

NEW EVIDENCE ON THE UPPER BARREMIAN — LOWER APTIAN AMMONITE SUCCESSIONS IN THE NORTH OF THE TOWN OF POPOVO (NORTH-EAST BULGARIA)

M. I. Ivanov

(Submitted by Corresponding Member T. Nikolov on May 4, 1992)

The Lower Cretaceous ammonite successions in the sections on the north of Popovo (Fig. 1) have already been a subject of studies [1,1,2,4,3,5]. The biostratigraphic subdivision and characteristics of the Barremian-Aptian boundary interval included the following results till the end of the seventies: 1) the ammonite zones *Heteroceras astierianum* or *Pseudosaynella strettostoma* (Upper Barremian) and *Deshayesites deshayesi* (Lower Aptian) were established; 2) the Barremian-Aptian boundary was placed by the disappearance of *Heteroceras*, *Barremites* (except *B. charrierianus*), *Matheronites*, *Anahamulina*, *Hamulina*, *Silesites*, *Pulchelia*, *Carstenia*, etc., and the appearance of *Deshayesites*, *Procheloniceras*, *Cheloniceras* and *Sanmartinoceras* [1, 1, 2]. In recent years, representatives of the genus *Colchidites* have been found in the Barremian-Aptian boundary beds in the studied region (i. e., round the villages of Kacelovo and Ostritsa and the town of Opaka). The *Procheloniceras pachystephanum* Zone was introduced at the base of the Aptian Stage. The lower boundary of the Aptian was placed by the appearance of the genus *Procheloniceras* [4, 5].

During a field re-examination of the Barremian-Aptian boundary interval on the east of Opaka the present author has found representatives of the genus *Turkmeniceras*. That genus was recorded only from the Middle Asia so far (the Great Balkhan Mountain and Little Balkhan Mountain, Tuarkir and Kopetdag) and was considered to be an endemic [12,6,9]. The finding of its representatives in the region of Opaka is of great biostratigraphical importance. This is an additional information about the complicated ammonite distribution patterns in the uppermost Barremian and lowermost Aptian of Northeast Bulgaria.

The ammonite successions have been studied in three localities on the east of Opaka* (Fig. 3). The spatial-

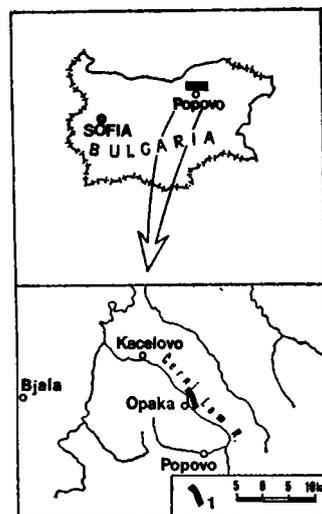


Fig. 1. Location of the study region and sections. 1 — place of the sections

temporal relationships between the lithostratigraphic units are schematically drawn in Fig. 2. In this paper, only the section to the east of Opaka is being described (Fig. 3C) which yielded species of *Turkmeniceras*. The section is located on the right bank of Černi Lom River some 250 m to the east of the bridge in the southeast end of the

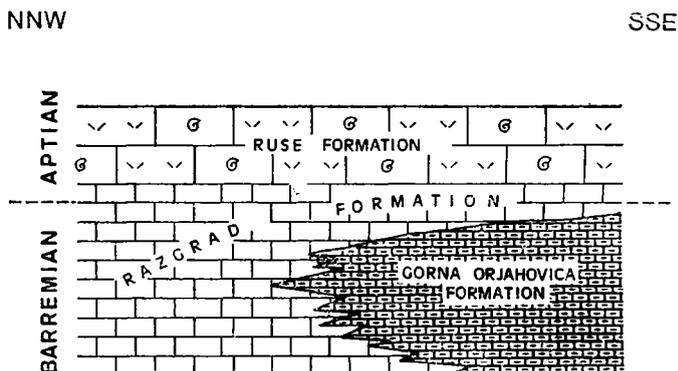


Fig. 2. Relationships between the lithostratigraphic units to the east of the town of Opaka

