

# Gastropod Mollusks from the Hauterivian of Ulyanovsk (Volga Region): 2. Genera *Khetella* Beisel, 1977 and *Cretadmete* gen. nov.

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**Abstract**—The diagnosis of the genus *Khetella* Beisel, 1977 is emended, and a new genus, *Cretadmete*, is described. Two new species belonging to these genera, *K. trautscholdi* and *C. neglecta*, are established from the Upper Hauterivian of Ulyanovsk (Volga Region).

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**Key words:** gastropods, Upper Hauterivian, Ulyanovsk, Volga Region.

## INTRODUCTION

This paper continues our first paper on gastropod mollusks from the Hauterivian of Ulyanovsk (Volga Region) (Blagovetshenskiy and Shumilkin, 2006). It describes representatives of two genera: *Khetella* Beisel, 1977 and *Cretadmete* gen. nov. Two new species are described within these genera: *Khetella trautscholdi* and *Cretadmete neglecta*. Data on the location and structure of the Hauterivian sections under consideration, the methods of sampling and treatment of material, the scheme of shell measurements, and explanations of terminology are given in our first paper.

## SYSTEMATIC PALEONTOLOGY

Order Hamiglossa

Suborder Rachiglossa

Superfamily Buccinoidea Rafinesque, 1815

Family ? Buccinidae Rafinesque, 1815

Genus *Khetella* Beisel, 1977

*Khetella*: Beisel, 1977, p. 146; Gerasimov, 1992, p. 104.

**Type species.** *Khetella bojarkae* Beisel, 1977; Kimmeridgian–Berriasian; northern Siberia, Khatanga Depression.

**Diagnosis.** Shell of medium to large size, ovally elongate. Aperture lens-shaped, with its anterior edge projecting beyond termination of siphonal canal. Ornamentation predominantly axial, restricted to visible portion of whorls. Axial costae bend fairly sharply in upper part of whorls to form distinct sutural area and to result in gradation of whorls.

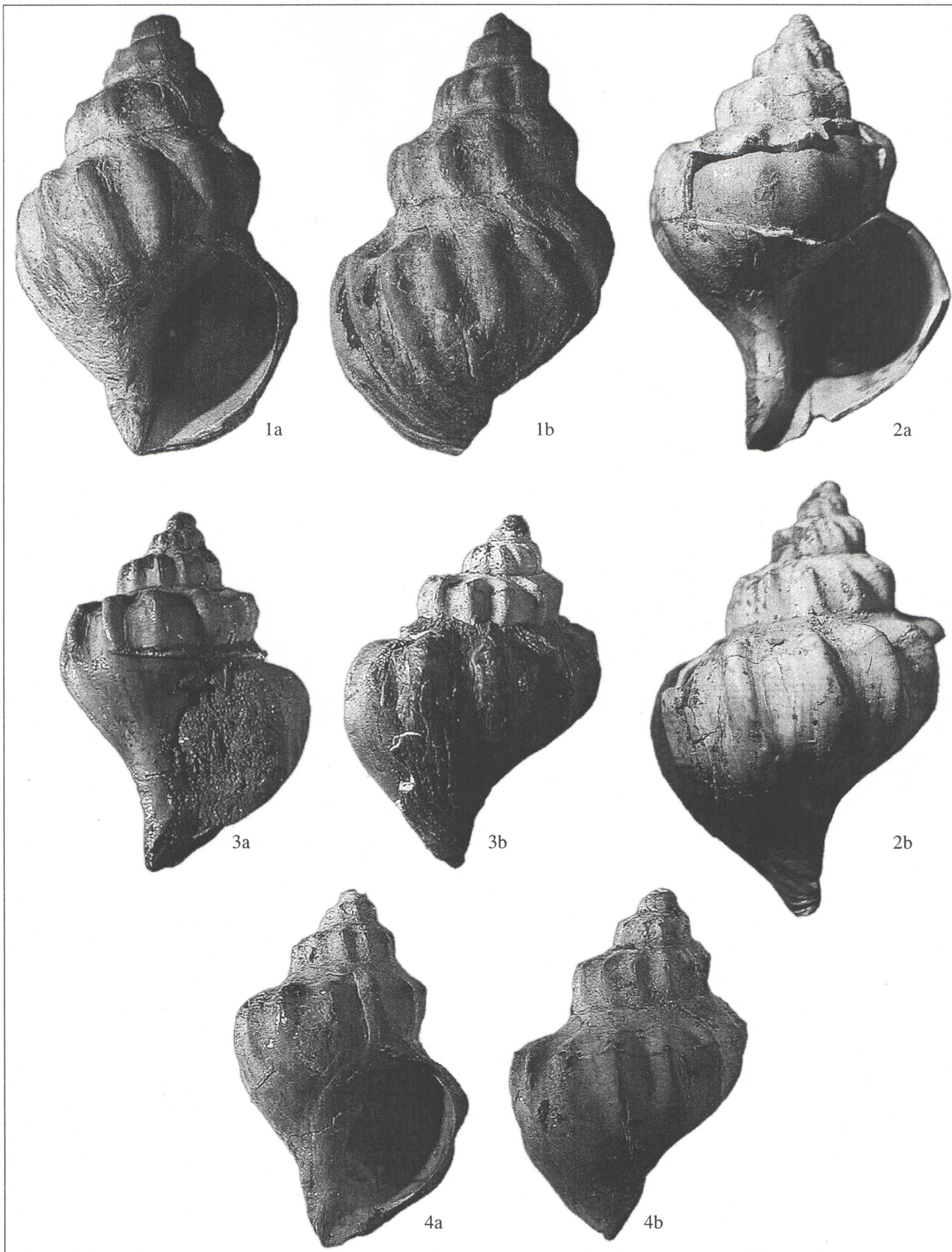
**Species composition.** In addition to the type species, 13 more species: *K. brunsvicensis* (Wollemann, 1900) from the Neocomian of Germany, *K. formosa* (Eichwald, 1868) from the Middle Callovian–

