ON NEW GENERIC FORMS OF CRETACEOUS MOLLUSCA AND THEIR RELATION TO OTHER FORMS.

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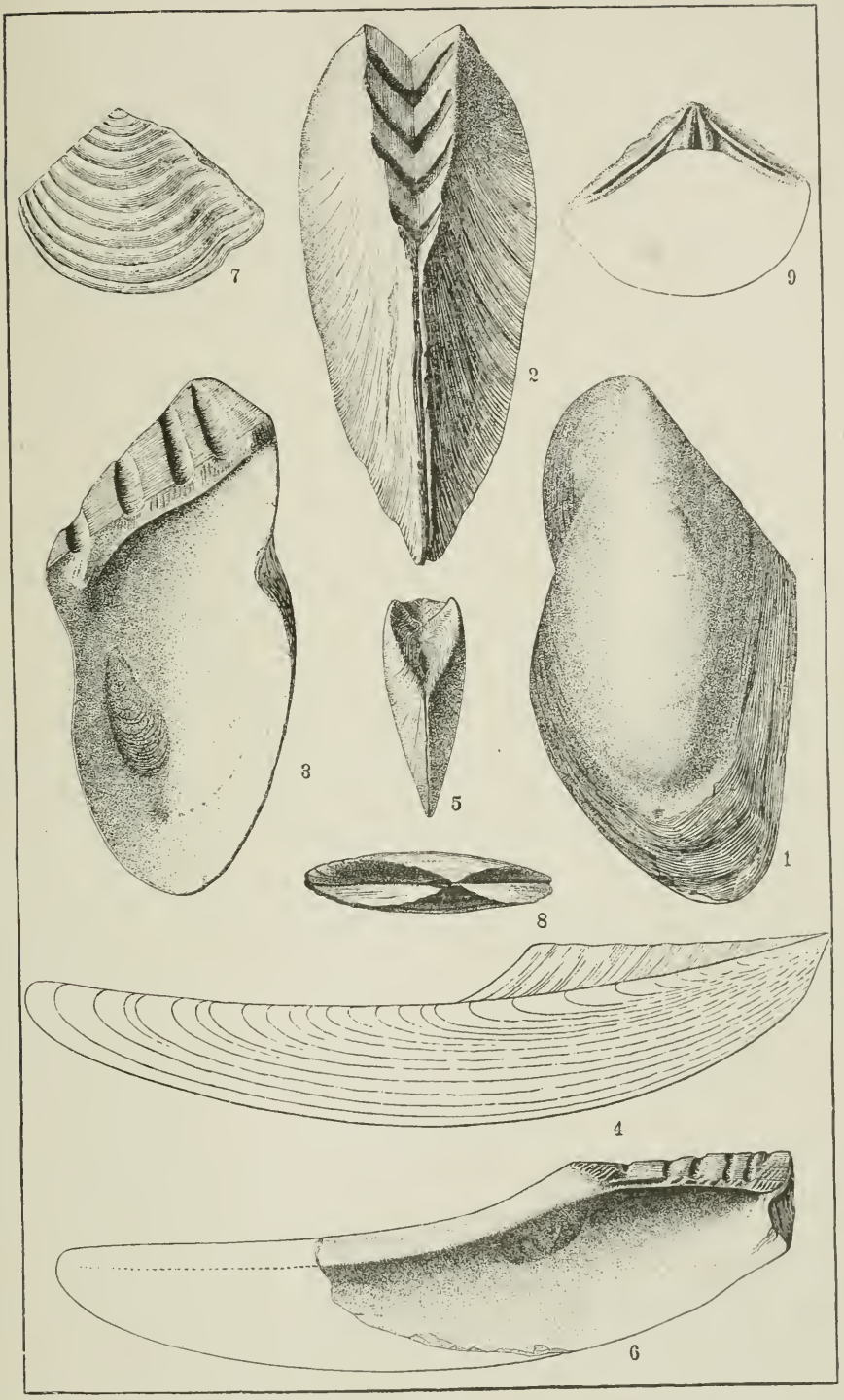
The type species of the three generic forms which are described in this article [1] belong to the collections of Cretaceous fossils from Texas, which I am now preparing for publication in one of the memoirs of the U. S. Geological Survey. In their generic characteristics all three of them appear to be respectively identical with certain forms which have long been known, but which have been referred to other genera by different authors. The features which I now present as having generic value seem to have been overlooked by those authors, or, so far as they were observed, they were treated as specific characters. Two of these forms belong to the section Melininæ of the family Aviculidæ. The other is referred to the Crassatellidæ, but it departs considerably from the typical section of that family.

