

A new ammonite, *Neogastrolites kamchatkensis*, from the Lower Cenomanian (Cretaceous) of North East Russia (with comments on related forms)

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With 4 figures in the text

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Abstract: Critical reinvestigation of the ammonite genus *Neogastrolites* McLEARN, 1931, from the Upper Albian/Lower Cenomanian of North East Russia indicates that there are two species: the Upper Albian *Neogastrolites americanus* (REESIDE & WEYMOUTH) and the Lower Cenomanian *N. kamchatkensis* n. sp. The description of the new species as well as short comments and illustrations of *N. americanus* from NE Russia are given.

Zusammenfassung: Aus der kritischen Neubearbeitung der Ammoniten-Gattung *Neogastrolites* McLEARN, 1931, aus dem Oberen Alb/Unteren Cenoman von NE-Rußland ergibt sich, daß hier zwei Arten vorliegen, *N. americanus* (REESIDE & WEYMOUTH) aus dem Oberen Alb und *N. kamchatkensis* n. sp. aus dem Unteren Cenoman. Die Beschreibung der neuen Art wird durch Kommentare und Abbildungen von *N. americanus* aus NE-Rußland ergänzt.

1. Introduction

The ammonite genus *Neogastrolites* McLEARN, 1931, is typical for the Upper Albian and Lower Cenomanian of the Western Interior of North America, and includes at least 8 species of strongly ribbed and often tuberculate ammonites (McLEARN 1931, 1933; REESIDE & COBBAN 1960; JELETZKY 1964, 1980; WARREN & STELCK 1969; STOTT 1982).

Members of this genus are uncommon in the contemporary rocks of North East Russia. Nevertheless, Russian authors have used *Neogastrolites americanus* (REESIDE & WEYMOUTH) for correlating the Upper Albian and Lower Cenomanian strata between North East Russia and North America (TEREKHOVA 1969; VERESCHAGIN 1977; ALABUSHEV 1989). The known records of *N. americanus* from Russia consist, however, of (1) a

* Editors and publisher regret deeply to inform the readers that Professor Dr. JOST WIEDMANN passed away on 2 December 1993.



Fig. 1. Regional map (without scale) showing visited outcrops (1-2). 1 – NEIM locality A8516, Ajnyn Valley; 2 – NEIM locality A8626, Main Valley.

single specimen from the Upper Albian of northwestern Kamchatka (VERESCHAGIN et al. 1965: p. 34, pl. 18, fig. 5) and (2) some specimens from the Upper Albian of the Korjak-Kamchatka region (ALABUSHEV & ALABUSHEVA 1988: p. 25, pl. 2, figs. 8a, b).

The other undoubted specimens of *N. americanus* were collected in North East Russia from the basal part of the Mametchinskaja Formation (Figs. 2A–D) and the Takynkujulskaja Formation (Figs. 2E–G). They come from rocks containing *Pseudhelicoceras* spp. (POKHIALAYNEN & TEREKHOVA 1984) which is overlain by strata with *Turrilites pseudocostatus* COLLIGNON (ATABEKIAN 1985). These specimens are very similar to typical ones from the uppermost Albian of North America (Figs. 3M–P).

There is also another group of *Neogastrolites*, coming from Lower Cenomanian strata of the Korjak-Kamchatka region and associated with *Hypophylloceras californicum* (ANDERSON), *Anagaudryceras buddha* (FORBES), *Parajaubertella kawakitana* MATSUMOTO, *Mariella* (*M.*) *cenomanensis* (SCHLÜTER), *Hypoturrilites gravesianus* (D'ORBIGNY), *H. mantelli* (SHARPE), *Desmoceras kossmati* MATSUMOTO, *D. (Pseudouhligella) japonicum* YABE, *Eogunnarites alaskensis* MATSUMOTO, *Marshallites cumshewaensis* (WHITEAVES), *M. columbianus* MCLEARN, *Rapidoplacenticerus sutherland-browni* (MCLEARN). This group of neogastrolitids forms a new species named *Neogastrolites kamchatkensis*.

The specimens described below are kept in the Geologisch-Paläontologisches Institut, Tübingen (GPIT) and in the North-Eastern Interdisciplinary Scientific Research Institute, Magadan (NEIM).