Oxfordian of the central regions of Russia, *K. gibbosa* (Stoliczka, 1867) from the Cretaceous of southern India. *K. incerta* (d'Orbigny, 1845) from the Lower Kimmeridgian–Berriasian of the central regions of Russia and the southern Ural Mountains, *K. neo-comiensis* (d'Orbigny, 1842) from the Cretaceous of France, *K. peybernesi* (Mongin, 1985) from the Albian of southern France, *K. requieniana* (d'Orbigny, 1842) from the Cretaceous of France and southern India; *K. septentrionalis* (Tullberg, 1881) from the *Aucella* beds of Novaya Zemlya, *K. trautscholdi* sp. nov. from the Upper Hauterivian of Ulyanovsk (Volga Region), *K. trichninopolitensis* (Forbes, 1845) from the Cretaceous of southern India; *K. ventrosa* Beisel, 1983 from the Berriasian–Valanginian of northern Siberia, and *K. ? gaultica* (d'Orbigny, 1842) and *K. ? itieriana* (d'Orbigny, 1842) from the Cretaceous of France.

**Comparison.** This genus differs from the Cenozoic genus *Buccinum* Linné, 1758 in the presence of a more or less sharp angulation of the axial costulae in the upper part of the whorls, more developed axial costulae, less complicated structure of parietal-columellar and palatal edges of the aperture, and the markedly less elongated shell.

**Remarks.** Beisel's (1977, 1983) placement of the genus *Khetella* in the family Colombellinidae Fischer, 1884 is rather questionable. Representatives of this family are characterized by parietal-columellar callous and thickened, frequently crenulated and explanate palatal edges of the aperture; the upper part of the aperture may have a projection; occasionally, spiral ornamentation predominates. In the genus *Khetella* these characters are absent. We believe that *Khetella* more closely resembles the family Buccinidae and, thus, may belong to a family (perhaps, extinct) that is closely related to it.







## Explanation of Plate 5

**Figs. 1–4.** *Khetella trautscholdi* sp. nov.; (1) specimen UKM, no. 40,  $\times 2$ : (1a) apertural view, (1b) abapertural view; small town of Slantsevyi Rudnik; *versicolor* Zone; (2) specimen UKM, no. 95,  $\times 5$ : (2a) apertural view, (2b) abapertural view; small town of Polivna; *decheni* Zone, bed g-12; (3) holotype UKM, no. 96,  $\times 6$ : (3a) apertural view, (3b) abapertural view; small town of Polivna; *decheni* Zone, bed g-12.5; (4) specimen UKM, no. 63/1,  $\times 5$ : (4a) apertural view, (4b) abapertural view; small town of Polivna; Upper Hauterivian, *decheni* Zone, bed g-12.

