

The Genus *Delphinites* Sayn (Ammonoidea: Neocomitidae) in the Lower Valanginian of the Russian Platform

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Abstract—This paper presents the results of the revision of the taxonomic composition and stratigraphic distribution of Central Russian representatives of the Valanginian genus *Delphinites*. The lower *Undulaticatilis* zone of the Valanginian in the basin of the Sura River (Menya River) contains *D. undulaticatilis* (Stchirowsky) [subjective synonyms: *Oxynoticeras tuberculiferum* Stchirowsky, *Pseudogarnieria securis* Sasonova], *D. menensis* (Stchirowsky), *D. alatyrense* (Kemper), *D. kurmyschensis* (Stchirowsky), *D. stchirowskyi* (Sasonova), *D. donovani* Alsen et Rawson and *D. heineae* sp. nov. In addition, *Delphinites* sp. was figured from the *Michalskii* Zone (terminal Lower Valanginian) of the Kostroma Region (Unzha River). Thus, the interval of distribution of the genus *Delphinites* is not restricted by the basal zone of the Valanginian.

Keywords: ammonites, Neocomitidae, *Delphinites*, Valanginian Stage, Russian Platform

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INTRODUCTION

Ammonites of the genus *Delphinites* Sayn, 1901 in the Russian Platform are primarily characteristic of the *Undulaticatilis* Zone of the Lower Valanginian and the first appearance of this taxon is a good marker of the Ryazanian–Valanginian boundary. *Delphinites* have a wide geographic distribution (Greenland, England, France), although for the majority of taxa only isolated or a few occurrences are known. The most representative material of the genus *Delphinites* for more than 100 years of its study was received from Middle Povolzhye (outcrops on the Menya River, left tributary of the Sura River). I study new material from this region, and also from the Unzha River in the Kostroma Region (Fig. 1). In addition, I studied the collections of other researchers in the museums of Moscow, St. Petersburg, and Copenhagen. Below the results of these studies are discussed.

HISTORY OF STUDIES

In the 1880s, A.P. Pavlov, the founder of the Moscow geological school, conducted fieldwork in the Kurmysh and Alatyr districts of the Sibmirk Region. There he discovered among other things, outcrops of the Lower Cretaceous (“Neocomian”) on the Menya River in the vicinity of the villages of Pekhorka and Mishukovo (currently Poretskoe District of Chuvashia) (Pavlov, 1890). Following Pavlov’s recommendation, in 1891 and 1893, these outcrops were vis-

ited by one of his students V.A. Stchirowsky, who paid particular attention to ammonites from gray oolitic marl between the bituminous shale of the Volgian Stage and dark Hauterivian clay. Shortly after, Stchirowsky (1894) published a paper with descriptions of some ammonites from an outcrop near the village of Pekhorka—*Oxynoticeras gevrili* (d’Orbigny), *O. tuberculiferum* Stchirowsky, *O. undulaticatilis* Stchirowsky, *O. marcoui* (d’Orbigny), *Hoplites menensis* Stchirowsky and *H. kurmyschensis* Stchirowsky. For many years after Stchirowsky’s publication, researchers repeatedly cited his paper. Spath (1923) recognized two new genera, *Pseudogarnieria*, with the type species *Oxynoticeras undulaticatilis* Stchirowsky, and *Proleopoldia*, with the type species *Hoplites kurmyschensis* Stchirowsky. Later Spath suggested that the ammonites Stchirowsky identified as *Oxynoticeras marcoui* (d’Orbigny), in fact belonged to a new species of the genus *Pseudogarnieria* (Spath, 1947).

E. Kemper (1961) supported the recognition of *undulaticatilis* and *tuberculiferum* and assigned them to the subgenus *Pseudogarnieria* of the genus *Platylenticeras*, and proposed that *Oxynoticeras marcoui* (Stchirowsky non d’Orbigny) should be identified as *Platylenticeras (Pseudogarnieria) alatyrense* nom. nov. Kemper illustrated a fragment of the suture of this new taxon which he copied from a plaster cast of an ammonite from the “Alatyr District” found in the collections of the Geological Institute in Göttingen.

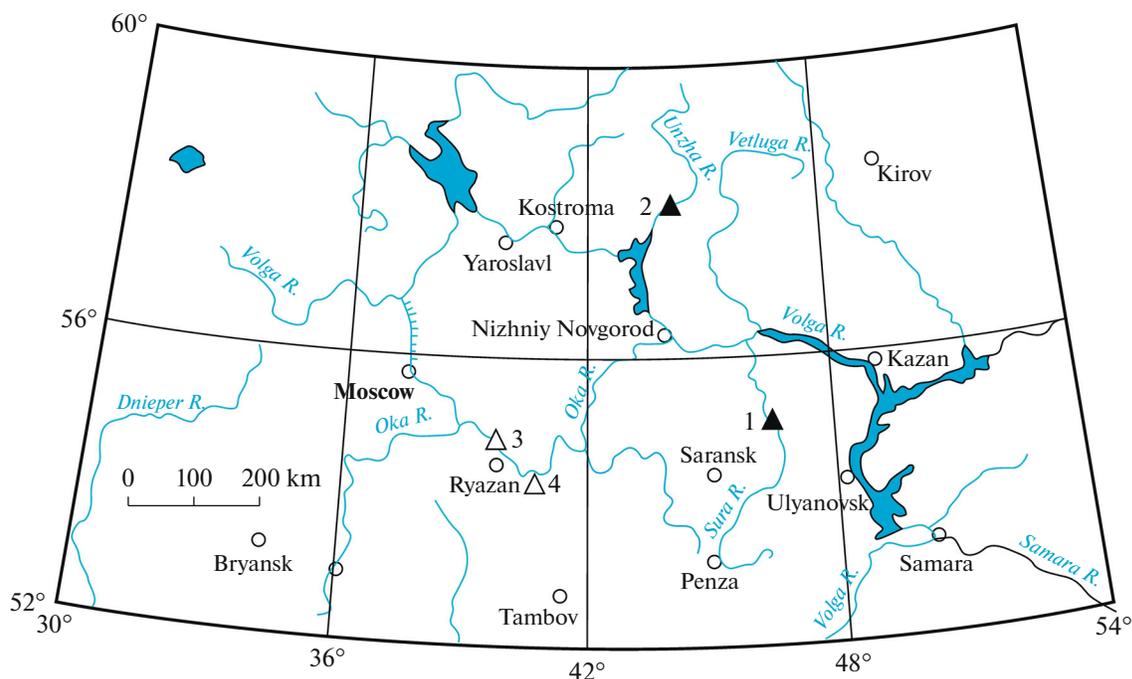


Fig. 1. *Delphinites* localities in the Russian Platform (triangles): (1) Menya River, (2) Unzha River; (3, 4) basin of the Oka River to the north and southeast of Ryazan, not confirmed by images and/or collections.

P.A. Gerasimov examined the original specimens published in Stchirowsky's paper and concluded that: "Ammonites described as *Oxynoticeras undulato-plicatile* Stchir., *O. tuberculiferum* Stchir., *O. gevrii* d'Orb., *O. marcoui* d'Orb., represent fragments, partly somewhat rounded, of internal molds of various growth stages of the same species of the genus *Pseudogarnieria*. Evidently, they do not belong to any of the known Western European species established by d'Orbigny. The preservation of the name *Pseudogarnieria undulato-plicatilis* (Stchir.) for this species is apparently reasonable, as this name characterizes it from the early ontogenetic stages. *Hoplites menensis* Stchir. and *H. kurmyschensis* Stchir. are only adult and younger individual of one species of the genus *Proleopoldia*, for which the name *P. menensis* Stchir., should be retained as it was the first name in the list of fossils described by V.A. Stchirowsky" (Gerasimov, 1971, p. 1157).