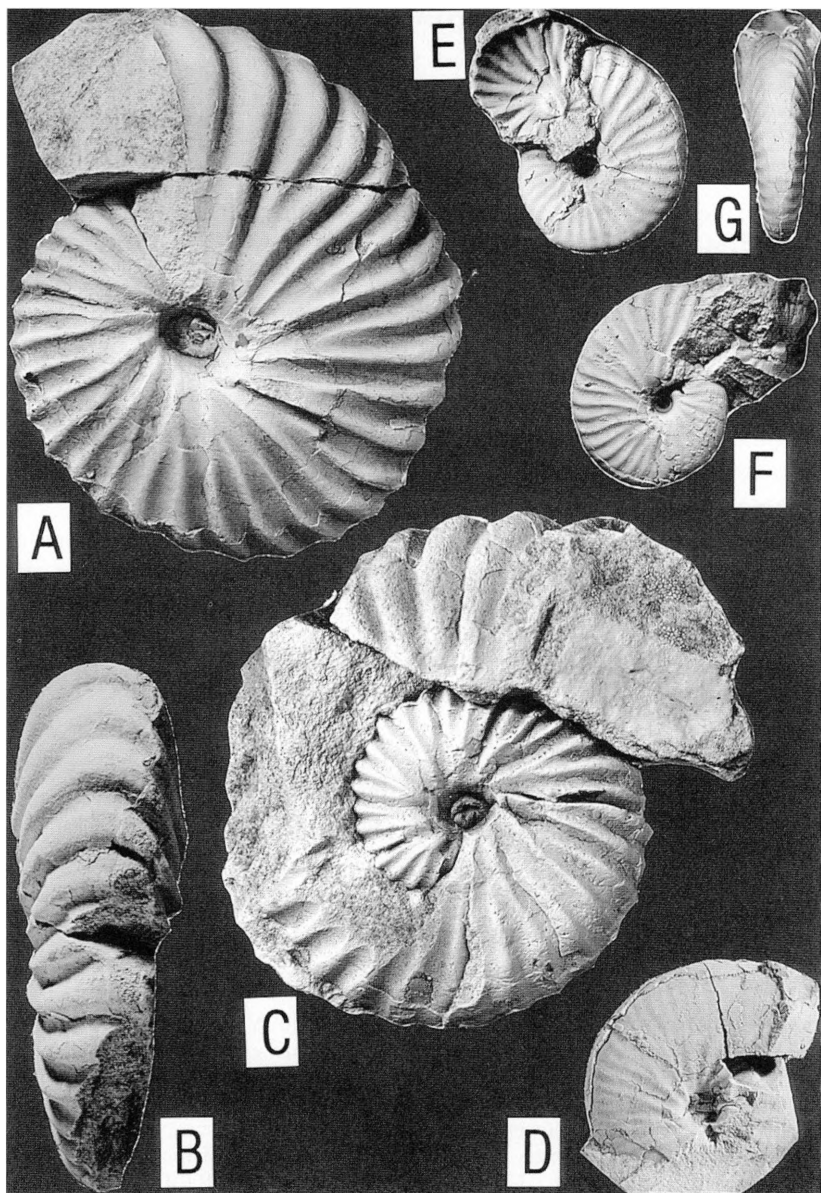


Fig. 2. *Neogastrolites americanus* (REESIDE & WEYMOUTH). A-C- specimen GPIT 1733/9, Upper Albian, northeastern coast of Penzhina Bay, collected by V. РОКНИЛАЙНЕН. D- specimen GPIT 1733/8, Upper Albian, interriver Ajnyn-Lekasyn, collected by E. ALEKSEEV. E-G- specimen NEIM 22s/9-1 from NEIM loc. A8429, Upper Albian, Penzhina Valley. All specimens are given in natural size.

Abbreviations used

USGS: United States Geological Survey, Loc.: locality, D: diameter, U: umbilicus, H: height, W: width.

Localities of fossils

The fossils newly described and illustrated here come from the fine-grained calcareous concretions of the Mametchinskaja Formation at the NEIM loc. A8516 and from the Levoberjozovskaja Formation at the NEIM loc. A8626 (Fig. 1).

