

THE MOLLUSCAN MACROFAUNA OF THE SEGUIN FORMATION (UPPER PALEOCENE) IN CENTRAL TEXAS

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ABSTRACT

Investigation of known Seguin localities led to the discovery of an overlooked diverse and abundant marine fauna in Solomon's Branch, a stream in Bastrop County, Texas. The fauna, a transported assemblage from a marine littoral environment, encompasses a mix of specimen types from large wave-worn individuals to the smallest unworn ornamented species. Following the discovery of this fauna, further field work was undertaken and other Seguin localities with different depositional environments were found and collections made from those sites. Finally, a further suite of specimens was examined within the Texas Natural Science Center, some from localities no longer in existence or now lost. The environment is transitional in character from the deeper water Midway to the nonmarine environment of the chiefly terrestrial Texas Wilcox deposits, and represents the last major marine transgression in this area prior to the Eocene. The fauna is a mix of that derived from early Paleocene and Cretaceous taxa as well as elements that appear to originate from western Africa, the Tethyan region, and the western coast of America. The inferred species' habitat includes a near-shore open marine element, a probable lagoonal component, and brackish water elements. From the 115 molluscan taxa recognized, six have not been recognized to date in sediments later than the Cretaceous, and 30 represent from the Eocene or later records. The following new gastropod genera and subgenera are proposed: *Texaficus*, *Crassauris*, *Latirus* (*Levarlatirus*), *Praesurcula*, and *Apiotoma* (*Lavarotoma*). The following new species and subspecies are described: Bivalvia: *Calorhadia diminutia*, *Adrana seguinensis*, *Bornia solomonis*, *Mactra* (*Eomactra*) *piscinasina*, *Arcopagia* (*Arcopagia*) *solomonis*, *A. (Johnsonella) seguinensis*; Gastropoda: *Turritella mortoni crassa*, *Tylotrochus extremus*, *Teinostoma* (*Idioraphie*) *seguinensis*, *Cochliolepis* (*Tylaxis*) *palaeocenica*, *Solariorbis velarum*, *Natica* (*Carinacca*) *seguinensis*, *Polinices* (*Euspira*) *perspecta texana*, *Texmelanatria contracta*, *T. brevis*, *Loxotrema texana*, *Pseudoliva globosa*, *Cantharus seguinensis*, *Colwellia humerosa*, *C. nodulina*, *C. nodulina meta*, *Tritiaria?* *seguinensis*, *Metula reticulata*, *Latirus* (*Levarlatirus*) *undus*, *L. (Levarlatirus) textilis*, *Strepsidura cancellata*, *Texaficus obesus*, *Levifusus pagoda seguinensis*, *L. actuocarinata*, *Fulgurofusus grande*, *Palaeorhaphis palaeocenica*, *Volutocorbis olsoni gracilis*, *Eoancilla hordea*, *Caveola ostium*, *Clinuropsis yanceyi*, *C. tuberculata*, *Praesurcula palaeocenica*, *Coronia vallare*, *Eopleurotoma molineuxae*, *Tropisurcula?* (*Eodrillia*) *cingula*, *Apiotoma* (*Lavarotoma*) *alva*, *Crassauris seguinensis*, *Pyramidella* (*Syrnola*) *bilineata*, *Turbonilla* (*Chemnitzia*) *obliqueata*, *Odostoma* (*Doliella*) *deprimere*, *Cylichna* (*Cylichnopsis*) *bicarinata*, *Mnestia ovata*, *Retusa* (*Cylichnina*) *bastropensis*; Cephalopoda: *Cimomia contraria*, *Angulithes?* *palaeocenica*. Other changes in taxonomic assignment include: the genus *Lisbonia* is moved from the Nassariidae to the Buccinidae; the genus *Palaeorhaphis* is moved from the Mitridae to the Fascioliariidae; the genus *Fictoacteon* is made a subgenus of *Eoacteon*; *Baluchicardia wilcoxensis* replaces *Venericardia wilcoxensis*; *Cochlodesma howei* replaces *Periploma howei*; *Pachymelania penrosei* replaces *Cerithium penrosei*; *Lisbonia pauper* replaces *Pseudoliva ostrarupis pauper*; *Pleuroploca plummeri* replaces *Fasciolaria?* *plummeri*; *Fulgurofusus perobliquus* replaces aff. *Falsifusus perobliquus*; *Eoancilla mediavia* replaces *Ancilla mediavia*; *Apiotoma* (*Lavarotoma*) *capex* replaces "*Pleurotoma*" *capex*; the genus *Ancillarina* should be used in place of *Ancilla* for several U. S. and European Eocene species; the genus *Coronia* is discussed and several species of that genus in the U. S. Gulf Coast are reassigned to *Gemmula*; the genus *Protosurcula* is moved from the Borsoniinae to the Cochlespirinae. Neotypes are designated for *Turritella polysticha* and *Pseudoliva ostrarupis*.