Conversely, J.G. Sasonova (1971, 1972) mostly agreed with the identifications of Stchirowsky. Apart from *Pseudogarnieria undulato-plicatilis*, *Ps. tuberculiferum*, *Proleopoldia kurmyschensis*, and *Pr. menensis*, she described in these genera the new species *Pseudogarnieria securis* and *Proleopoldia stchirowskyi*, also from the outcrop on the Menya River.

At the same time both the latter authors agreed that the host rocks with these ammonites should be recognized as basal subdivisions of the Valanginian of the Russian Platform, *Undulato-plicatilis* Zone (Gerasi-

mov, 1971; Sasonova, 1971), which is currently accepted (*Unifitsirovannye ...*, 1993).

Casey (1973, p. 258) re-examined Stchirowsky's original material and concluded that "its examination has convinced me that *Pseudogarnieria* and *Proleopoldia* are not separable above the species-level. Accordingly, Casey suggested that all specimens described by Stchirowsky should be assigned to the genus *Pseudogarnieria*. The only specimen in that paper from England (Lincolnshire) of *Pseudogarnieria* ("*Proleopoldia*") cf. *kurmyschensis* (Stchirowsky), represented by the mold of the inner whorls of the phragmocone, is figured.

A paper on the biography and scientific contribution of Stchirowsky in the study of the Mesozoic of Middle Povolzhye (Mitta and Starodubtseva, 2000) was mainly supported by Gerasimov's conclusion of the synonymy of some species names, and Casey's opinion on the assignment of all material from the Menya River to one genus. The same paper contains the first photographic illustrations of some original specimens from Stchirowsky's (1894) paper.

In the meantime Thieuloy (1977)¹ compared *Pseudogarnieria* and *Proleopoldia* with the type species of the genus *Delphinites* Sayn, 1901 (*D. ritteri* Sayn) from the Lower Valanginian of France, acknowledging their unequivocal proximity. Authors of the revised edition of *Treatise ...* (Wright et al., 1996) made a fur-

¹ I could access this paper only after 2000.

ther step, defining *Pseudogarnieria* and *Proleopoldia* as junior subjective synonyms of *Delphinites*, which did not cause objections from the other authors.

Later, ammonites described as the new species *Delphinites* (*Pseudogarnieria*) *christenseni* Alsen et Rawson and *D. (P.) donovani* Alsen et Rawson (Alsen and Rawson, 2005; Alsen, 2006) were found for the first time in the Lower Valanginian of East Greenland. Klein (2006) also assigned all the above-mentioned species from Central Russia and East Greenland to *Delphinites* (*Pseudogarnieria*). Finally, two images of *Delphinites* from the Menya River, were published in open nomenclature (Bogomolov and Mitta, 2007), in the materials of the 7th conference “Cephalopods—Present & Past.”

Representatives of *Delphinites* (identified as *Pseudogarnieria* and *Proleopoldia*) were listed from the Lower Valanginian from other regions of the Russian Platform, and in particular, from the basin of the Oka River in the Ryazan Region (Zonov, 1937; Mesezhnikov, 1984). However, these data are not supported by figures, or indications in the collection. Only a small fragment of Platylenticeratinae gen. et sp. indet., from the Valanginian of the Ryazan Region, known from Pawlov’s collection of the end of the 19th century (Mitta, 2007); it is possible that this specimen belongs to *Delphinites*.

Until recently, occurrences of *Delphinites* have not been confirmed from the Valanginian of the basin of the Unzha River, from where M.I. Sokolov reported “*Hoplites*” sp., original *Hoplites*, approaching in some ways *Hoplites kurmyschensis* Stschirrowskii, and in other ways to *H. leopoldianus* d’Orb. (Sokolov, 1929, p. 24). Unprepared collections of M.I. Sokolov housed in Vernadsky State Geological Museum (GGM RAS), apparently do not contain this ammonite. However 10 years ago (Mitta and Bogomolov, 2009) reported in one of the gullies in the village of Unzha on the Unzha a sandstone nodule with numerous bivalves of the genus *Buchia* and less numerous ammonites of the genus *Polyptychites*, and several fragments of *Delphinites* sp. This ammonoid is important primarily because it comes from the upper zone of the Lower Valanginian, *Polyptychites michalskii*, and confirms the distribution of the genus *Delphinites* in the whole of the Lower Valanginian.

The position of these taxa in the system of Perisphinctoidea is a subject of discussion. Various author placed them in the family Garniericeratidae Spath, 1952 (Sasonova, 1971), in the family Berriasellidae Spath, 1924 (Casey, 1973), in the family Olcostephanidae Haug, 1910 (Thieuloy, 1977), in the family Polyptychitidae Wedekind, 1918 (Wright et al., 1996), or in the family Neocomitidae Salfeld, 1921 (Alsen and Rawson, 2005).

MATERIAL

In 1992–2002 I repeatedly visited sections on the Menya River, from the village of Pekhorka (currently Krasnomaiskaya) and downstream (village of Mishukovo). The basal Valanginian *Delphinites undulatopectilis* Zone is represented in the lower end of the village of Mishukovo by thin beds (up to 0.5 m) of sand and gray-yellowish-brown sandstones with rare oolites, with shells of *Buchia* and other bivalves, ammonites, and less commonly belemnite rostra (see description of the section in Mitta and Starodubtseva, 2000; Mitta, 2017). As a result, a collection of several hundred ammonites was assembled from this locality and mainly included the genera *Surites* Sasonov, *Menjaites* Sasonova and numerous derivatives of these taxa (Sasonov, 1951; Sasonova, 1971, 1972, 1977). Shells of *Delphinites* are rare, 2–3% of the total ammonite assemblage; they are mainly represented by molds, very rarely with remains of the shell layer.

Delphinites shells are also rare in the *Polyptychites michalskii* Zone on the Unzha River, compared to other taxa. There A.V. Stupachenko (geologist and amateur paleontologist) found a concretion containing fragments of ammonites of this genus, with a preserved shell layer (Mitta and Bogomolov, 2009). Concretions of yellowish-gray loosely cemented ferruginous sandstone come from a thick series of gray and yellowish-gray thin-grained micaceous argillaceous sand. Subsequent studies in this locality (a description of this section will be published separately) did not lead to the discovery of new *Delphinites* occurrences.

The studies material also included collections housed in the V.I. Vernadsky State Geological Museum (GGM, Moscow), In the F.N Tschernyshev Central Research Geological Exploration Museum (TsGM, St-Petersburg) and in the Geological Museum of Copenhagen, including original material from the studies of Stchirowsky (1894), Sasonova (1971, 1972), Alsen and Rawson (2005), and Alsen (2006).

The original material is housed in the V.I. Vernadsky State Geological Museum (GGM) and in the A.A. Borissiak Paleontological Institute of the Russian Academy of Sciences (PIN).

DISCUSSION

The study of material of the genus *Delphinites* from the Menya River, my own and those collected by previous authors, revealed the presence of eight groups (species) differing in shell shape and ornamentation.