The first locality is situated 4 km SE of the mouth of the Melkij Creek, the Ajnyn Valley, northwestern Kamchatka. The following ammonites were collected here from interbedded sandstones and siltstones of the Mametchinskaja Formation: *Parajaubertella kawakitana* MATSUMOTO, *Anagaudryceras buddha* (FORBES), *Marshallites columbianus* MCLEARN, and *Rapidoplacenticerias sutherlandbrowni* (MCLEARN).

NEIM loc. A8626 is situated near the source of the Levaja Berjozovaja River, Main Valley, Korjak-Kamchatka region. The rich assemblage of fossils from undistinctly bedded siltstones of the basal part of the Levoberjozovskaja Formation includes *Hypophylloceras californicum* (ANDERSON), *Parajaubertella kawakitana* MATSUMOTO, *Anagaudryceras buddha* (FORBES), *Mariella (Mariella) cenomanensis* (SCHLÜTER), *Hypoturrites mantelli* (SHARPE) and *Desmoceras kossmati* MATSUMOTO.

2. Systematic description

Family Hoplitidae DOUVILLÉ, 1890

Subfamily Gastroplitinae WRIGHT, 1952

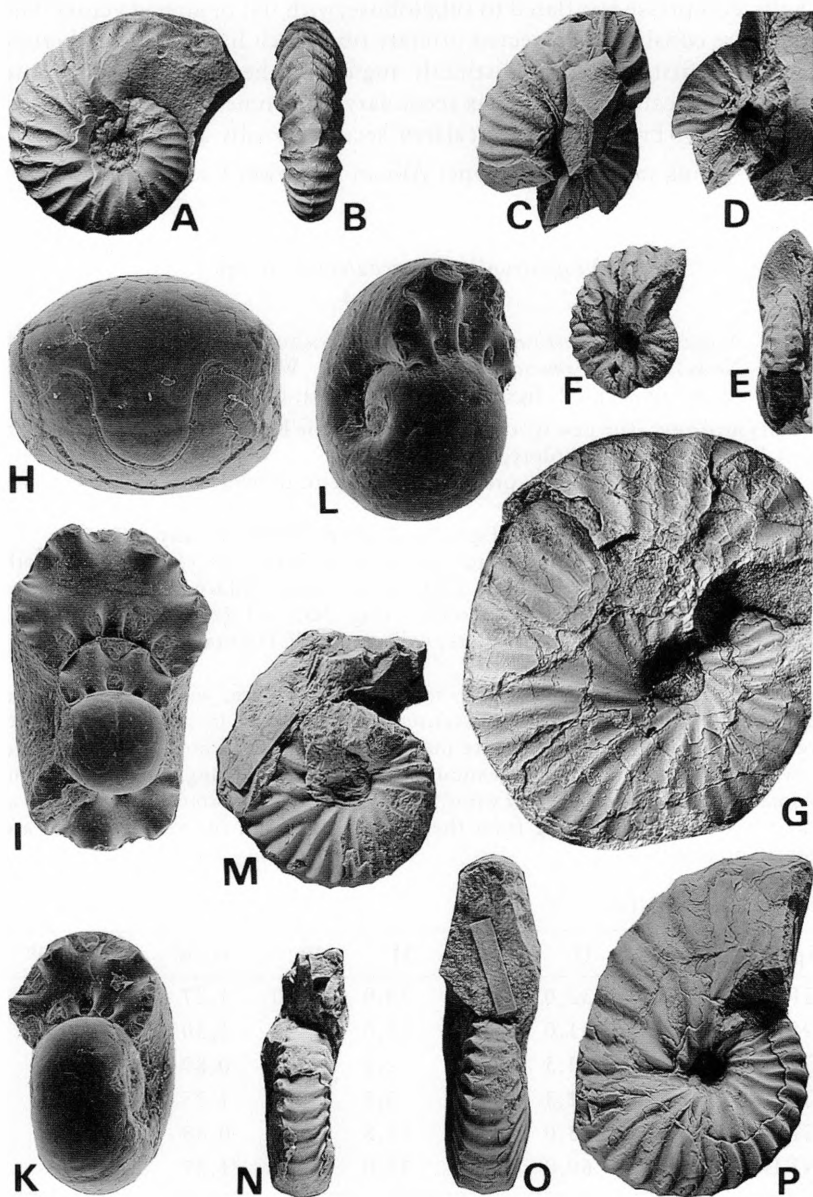
Genus *Neogastrolites* MCLEARN, 1931

Type-species: *Buchiceras? cornutum* WHITEAVES, 1885.

