

defined upon both the inner and outer surface; the margin of the apertures not being even everted or raised upon the outer surface. Moreover, these perforations exist upon the middle portion of the valve only, the greater part of the rows extending from the umbo to the basal border. In the young state, as shown on the umbo of adult shells, a lesser part of the median interspaces were thus perforated, but as the shell grew perforations were introduced into the next outer adjoining interspaces, so that fully one-half of the surface of the adult shell was occupied by them. Both the anterior and posterior portions of the surface, comprising a considerable proportion of the ribs which mark the surface, are entirely without either holes or spines, and besides the ribs, the surface is marked only by the ordinary lines and imbrications of growth.

This shell therefore differs from the typical forms of *Criocardium* in having perforations only instead of spines or nodes upon the intercostal interspaces; and in having neither spines nor perforations upon either the anterior or posterior portions of the valves, upon which portions in *Criocardium* the spines are more conspicuous than upon the median portion. These differences from *Criocardium* are certainly as great as those which separate any of the other recognized subgenera of *Cardium*, and this shell is therefore as worthy as they of subgeneric designation. I therefore propose for a section of the genus *Cardium*, of which *C. speciosum* Meek & Hayden is the type, the subgeneric name of *Ethmocardium*.

WASHINGTON, December 2, 1879.

#### DESCRIPTIONS OF NEW CRETACEOUS INVERTEBRATE FOSSILS FROM KANSAS AND TEXAS.

By C. A. WHITE.

Of the fossils described in this paper the two Aviculids were discovered by Prof. B. F. Mudge,\* in strata of the Dakota Group, in Saline County, Kansas, and sent by him to the National Museum. The locality of these fossils is only about three miles distant from that at which he obtained a series of fossils which were described and figured in vol. ix, U. S. Geol. Surv. Terr. (4to ser.). They are all from the Dakota Group, and all evidently from the same local horizon, because at least two of the associated species are identical with two which were among those described by Mr. Meek, and just referred to.

All the remainder are from Texas, having been sent respectively by Mr. G. W. Marnoch, from Bexar County; Mr. D. H. Walker from Bell County, and Mr. S. W. Black, from Collin County. The types of all these species are now in the collections of the National Museum.

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\* While these pages are passing through the press the sad intelligence comes that Professor Mudge is dead. He was a sincere devotee and an intelligent interpreter of nature, and, better still, an honest man. Peace to his ashes.—C. A. W.

## MOLLUSCA.

Genus OSTREA Linnæus.

Subgenus ALECTRYONIA Fischer.

**Ostrea (Alectryonia) blackii** (sp. nov.). Plate 4, figs. 1 and 2.

Shell irregularly subovate in marginal outline, moderately capacious, beaks small, sometimes obscure and sometimes moderately prominent. Lower valve usually moderately deep and capacious, its convexity being more prominent about the middle than elsewhere, often subalate, but this latter feature is usually obscure; scar of attachment at the beak usually present and often moderately large; ligament-area usually short and rather small, but sometimes comparatively large and laterally extended; ligament-furrow well defined and having the usual characteristics of the genus. Upper valve nearly flat and corresponding with the lower in other respects, except that it is not so broad along the hinge-border and never has there the subalations which sometimes mark the lower valve. The adductor scars are moderately large and have the form common to *Alectryonia*, namely, curved-spatulate. Surface of both valves marked by concentric lines and strong imbrications of growth, and each by a dozen or more radiating ribs or plications, which constitute a conspicuous feature of the shell; but they are usually somewhat less distinct upon the upper than upon the under valve.

Length, 68 millimeters; greatest breadth, 62 millimeters; thickness, 32 millimeters.

In form and general aspect this shell approaches that of a typical *Ostrea*; but in the character of its adductor scars, the extent of its plications, and the subalation of its cardinal border it is properly referable to *Alectryonia*. The only shell with which it need be compared is *O. bellaplicata* Shumard, also from Texas. It differs from that shell in being constantly larger, proportionally less capacious, broader toward the base, and in having its hinge-border longer and more oblique.

*Position and locality*.—Cretaceous strata, Collin County, Texas, where it was collected by Mr. S. W. Black, and sent by him to the Smithsonian Institution. The specific name is given in his honor.

Genus EXOXYRA Say.