(1) Shells flattened, with a spear-shaped whorl cross section. The venter at D ~ 30 mm is narrow, finely serrated; with age, the serrations become more widely spaced and smoothed, and the venter becomes subacute. The ribs are, at D = 30–60 mm, weakly developed, falcate; their ends form part of ventral serrations. At D ~ 45 mm, prominent umbilical nodes appear and with age become modified into long

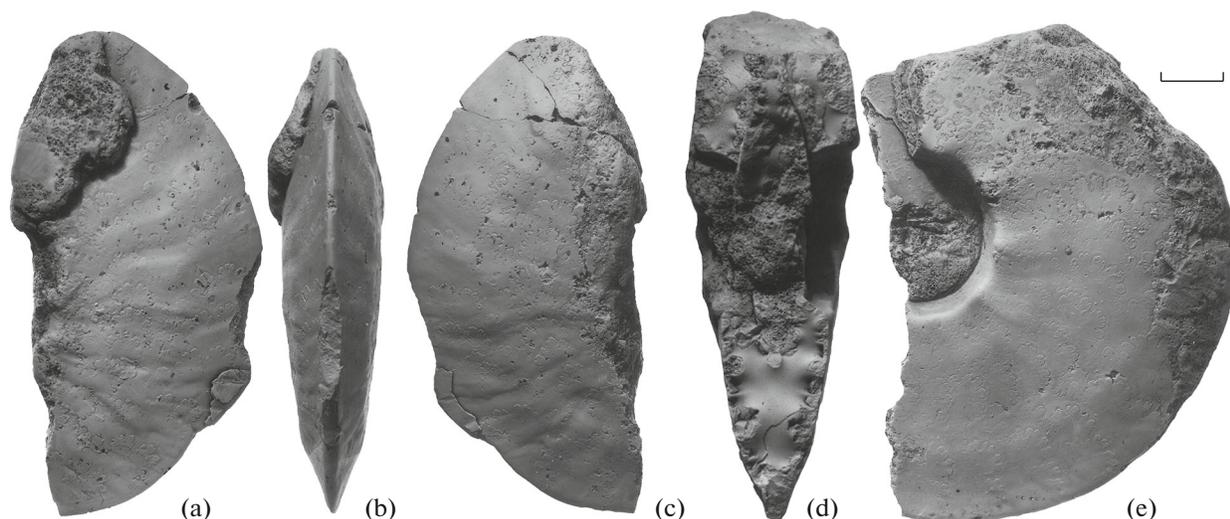


Fig. 2. *Delphinites undulatoplicatilis* (Stchirowsky): (a–c) holotype by monotypy, specimen GGM no. VI-13/3, (a, c) lateral view; (b) ventral view; (d, e) specimen GGM no. VI-13/2 [= *Oxynticeras tuberculiferum* Stchirowsky, 1894, pl. 15, fig. 2; holotype by monotypy], (d) apertural view, (e) lateral view; Chuvashia, Poretskoe District, right bank of the Menya River near the village of Pekhorka; Valanginian Stage, Lower Substage, *Delphinites undulatoplicatilis* Zone; coll. V.A. Stchirowsky. Scale bar here and everywhere 10 mm.

rib-folds reaching the mid-flanks. This group of specimens figured by Stchirowsky include the holotype (by monotypy) of *Delphinites undulatoplicatilis* (Figs. 2a–2c), holotype (by monotypy) of *D. tuberculiferum* (Figs. 2d, 2e) and the ammonite described as *Oxynticeras gevrili* d’Orbigny (Figs. 3a, 3b). Of Sasonova’s ammonite material described as *Pseudogarnieria undulatoplicatilis* (1971, pl. 20, fig. 5; pl. 22, fig. 4), *Platylenticeras* aff. *marcouisianum* (1971; pl. XXII, fig. 1), *Pseudogarnieria tuberculiferum* (1971, pl. 18, fig. 1) and *P. securis*, including the holotype (1971, pl. 16, fig. 1 [=1972, pl. 33, fig. 1]; pl. 16, fig. 1 [=1972, pl. 34, fig. 3]). In addition, this species is represented by a specimen from GGM collections (Fig. 4) and our finds (Figs. 3c–3e, and unfigured specimens nos. 5322/14, 5322/15, 5322/16, from the PIN collection). I support Gerasimov who used the First Reviser Action to choose the name *undulatoplicatilis* for this species. The names *tuberculiferum* Stchirowsky and *securis* Sasonova are subjective synonyms.

(2) Shells flattened, triangular in cross-section. The species is very similar to *undulatoplicatilis*, but is distinguished by the venter, flattened at early stages ($D \sim 30$ mm), and becoming narrower only in adult whorls of the phragmocone. In addition, the umbilical nodes are not transformed into ribs-folds as the shell grows. Two specimens figured by Stchirowsky as *Oxynticeras marcoui* d’Orbigny, including a specimen later designated as the holotype of *Delphinites alatyrensis* (Kemper) (pl. 1, figs. 2, 3), a specimen from the old GGM collection (pl. 1, fig. 1), four specimens from my collection (Figs. 5, 6, and unfigured specimens nos. 5322/13, 5322/17, from the PIN collection)

are assigned to this species. The correct name for this species is *alatyrensis*.

(3) Shell moderately wide with high-trapezoid whorl cross-section. At $D = 40–50$ mm, the venter is flattened, and with age, the ventrolateral shoulder becomes more rounded. Up to 40 mm in diameter small nodes are present on the ventrolateral shoulder, which later become leveled. A rim of umbilical node, with age becoming short primary ribs, is well-developed. This species is readily distinguished from the above-described species in the wider whorls with a wider and rounded venter. The holotype (by monotypy) of *Delphinites menensis* (Stchirowsky) (Fig. 7a), specimens assigned to that species by Sasonova (1971, pl. 12, fig. 1 [=1972, pl. 32, fig. 1], text-fig. 3) and six specimens from my collection (Figs. 7b–7f, and unfigured nos. 5322/7, 5322/9, 5322/10, 5322/22, in the PIN collection) also belong to this species. Accordingly the correct name for this species is *menensis*.

(4) A species externally very similar to *D. menensis*, differing in the more strongly compressed whorls. The umbilical nodes are well developed, and at $D = 90$ mm they become acute primary ribs reaching the mid-flank. The ventrolateral nodes are much more prominent. Apart from the lectotype of *D. kurmyschensis* (Stchirowsky) (Figs. 8), designated by Mitta and Starodubtseva (2000), specimens described under the same specific name by Sasonova (1971, pl. 15, fig. 1; pl. 16, fig. 2 [1972, pl. 33, fig. 2; pl. 34, fig. 1], 4; pl. 18, fig. 2) and one specimen from our collection (no. 5322/21, PIN). The name *kurmyschensis* is the only available name for this species.