*Khetella trautscholdi* Blagovetshenskiy et Shumilkin, sp. nov.

Plate 5, figs. 1–4

*Fusus minutus*: Trautschold, 1865, p. 18, pl. 3, fig. 13.

*Buccinum incertum*: Glasunova, 1973, p. 80, pl. 43, figs. 1–7.

**Etymology.** In memory of G.A. Trautschold, who was the first to describe this form.

**Holotype.** UKM, no. 96; Ulyanovsk Region, small town of Polivna; Upper Hauterivian, *decheni* Zone.

**Description.** The shell is of medium size or large (up to 40 mm), thick-walled, and broadly fusiform and consists of five to seven fairly rapidly increasing whorls with an angulation on a shoulder. The height of the spire whorls is 0.4 times their diameter. The ratio of the width of the last whorl measured above the aperture to the height of the last whorl above the aperture is 2.5–3.4. The height of each spire whorl is 1.5–1.7 of the preceding. The last whorl is 0.78–0.8 of the shell height. The apical angle of the first whorls is  $65^{\circ}$ – $75^{\circ}$ . The generating line is slightly convex.

The ornamentation is indistinct on the first two whorls and distinct on the others. The axial ornamentation consists of fairly well-defined growth lines and thick, coarse, slightly curved, inclined costulae. There is an easily observable angulation of costulae on the

whorl shoulders; hence, the gradation of whorls. The costae of the axial ornamentation are thinner and higher in the upper part of the whorls and flatten abapically. This is easily observable on the last whorl, where costae completely disappear toward the base of the shell in contrast to the spire whorls, where costae are well-developed on the entire surface. On the last whorl the number of axial costae varies from 11 to 15 (12 on the average). The spire whorls have 11 or 12 costae. The costae are slightly wider than the interspaces between them. The spiral ornamentation is represented by a barely visible costula on the whorl shoulders. In some specimens this costula is quite prominent. The intersections of this costula with the axial costae form small nodes.

The aperture is oval ( $HA/WA = 1.8$ – $2.3$ ). The height of the aperture is 0.55–0.62 of the shell height. The siphonal canal is well-defined, slightly curved, and short and is not separated from the apertural margin. The columellar and parietal edges of the aperture have a bright smooth surface that, in some shells, retains its original yellowish-pink color. The internal surface of the aperture is similar in character. The umbilicus is absent. The base of the shell is smooth, only growth lines can be seen.

Measurements in mm and ratios:<sup>1</sup>

Specimen no.	H	D	HLW	HA	WA	NW	NAC	H/D	HLW/H	HA/H
Holotype 96	11.0	7.7	8.7	7.0	~3.6	5(6)	11	1.41	0.78	0.62
351/1	11.0	7.7	9.0	7.0	3.6	3(5)	11	1.43	0.79	0.62
63/1	13.2	8.9	10.6	7.4	3.5	4(6)	13	1.51	0.79	0.55
319	13.2	9.0	10.5	7.8	4.3	4(6)	15	1.49	0.78	0.58
95	15.9	11.1	12.4	9.7	4.4	5.5(6)	11	1.44	0.78	0.60
88/1	18.1	11.8	14.6	11.1	4.8	4(6)	12	1.57	0.79	0.60
40	40.3	25.5	~30	~16	11	4.5(7)	14	–	–	–

**Variability.** There is considerable variation in the ratios H/D (1.4–1.5) and WLW/HLW (2.5–3.4) and in the number (from 11 to 15) and the degree of development of the axial costae on the last whorl. As already noted by Kabanov (1959), the shells from the *versicolor* Zone are larger and more massive than those from the *decheni* Zone.

