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To the Revision of Some Jurassic Gastropods from Central Russia: 1. Genus *Plicacerithium*

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Abstract—On the base of the protoconch structure, the subgenus *Plicacerithium* Gerasimov, 1992, of the genus *Procerithium* is reconsidered as a separate genus and moved from the family Procerithiidae to the family Epitoniidae. Several other genera from the Triassic and Jurassic are also assigned to the family for the first time, thus expanding the existing range of the epitoniids. The embryonic shells of three epitoniid species from the Jurassic of Central Russia are described for the first time. One new species, *Plicacerithium altum*, is described.

INTRODUCTION

A vast number of gastropod species have been described to date from the Jurassic of Central Russia (Gerasimov, 1992). However, their taxonomy ignores the data on the embryonic shells. The protoconch study of several groups has revealed that they should be assigned to the Ptenoglossa. The obtained data are of great interest, since there is little information on the Jurassic Ptenoglossa. This paper opens a series of articles intended for filling this gap.

Eichwald (1868) described the species *Cerithium apicatum* Eichw. from the Jurassic of Central Russia. Gerasimov (1992) established a new subgenus, *Plicacerithium*, within the genus *Procerithium* and designated *C. apicatum* as a type species. In addition, four other species of the Oxfordian and Volgian gastropods from Central Russia were also assigned to the new subgenus, i.e., *P. korobceevense* Geras., 1992; *P. volgense* Geras., 1992; *P. bitzae* Geras., 1992; and *P. parabitzae* Geras., 1992.

I restudied all the species except for the last one, since its single specimen, as it was noted by the author, had been lost prior to the publication of Gerasimov's monograph. Unfortunately, the description of *P. parabitzae* provided no valuable data for reevaluation of its systematic position. As for the other members of *Plicacerithium*, I suppose that the species *P. apicatum* and *P. korobceevense* should be assigned to the family Epitoniidae Berry; *P. bitzae* is a member of Cerithiopsidae H. et A. Adams; and *P. volgense* represents the genus *Glosia* (Rissoacea). Recently collected material yielded a new epitoniid species, which is similar to *P. apicatum*. This species is described below as *Plicacerithium altum* sp. nov.

All three species of the genus *Plicacerithium* have subcylindrical protoconchs composed of a single smooth whorls and several whorls ornamented by orthocline plicae similar to those of *Tenuiscala labrieri* Boury (Nützel, 1998, pl. 18, figs. Q–R), *Opaliopsis* cf. *concava* (Dall) (Nützel, 1998, pl. 14. figs. P–Q; Bandel, 1991, p. 261, fig. 51). The structures of the teleoconch and of the aperture of *Plicacerithium* are also similar to those of the genera *Proscala* Cossmann, 1912, *Confusiscala* Boury, 1910, and *Claviscala* Boury, 1910, which are placed in the Epitoniidae (Cossmann, 1912; Wenz, 1940).

The apertural margin is broken in all of the studied specimens of *Plicacerithium*, but it has basal angle suggesting the possible presence of a siphonal notch. The teleoconch morphology also shows similarity of *Plicacerithium* to the Early Cretaceous epitoniids (*Proscala, Confusiscala* and *Claviscala*). It has flat or slightly inflated whorls ornamented by thick plicae and fine densely placed ribs. The plicae are widely spaced and concur with each other on neighboring whorls; this is also typical of the above-mentioned epitoniid genera. The species *Plicacerithium korobceevense* has carina-like angulation at the base of the adult shell. This angulation is characteristic of numerous Cretaceous epitoniids.

The members of the genus *Procerithium*, where *Plicacerithium* have been placed by Gerasimov, differ in the structure of the embryonic shell. In *Procerithium*, it consists of several smooth whorls, which could bear angulation in the lower part. Structurally, its protoconch is similar to that of the Zygopleuridae Wenz rather than to that of the epitoniids. Thus, *Plicacerithium* should be treated as a separate genus of the family Epitoniidae. Probabaly, the genus consists of species ancestral to the Early Cretaceous genera *Proscala* and *Claviscala*.