CRASSATELLIDÆ.

Genus **STEARNSIA** (gen. nov.).

Shell compressed, subtrihedral or subcircular in marginal outline; beaks small, closely approximate, prominent by reason of the abrupt sloping away of both the antero-and postero-dorsal borders; lunule and escutcheon both well defined and flattened or excavated; hinge strong, consisting of both cardinal and lateral teeth; cardinal teeth two in the left valve and three in the right; both posterior and anterior lateral teeth long aud slender; posterior laterals two in the right valve and one in the left; anterior laterals two in the left valve and one in the right. If, however, the overlapping border of the right valve and the entering border of the left, within the lunule, and the overlapping border of the left valve and the entering border of the right, within the escutcheon, be regarded as teeth, the number of both the anterior and posterior laterals is two in each valve; ligament

[1] The names under which I have described these forms respectively are *Dalliconcha*, *Stearnsia* and *Aguileria*. They are given in honor of Dr. W. H. Dall and Dr. R. E. C. Stearns of the U. S. Geological Survey, and of Señor José G. Aguilera, of the Mexican Geographical and Exploring Commission.



WHITE, NEW CRETACEOUS MOLLUSCA.

small, mainly internal; free margins apparently smooth; pallial line apparently simple.

This genus agrees with *Crassatella* in having both lunule and escutcheon clearly defined, in the general character of the hinge, exclusive of the lateral teeth, in the nearly internal position of the ligament, and, apparently, in having a simple pallial line. It differs from *Crassatella* in its small and compressed beaks, the laterally compressed form of the shell, in its greater number of cardinal teeth; and in the long and slender character of both the anterior and posterior lateral teeth.

It agrees with *Astarte* in having both lunule and escutcheon well defined; but it differs from that genus in having a greater number of cardinal teeth; in its well developed anterior and posterior lateral teeth; and in having its ligament mainly internal.

It agrees with *Circe* (as represented by *C. scripta*, Lin.) in its laterally compressed form, especially that of the umbonal region, and in the number of its cardinal teeth. It differs from *Circe* in having its ligament mainly internal; in the long and slender character of the anterior lateral teeth, and in the possession of posterior lateral teeth.

It agrees with *Eryphila* in having both lunule and escutcheon well defined, and, approximately, in the character of its posterior and anterior lateral teeth. It differs from that genus in having a greater number of cardinal teeth, and in having its ligament mainly internal.

It has somewhat the aspect of *Gouldia*, but it differs from that genus in having slender, well developed posterior, as well as anterior lateral teeth. It has also a greater number of cardinal teeth than *Gouldia* and its ligament is differently situated and partly external.

The only species of this genus which I have satisfactorily examined is the one which is described in the following paragraph. This I regard as the type of the genus, but it is likely that the *Astarte carinata* of d'Orbigny[1] is congeneric with it.

Stearnsia Robinsi (sp. nov.) Pl. II, figs, 7–9.