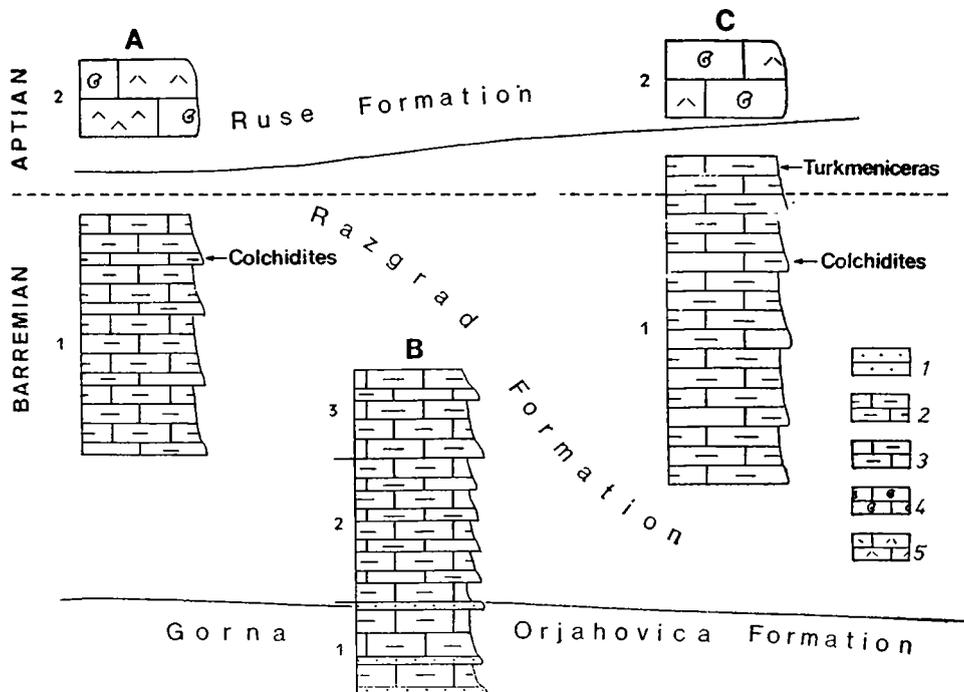


Fig. 3. Lithological sequences and correlation of the sections to the east of Opaka: A — the section along the road to Lyublyan; B — the section at the marl quarry; C — the section to the east of Opaka: 1 — sandstones; 2 — marls; 3 — clayey limestones; 4 — biogenic limestones; 5 — detrital limestones

town. The outcrop extends along the road on the western slope of the hill.
Ruse Formation (No. 2, Lower Aptian Substage)
2. (7 m)

Limestones, light-beige to yellowish, medium bedded, indistinctly bedded. An irregular alternation of detrital, massive micritic, biogenic limestones and limestones crowded with Orbitolinids. No ammonites were found.

no outcrops some 20-30 m

Razgrad Formation (No. 1, Upper Barremian Substage-Lower Aptian Substage)
1. (26 m)

An alternation of marls and clayey limestones. The marls are light-beige to whitish, locally grey-beige and spotty. They are indistinctly bedded and dominate over the limestones in the packet. The clayey limestones are light-beige to whitish. The form beds 20 to 40 cm thick are outstanding in the landscape. The marls and especially the clayey limestones are rich in ammonite fauna. It was recovered: from the highest part — *Turkmeniceras turkmenicum* Tovbina, *T. rarecostatum* Bogdanova, *Turkmeniceras* sp. nov., *Turkmeniceras* sp. juv., *Turkmeniceras* sp. indet., *Barremites* (*B.*) *charrierianus* (d'Orbigny), *Pseudohaploceras matheroni* (d'Orbigny); from the middle part — *Colchidites* cf. *ratschensis*, *Colchidites* sp. indet., *Heteroceras elegans* Rouchadze, *H.* cf. *vermiformis* Rouchadze, *Pseudohaploceras matheroni* (d'Orbigny), *Silesites seranonis* (d'Orbigny), *Pseudosaynella strettostoma* (Uhlig), *Barremites* (*B.*) *difficilis* (d'Orbigny), from the lower part — *Heteroceras elegans* Rouchadze, *H. vermiformis* Rouchadze, *Audouliceras* cf. *collignoni* (Sarkar), *Anahamulina silesiaca* (Uhlig), *Pseudosaynella strettostoma* (Uhlig).