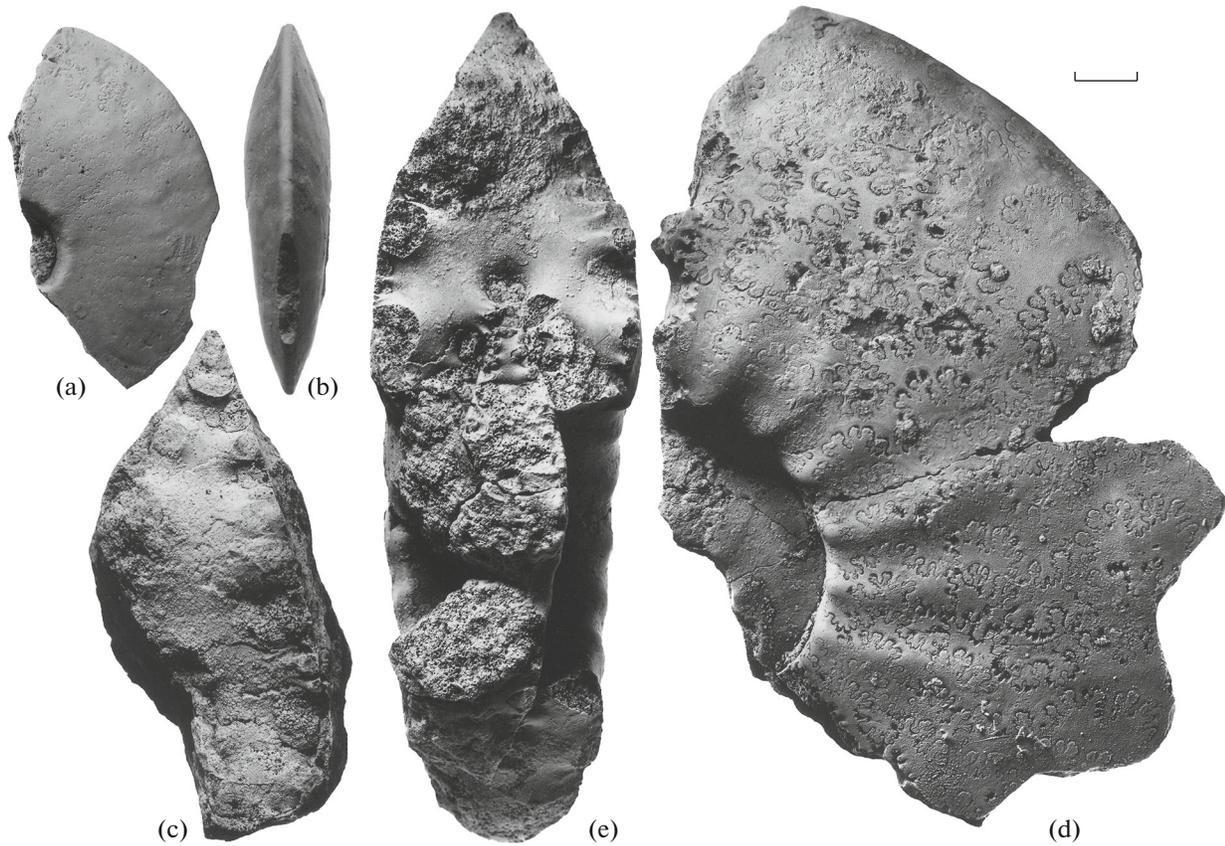


Fig. 3. *Delphinites undulatoplicatilis* (Stchirowsky): (a, b) specimen GGM no. VI-13/1 [= *Oxynoticeras gevrii* d'Orbigny sensu Stchirowsky, 1894, pl. 15, fig. 1], (a) lateral view, (b) ventral view; (c) specimen PIN no. 5322/19, whorl cross-section; (d, e) specimen PIN no. 5322/18, (d) lateral view, (e) apertural view; Chuvashia, Poretskoe District, right bank of the Menya River; Valanginian Stage, Lower Substage, *Delphinites undulatoplicatilis* Zone; (a, b) near the village of Pekhorka, coll. V.A. Stchirowsky; (c–e) near the village of Mishukovo, coll. by the present author.

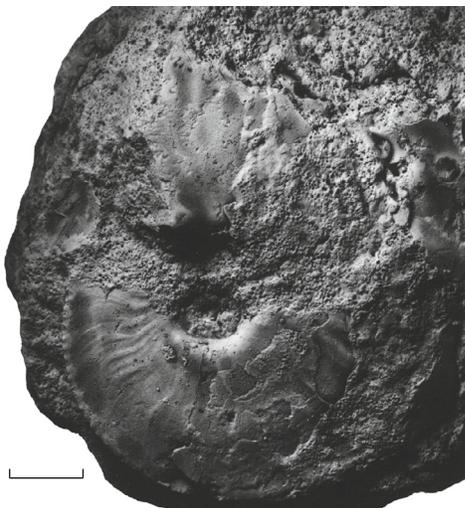


Fig. 4. *Delphinites undulatoplicatilis* (Stchirowsky), specimen GGM no. II-108/402, lateral view; Chuvashia, Poretskoe District, right bank of the Menya River; Valanginian Stage, Lower Substage, *Delphinites undulatoplicatilis* Zone; collector unknown.

(5) A species differing from *D. kurmyschensis* in the venter being already rounded at $D \sim 60$ mm, in the primary ribs and the early disappearance of first of all ventrolateral nodes and then umbilical nodes. This species described by Sasonova as *D. stchirowskyi* is known from two preserved specimens (1971, pl. 12, fig. 2 [1972, pl. 30, fig. 2], holotype; pl. 22, fig. 2).

(6) Shells with relatively wide whorls with convex flanks, wide rounded venter and weakly developed nodes; these are described below as a new species, *D. heineae*, sp. nov.

(7) Shells with three rows of nodes: apart from the umbilical and ventrolateral rows, there are nodes in the middle of the flanks. With age, the lateral and then ventrolateral row of nodes smoothen out. One specimen from the old GGM collections (Fig. 9) and one specimen from my collection (pl. 2, fig. 2) can be assigned to this species. The species is identified as *D. donovani*, described from Greenland based on the holotype (Alsen et Rawson, 2005, pl. 40, R, S). However, *D. aff. donovani* (id., ibid., fig. U, T) clearly belongs to the same species.