Fig. 3. *Neogastrolites kamchatkensis* n. sp. (A-L) and *N. americanus* (REESIDE & WEYMOUTH). All specimens, except Figs. H-L, are given in natural size.

N. kamchatkensis n. sp.: A-B - holotype GPIT 1733/1 from NEIM loc. A8516, Lower Cenomanian, Ajnyn Valley; C-E - paratype GPIT 1733/2, idem; F - specimen GPIT 1733/7, Lower Cenomanian, Bering Peninsula, collected by V. POKHIALAYNEN; G - specimen NEIM 22s/10-1, from NEIM loc. A8626, Lower Cenomanian, Main Valley; H - protoconch of specimen GPIT 1733/3, $\times 35$; I - inner whorls of specimen GPIT 1733/4, $\times 12$; K - specimen GPIT 1733/5, $\times 9$; L - specimen GPIT 1733/6, $\times 16$. H-L - from NEIM loc. A8516, Lower Cenomanian, Ajnyn Valley.

N. americanus (REESIDE & WEYMOUTH); M-N - specimen GPIT 1733/10, O-P - specimen GPIT 1733/11, both collected by W. COBBAN from USGS loc. 23042, Upper Albian, Montana, USA.



Generic character: *Neogastrolites* includes moderately involute shells, compressed, inflated to subglobose, with flat or arched venter. The sculpture consists of projected primary ribs which have a rounded cross-section at first, becoming distinctly angular in the adult. These ribs are usually bifurcating into convex secondary ribs, sometimes with bullae at the point of branching. Intercalated secondary ribs are also present.

The genus ranges from Upper Albian to Lower Cenomanian.

Neogastrolites kamchatkensis n. sp.

Figs. 3A–L, 4

1987 *Neogastrolites americanus* (REESIDE & WEYMOUTH); ALABUSHEV, text-fig. 4.

1988 *Neogastrolites americanus* (REESIDE & WEYMOUTH); ALABUSHEV & ALABUSHEVA, pl. 2, figs. 7a, b (non figs. 8a, b)

Etymology: The new species is named after the Kamchatka Peninsula, North East Russia, where the holotype was found.

Material: 19 differently preserved specimens, of which the following ones are selected for description:

Holotype: GPIT 1733/1 (Figs. 3A, B) from NEIM locality A8516.

Paratypes: GPIT 1733/2 (Figs. 3C–E) and NEIM 22s/16–3 (Fig. 4), both from NEIM locality A8516. GPIT 1733/3, -/4, -/5 and 1733/6 (Figs. 3H–L) from NEIM locality A8516. NEIM 22s/10–1 (Fig. 3G) and 22s/10–2 from NEIM locality A8626. GPIT 1733/7 (Fig. 3F) collected by V. POKHIALAYNEN from Bering Peninsula.

Diagnosis: Shell fairly small, moderately involute, with relatively wide umbilicus. Whorls oval in cross-section, with narrowly to moderately arched venter and convex flanks. Ribs are numerous, 30–36 per whorl, gently concave towards aperture, sometimes flexuous, with a broad and angular cross-section. Primary ribs are few, 12–17 per whorl. One (rarely two) shorter rib(s) are intercalated between or branching from the primary ones. On the venter all ribs are gently projected.

Measurements:

Specimen	D	U	H	W	H/W	Ribs/180°
GPIT 1733/1	32,0	8,0	14,0	11,0	1,27	15
GPIT 1733/2	31,0	7,3	13,0	10,0	1,30	18
GPIT 1733/5	4,3	1,0	2,4	2,7	0,89	–
GPIT 1733/6	11,3	2,4	5,5	4,4	1,25	18
GPIT 1733/7	23,0	4,5	11,5	13,0	0,88	16
NEIM 22s/10–1	60,0	9,0	33,0	26,0	1,27	18

Description: The shell is moderately involute, the umbilicus measures 15 to 25% of the diameter, mostly 21–23%. The whorl increases slowly from the protoconch (Fig. 3H) to the end of the second whorl (Fig.

