, and which "nest" into each other, the V's pointing toward the ventral margin. Posterior area with fine riblets running from the posterior ridge to the margin. Type *Eonaias reynosenica*, new species, described below.

The nearest relative seems to be *Quadrula petrina* Gould, a pearly mussel now living in Texan waters, and which has a somewhat similar form and beak sculpture. *Eonaias* shows also some relation to

Psoronaias Crosse and Fischer, of which a couple of species are found living in northeastern Mexico, namely, *Psoronaias herrerae* Marshall and *Psoronaias semigranosus* von dem Busch, and several other species in Guatemala. In *Psoronaias* the beak ornamentation is indistinctly of the nested V pattern and the undulations are broken into numerous granules. Both genera have riblets on the posterior area running from the ridge to the margin.

The beak ornamentation is related to that of some of the Naiades of the upper Cretaceous formation of Wyoming and Utah.

EONAIAS REYNOSENICA, new species

Plate 1, Figures 3, 4, 6

Shell nearly quadrate, inflated, somewhat oblique. Dorsal margin arcuate, making nearly a right angle with the posterior margin. Ventral margin well rounded, curving abruptly, almost angularly, into the posterior margin, and slopingly rounding into the anterior margin, which is regularly curved and offsets at its upper part to allow for a large lunule under the beak. Beak set well forward, about 10 mm. back of the extreme front end and 32 mm. in front of the extreme rear end. Posterior ridge high, roundly angular. Anterior ridge not so well marked, but the anterior area making a rapid descent from the disk of the shell to the margin. Beak with V-shape undulations, "nesting" one within another, those distant from the beak tending to break into granules, especially on the anterior area. Posterior area with a number of riblets running from the posterior ridge to the margin. Concentric sculpture strong. Cavity of the shell deep, the anterior adductor scar deeply punched. Pseudocardinal teeth massive, laterals thick and short.

The type (Cat. No. 371001, U.S.N.M.) measures: Length, 42 mm.; height, 33 mm.; diameter, if both valves were present, would be about 24 mm. Other specimens (Cat. No. 371002, U.S.N.M.) have about the same proportions as the type. The largest measures: Length, 48 mm.; height, 38 mm.; diameter, if both valves were present, would be about 34 mm.

In the type some of the beak characters are almost worn away and indistinct. In some of the paratypes they are very well preserved.

ANTEDIPLODON, new genus

Characterized by elongate form, abrupt anterior end, and especially by the sculpture of the beak, which consists of several fine, clear-cut, direct, radiating riblets.

The type is *Unio dumblei* Simpson.² (Pl. 1, figs. 2, 8.)

²Simpson, Description of four new Triassic Unios from the Staked Plains of Texas. Proc. U. S. Nat. Mus., vol. 18, no. 1072, 1896, p. 383, text fig. 3.

It came from "Five miles northeast of Dockum, head of Duck Creek, Dickens County, Tex." *Unio graciliratus* Simpson,² p. 384, text fig. 4, and *Unio dockumensis* Simpson,² p. 385, text fig. 5, belong in this new genus. The fourth species described by Simpson, *Unio subplanatus* Simpson,² p. 383, text figs. Nos. 1 and 2, is a large fresh-water mussel but does not fall into *Antediplodon* and can hardly be an *Elliptio* (*Unio*).

At the time Simpson's paper was published the old classification of the pearly fresh-water mussels was still in use, and the importance of beak characters had not yet been fully recognized, hence his use of the generic name *Unio* for all of them. He points out the resemblance of the beak sculpture to that of some of the South American naiades. Had the new classification been in use it is probable that Simpson would have done as is being done in this paper; that is, he would have formed a new genus for the three species mentioned above as belonging to *Antediplodon*. This new genus became necessary to receive the species described below.

ANTEDIPLODON DEWITTENSIS, new species

Plate 1, Figure 7

Shell wedge-shaped, having its greatest diameter near the anterior end; tapering somewhat and having its least diameter at the posterior extremity. Beaks set far forward, about 7 mm. behind the extreme front end and about 40 mm. in front of the extreme rear end. Posterior dorsal margin nearly straight; ventral margin slightly curved, apparently joining the posterior margin in a blunt point and sharply rounding into the anterior margin. Posterior ridge lacking; anterior ridge very high, rounded. Anterior area nearly truncate, a rather large lunule near the beaks.

The type (Cat. No. 371003, U.S.N.M.) measures: Length, about 47 mm. (estimated, because a portion of the rear end is lacking); height, about 24 mm.; greatest diameter, about 24 mm.

This species is well characterized by its donaciform shape. The common east American marine shell *Donax fossor* Say if greatly enlarged would have about the same form. The species is not closely related to any other known species, recent or fossil. Its nearest relative is *Antediplodon dumblei* Simpson (*Unio dumblei*).

POLYGYRA MYERSI, new species

Plate 1, Figures 5, 10

Shell with spire depressed-conic; base full and rounded; whorls six, flattened, narrow except the last which is moderately broad. Sutures well marked; periphery somewhat angulate; sculpture of

² Simpson, Description of four new Triassic Unios from the Staked Plains of Texas. Proc. U. S. Nat. Mus., vol. 18, no. 1072, 1896, p. 383, text fig. 3.

numerous, rather coarse riblets of growth. Umbilicus filled but apparently wide and deep. Aperture filled, apparently rounded and extending very little below the base.