**Comparison.** This species very closely resembles *K. ventrosa* from the Berriasian–Valanginian of north-central Siberia (Beisel, 1983, p. 75, pl. 3, figs. 16, 17, 20) in the size, outline, and ornamentation of the shell, but this species differs from the latter in the fewer

and coarser axial costae on the last whorl (11–13, rarely 15, instead of 15–17) and in the spiral ornamentation that is still more poorly developed. *K. ventrosa* has from three to five slender spiral costulae. The uppermost of these costulae is most important and intersects with the axial costae to form nodes. The second costula also forms nodes, but these are considerably less prominent. The species being described has only one spiral costula on a whorl shoulder the intersections of which

<sup>1</sup> NAC denotes the number of axial costae on the last whorl. See our first paper (Blagovetshenskiy and Shumilkin, 2006) for the explanations of other abbreviations.







with axial costae form nodes. Using an oblique illumination, one can see two or three ridges below the spiral costula in specimens with a very well preserved surface; however, they are too faint to be considered as elements of the spiral ornamentation. The species under consideration differs from the specimens of *K. incerta* that come from the Upper Jurassic of the southern Ural Mountains (d'Orbigny, 1845, p. 453, pl. 35, figs. 6–8) and the Kimmeridgian–Berriasian of the central regions of the Russian Platform (Gerasimov, 1992, p. 104, pl. 27, figs. 8, 11, 13, 14) and from those of *K. brunsvicensis* from the Neocomian of Germany (Wollemann, 1900, p. 174, pl. 8, figs. 11, 12) in the extremely poorly developed spiral ornamentation, which is very well developed in the latter two species, and from *Khetella bojarkae* that comes from the Kimmeridgian–Berriasian of northern Siberia and the subpolar Ural Mountains (Beisel, 1983, p. 74, pl. 3, figs. 18, 19; pl. 4, fig. 1) in the sharply angular whorls (which in the latter species are more leveled), finer axial costae, and in the lower spire.

**Remarks.** The diagnosis of the genus points out that the anterior edge of the aperture projects beyond the termination of the siphonal canal. However, the free edge of the aperture is lost to a greater or lesser extent in all available specimens. There are specimens, however, in which the free edge is only moderately damaged; in this case, the growth lines allow a reconstruction of the actual shape of the apertural margin. The species being described bears a close resemblance to *Paracerithium* (*Fossacerithium*) *formosum* (Eichwald, 1868) from the Callovian–Oxfordian of the Russian Platform (Gerasimov, 1992, p. 87, pl. 24, figs. 1–5, 10), but differs from the latter in the virtually complete absence of spiral ornamentation and in the gentler gradation of whorls. Most likely this species also belongs to the genus *Khetella*. The genus *Paracerithium*, as well as the entire subfamily Paracerithiinae, features a conical-turriculate shell with a more or less long spire, whereas the form described by Gerasimov has a fusiform shell with a short spire. Gerasimov believed that the long siphonal projection (siphonal canal) is a characteristic feature of the subgenus *Fossacerithium*. It is most likely, however, that the partial destruction of the basal and palatal edges of the aperture and the preservation of the stronger columellar part create the impression of the presence of a siphonal projection. Similarly, many specimens of *K. trautscholdi* (designated here) have structures resembling a siphonal projection, although the undamaged specimens have in fact the anterior edge of the aperture either projecting beyond the termination of the siphonal canal or located at the

same level with the termination. According to A.V. Guzhov, there are representatives of the genus *Khetella* that possess a true siphonal projection.

**Occurrence.** Upper Hauterivian, *versicolor–decheni* Zone and Barremian, *jasykowi* Zone of Ulyanovsk (Volga Region); *versicolor* Zone of the Northern Caspian Sea region.

**Material.** Forty specimen in varying states of preservation from Upper Hauterivian clay with a low sand content; *versicolor* Zone: UKM, no. 60/3; bed g-5, 1 km south of the small town of Slantsevyi Rudnik (SR  $K_1h_2vd-1$ ); nos. 319 and 351/1, bed g-5, 3 km southeast of the village of Novaya Beden'ga (CS  $K_1h_2v-2$ ); no. 40, small town of Slantsevyi Rudnik ( $K_1h_2v$ ); *decheni* Zone: UKM, no. 80/3, bed g-11.1, 1.5 km south of the small town of Polivna (P  $K_1h_2d-2$ ); no. 266, level G12, limestone concretion, south of the small town of Polivna (P  $K_1h_2d$ ); no. 63/1, bed g-12, 2.5 km south of the small town of Polivna (P  $K_1h_2d-3$ ); nos. 95 and 96, bed g-12.1, 1.5 km south of the small town of Polivna (P  $K_1h_2d-2$ ); and no. 88/1, 1.5 km south of the small town of Polivna (P  $K_1h_2d-2$ ).