The Upper Jurassic epitoniids are known only from the Russian Platform and Crimea. A thorough review of more than 700 papers revealed only two representatives of *Plicacerithium*, i.e., *Melania undulata* Zieten, 1833, from the Lower Jurassic and *Katosira proundulata* Ammon, 1892, from the Rhaetian (?) of Germany. The numerous forms from the Ladinian–Carnian illustrated by A. Nützel (1998) could be considered to be ancestral to the epitoniids rather than members of the family

Zygopleuridae. Nützel divided the family Zygopleuridae into two subfamilies. The first subfamily, Zugopleurinae, includes mollusks with plicated teleoconchs and smooth protoconchs bearing a row of nodes along the upper suture. The second subfamily, Ampezzopleurinae Nützel, 1998, includes forms with the protoconch composed of the first smooth whorl and several whorls covered by dense plicae. Their teleoconchs are ornamented either by plicae (*Ampezzopleura* Bandel, 1991) or by a combination of plicae and ribs (*Striazyga* Nützel, 1998). The difference in the protoconch ornamentation prevents the ampezzopleurins from being put in the family Zygopleuridae; thus, they could possibly be regarded as the most ancient epitoniids. The last whorls of these hypothetical Triassic epitoniids lack the basal carina-like angulation, which is typical of the post-Jurassic genera of the family. The plicae take the form of rounded angular arched bulges. It is noteworthy that in contrast to the Recent Epitoniidae, the ancient epitoniids from the Triassic (*Ampezzopleura* and *Striazyga*), Jurassic (*Plicaceirhium*), and Cretaceous (*Proscala, Confusiscala*, and *Claviscala*) had a siphonostome aperture. This fact casts doubt on the validity of their taxonomic position.

Let me explain some morphological terms used in this paper. The spiral elements of ornamentation are called ribs or threads; the collabral elements are called plicae. The ribs are divided into primary and secondary: the primary ribs began to form just from teleoconch's inception, the secondary ribs appeared later in the teleoconch ontogeny. The term *junction* means the border between the protoconch and teleoconch; this border is marked by a resorption line and corresponds to a stop in shell growth.

According to their size, the shells are divided into small (3–10 mm high) and medium (10–40 mm high). Since the coiling angle changes only slightly during the shell growth and, thus, this is of little systematic value for the group under discussion, I consider only the teleoconch angle measured between the tangent lines of the last whorl. According to the value of this angle, shells are divided into highly conical (up to 15°) and conical (16°–40°).

MATERIAL

The material studied in the paper is housed at the Geological-Mineralogical Museum of the Krupskaya Moscow Pedagogic University (GMM MPU, collection no. 12).

SYSTEMATIC PALEONTOLOGY

Family Epitoniidae Berry, 1910

Genus *Plicacerithium* Gerasimov, 1992

Procerithium (Plicacerithium): Gerasimov, 1992, p. 77.

Type species. *Cerithium apicatum* Eichwald, 1868; Upper Jurassic, Upper Oxfordian; Russia, Moscow Region.

Diagnosis. Shell medium or large, conical or highly conical. Protoconch consists of one and a half rounded, smooth, and almost planispiral whorls and two and a half or three whorls ornamented by densely spaced plicae. Ornamented whorls expand only slightly or even retain the same width, so protoconch has cylindrical appearance. Border between protoconch and teleoconch marked by opistocyrt junction. Beyond junction, ribs appear and type of plicae changes. Teleoconch whorls not steplike, flattened, or inflated. Its ornamentation composed of densely spaced and fine threads and coarse plicae running from suture to suture. Last whorl rounded or bears basal-palatal carina-like angulation. Whorl can bear narrow and gentle shoulder just below upper suture. Base low or high, convex, ornamented by densely spaced and fine threads. Aperture unknown, whorl oval in cross section. Growth lines slightly opistocyrt below suture and prosocyrt on base.

Composition. In addition to the type species, five other species, i.e., *P. altum* sp. nov., *P. korobceevense* (Gerasimov, 1992), *P. proundulatum* (Ammon, 1892) from the Rhaetian (?) of Germany, *P. undulatum* (Zieten, 1833) from the Lias of Germany, and, probably, *P. consorbinum* (Eichwald, 1868) from the Middle Oxfordian–Lower Kimmeridgian of the Crimea.