Analysis of the ammonite successions at the sections to the east of Opaka made it possible to recognize specific ammonite associations. The distinctive Upper Barremian ammonite species *Pseudosaynella strettostoma* (Uhlig), *Heteroceras elegans* Rouchadze, *H. vermiformis* Rouchadze, *H.* cf. *astierianum* d'Orbigny, *Silesites seranonis* (d'Orbigny) and *Audouliceras* cf. *collignoni* (Sarkar) confirm the presence of the *Heteroceras astierianum* Zone [11,3] (= *Pseudosaynella strettostoma* Zone [2]) established by previous authors. In the upper parts of the sections these species occur together with *Colchidites vulanensis australis* Klinger, Kakabadze & Kennedy and *C.* cf. *ratschensis* Rouchadze. Representatives of *Turkmeniceras* appear immediately above those of *Colchidites*, being phylogenically related to the latter. Different ammonite successions were observed in the section near Kacelovo where species of *Colchidites* and *Procheloniceras* were found to exist together [4,5]. The lower boundary of the Aptian Stage is drawn by the appearance of Cheloniceratinae. A comparison of the ammonite distribution patterns in these two sections situated at about 13 km from each other (Fig. 1) suggests that *Turkmeniceras* makes its first appearance at the base of the Aptian. This conclusion is in harmony with the observations of some authors from abroad [7, 8]. The beds containing *Turkmeniceras* in the section at Opaka correlate with the lower part of the *Procheloniceras pachystephanum* Zone in the section at Kacelovo. In the Opaka region, no representatives of *Procheloniceras* were found so far.

The first Cheloniceratinae and Deshayesitinae were probably strictly related to particular palaeoenvironments. The representatives of *Procheloniceras* and *Turkmeniceras* existed at the same time, occupying, however, different biotopes. That peculiarity apparently caused the complicated ammonite distribution patterns in the Barremian-Aptian boundary strata not only in Northeast Bulgaria but in the world, too [12, 7, 4, 9, 8, 10, 5]. The differences in the stratigraphic assignment of the *Turkmeniceras* beds or the *T. turkmenicum* Zone are presented in detail in a series of papers [12, 7, 9, 8, 10].

In conclusion, to the north of Popovo (NE Bulgaria), significant differences in the ammonite successions of the Barremian-Aptian boundary interval have been established. They are marked by the presence or absence of representatives of Deshayesitinae and Cheloniceratinae. The boundary between the two stages is drawn by the appearance of *Procheloniceras* or *Turkmeniceras*. The base of the Aptian stage in these two

cases contains different ammonite faunas and has peculiar biostratigraphic characteristics. The representatives of *Colchidites* are common in the highest parts of the Barremian. An additional study should result in defining these strata as a separate biostratigraphic unit.

Thanks are due to Dr K. Stoykova for providing her materials and unpublished results.

REFERENCES

- ¹ Breskovski, S. KBGA, 7 Congr., 1, 2, 1965, 211—215. ² Id. *Geologica Balc.*, 5, 1975, No 2, 47-66. ³ Nikolov, T. *The Mediterranean Lower Cretaceous*. Sofia, Bulg. Acad. Sci., 1987, 268. ⁴ Nikolov, T., K. Stoykova, M. Ivanov. *Compt. rend. Acad. bulg. Sci.*, 36, 1983, No 8, 1081-1084. ⁵ Stoykova, K. *Ibid.*, 43, 1990, No 1, 95-96. ⁶ Богданова, Т. Н. *Палеонтол. ж.*, 3, 1971, 60—71. ⁷ Друщниц, В. В., И. А. Михайлова. *Изв. АН СССР, сер. геол.*, 4, 1979, 47—62. ⁸ Е го я н, В. Л. В: *Зоны меловой системы СССР*. Ленинград. Наука, 1989, 120—140. ⁹ Лупов, П. П., Т. Н. Богданова, В. А. Прооровский, С. З. Товбина. В: *Геологическое строение Туркменистана*. Ашхабад, Ылым, 1987, 103—118. ¹⁰ Котетшвили, Э. В. В: *Зоны меловой системы СССР*. Ленинград. Наука, 1989, 94—119. ¹¹ Николаов, Т. *Тр. геол. Бълг. сер. палеонтол.*, 6, 1964, 117—131. ¹² Товбина, С. З. *Тр. ВСЕГЕИ*, 109, 1963, No 14, 98—119.

*Geological Institute
Bulgarian Academy of Sciences
1113 Sofia, Bulgaria*