INTRODUCTION

This monograph is the continuation of a project to investigate the central Texas Tertiary molluscan faunas in finer temporal resolution than is presently known. The Middle Eocene Claibornian Texas faunas are well known from the results of numerous studies, particularly those of Palmer (1937), Harris (1937), Stenzel (1943), Stenzel & Turner (1943), Stenzel *et al.* (1957), and Garvie (1996); for the underlying Midway Group (Paleocene), Harris (1895a, 1896) and Gardner (1935) should be mentioned. During exploratory field work to re-

locate some localities described by Gardner (1935), the author visited Solomon's Branch in Bastrop County where large concretions, up to 2 m in diameter, were found in the creek bed, and *in situ* embedded in the creek-side walls. Many of these contained a layer of densely concentrated fossil shells, some very large. Even a cursory examination indicated the existence of many new forms. The discovery of a fauna from a nearshore littoral environment is of particular interest, because there appears to be no other known from a similar environment in the Gulf Coast Paleogene.

ADDITIONS TO THE MOLLUSCAN MACROFAUNA OF THE REKLAW FORMATION (EOCENE: LOWER CLAIBORNIAN) AND TWO NEW TAXA FROM THE MIDDLE CLAIBORNIAN IN TEXAS

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ABSTRACT

Nineteen taxa new to the Reklaw Formation are recognized, 13 of them new; the new taxa are: Bivalvia: *Modiolus marquezensis*, *Venericor densata newbyensis*, *Nemocardium angelinae*, *Kellia microstriatula*, *Katherinella plummeri*, *Cuspidaria textorama*; Gastropoda: *Atlanta funicularis*, *Phalium (Echinophoria) cingulae*, *Xenophora spiralis*, *Hemisurcula terus*, *Microdrillia infans reklawensis*, *Gemmula taylori quadrata*, and *Turbonilla (Chemnitzia) reklawensis*. One bivalve taxon: *Cuna* sp., and four gastropod taxa are newly recognized from the Reklaw Formation: aff. *Gracilialia* sp., *Fulgurofusus perobliquus* (Johnson, 1899), *Fulgurofusus* aff. *rugatus* (Aldrich, 1886), and *Glyptotoma* cf. *crassiplicata* (Gabb, 1860). One new subspecies of gastropod is proposed from the Cook Mountain Formation: *Ectinochilus (Cowlitzia) texanum stephensoni*, and one new species from the Weches Formation: *Phalium (Semicassis) marcusii*. In addition, *Ectinochilus texanum* (Harris, 1895) is placed under the subgenus *Cowlitzia* as *Ectinochilus (Cowlitzia) texanum texanum*.

INTRODUCTION

The original report on the Reklaw faunas (Garvie, 1996) was the result of more than ten years of intensive collection in the Formation; every taxon with at least one well-preserved specimen or with characters deemed unique enough for recognition was discussed. Since that time, further collecting has produced a few new taxa, and some taxa from the original collections that were never described were re-evaluated with a view to publication. It was originally expected that further intensive collecting might result in finding more specimens of these remaining taxa, but the original sandy lenses that produced the bulk of the taxa described in the original report (Garvie, 1996: 10) were of limited areal extent and are now worked out. More importantly, the weather in central Texas has become much drier in recent decades, and the creeks no longer get the regular winter rainfall that would scour the exposures and expose new material. With little expectation that this might improve any time soon, these additional taxa are described here because the original intention was to give as complete as possible a picture of the Reklaw fauna. At the time of the original report, the author only had limited access to the then-named Texas Memorial Museum (now Texas Natural Science Center, henceforth TNSC) collections. Unrestricted access has allowed examination of the quite extensive Reklaw collections and they were found to contain taxa mostly replicating those that the author had personally collected. Three localities represented in the collections did prove to be of particular interest, discussed below under localities.

MATERIAL AND METHODS

This report is based on material not described in the original report (Garvie 1996), a few new taxa collected since, and several hundred specimens from the TNSC collections not exam-

ined before. With the exception of careful cleaning and matrix removal from three specimens, no other preparation was necessary. Medium to small specimens were photographed with a 5 Mb pixel digital camera and macro lens. Very small specimens were photographed with a digital camera attached to the microscope eyepiece while using 10X magnification, or attached to the Zeiss Tessovar optical microscope system in the TNSC facility. Multiple images were taken of all specimens at different focal lengths and CombineZM stacking software was utilized to produce a final image. Image quality was then improved by using Adobe Photoshop CS3 to manipulate levels, brightness, and contrast of the image. Photoshop was also used to decrease the contrast and visual impact of the matrix for those specimens that were partially embedded and often of a similar color. I follow Garvie (1996, 2013) in the use of morphological terms, and in the philosophy of assignment of new taxa. Higher taxonomic classifications and treatment order follow Bouchet & Rocroi (2005) for the gastropods and Bieler *et al.* in Bouchet & Rocroi (2010) for the bivalves.