Shell much compressed, trihedral in marginal outline; lunule long and narrow, nearly straight from end to end, concave transversely; escutcheon similar in shape and character to the lunule, but longer; beaks small, appressed, angular; ligament slightly

[1] See Palcont. Francaise, Ter. Cret. iii, pl. 262, figs. 1. and 2.

exposed, and it appears to have been divided into an outer and inner portion by a calcareous septum; umbonal furrows distinct, producing an emargination at the posterior part of the convex basal border and a considerable prominence of the posterior extremity; hinge strong; the lateral teeth slender and extending the full length of the lunule and escutcheon respectively; surface marked by strong concentric furrows and ridges, which end abruptly at the margins of the lunule and escutcheon respectively; the surface of both lunule and escutcheon plain,

AVICULIDÆ.

Genus **DALLICONCHA** (gen. nov.).

Shell resembling *Gervillia* in general form, in the character of the test, in the muscular markings, and in the possession of a pit-bearing diverging hinge area upon each valve. The valves are more or less nearly equal in convexity; beaks terminal, divergent; the upper borders of the hinge areas converging from the widely separated beaks to the posterior end of the wing, where the areas come in contact with each other by their full width; posterior wing elongate, clearly defined from the body of the shell; anterior wing absent, the anterior extremity of each valve being inflexed so as to form, when both valves are together, a three-lobed depression in the front portion of the shell, one lobe of which ends at the extremity of each of the divergent beaks and the other below, at the contact of the antero-basal margins of the valves. At the bottom of the depression there is a distinct byssal aperture, to form which both valves are nearly or quite equally notched. The articulating portion of the hinge of each valve is marked by more or less distinct crenulations which cross it obliquely downward and backward, and which are sometimes visible upon the surface of the areas above the articulating border. At the anterior end of the hinge these crenulations are approximately perpendicular, and sometimes denticulate in character, and at the posterior end they sometimes assume the form of slender, nearly horizontal lateral teeth, above which are more nearly transverse crenulations.

Dalliconcha agrees with *Gervillia* in the characteristics already mentioned; but it differs from the typical forms of that genus mainly in the inflection of the anterior extremity of the valves, and the consequent terminal position of the beaks, and absence

of an anterior ear. It also differs in wanting the large, longitudinal teeth which characterize true *Gervillia*—as seen, for example, in *G. difficilis* d'Orbigny, and *G. anceps* Deshayes.[1] The byssal aperture is also more clearly defined than in *Gervillia*.

In these differing features it agrees approximately with *Perna;* but it differs conspicuously from *Perna* in its much more elongate form, in the distinct definition of the posterior wing, the smaller number of ligamental pits, and in the crenulation of the hinge. This genus is more nearly related to *Gervillia* than to any other genus of the Aviculidæ, the relation between the two genera being somewhat similar to that which exists between the living forms of *Avicula* and the Carboniferous genus *Monopteria* of Meek and Worthen.

The species which is described in the following paragraph is proposed as the type of *Dalliconcha*, but the *Gervillia ensiformis* of Conrad is an equally typical species. The *G. aviculoides* of Defrance (not Sowerby) and *G. solenoides* Defrance seem also to belong to this genus, as doubtless do several other forms which have been referred to *Gervillia*.

Dalliconcha invaginata (nov. sp.). Pl. II, figs. 4 and 5.

Shell long and slender; the dorsum gently concave from beak to posterior end, and transversely flattened by the abrupt inflection of the dorsal border of each valve; wing well developed; the anterior depression rather deep; beaks prominent; byssal aperture moderately large, oval; hinge-areas each bearing five or six ligamental pits, which are of unequal size; the spaces between the pits marked by irregular oblique crenulations.

Genus **AGUILERIA** (gen. nov.).