Comparison. Differs from *Claviscala* Boury in the absence or slight development of the basal-palatal angulation and more widely spaced plicae; from the genus *Proscala* Cossmann, it can be distinguished by having coarser ribs and usually wider shells.

Plicacerithium altum Guzhov, sp. nov.

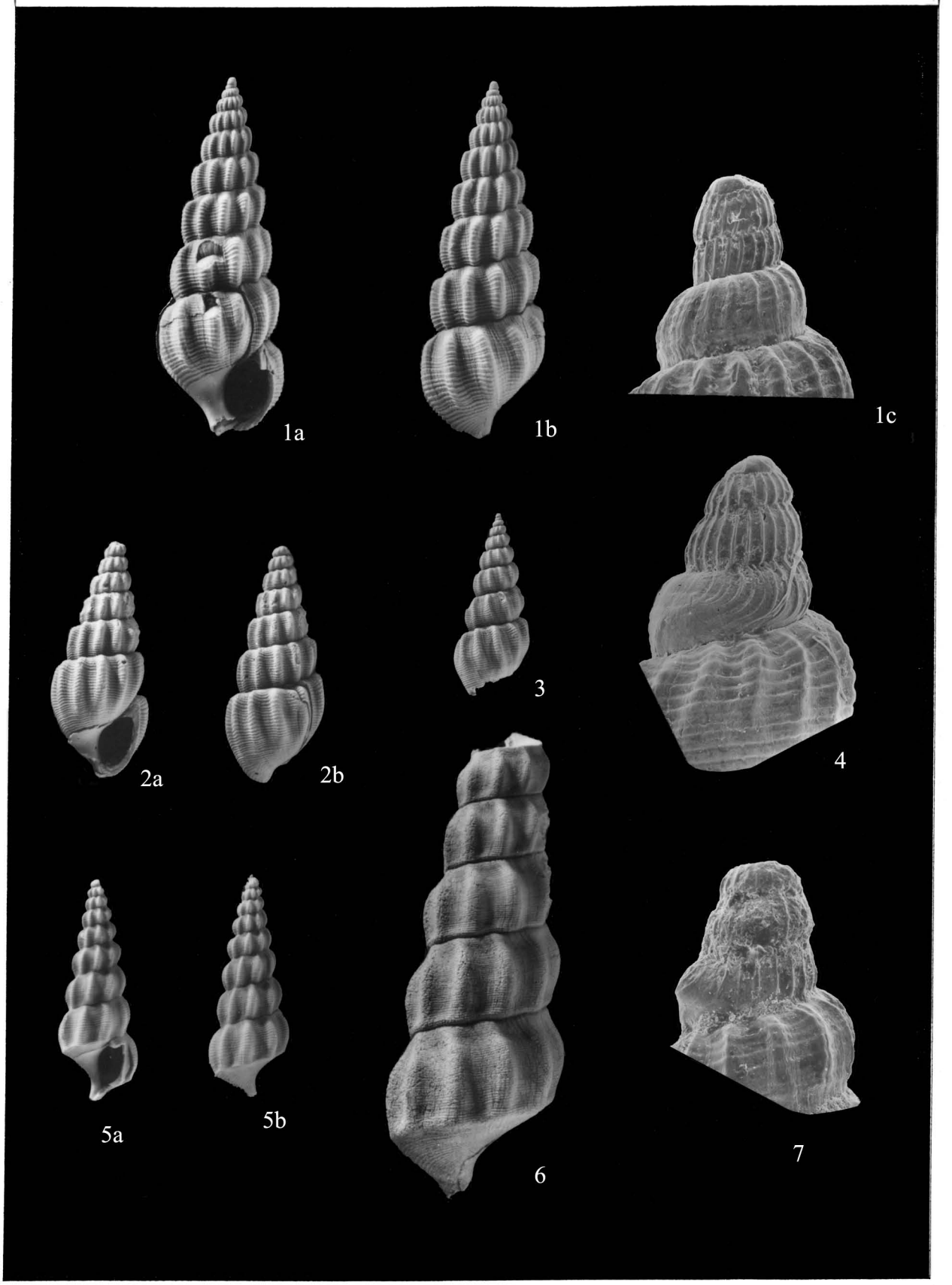
Plate 2, fig. 1

Etymology. Latin *altus* (high).