**Exogyra forniculata** (sp. nov.). Plate 4, figs. 3 and 4.

Shell subtrihedral in lateral outline, somewhat compressed vertically. Under, or left valve thick, especially its umbonal half; beak curved strongly toward the posterior border, and in the plane of the free margins of the valve, not forming so much as one complete revolution, its point being free but closely approaching the posterior border of the valve; ligament-area irregularly triangular, moderately large, extending to the apex of the beak, its sulcus well developed; interior surface

having the usual characteristics of the genus. A faint, illy-defined sulcus is apparent on the posterior side, extending from the umbo to the basal border, between which sulcus and the laterally flattened-concave posterior border of the valve there is an equally undefined radiating curved ridge. The anterior portion of the valve is marked by a strong angular, rough carina or ridge which extends from the beak to the basal border. The prominence of this ridge gives a flattened aspect to the outer surface of the valve, and also produces a flattened space of considerable width between it and the anterior margin. Surface marked by the ordinary coarse lines of growth, often presenting the coarse imbrications so common to the *Ostreidae*; and upon the ridges just described there are occasional nodes or vaulted projections of portions of the shell. Upper valve unknown.

Length, 70 millimeters; breadth across near the base, where it is broadest, 50 millimeters.

In general aspect this shell is much like a *Gryphæa*, but it is referred to *Exogyra* because of its laterally instead of perpendicularly curved umbo and beak. This species therefore affords additional evidence of the well-known fact that the two genera named approach each other very closely. Specifically this shell is well marked by its strong, rough angular carina, its free beak, narrow umbonal region and broad base. In these respects it differs too much from any described form to need detailed comparison. By casual observation it may be mistaken for the variety *navia* Conrad, of *Gryphæa pitcheri*; but a comparison of the beaks of the two forms will show a well-marked difference.

*Position and locality*.—Cretaceous strata, Bexar County, Texas, where it was collected by G. W. Marnoch, esq., together with many well-known Cretaceous species of that region.

***Exogyra winchelli*** (sp. nov.). Plate 2, figs. 1 and 2; and plate 3, figs. 1 and 2.

Shell of medium size, irregularly subovate in marginal outline; sessile, or attached by a large part of the surface of the lower or left valve, being obliquely inclined so that the anterior border is very much higher than the posterior. Lower valve massive, moderately deep, its front side nearly perpendicular and of considerable height vertically; umbo vertically flattened continuously with the front side, and broadly curving backward; beak closely incurved under the posterior border and there concealed; ligamental groove long and narrow, occupying the whole curvature of the umbo. Upper valve nearly flat, thick; the anterior part being much thicker than the posterior; beak vertically thin or compressed, closely coiled in a plane with that of the valve, making a little more than one entire revolution. Surface marked by coarse lines of growth, and near the anterior borders of both valves, especially the upper, it is usually deeply laciniate.

Length, 90 millimeters; breadth, 66 millimeters; height in front, 55 millimeters.

This species belongs to the same section of the genus *Exogyra* with

*E. haliotoidea* Sowerby, sp., and *E. walkeri* White. The latter species is larger and proportionally broader than *E. winchelli*, and not properly sessile as the latter species is. *E. haliotoidea*, as figured by d'Orbigny in Pal. Française, t. iii, pl. 478, differs from *E. winchelli* in being proportionately higher in front and narrower in transverse diameter, and in not having the beaks so much incurved. *E. interrupta* Conrad, from Mississippi, also belongs to the same section, but that species is described as having radiating ribs, which ours has not.

*Position and locality.*—Cretaceous strata, Collin County, Texas, where it was collected and sent to the Smithsonian Institution by Mr. S. W. Black. The collections of the Institution also contain a fine example sent by Prof. A. Winchell many years ago from Prairie Bluffs, Ala., which is believed to be specifically identical with the form here described, but is proportionally more elongate, has a larger muscular scar, and the umbonal curve is a little more abrupt. The specific name is given in honor of Professor Winchell.

#### Genus GERVILLIA Defrance.

*Gervillia mudgeana* (sp. nov.). Plate 5, figs. 3 and 4.