Shell resembling *Perna* in general form, in the character of the test, in its muscular markings, and in the possession of a pit-bearing, diverging hinge area upon each valve. The valves are more or less nearly equal in convexity; a more or less distinct furrow passes from the dorsal border of each valve, near the apex of the beak, to the anterior margin, defining a projecting, more or less inflated anterior portion of the shell, which is homologous with the anterior ear of *Margaritophora*. The beaks are not prominent, situated anteriorly, but not terminal; ligamental pits distinct, but not numerous. The articulating

[1] See Paleont. Francaise, Ter. Cret., iii, pl. 394, fig. 3; and pl. 396, fig. 7

portion of the hinge of both valves of the adult examples of the type species is marked by crenulations or denticles, which cross the hinge at nearly right angles in front, but at the posterior portion their course is obliquely downward and backward.

In the type species a small blunt tooth is observable at the anterior end of the hinge of the left valve; and there is a larger, more oblique one at the posterior end of the hinge. There are corresponding pits in the left valve to receive these teeth, and some specimens also show a slight elevation at the side of the anterior and posterior dental pits respectively, suggesting that they represent incipient teeth in that valve. Byssal aperture obscure or absent.

This genus agrees with *Perna* in the characters which have already been mentioned, but it differs from *Perna* in the retreating position of the beak, in the projecting instead of inflected anterior extremity of the shell beneath the beaks, in the crenulation of the articulating portion of the hinge, in the smaller number of ligamental pits, and in the absence of a well-defined byssal notch in either valve.

It agrees with *Margaritophora*, as shown, for example, by the living species *M. pica* Gould, from the southern Pacific Ocean, in the character of the test, in the muscular markings, in the possession of blunt teeth upon the anterior and posterior portions of the hinge, and in the retreating position of the beaks. It differs from *Margaritophora* in having well-developed ligamental pits in its hinge areas, a crenulate or denticulate, instead of a smooth hinge border, and in the absence of a compressed anterior ear, and of a distinct byssal notch.

Bakevellia has some characteristics similar to those of this genus, but its ligamental pits are fewer in number and occupy only the middle portion of the hinge, while its lateral teeth are two or three in number at each end of the hinge, and they are nearly parallel to the hinge border; the latter being smooth and not crenulate. Besides this there is some reason to doubt whether *Bakevellia* really belongs to the family Aviculidæ, as do *Perna* and its congeners; and to which family this new genus is referred.

The species which is described in the following paragraph is proposed as the type of *Aguileria*. Señor Aguilera has shown me some examples of a species which he obtained from the Cre-

taceous rocks of the State of Puebla, Mexico, which is probably congeneric with this Texan form. It is probable also that the *Gervillia Renauxiana* of Matheron, and other published forms, ought to be referred to the genus here proposed. A form from the Cretaceous of Brazil, described by me some years ago under the name of *Gervillia dissita*, but still unpublished, seems to belong to this genus. If those species should be assigned to this genus it may be that the crenulation of the hinge will be found to be an inconstant character; but the other characters which are herein described are regarded as a sufficient basis for its generic identity.

Aguileria Cumminsi (sp. nov.). Pl. II, figs. 1–3.

Shell inflated, obliquely subelliptical in marginal outline; test thick, hinge line moderately long; hinge areas broad, bearing three or four ligamental pits; hinge border including the surface of the cardinal teeth, distinctly crenulated in adult examples; posterior cardinal tooth moderately large; anterior one small and indistinct.

EXPLANATION OF PLATE II.

Aguileria cumminsi White.

FIG. 1. Left side view of an adult example.

FIG. 2. Dorsal view of the same.

FIG. 3. Interior view of a left valve, somewhat narrowed by lateral compression, showing the hinge and cardinal area.

Dalliconcha invaginata W.

FIG. 4. Right side view of a restored outline, reduced to three-fourths natural size.

FIG. 5. Front view of an adult example, restored as to its outline from a partially crushed condition.

Dalliconcha ensiformis Conrad, sp.

FIG. 6. A left valve, showing hinge and front features; introduced for comparison.

Stearnsia robbinsi W.

FIG. 7. Left side view of a medium-sized example.

FIG. 8. Dorsal view of the same.

FIG. 9. An imperfect example, showing the hinge of the left valve.

All the figures except 4 are of natural size.