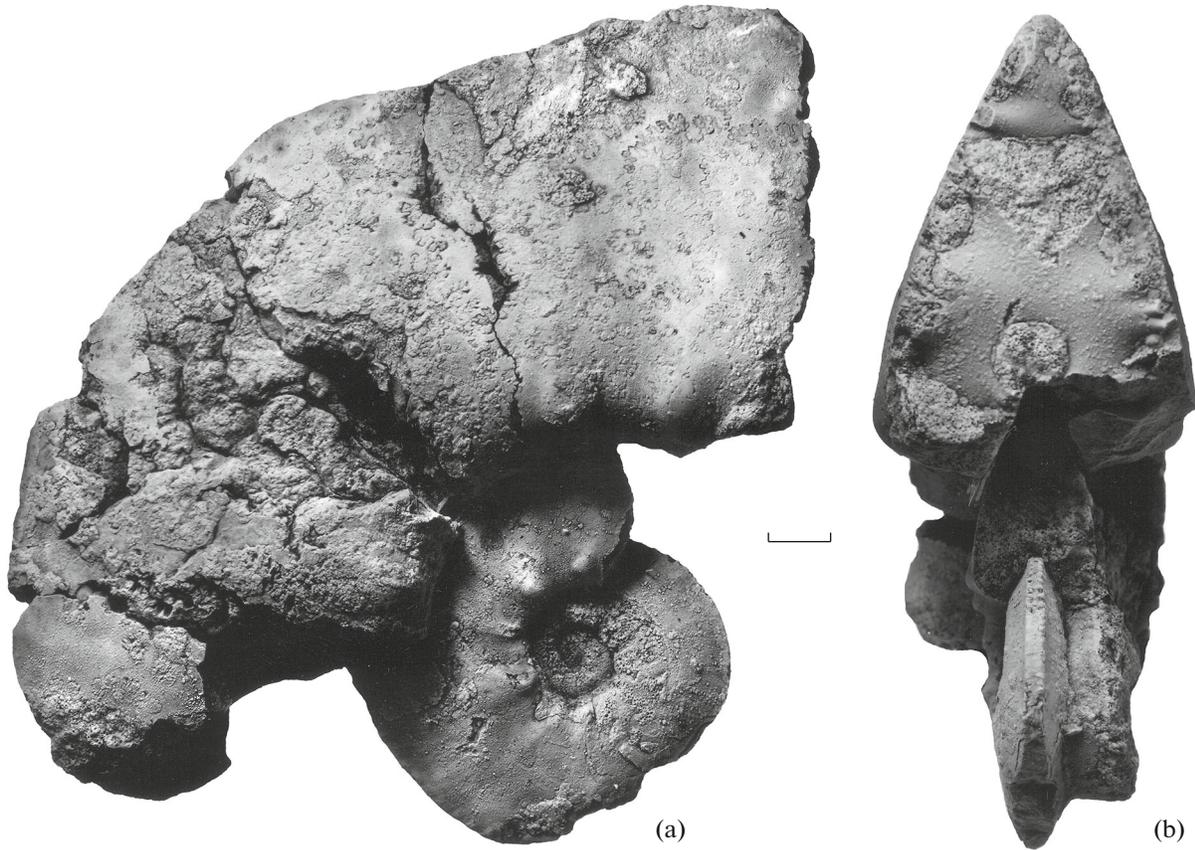


Fig. 5. *Delphinites alatyrensis* (Kemper), specimen PIN no. 5322/11: (a) lateral view, (b) apertural view; Chuvashia, Poretskoe District, right bank of the Menya River near the village of Mishukovo; Valanginian Stage, Lower Substage, *Delphinites undulaticatilis* Zone; coll. by the present author.

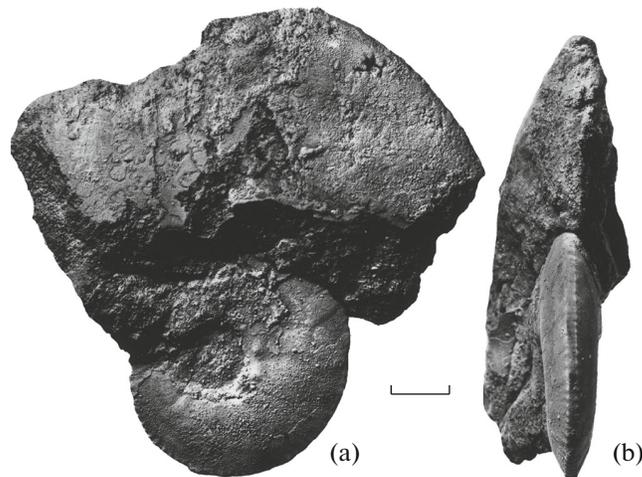
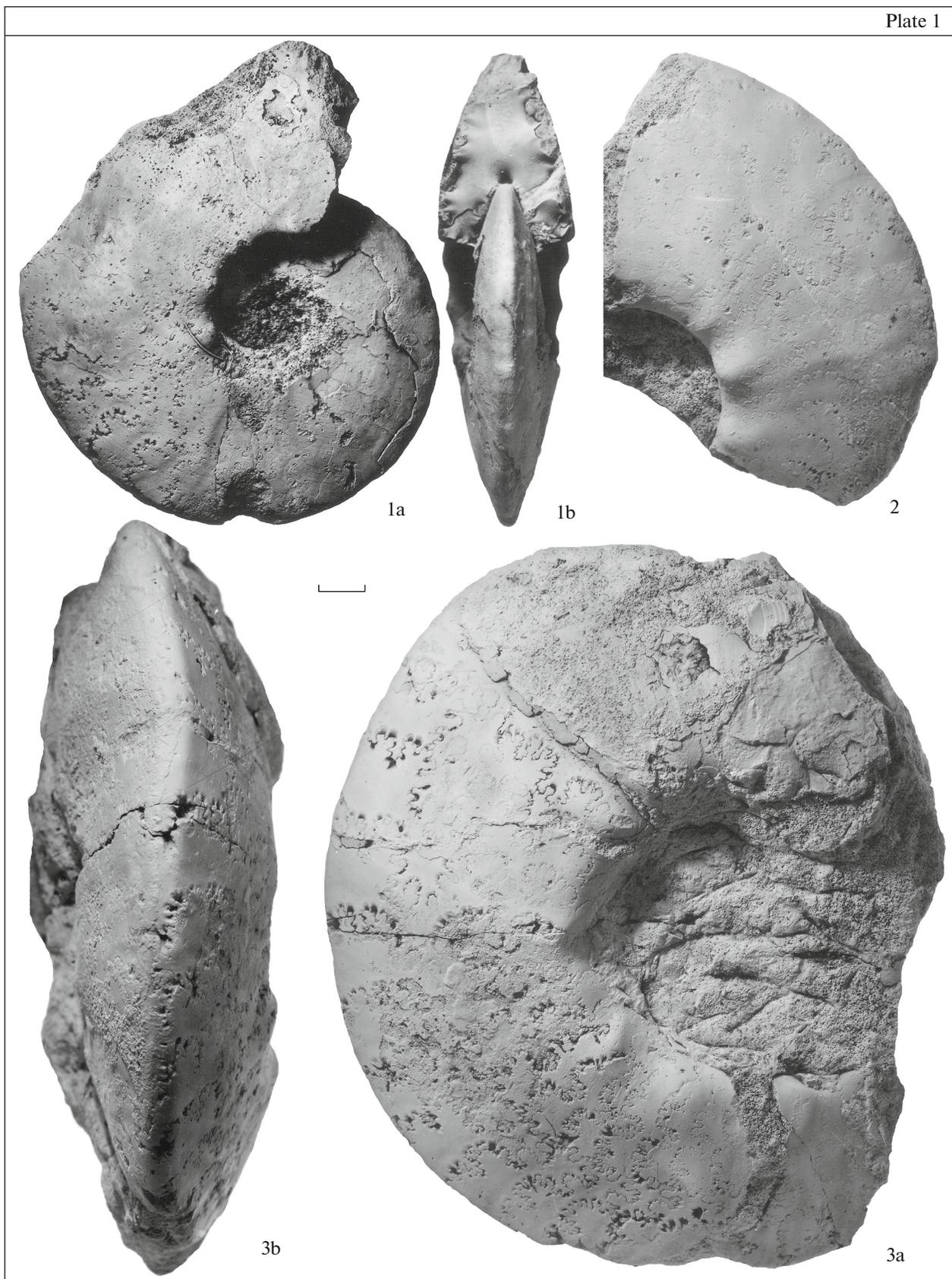


Fig. 6. *Delphinites alatyrensis* (Kemper), specimen PIN no. 5322/12: (a) lateral view, (b) ventral view; Chuvashia, Poretskoe District, right bank of the Menya River near the village of Mishukovo; Valanginian Stage, Lower Substage, *Delphinites undulaticatilis* Zone; coll. by the present author.