This shell is known only by natural casts in brown hematite of the interior, and a few adhering fragments showing the character of the test. It is moderately large, laterally distorted; hinge-line comparatively long, very oblique with the axis of the shell, producing a somewhat prominent posterior alation which is not distinctly defined from the body of the shell; cartilage-pits in the area of each valve six or seven, as indicated by undulations upon the cast; beaks placed very near the anterior end, beyond which there appears to have been no distinct anterior ear; beak of the right valve more prominent than that of the other, although the right valve is less convex transversely than the left; right valve having a somewhat regular and strong longitudinal convexity; but its transverse convexity is very little in the anterior half, while its posterior half is nearly flat; left valve nearly straight, or even slightly concave longitudinally along the axis, but very strongly convex transversely in all parts of the shell, this convexity being more abrupt along the axis than elsewhere; and there is also between the axis and the hinge-margin a slightly raised, rounded fold which extends from behind the beak to the posterior margin; adductor muscular impression large and distinct in each valve. A few fragments show the surface to have been marked by the ordinary concentric lines of growth, and also that the test although firm was not massive.

The dimensions cannot be definitely given, but the largest example discovered indicates a length of at least 80 millimeters.

This shell differs too much from any of the few known Cretaceous species of the genus to need detailed comparison, but it is related to *G. subtortuosa* Meek & Hayden, which it resembles in being tortuous. It differs, however, in being a proportionally much shorter shell, in the

shape and position of the adductor scars, and in the relative position and arrangement of the cartilage-pits. It is less tortuous than *G. tortuosa* Sowerby, and its proportions are different. The relation of this species with *G. subtortuosa* is doubtless genetic, and it presents one more among other now known similar cases of evident genetic relationship between the molluscan fauna of the Dakota Group and that of the later Cretaceous groups of the West, which were formerly unknown, but which the discoveries of Professor Mudge have done more than those of all others to show.

*Position and locality.*—Strata of the Dakota Group, Saline County, Kansas, where it was discovered by Prof. B. F. Mudge, in whose honor the specific name is given.

### Genus PTERIA Scopoli.

#### Subgenus OXYTOMA Meek.

*Pteria* (*Oxytoma*) *salinensis* (sp. nov.). Plate 5, figs. 1 and 2.

Shell rather large for a Cretaceous *Pteria*; the body, exclusive of the wings, obliquely subovate, broad at the base, moderately gibbous, distinctly but not very greatly inequivalve; the left valve, as usual, more convex than the right and its beak more prominent; the convexity of the valves somewhat uniform but increasing toward the umbonal region in each, where it is greatest; anterior wing moderately large, defined from the body of the shell by being laterally compressed, but not by any distinct auricular furrow; the byssal sinus under the anterior wing of the right valve having the usual size and shape common to *Oxytoma*; posterior wing not proportionally large, and not distinctly defined from the body of the shell except by a somewhat gradual lateral compression; its posterior angle not greatly produced; hinge-line less than the axial length of the shell; posterior adductor scars not distinct; anterior adductor scars distinct and deep for a shell of this genus, placed immediately in front of the beaks, that of the left valve being more distinct than the other.

This, like the last-described species, is known only by natural casts in brown hematite of the interior of the shell, the imperfection of which will not allow of an accurate measurement of all its proportions. It is, however, known to have reached an axial length of more than 60 millimeters, a transverse width near its base of at least 50 millimeters, and a thickness of about 25 millimeters when both valves were in natural position.

The character of the surface is not known, but it was evidently nearly smooth, as is usual with *Oxytoma*. It is related probably genetically to *P. (O.) nebrascana* Evans & Shumard, but it is a larger and more robust shell, with a proportionally larger anterior wing, more prominent beaks, and broader base.

*Position and locality.*—Strata of the Dakota Group, Saline County,



## EXPLANATION OF PLATE 2.

### EXOZYRA WINCHELLI.

Fig. 1, interior view of lower valve, natural size. Fig. 2, inside view of upper valve. (See other figures on Plate 3.)

## EXPLANATION OF PLATE 3.

### EXOZYRA WINCHELLI.

Fig. 1, front view of lower valve, natural size. Fig. 2, outside view of upper valve. (See other figures on Plate 2.)

## EXPLANATION OF PLATE 4.

### OSTREA BLACKII.

Fig. 1, outside view of lower valve, natural size. Fig. 2, upper view of the same example.

### EXOZYRA FORNICULATA.

Fig. 3, outside view of lower valve, natural size. Fig. 4, inside view of the same.