Holotype. GMM MPU, no. 12/10; Russia, Moscow Region, Kolomna District, town of Shchurovo (Zarech'e District), Quarry; Upper Jurassic, Middle Oxfordian, *tenuiserratum* Zone.

Description. The shell is 15.7 mm high. The protoconch is composed of three and a half whorls (incomplete). The first whorl is smooth and almost planispiral; the other two and a half whorls bear densely spaced fine and high orthocline plicae. The ornamented whorls do not increase in width, so the protoconch has a subcylindrical shape. There are no junctions on the border between the protoconch and teleoconch. In contrast to the cylindrical protoconch, the teleoconch has rapidly expanding whorls. The teleoconch is composed of nine and a half whorls. It starts from the coarse plica, which runs from suture to suture and beyond which a spiral rib appears near the lower suture. The whorls become inflated. From one-fifth of the first teleoconch whorl, other spiral ribs appear (four or five in number). The teleoconch angle is 25°. The whorls are convex; their coverage is 42%. The maximum width of the whorl lies at the middle of its height (between the plicae) or is shifted upward (on the plicae). The narrow and gentle shoulder takes place on the upper part of the

Plate 2



Explanation of the Plate 2

Fig. 1. *Plicacerithium altum* sp. nov.; holotype, GMM MPU, no. 12/10: (a) apertural view, ×3; (b) dorsal view, ×3; (c) protoconch, ×49; town of Shchurovo, Middle Oxfordian, *tenuiserratum* Zone.

Figs. 2–4. *Plicacerithium apicatum* (Eichwald); (2) GMM MPU, specimen no. 12/11, ×3: (2a) apertural view, (2b) dorsal view; Egor'evsk Phosphorite Quarry, no. 7-2 bis; Upper Oxfordian, *serratum* Zone, *serratum* Subzone; (3) GMM MPU, specimen no. 12/12, dorsal view, ×3; Village of Mikhalenino; Lower Kimmerdgian; (4) GMM MPU, specimen no. 12/13, protoconch, ×64; Egor'evsk Phosphorite Quarry, no. 7-2 bis; Upper Oxfordian, *serratum* Zone, *serratum* Subzone.

Figs. 5–7. *Plicacerithium korobceevense* (Gerasimov); Egor'evsk Phosphorite Quarry, no. 7-2 bis; Upper Oxfordian, *serratum* Zone, *serratum* Subzone; (5) GMM MPU, specimen no. 12/14, ×4: (5a) apertural view; (5b) dorsal view; (6) GMM MPU, specimen no. 12/15, dorsal view, ×3; (7) GMM MPU, specimen no. 12/16, protoconch, ×65.

whorl. The base of the whorl is gently rounded. The suture is shallow and angular. The ornamentation includes 14 threads, five or six of which are primary (whorl diameter is 5 mm). The density of the threads is 6–7 per millimeter. The plicae are straight and opisthocline, 11 per whorl (whorl diameter is 6 mm). Their number (17 on the first whorl) gradually decreases throughout the shell growth. The last whorl bears 37 or 38 fine threads (33 or 34 threads when the diameter of the whorl is 6 mm). The last whorl accounts for 33% of the shell height. The base of the shell is high and convex.

Comparison. Differs from *P. apicatum* in having more convex and less asymmetric whorls and narrower shells; from *P. korobceevense*, it can be distinguished by the absence of angulation, wider shell, and coarser ornamentation.

Material. Holotype.

***Plicacerithium apicatum* (Eichwald, 1868)**

Plate 2, figs. 2–4

Cerithium apicatum: Eichwald, 1868, p. 859, pl. 29, fig. 3.

Procerithium (Plicacerithium) apicatum: Gerasimov, 1992, p. 77, pl. 24, figs. 11 and 12.