To conclude the discussion of *Delphinites* from the Menya River, it is necessary to emphasize the following. All the listed species come from one relatively narrow stratigraphic interval within the *Delphinites undu-*

latoplicatilis ammonite zone. A considerable species diversity (seven species of one genus), is evidently a product of condensed deposition, and the presence of dimorphic pairs within these species. Identification of



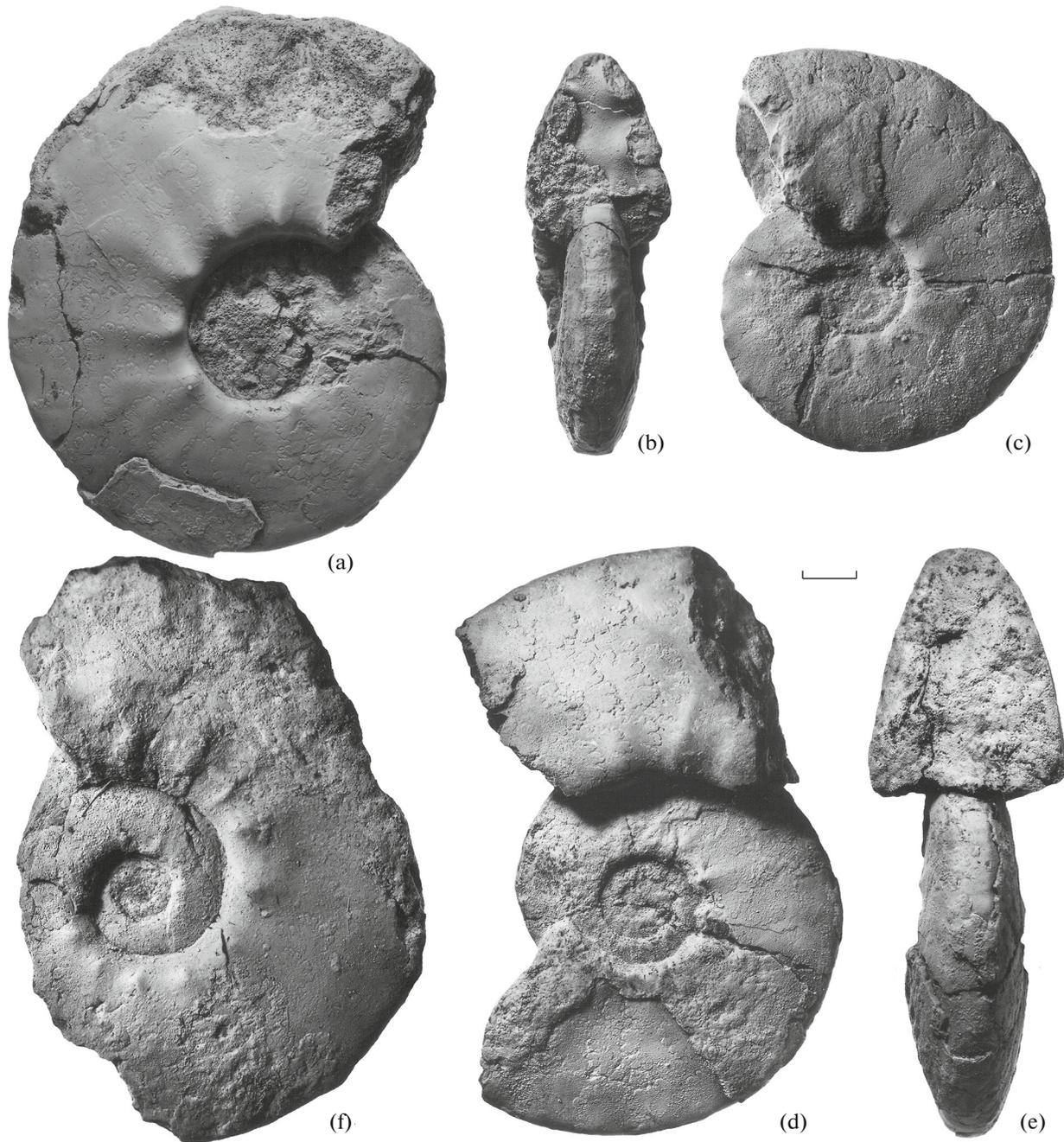


Fig. 7. *Delphinites menensis* (Stchirowsky): (a) holotype by monotypy, specimen GGM no. VI-13/6, lateral view; (b–e) specimen PIN no. 5322/6, (b, e) apertural view, (c, d) lateral view; (f) specimen PIN no. 5322/8, lateral view; Chuvashia, Poretskoe District, right bank of the Menya River; Valanginian Stage, Lower Substage, *Delphinites undulatoplicatilis* Zone; (a) near the village of Pekhorka, coll. V.A. Stchirowsky; (b–f) near the village of Mishukovo, coll. by the present author.

Explanation of Plate 1

Figs. 1–3. *Delphinites alatyrensis* (Kemper): (1) specimen GGM, no. II-117/841: (1a) lateral view, (1b) apertural view; (2) specimen GGM, no. VI-13/4 [= *Oxynoticeras marcoui* d'Orbigny sensu Stchirowsky, 1894, pl. 15, fig. 4a], lateral view; (3) holotype, GGM, no. VI-13/5 [= *Oxynoticeras marcoui* d'Orbigny sensu Stchirowsky, 1894, pl. 15, fig. 5]: (3a) lateral view, (3b) ventral view; Chuvashia, Poretskoe District, right bank of the Menya River near the village of Pekhorka; Valanginian Stage, Lower Substage, *Delphinites undulatoplicatilis* Zone; (1) collector unknown, (2, 3) coll. V.A. Stchirowsky.