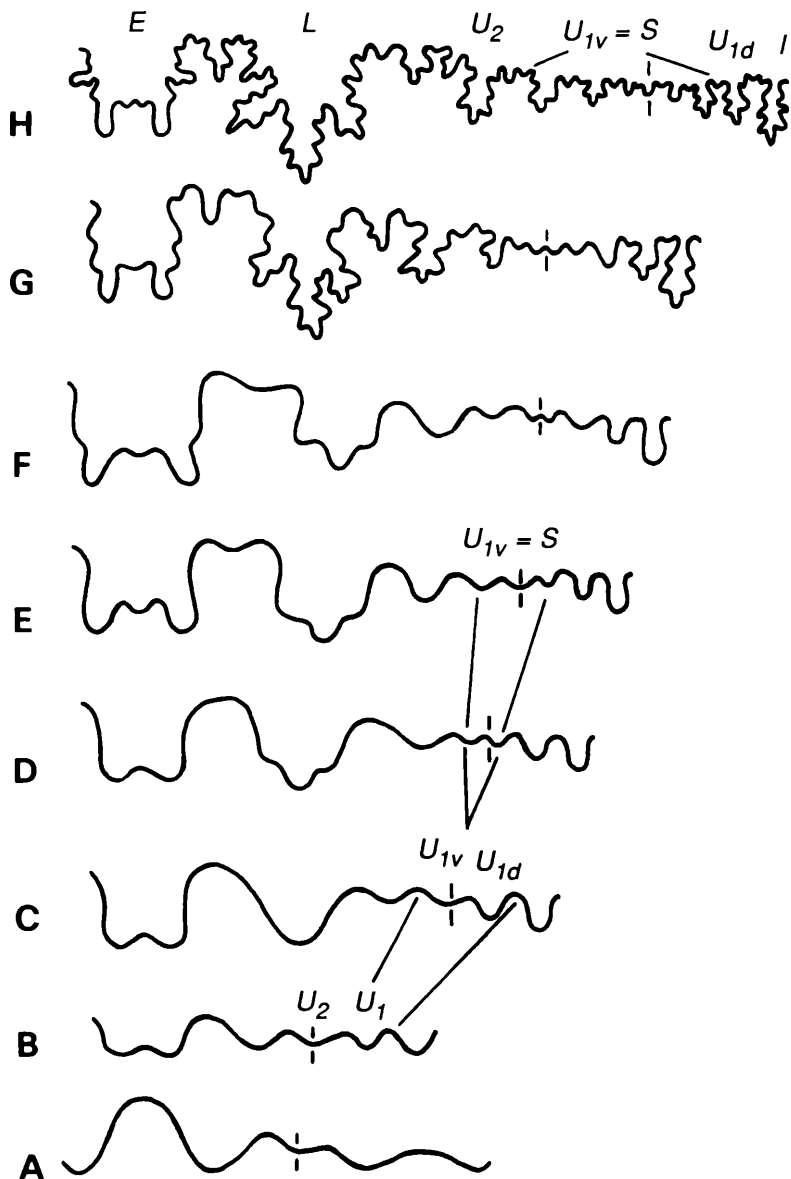


Fig. 4. Suture line ontogeny of *Neogastrolites kamchatkensis* n. sp. Paratype NEIM 22s/16-3 from NEIM loc. A8516. Lower Cenomanian, Ajnyn Valley. A - prosuture, $\times 30$; B - primary suture, $\times 30$; C - 10th suture line (primary constriction), $\times 30$; D - 15th suture line (1,5 whorls), $\times 25$; E - 19th suture line (2,0 whorls), $\times 20$; F - 2,5 whorls, $\times 15$; G - 3,0 whorls, $\times 6$; H - 4,0 whorls, $\times 3$.

3L). In this stage, the whorl is somewhat broader than high, $H/W = 0,65$ (Fig. 3I). Thereafter, whorls increase with moderate rate, showing an increase in whorl-height of twice the width (Figs. 3I = outer whorl; 3K). The umbilical wall is gently rounded, passing imperceptibly to the convex flanks. The venter is moderately arched in the holotype (Fig. 3B) and in specimen NEIM 22s/10-1; but is more narrowly arched in the paratype GPIT 1733/2 (Fig. 3E), and in intermediate stages of others. The maximum of whorl thickness is in the inner third of the flank.