## EXPLANATION OF PLATE 5.

### PTERIA SALINENSIS.

Fig. 1, left side view of natural cast of the interior, natural size. Fig. 2, dorsal view of the same.

### GERVILLIA MUDGEANA.

Fig. 3, left side view of natural cast of the interior, natural size. Fig. 4, dorsal view of the same.

## EXPLANATION OF PLATE 6.

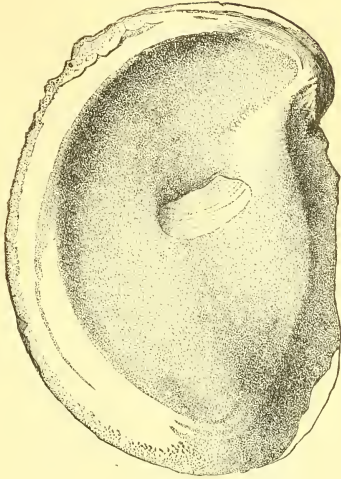
### THRACIA MYÆFORMIS.

Fig. 1, right side view, natural size. Fig. 2, dorsal view of the same.

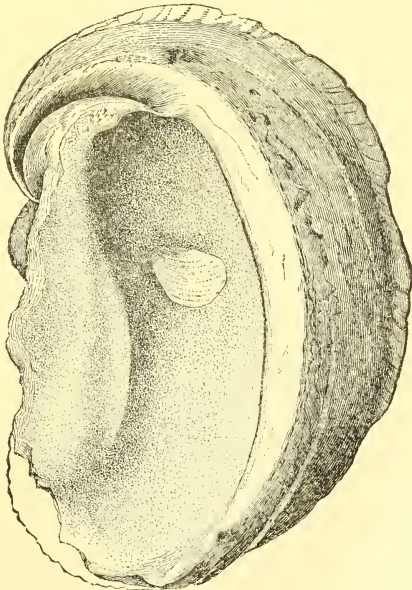
### PACHYMYA? COMPACTA.

Fig. 3, right side view, natural size. Fig. 4, dorsal view of the same.

2



1

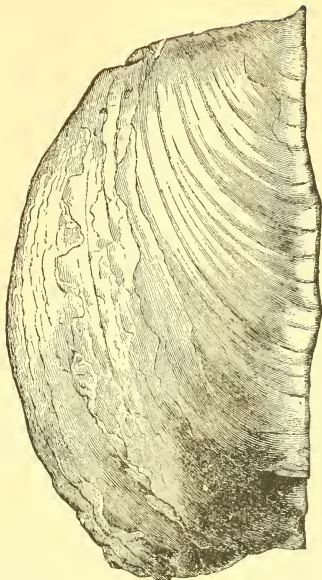


EXOYRA WINCHELLI.

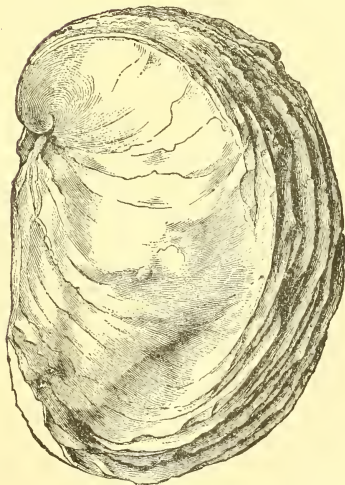




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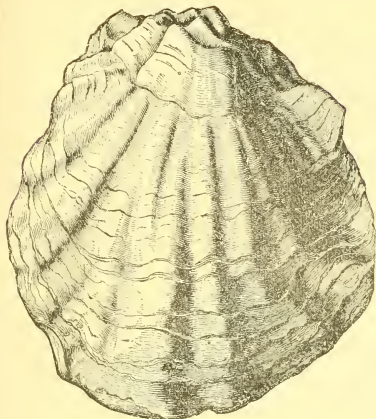
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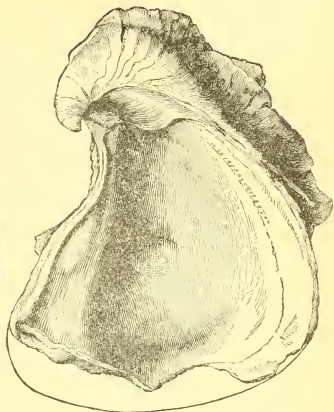
EXOGYRA WINCHELLI.