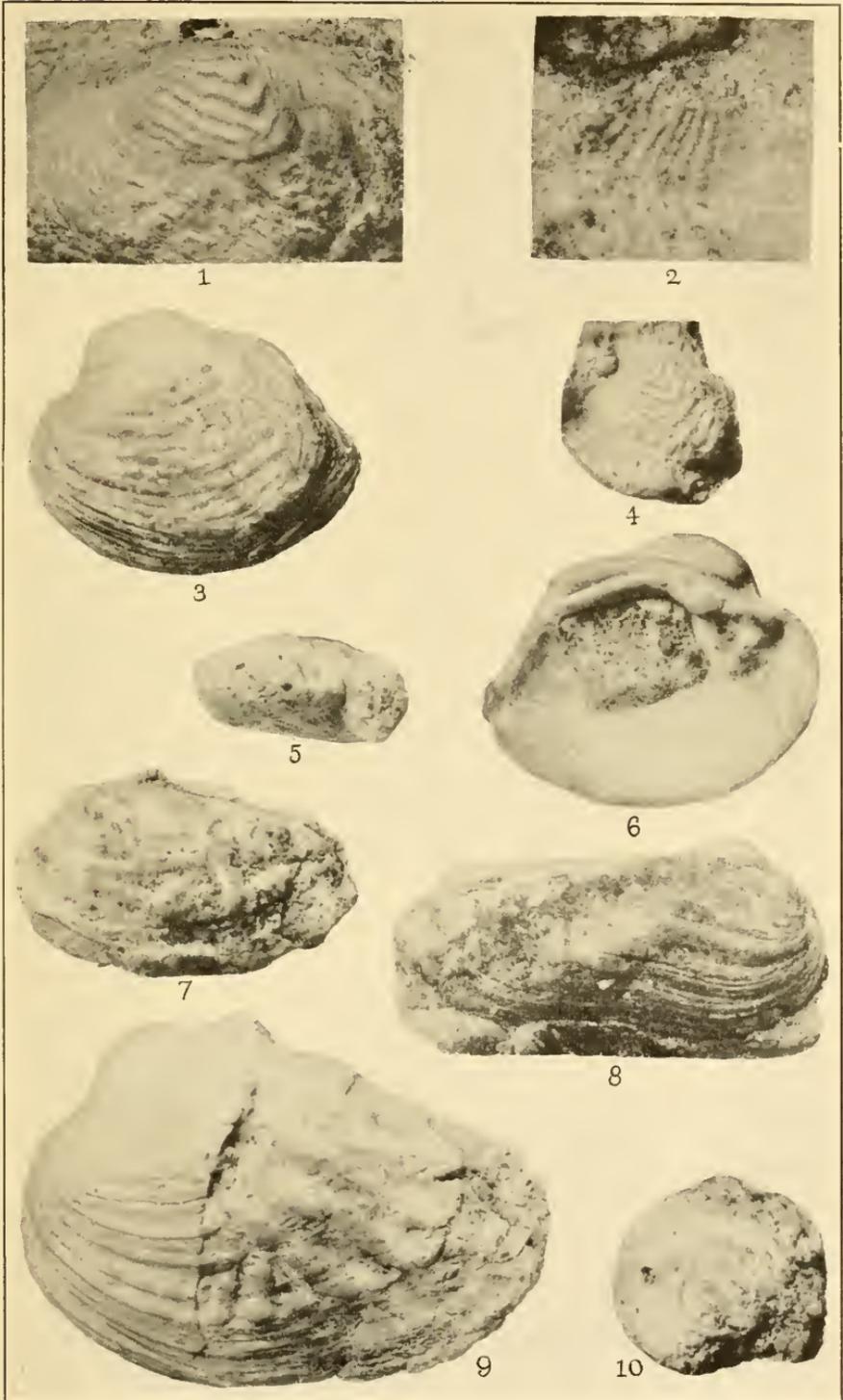
The type (Cat. No. 371005, U.S.N.M.) measures: Greater diameter, 14 mm.; lesser diameter, 12 mm.; altitude, $6\frac{1}{2}$ mm.

This species may be closely related to *Polygyra texasiana* Moricand, but is larger and the material filling the aperture makes it impossible to say whether or not there were teeth. The species is named for John C. Myers, of Houston, Tex., who sent the material on which this paper is based.

EXPLANATION OF PLATE

- FIG. 1. *Pliconaias popenoei* (beak sculpture), new species. $\times 2$.
 2. *Antediplodon dumblei* Simpson (beak sculpture). $\times 5$.
 3. *Eonaias reynosenica*, new species.
 4. *Eonaias reynosenica* (beak sculpture of paratype). $\times 2$.
 5. *Polygyra myersi* (front view), new species. $\times 2$.
 6. *Eonaias reynosenica*, new species.
 7. *Antediplodon dewitensis*, new species.
 8. *Antediplodon dumblei* Simpson.
 9. *Pliconaias popenoei*, new species.
 10. *Polygyra myersi* (top view), new species. $\times 2$.





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