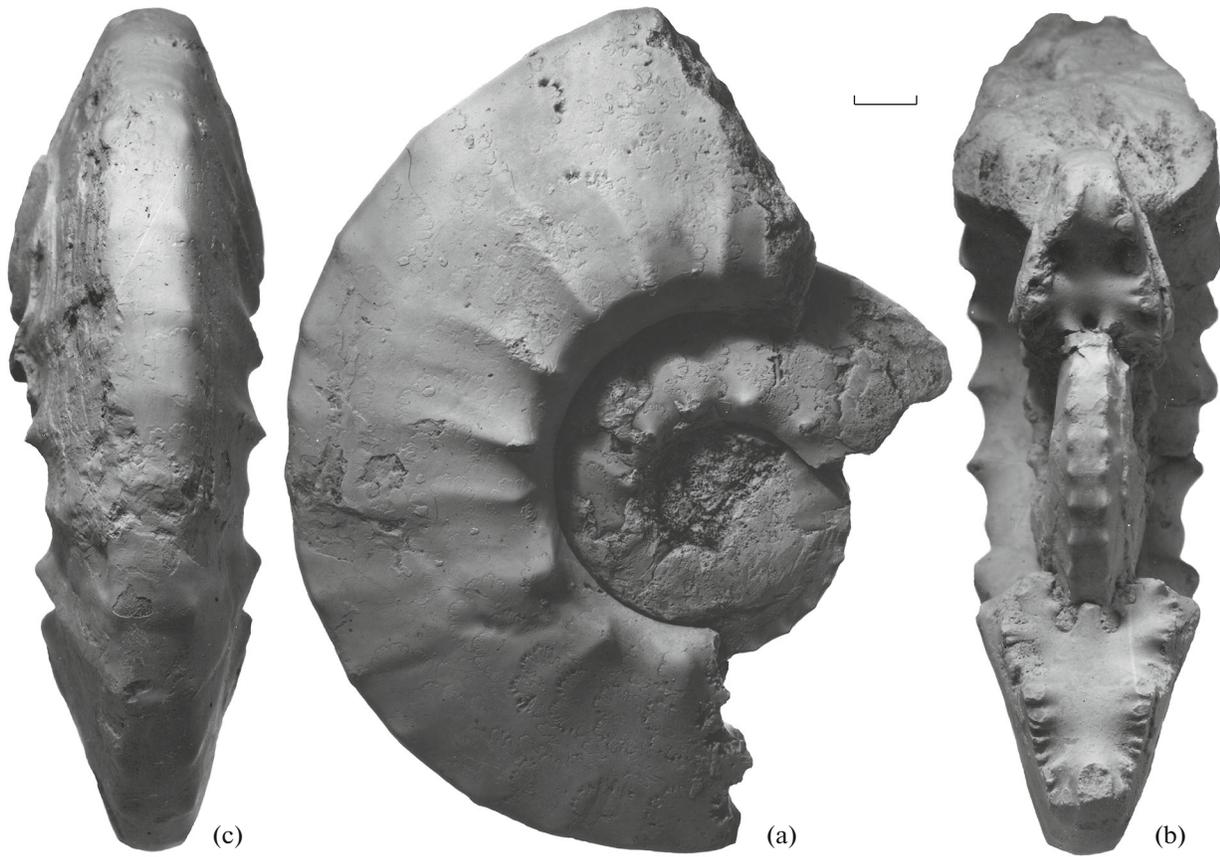


Fig. 8. *Delphinites kurmyschensis* (Stchirowsky), lectotype, specimen GGM no. VI-13/7, (a) lateral view, (b) apertural view, (c) ventral view; Chuvashia, Poretskoe District, right bank of the Menya River near the village of Pekhorka; Valanginian Stage, Lower Substage, *Delphinites undulatoplicatilis* Zone; coll. V.A. Stchirowsky.

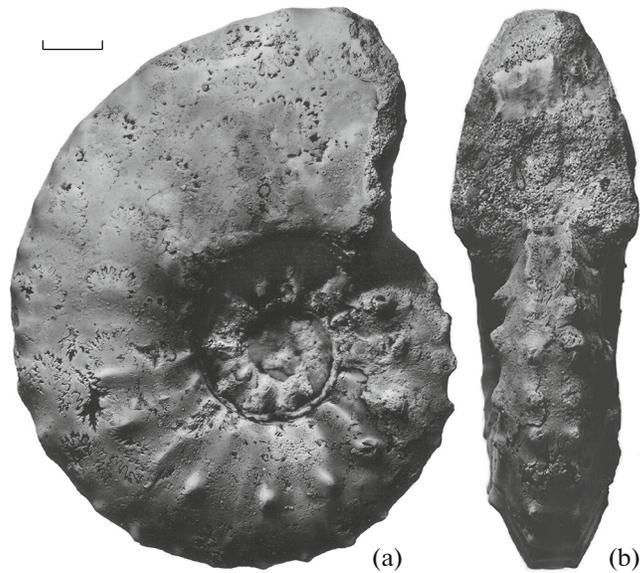


Fig. 9. *Delphinites donovani* Alsen et Rawson, specimen GGM no. II-117/788: (a) lateral view, (b) apertural view; Chuvashia, Poretskoe District, right bank of the Menya River near the village of Pekhorka; Valanginian Stage, Lower Substage, *Delphinites undulatoplicatilis* Zone; collector unknown.

microconchs and macroconchs, judging from the state of preservation of the material (lack of shells with a preserved body chamber) is currently impossible.

As mentioned above, a sandstone concretion with numerous *Buchia* and less abundant ammonites, containing fragments of *Delphinites* was found in one of the gullies near the Unzha River (Makariev District of the Kostroma Region). The externally ferruginous, calcareous sandstone concretion overfilled with fossils comes from the gray micaceous, fine-grained argillaceous sand series overlying a bed of greenish-gray, glauconitic, phosphatized sandstone with rare *Craspedites* sp. from the upper substage of the Volgian Stage. The sandstone concretion (the preparation was aided by Yu.I. Bogomolov and V.A. Zakharov; see Mitta and Bogomolov, 2009) yielded *Euryptychites* ex gr. *astierptychus* (Voronetz), *Siberites* cf. *ramulicosta* (Pavlov), and *Buchia keyserlingi* (Trautschold, 1868) var. *sibirica* (Sokolov, 1908). These ammonites are widespread in the north of Siberia (Bogomolov, 1989) and are characteristic of the middle (*Astierptychus* Zone) and the lower horizons of the upper part (*Ramulicosta* Subzone of the *Ramulicosta* Zone) of the Lower Valanginian, which is supported by identifications of *Buchia* (*Keyserlingi* Zone, Middle-Upper parts of the Lower Valanginian (Zakharov, 1981). This stratigraphic interval corresponds to the upper part of the *Hoplitooides* Zone—lower part of the *Michalskii* Zone of the Russian Platform.

The remains of the ammonite shells in the concretions are represented by molds, distorted to varying extents, some with the nacreous layer preserved. Three fragments were assigned to *Delphinites*, all with the nacreous layer. The smallest fragment (Fig. 10a) shows a fragment of a venter with prominent small spinous extensions on the ventrolateral shoulder. The second fragment (Fig. 10b) is better preserved, showing the flank of a completely crushed shell. It shows that the ventrolateral spines (or teeth) give rise to simple, weakly curved ribs, readily discernible on the flank and terminating in small crest-like bulges. A fragment of the largest whorl is represented by the external half of the flank, with an adjacent portion of the venter (Fig. 10c). It is readily observable that the ventrolateral row of spines represents the terminations of the wide and prominent primary ribs that are present on the flanks. This type of ornamentation is characteristic in the Valanginian only of the subfamily Platylenticeratinae, and resembles the ornamentation of some *Delphinites* (early whorls of *D. undulatoplicatilis* and more mature *D. kurmyschensis*); apparently, these specimens belong to an undescribed species of the genus *Delphinites*.

Previously, the distribution of the genus *Delphinites* was considered to be restricted to the *Undulatoplicatilis* Zone, lower in the Valanginian. Based, on the above, the distribution of *Delphinites* in the Russian Platform,

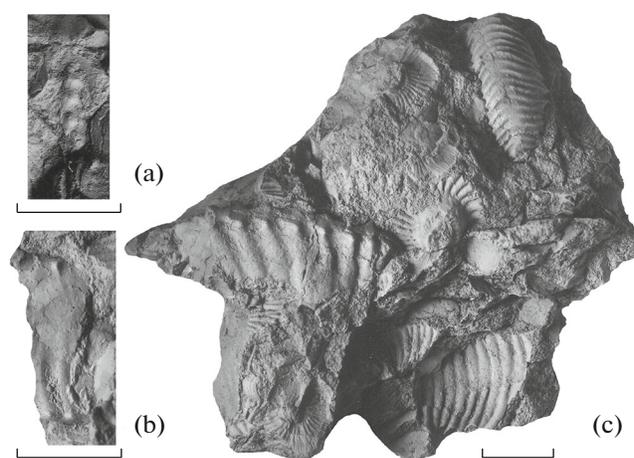


Fig. 10. *Delphinites* sp. (sp. nov.), remains of shells in one piece of rock, specimen PIN no. 5322/3: (a) fragment of a juvenile whorl, ventral view, (b) fragment of the flank, (c) another fragment, lateral view; Kostroma Region, Makariev District, gully in the western vicinity of the village of Unzha; Lower Valanginian, *Michalskii* Zone; coll. A.V. Stupachenko.

up to the upper zone of the Lower Valanginian inclusive, can be confirmed.