LOCALITY DESCRIPTIONS

Localities with -T- designations are Texas Bureau of Economic Geology registered localities. Remaining localities are those described by Garvie (1996: 13–16). Coordinates are given as geodetic latitude and longitude.

1-T-6: Magnolia Ferry, left bank of the Trinity River, Anderson County, Texas. The ferry was in the now-abandoned town of Magnolia. Marquez Member of the Reklaw Formation; approximate map coordinates: 31°39.259'N, 95°44.292'W. As indicated by the TNSC collections and from the author's own fieldwork, this is the only locality where well-preserved shells rather than casts occur in the well-known (Deussen, 1914: 45–46; Stenzel, 1953:

NEW EOCENE MOLLUSCA FROM THE COLLECTIONS OF THE TEXAS NATURAL SCIENCE CENTER

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ABSTRACT

Thirteen new taxa from the Eocene of Texas are described: *Barbatia* (*Cucullaearca*) *kickapooensis*, *Cochlodesma unda*, *Pachychilus fulvus*, *Platyoptera cherokeensis*, *Paraseraphs texanopsis*, *Volutostrombus*, *V. eocenica*, *Cyrtochetus* (*Cyrtochetus*) *augustulus*, *Lacina alveata serpens*, *Oniscidia clai-bornensis*, *Caricella?* *turboides*, *Surculites venustus*, and *Scaphander* (*Mirascapha*) *smithvillensis*. An updated composite section for the Claibornian Middle Eocene of Texas is given.

INTRODUCTION

While cataloging and identifying the Eocene molluscan material in the Texas Natural Science Center (henceforth TNSC) collections, some new and interesting material has come to light. The TNSC collections include historical Eocene material collected by Shumard in 1855, for the first Texas Geological Survey, by E. T. Dumble, G. D. Harris, and others for the 1892 second Texas Geological Survey, and since 1909, under the auspices of the Bureau of Economic Geology by later workers including F. B. Plummer and H. B. Stenzel. The Eocene material collected during the second Texas Survey is well curated and identified and those species were mostly treated by Palmer (1937). The bulk of the Texas material treated by Palmer (1937) came from only two geographically small areas, one centered around Stone City Bluff on the Brazos River near College Station in Brazos County and the second centered on the Colorado River at Smithville in Bastrop County. The great expanse of Eocene that outcrops in innumerable small roadside and creek side exposures in a wide area in eastern Texas has hardly been examined except by the early surveying parties working primarily in the 1920s and 1930s; their collections comprise the bulk of the TNSC material. Secondly, the band of Eocene that outcrops in the lower Gulf, from Smithville to the Rio Grande River has been examined even less, and judging from the material in the TNSC Museum, much new material will be uncovered. Palmer (1937: 5) mentioned the "great numbers of new material which will be uncovered in the lower Claiborne localities of the Gulf States, particularly Texas and Louisiana ..." and her comment is prescient. The present paper reports on a few of these new taxa, many of which are particularly interesting as being very unusual for this area, or extending either their temporal or geographical range. It is the author's intention to describe further new material from both the TNSC and the author's own collections in succeeding papers. The composite section of the

Claiborne Stage (Text-fig. 1) is derived from several sources, of which the principal ones are: Guevara & Garcia (1972), Pane (1972), Flores-Espinoza (1983), Dockery (1998), Cra-baugh & Elsik (2000), and Aniekwensi (2010).

MATERIALS AND METHODS

This study is based on the collections of the TNSC with one additional specimen of *Volutostrombus eocenica* n. gen. & n. sp., from the author's collection, which is designated a paratype. Specimens from the Cook Mountain and Yegua formations are generally very well preserved and needed little to no cleaning. Specimens from the Weches Formation are typically found in a fairly indurated matrix and often must have been weathering for some time before the specimen is exposed; any exposed shell is then liable to abrasion and leaching. Cleaning most often requires the first use of a consolidant on any exposed shell, followed by careful matrix removal with sharp needles.

The geologic unit Cook Mountain Formation is now in general usage by the United States Geological Survey¹ and is therefore used here, superseding the older term, Crockett Formation, which referred to the same unit.

Morphological terms used are those defined by Moore (1960). For bivalves, the orientation follows Stenzel *et al.* (1957) and the morphological terms used are those from Moore (1969). Higher taxonomic classifications and treatment order follow Bouchet & Rocroi (2005) for the gastropods, and Bieler *et al.* in Bouchet & Rocroi (2010) for bivalves.

¹National Geologic Map Database, http://ngmdb.usgs.gov/Geolex/geolex_qs.html, accessed February 2013.