The ribs are numerous. The holotype (Figs. 3A, B) represents a more coarsely ribbed form; there are 30 ribs per whorl at $D = 32$ mm; only 12 are bifurcating primary ribs with long bullae at the branching point, 6 shorter ribs are intercalated. At about the same stage, the paratype (Figs. 3C-E) has more numerous (36 per whorl) and finer ribs without distinct tubercles at the point of branching. Specimen NEIM 22s/10-1 (Fig. 3G) exhibits the finest ribbing at a diameter of 60 mm.

Many of the shorter intercalated ribs arise near mid-flank, and some more ventrally. Most ribs are gently inclined forward on the lower part of the flank, only a few being nearly rectiradiate. On the central part of the flank all ribs are flexuous. All ribs cross the venter with a slight curvature towards the mouth. At the adult, the ribs become somewhat more numerous and the lateral bullae become weaker and more elongated, tending to finally disappear.

The suture line (Fig. 4) is of a hoplitid-type with three-lobate prosuture " LU_2U_1 " (Fig. 4A) and five-lobate primary suture ELU_2U_1I (Fig. 4B). All these lobes continue to develop. The next new "lobe" appears by subdivision of U_1 to $U_{1v}U_{1d}$ in the 10th suture line (Fig. 4C), and by developing a sutural lobe (S) in U_{1v} (Fig. 4D-E).

Comparison and discussion: This new species resembles *Neogastropilites maclearni* REESIDE & COBBAN from the Fort St. John Group of Alberta, Canada (REESIDE & COBBAN 1960: pl. 56, figs. 13-18) and from the Colorado Shale of Montana, USA (ibidem: pl. 56, figs. 19-21) in the general aspects of shell form and ornamentation, but is distinguished by its finer and more numerous ribbing with higher point of branching.

With respect to the shell form, *N. kamchatkensis* is closely similar to *N. americanus* (REESIDE & WEYMOUTH) (1931: pl. 3, figs. 1-4) from the Aspen Shale of Wyoming, USA, as well as from the upper part of the Fort St. John Group of Alberta, Canada, and the Mowry or Colorado Shale of Montana and Wyoming, USA (REESIDE & COBBAN 1960: pl. 7, figs. 1-42, pl. 45, figs. 1-12, pl. 46, figs. 1-30, pl. 47, figs. 1-6, pl. 48, fig. 1, pl. 49, figs. 1-11, pl. 50, figs. 1-30, pl. 51, figs. 1-12, pl. 52, figs. 1-26, pl. 53, figs. 1-28, pl. 54, figs. 1-28, pl. 55, figs. 1-10), but the latter has even more

numerous ribs with ventrolateral broadening or tubercles, and a narrower umbilicus.

The new species differs from *N. americanus* from the Mametchinskaja and Takynkujulskaja formations of North East Russia (Figs. 2A–G, VERESCHAGIN et al. 1965: pl. 18, fig. 5) by its broader shell with less numerous ribs without ventrolateral inflations and by a wider umbilicus.

N. kamchatkensis is near to *N. americanus* from the Upper Albian of Western and Arctic Canada (JELETZKY 1964: pl. 35, figs. 2, 3, 5, 8), having an intermediate number of ribs with weak umbilical bullae and without ventrolateral tubercles. It can, however, be separated by its broader whorls with more convex flanks and less numerous ribs having a narrowly angular cross-section.

Occurrence: The holotype, paratypes and seven other specimens were obtained from carbonate concretions of the lower part of the Mametchinskaja Formation at NEIM locality A8516 (Ajnyn Valley) together with *Parajaubertella kawakitana* MATSUMOTO and *Anagaudryceras buddha* (FORBES). Six other specimens and three fragments were collected from strata with *P. kawakitana*, *A. buddha* as well as *Desmoceras kossmati* MATSUMOTO, *Mariella (M.) cenomanensis* (SCHLÜTER) and *Hypoturrilites mantelli* (SHARPE) in the basal part of the Levoberjozovskaja Formation at NEIM locality A8626 (Main Valley). One specimen (GPIT 1733/7, Fig. 3F) was discovered together with *Hypoturrilites gravesianus* (D'ORBIGNY) in the lower part of the Ginterovskaja Formation of Bering Peninsula. The stratigraphic position of all known specimens of *N. kamchatkensis* is, therefore, Lower Cenomanian.

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