#### Suborder Nematoglossa

#### Family Admetidae Troschel, 1869

#### Genus *Cretadmete* Blagovetshenskiy et Shumilkin, gen. nov.

*Brachytrema*: Gerasimov, 1955, p. 195.

*Astandes*: Beisel, 1983, p. 76; Gerasimov, 1992, p. 95.

**Etymology.** From the Latin *creta* (Cretaceous) and the generic name *Admete*.

**Type species.** *C. neglecta* sp. nov.; Upper Hauterivian, *decheni* Zone; Ulyanovsk Region.

**Diagnosis.** Shells small, fusiform. Protoconch smooth, consisting of 2.5–3 convex whorls, separated from teleoconch by prominent commissure followed by convex whorls with distinct ornamentation. Spiral ornamentation consists of numerous, narrow, somewhat flattened costulae. Axial ornamentation consists of low, fairly wide, rounded costae, which vary in number from 14 to 25 on last whorl. Axial costae bend more sharply in upper part of last whorl and flatten below. Aperture semilunar. Siphonal canal not separated from apertural margin.

**Species composition.** In addition to the type species, five more species: *C. gracillima* (Wollemann, 1907) from the Aptian–Albian of northern Germany, *C. kostromensis* (Gerasimov, 1955) from the Middle Callovian of the Volga River Region and Upper Oxfordian–Lower Kimmeridgian of northern Siberia, *C. piccua* (Beisel, 1983) from the Kimmeridgian–Val-

#### Explanation of Plate 6

**Figs. 1–4.** *Cretadmete neglecta* sp. nov.; (1) specimen UKM, no. 56/1,  $\times 10$ : (1a) apertural view, (1b) abapertural view; small town of Polivna; *decheni* Zone, bed g-12; (2) holotype UKM, no. 155/1,  $\times 10$ : (2a) apertural view, (2b) abapertural view; small town of Slantsevyi Rudnik; *decheni* Zone, bed g-12; (3) specimen UKM, no. 155/2,  $\times 10$ : (3a) apertural view, (3b) abapertural view; same age and locality; (4) specimen UKM, no. 444/7, a young individual with a partly preserved protoconch,  $\times 20$ : (4a) oblique abapical view, (4b) abapical view; small town of Polivna; *decheni* Zone, bed g-12.

anginian of northern Siberia, *C.?* *conspicua* (Eichwald, 1868) from the Middle–Upper Oxfordian of the central regions of Russia, and *C.?* *keyserlingiana* (Rouillier, 1846) from the Oxfordian–Lower Kimmeridgian of the Russian Platform.

**Comparison.** This genus differs from the Cenozoic genus *Admete* Moeller, 1842, to which is very similar in morphology, in the almost straight parietal-columellar margin of the aperture (in the genus *Admete* the parietal and columellar margins of the aperture form a distinct obtuse angle) and in the better developed spiral ornamentation.

**Remarks.** This genus differs from the genus *Maturifusus* in the prominent commissure between the protoconch and teleoconch (in the genus *Maturifusus* the smooth protoconch gradually passes into the ornamented teleoconch whorls).

*Cretadmete neglecta* Blagovetshenskiy et Shumilkin, sp. nov.

Plate 6, figs. 1–4

**Etymology.** From the Latin *neglectus* (neglected).

**Holotype.** UKM, no. 155/1; Ulyanovsk Region, small town of Slantsevyi Rudnik; Upper Hauterivian, *decheni* Zone.

**Description.** The shell is small, strong, and broadly fusiform and consists of convex, fairly rapidly increasing whorls separated by a depressed suture. The shoulders of the whorls are rounded and clearly defined. The height of the spire whorls is 0.4 times their diameter. The ratio of the width of the last whorl measured above the aperture to the height of the last whorl above the aperture is 2.3–3.2. The height of each spire

whorl is twice the preceding. The last whorl is 0.82–0.88 of the shell height. The average apical angle of the first three whorls is 75°–80°. The generating line is straight or slightly convex.