1



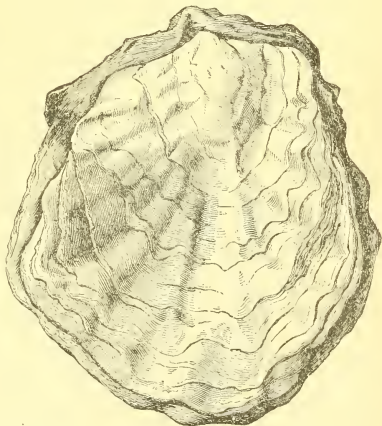
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3



2

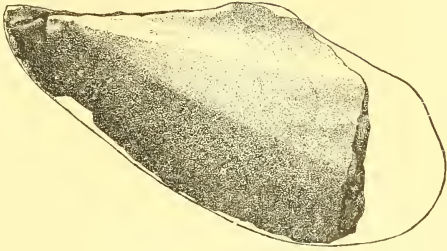


1 and 2.—*OSTREA BLACKII*.

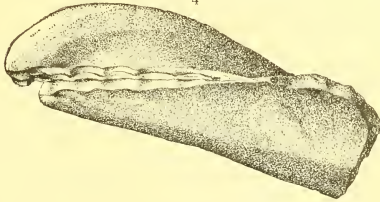
3 and 4.—*EXOGYRA FORNICULATA*.



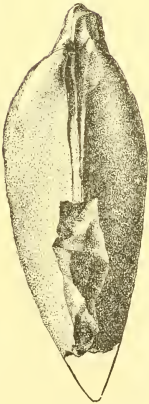
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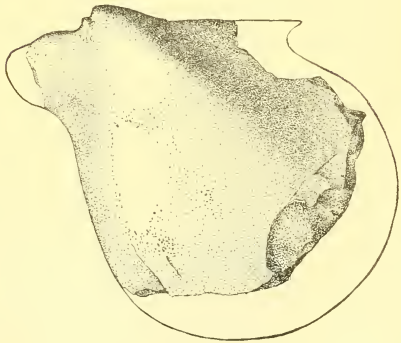
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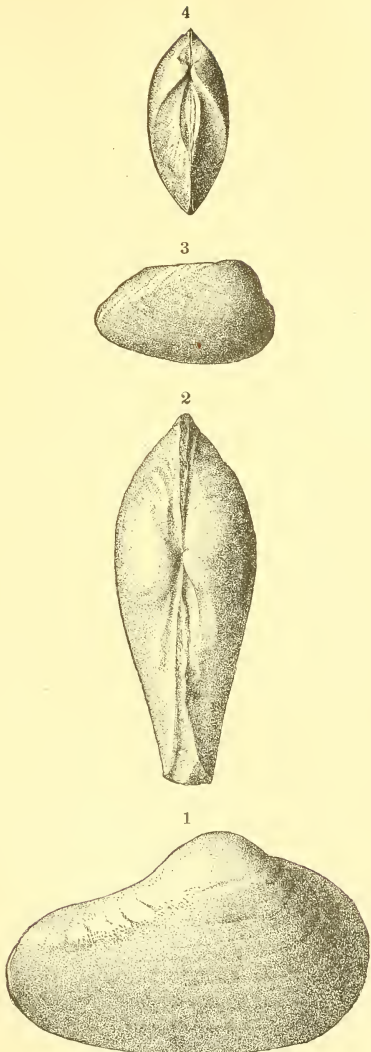


1



1 and 2.—*PTERIA SALINENSIS*.  
3 and 4.—*GERVILLIA MUDGEANA*.





1 and 2.—THRACIA MYEFORMIS.  
3 and 4.—PACHYMYA? COMPACTA.





Kansas, where it was discovered by Prof. B. F. Mudge associated with the preceding species, and also with *Cyrena Dakotensis* Meek & Hayden and *Cardium? kansascense* Meek.

### Genus PACHYMYA Sowerby.

*Pachymya? compacta* (sp. nov.). Plate 6, figs. 3 and 4.