Holotype. SPbGU, no. 2/1789 (shell not preserved, only indistinct imprint present); Russia, Moscow Region, Krasnogorsk District, right bank of the Moskva River near the village of Gal'evo; Upper Jurassic, Upper Oxfordian.

Description. The shell is up to 18–20 mm high. The protoconch is composed of four whorls. The first one and a half whorls are smooth and almost planispiral. The other whorls are ornamented by densely spaced fine and high orthocline plicae. The ornamentation appears at once. The plicae become opisthocyrt on the last one-fifth of the protoconch whorl. Farther, the smooth part takes place. It occupies the first one-fifth part of the teleoconch whorl and bears only growth lines and indistinct spiral threads. The teleoconch is composed of seven and a half or eight whorls. The teleoconch angle is about 30°. The whorls are slightly convex; their coverage is 42%. The maximum width of the whorls takes place at the upper one-quarter. The gentle shoulder lies on the upper part of the whorl. The basal-palatal angulation is absent. The suture is shallow and angulated. The ornamentation is composed of 16 to 20 threads (whorl diameter is 5.5–6.5 mm). There are six to eight threads per millimeter. There are six to seven primary threads. The plicae are opisthocline at the beginning, later, on larger whorls, become orthocline. There are 11 to 14 plicae per whorl (whorl diameter is 5.5–6.5 mm). At the beginning of the teleoconch, plicae are absent or indistinct and appear slightly later than threads. The last whorls bear 36 to 39 threads. The last whorl constitutes 36–41% of the shell height. The base is high and convex.

Comparison. Differs from *P. korobceevense* in the absence of basal-palatal angulation, flatter whorls, wider shells, and coarser ornamentation; from *P. altum*, it can be distinguished by having less inflated and more asymmetric whorls and wider shells.

Occurrence. Upper Jurassic, Middle–Upper Oxfordian; Central Russia.

Material. Seven specimens, Upper Jurassic, Upper Oxfordian, *serratum* Zone, *serratum* Subzone; Egor'evsk Phosphorite Quarry, no. 7-2 bis.

***Plicacerithium korobceevense* (Gerasimov, 1992)**

Plate 2, figs. 5–7

Procerithium (Plicacerithium) korobceevense: Gerasimov, 1992, p. 78, pl. 24, figs. 7 and 13.

Holotype. Repository unknown, possibly lost; Moscow Region, Voskresensk Distruct, Egor'evsk Phosphorite Quarry, no. 9; Upper Oxfordian, *serratum* Zone, *serratum* Subzone.

Description. The shell is up to 40–42 mm high. The protoconch is composed of 2.3 whorls (incomplete). The preserved whorls bear densely spaced fine and high orthocline plicae. At the end of the protoconch, the plicae disappear to give way to the smooth part with opistocyrt growth lines. The teleoconch is composed of 16 or 17 whorls; its angle is about 15°. The whorls are low and inflated; their coverage is 30–32%. The maximum whorl width lies at the middle of the height. The suture is shallow and angular. The whorls are ornamented by numerous fine threads. The density of the threads varies from 5 or 6 to 12 or 13 per millimeter (no less than eight to ten threads per millimeter above the suture). The last whorl (diameter 3.3 mm) bears 24 threads above the base and 14 or 15 threads on the base. The plicae are opisthocyrt, 10 or 11 per whorl (whorl diameter is 3.0–3.5 mm). The plicae are arched and high. The last whorl forms 28% of the shell height (in a nine-whorl teleoconch). The last

whorl bears the basal-palatal angulation. The base is low and slightly convex.

Comparison. Differs from *P. altum* and *P. apicatum* in the presence of the basal-palatal angulation and narrower shell.

Occurrence. Upper Jurassic, Upper Oxfordian, *serratum* Zone–Lower Kimmerdgian; Central Russia.

Material. Upper Jurassic, Upper Oxfordian, *serratum* Zone, *serratum* Subzone, Egor'evsk Phosphorite Quarry, no. 7-2 bis (four specimens), no. 10 (ten specimens); Lower Kimmeridgian, village of Mikhalenino (two specimens).

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