The protoconch (which is incomplete) is smooth and consists of three whorls separated from the teleoconch by a prominent commissure followed by distinctly ornamented whorls. The axial ornamentation includes, in addition to growth lines, rounded costae that are slightly curved and slightly inclined. The costae are approximately as wide as the interspaces between them. The costae are almost straight on the spire whorls and curved on the last whorl, where they are prominent on the upper third of the whorl and leveled below. The last whorl has 14–16 or, infrequently, 20 costae; certain costae are rather poorly defined.

The spiral ornamentation consists of numerous flattened costulae that occur both in the interspaces between the axial costae and on the costae themselves; in the latter case they are barely visible. Finer costulae may exist between the spiral costae. Not counting the intermediate costulae, there are approximately 25 spiral costulae on the last whorl.

The aperture is oval, semilunar ( $HA/WA = 1.64–1.84$ ). The siphonal canal is shallow and is not separated from the apertural margin. The height of the aperture is 0.59–0.65 of the shell height.

The umbilicus is completely closed by the flaring of the inner edge of the aperture. The base of the shell is only covered by the growth lines and the costulae of the spiral ornamentation.

Measurements in mm and ratios:

Specimen no.	H	D	HLW	HA	WA	NW	NAC	H/D	HLW/H	HA/H
314*	8.6	6.5	7.5	5.4	~3.2	4.2(6)	20	1.29	0.86	0.63
56/1	8.0	5.7	7.0	4.9	2.8	4(6)	15	1.41	0.88	0.62
Holotype 155/1	7.3	5.1	6.2	4.6	2.6	4(6)	14	1.47	0.84	0.62
155/2	6.3	4.3	5.3	3.9	–	3.5(6)	14	1.47	0.82	0.60
315*	5.2	4.1	4.5	3.2	1.9	3.5(4.5)	16	1.31	0.83	0.59
1/1	3.9	3.2	3.5	2.6	1.5	3(4.5)	16	1.24	0.87	0.65

Note: UPM specimens are marked with the symbol \*.

**Ontogenetic changes.** Our collections contain specimen no. 1/1, which differs from the other specimens in the smaller value of elongation (H/D), smaller measurements, and smaller number of whorls (4.5 instead of 6) and closely resembles them in all the other characters. It is common knowledge that the ratio H/D may vary with age. Thus, it seems quite probable that this specimen represents an earlier developmental stage of the species being described.

**Comparison.** The species described resembles *C. piccua* from the Kimmeridgian–Valanginian of northern Siberia and the Lower Valanginian of the sub-

polar Ural Mountains (Beisel, 1983, p. 76, text-fig. 27, pl. 4, figs. 3–6) in the measurements, the outline of shell, and the pattern of ornamentation, but differs from the latter in the smaller numbers of axial costae on the last whorl (14–20 instead of 22–25), in the shell that is slightly less elongated, and in the higher values of HA/H (0.60–0.65 instead of 0.5). This species differs from *C. gracillima* from the Aptian–Albian of northern Germany (Wollemann, 1907, p. 33, pl. 5, figs. 1, 2) in the more elongated shell ( $H/D = 1.24–1.47$  instead of 1.15 in *C. gracillima*) and from all the other species in the markedly higher rate of whorl increase, smaller

elongation, the higher value of HA/H, and in the less prominent spiral ornamentation.

**Remarks.** The specimen of *C. gracillima* figured by Wolleermann in his later paper (Wolleermann, 1909, p. 295, pl. 10, fig. 12) differs from the original figure in the more elongated shell and, thus, more closely resembles *C. neglecta*.

**Occurrence.** Upper Hauterivian, *decheni* Zone, Ulyanovsk (Volga Region).

**Material.** Seven specimens in a good state of preservation from clay with low sand content: UPM, no. 314, 315, bed g-11, small town of Polivna, (K<sub>1</sub>h<sub>2</sub>d); UKM, no. 56/1; bed g-12, 2.5 km south of the small town of Polivna (P K<sub>1</sub>h<sub>2</sub>d-3); nos. 155/1 and 155/2, bed g-12, 2 km north-northeast of the small town of Slantsevyi Rudnik (CS K<sub>1</sub>h<sub>2</sub>d-2); and no. 1/1, bed g-12.1, 1.5 km south of the small town of Polivna (P K<sub>1</sub>h<sub>2</sub>d-2).

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