

**Article XXIV.—LAND SHELLS FROM THE TERTIARY OF WYOMING.**

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In 1912, Mr. W. Stein collected for the American Museum of Natural History a quantity of small land shells near the mouth of Pat O'Hara Creek, in Clark's Fork Basin, Wyoming. A study of this material reveals a surprising number of species, eight in all, and shows that shells apparently referable to the Indian genus *Boysia*, and to a new allied genus, inhabited the Rocky Mountain region in early Tertiary times. One of the new species collected by Mr. Stein was described in this Bulletin, XXXIII, p. 105; four others are described herewith.

It is extremely desirable that further material should be collected at Mr. Stein's locality, so rich in remarkable species, on the whole in an excellent state of preservation. It is surely probable that we have only a portion of a quite rich Molluscan fauna.

***Protoboysia* n. g. (Bulimulidæ.)**

Shell conic-globulose, with an obtuse regularly rounded spire of seven flattened whorls; eighth whorl curved upwards, obliquely wrapping the spire, curving round it near the apex, the narrowly semilunar aperture situated on the sides of whorls 3 to 6; near the point where the last whorl ascends is a deep transverse constriction, the margins of which are thickened. The sculpture consists of fine oblique striæ, coarser on the last whorl. The nuclear region appears to be without sculpture. The umbilicus is represented by a chink. Type, *P. complicata* n. sp.

***Protoboysia complicata* n. sp. (Fig. 1; A, side view; B, from beneath.)**

Length and width  $3\frac{1}{2}$  mm.; oblique striæ regular, about 6 in  $160\ \mu$  near end of seventh whorl, fine and widely spaced ( $95\text{--}125\ \mu$  apart) a short distance before aperture.

Five miles southeast of mouth of Pat O'Hara Creek, Clark's Fork Basin, Wyoming. Above red-banded beds; probably base of Wasatch formation.<sup>1</sup> (*W. Stein*, 1912).

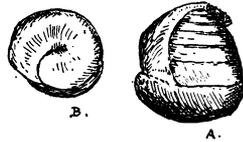


Fig. 1. *Protoboysia complicata*.

This is a most astonishing discovery; a shell entirely new to our American Tertiary, closely resembling the Indian *Boysia bensoni* Pfeiffer, but with the

<sup>1</sup> See, however, Granger, Bull. Amer. Mus. N. H., XXXIII, p. 204.

last whorl even more wrapped around the spire, and showing toward the base a swelling followed by a deep constriction. The last feature reminds us of the Brazilian *Tomigerus cumingi* Pfeiffer, which is perhaps the nearest relative of our shell in the New World. Pilsbry (Non-Marine Mollusca of Patagonia, Rep. Princeton Univ. Exp. to Patagonia, III, p. 619) has given maps showing the scattered distribution of this group of molluscs in the Neotropical Region; while we have the remarkable case of the genus *Hyperaulax*, which has a living species on the island of Fernando Noronha, and several fossil representatives in the Silex Beds at Tampa, Florida. The discovery of a member of this group in the Tertiary of Wyoming affords one more illustration of the former occurrence in the north of a type now more southern on both sides of the world.

### **Boysia Pfeiffer, 1849.**

The two following species are without the callus and constriction at the beginning of the ascending whorl, and cannot at present be distinguished from *Boysia*.

#### **Boysia sinclairi (Cockerell). (Fig. 2, showing broken aperture.)**

*Gastrodonta* (?) *evanstonensis* var. *sinclairi* Cockerell, Bull. Amer. Mus. Nat. Hist., XXXI, (1912) p. 231.

The upturned whorl had been broken off in the type; but numerous specimens found with *Protoboysia* clearly show that the last whorl was directed upwards, very narrowly crescentic in section, to end on the fourth to sixth whorls in an aperture provided with a very thick reflexed lip. Only the upper end of the lip has been preserved, so the form of the aperture cannot be ascertained. The whole shell, except the apex, has delicate oblique riblets.



Fig. 2. *Boysia sinclairi*.

#### **Boysia phenacodorum n. sp. (Fig. 3.)**

Shell subglobose, about  $5\frac{1}{2}$  mm. high and 7 broad; spire rounded and obtuse, with six very slightly convex whorls, which are distinctly obliquely striate, the sixth having coarse regular ribs, five to a mm.; the last, upturned whorl is only partly preserved, but appears to be formed as in *B. sinclairi*, except that it is not so narrowly crescentic in section. The umbilicus is closed.



Fig. 3. *Boysia phenacodorum*.

Two specimens, found with *Protoboyisia*. Easily known from *B. sinclairi* by its smaller size and less elevated spire.

***Vitrea sinoparum* n. sp.** (Fig. 4.)

Shell  $5\frac{1}{4}$  mm. diameter,  $2\frac{1}{4}$  high; spire low; whorls six, rounded, without distinct sculpture; aperture broad, somewhat oblique.

Found with *Protoboyisia*.

A very modern looking shell, without striking characters.



Fig. 4. *Vitrea sinoparum*.

***Thysanophora oxyænæ* n. sp.** (Fig. 5.)

Shell not quite 5 mm. broad,  $2\frac{1}{4}$  high; spire low; whorls  $5\frac{1}{4}$ , rounded, the last whorl elevated next to the suture; aperture semilunar, comparatively narrow; umbilicus broad.

Found with *Protoboyisia*. This is referred to *Thysanophora* with some confidence, on account of its resemblance to the living *T. ingersolli* of the Rocky Mountains; nevertheless, it might belong to the Zonitidæ, so far as the visible characters show. Seen from above, it looks like *Vitrea sinoparum*.



Fig. 5. *Thysanophora oxyænæ*.

Other shells found with *Protoboyisia* are *Pyramidula ralstonensis* Ckll. (many) and *Oreohelix megarche* C. & H. (immature).