Shell small, narrower posteriorly than anteriorly, slightly gaping behind; beaks depressed, approximate, incurved, directed forward, their position being very near the front; basal margin broadly convex; posterior margin narrowly rounded; postero-dorsal margin forming an oblique downward and backward truncation of that part of the shell; cardinal margin nearly straight, subparallel with the basal margin, much shorter than the full length of the shell; ligament short, its area depressed and sharply defined; front very short, depressed beneath the beaks and narrowly rounded below; umbonal ridges prominent and angular or subangular; the space above and behind them moderately broad and flattened; the remainder of each valve somewhat regularly convex. Hinge and interior markings unknown. Surface marked by the ordinary concentric lines of growth.

Length, 29 millimeters; height, 18 millimeters; thickness, both valves together, 14 millimeters.

This species is evidently congeneric with the shell which in the An. Rep. U. S. Geol. Sur. Terr. for 1877, p. 298, I described as *Pachymya? herseyi*, and also with the *Cypriocardia? texana* of Roemer, but knowing nothing of the hinge of either of these forms, I am not satisfied that they are properly referable to *Pachymya*; yet in all their external characters they seem to agree.

*Position and locality*.—Cretaceous strata, Bell County, Texas, where it was collected by Mr. D. H. Walker.

### Genus THRACIA Leach.

*Thracia myæformis* (sp. nov.). Plate 6, figs. 1 and 2.

Shell transversely subovate in marginal outline; valves nearly equal; anterior end regularly rounded; wider and thicker anteriorly than posteriorly; posterior portion narrowed vertically and somewhat compressed but gaping at the extremity; basal border broadly convex; posterior border abruptly rounded; cardinal margin slightly convex, but the prominent umbones give the shell a concave appearance behind the beaks; a distinct linear depression is seen in the natural cast upon each side of the ligament; beaks prominent, incurved and directed a little forward; muscular impressions not distinctly shown in our examples, which are natural casts in chalky limestone, but the pallial sinus appears to have been large and subangular at its anterior end. Surface marked by the ordinary lines of growth, and also by more or less distinct irregular concentric wrinkles.

Length, 57 millimeters; height from base to umbo, 37 millimeters; thickness, both valves together, 24 millimeters.

In general aspect this shell approaches *T. prouti* Meek & Hayden, from the Upper Fox Hills Group of the Upper Missouri River region, but it differs in being proportionally narrower and more produced behind the beaks, and in the greater prominence of the umbones.

*Position and locality.*—Cretaceous strata, Bell County, Texas, where it was collected by Mr. D. H. Walker.

WASHINGTON, December 4, 1879.

**NOTES ON A COLLECTION OF FISHES OBTAINED IN THE STREAMS OF GUANAJUATO AND IN CHAPALA LAKE, MEXICO, BY PROF. A. DUGÈS.**

By DAVID S. JORDAN.\*

The collection which forms the subject of this paper was obtained by Prof. A. Dugès in the streams of the province of Guanajuato in Mexico, and by him forwarded to the Smithsonian Institution. Many of them are extremely interesting as representing the ordinary North American fish fauna at a point near its southern limit, before it gives place to the Central and South American forms.

*Chiostoma estor* Jordan, sp. nov.

Allied to *Chiostoma humboldtianum* (C. & V.).

Body elongate but rather robust for the genus, the depth about one-sixth the length to the base of the caudal.

Head very large, pike-like, forming more than one-fourth (two-sevenths) the length to base of caudal.

Mouth very large, the maxillary reaching to past the front of the eye. Intermaxillaries forming the edge of the jaw strongly curved, their posterior portions broadly dilated as in *Chiostoma meuidium*. Teeth strong, in several series in each jaw. Two small fang-like teeth on the front of the vomer. Lower jaw considerably projecting beyond the upper. Eye large, anterior, 5 in length of head, shorter than snout, and a little narrower than the interorbital space, which is nearly flat.

Head covered with scales, which are smallest on the occipital region, and largest on the lower part of the cheeks. Smaller scales on the interopercle.

Sides of head vertical, a conspicuous ridge along the edge of the top of the head above and behind the eye.

Scales small, anteriorly crowded, about 72 in a longitudinal series, and 18 in a cross series. Posterior margin of scales strongly crenate, so that the fish feels rough to the touch.

\* As Professor Jordan is far distant while this paper is going through the press, the proof has been compared with his manuscript by the editor of these Proceedings. In the description of *Zophendum australe* two verbal additions are indicated in parentheses.