SYSTEMATIC PALEONTOLOGY

Superfamily Perisphinctoidea Steinmann, 1890

Family Neocomitidae Salfeld, 1921

Subfamily Platylenticeratinae Casey, 1973

Genus *Delphinites* Sayn, 1901

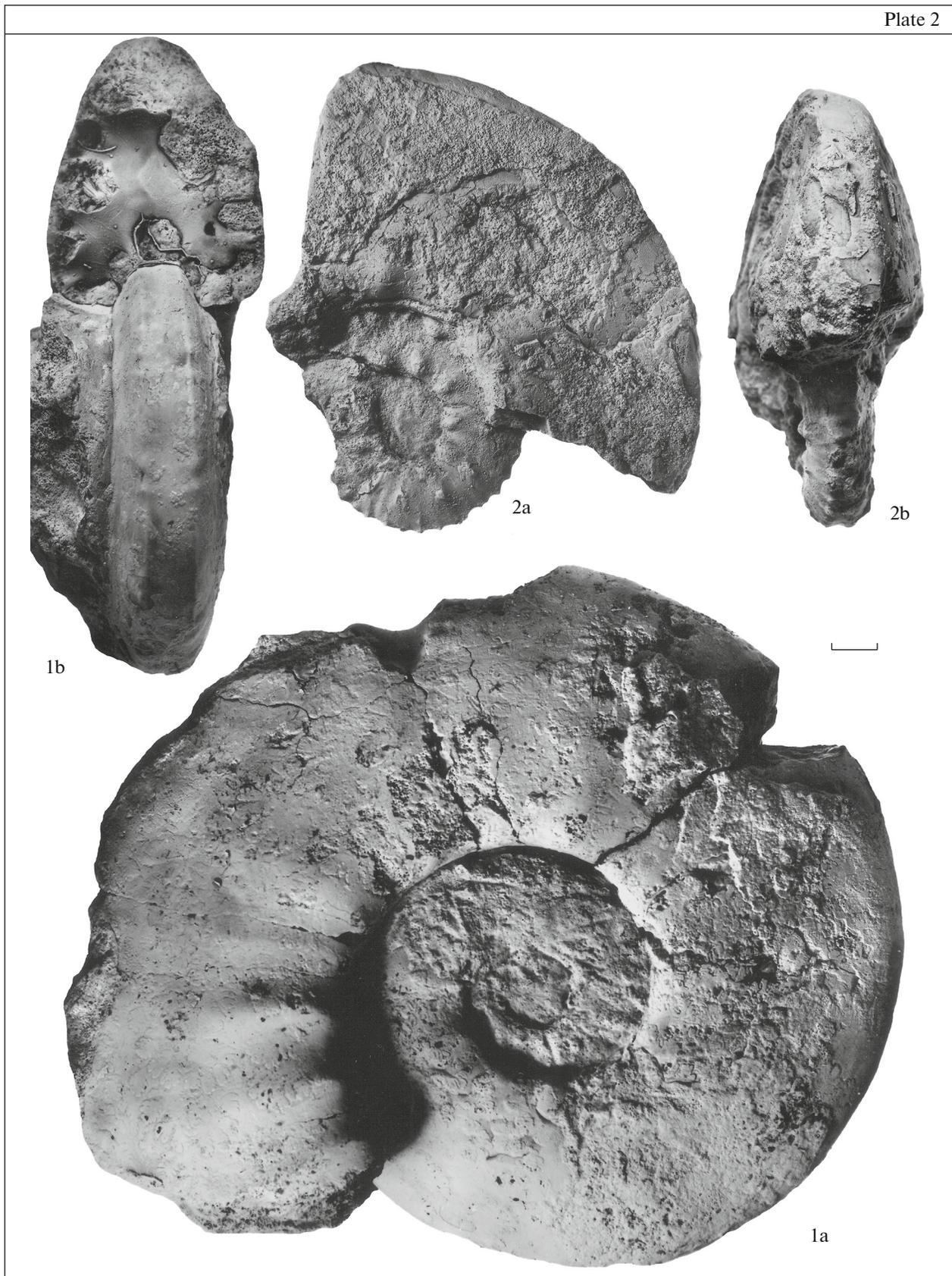
Delphinites heineae Mitta, sp. nov.

Plate 2, fig. 1

E t y m o l o g y. In memory of Johanna Sasonova (née Heine) (1913–2000), a researcher of ammonites, biostratigraphy, and paleogeography of the Mesozoic of the Russian Platform.

H o l o t y p e. PIN, no. 5322/4; Chuvashia, Poretskoe District, right bank of the Menya River, near the northern vicinity of the village of Mishukovo; Valanginian Stage, Lower Substage, *Delphinites undulatoplicatilis* Zone; coll. by the present author, 2002.

D e s c r i p t i o n. The phragmocone is up to ~160 mm in diameter. The whorls are moderately wide. The whorl cross-section is subtriangular or ellipsoidal, with its maximum width in the umbilical region, with weakly convex flanks and a rounded venter. The umbilicus is moderately wide. The umbilical wall is vertical. The umbilical shoulder is rounded. Up to 100 mm in diameter, the ventrolateral shoulder is angular, distinct, and with age the transition to the venter becomes rounded. The body chamber and the shape of the aperture are unknown.



Explanation of Plate 2

←
Fig. 1. *Delphinites heineae* sp. nov., holotype PIN, no. 5322/4: (1a) lateral view, (1b) apertural view (part of a whorl separated).

Fig. 2. *Delphinites* aff. *donovani* Alsen et Rawson, specimen PIN no. 5322/5: (2a) lateral view, (2b) ventral view; Chuvashia, Poretskoe District, right bank of the Menya River, near the village of; Mishukovo; Valanginian Stage, Lower Substage, *Delphinites undulatoplicatilis* Zone; coll. by the present author.

The ornamentation in the early whorls is represented by two rows of nodes, umbilical and ventrolateral. The umbilical nodes (6–7 in 1/2 whorl) are prominent at $D = 100$ mm, and are later transformed into primary ribs, reaching mid-flank and leveling out. The nodes of the ventrolateral row are small and weakly developed (~15 in 1/2 whorl) and completely disappear at $D \sim 75$ mm.

Dimensions in mm and ratios:

Specimen no.	D	WH	WW	UW	WH/Dm	WW/Dm	UW/Dm
Holotype 5322/4	125	51	43	40.5	0.41	0.34	0.32
	78	34.5	27	22.5	0.44	0.35	0.29

Variability. The whorl cross-section varies in shape in the available material, i.e., the venter narrow in the adult whorls of the phragmocone.

Comparison. This species is distinguished from the most similar *D. kurmyschensis* (Stchirovsky) and *D. menensis* (Stchirovsky) primarily in the in the whorl cross-section shape, which has concave flanks and much wider with convex flanks and considerably wider venter becoming rounded with age. It is distinguished from *D. kurmyschensis*, apart from the above character, by reduced primary ribs and very weakly developed secondary ribs.

Remarks. The ornamentation of the new species strongly resembles that of *D. undulatoplicatilis*, which has a considerably more strongly compressed shell with a spear-shaped cross-section. It is possible that shells with a narrow venter at small shell size are microconchs. The absence in the material from Central Russia of specimens with a preserved body chamber does not allow this question to be answered at present.

Material. Apart from the holotype, the collection contains a fragment of a shell representing two successive whorls of a phragmocone that reached ~110 mm in diameter (specimen PIN no. 5322/20), from the type locality.

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