Representatives of the Toarcian ammonite genera
Osperleioceras Krimholz, 1957 and Phlyseogrammoceras Buckman, 1901 in Bulgaria

Ljubomir Metodiev1, Ivo Sapunov 2

1: University of Sofia "St. Kliment Ohridski", Tsar Osoboditel Blvd, 15, 1504 Sofia. e-mail: bina@mbox.digsys.bg
2: Geological Institute, Bulgarian Academy of Sciences, 1113 Sofia. e-mail: sapunov@geology.acad.bg

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Abstract. The following taxa of the species group, belonging to the genera Osperleioceras and Phlyseogrammoceras are described and figured for the first time in this country: Osperleioceras bicarinatum (Zieten, 1831), Phlyseogrammoceras dispansum evolutum subsp. n., P. maubeugei sp. n., P. bleicheri Maubeuge, 1949. The Bulgarian Phlyseogrammoceras dispansum Zone is characterized by species of Phlyseogrammoceras for the first time also.

Introduction

Representatives of the Toarcian genera of Osperleioceras and Phlyseogrammoceras were found in Bulgaria more than 30 years ago at the section near the village of Gorno Ozirovo, Montana District (Сапунов, 1968, p. 136; see also Sapunov et al., 1994, pp. 10, 11). The representatives of Osperleioceras were then misinterpreted as belonging to Polyplectus Buckman, 1890 [P. bicarinatus (Münster)]. Together with Phlyseogrammoceras sp. and P. dispansum (Lycett) they come from condensed Upper Toarcian sediments - “upper zoogenic bed” of the Ozirovo Formation. At that time Сапунов (1968) did not distinguish Phlyseogrammoceras dispansum (Sub) Zone because Phlyseogrammoceras were found under conditions of condensation.

Some time later, by investigations in the southern part of Western Stara Planina Mts., several Phlyseogrammoceras spp. were found. These ammonites were established at the upper part of packet 15 in the section of the Ozirovo Formation at the village of Dragovishtitsa, Sofia District (Сапунов et al., 1976, p. 104). This was the first indication of the Phlyseogrammoceras dispansum Zone, established in superposition, above Grammoceras thouarsense Zone and below Dumortieria levesquei Zone (Сапунов et al., 1976, p. 104).

The present publication describes and figures for the first time the following taxa of the species group, belonging to genera Osperleioceras and Phlyseogrammoceras: Osperleioceras bicarinatum (Zieten, 1831), Phlyseogrammoceras dispansum evolutum subsp. n. Metodiev & Sapunov, P. maubeugei sp. n. Metodiev & Sapunov, P. bleicheri Maubeuge, 1949. The examined specimens have been treasured as a part of the collection of the Museum of palaeontology and historical geology at the Uni-
versity of Sofia “St. Kliment Ohridski”.

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Stratigraphical distribution of studied taxa of the species group of Osperleioceras and Phlyseogrammoceras

Section at the village of Gorno Ozirovo, Montana District (fig. 1, A, B)

The section is situated at the foot of Kotlya Hill within 6 km to the north of the village of Gorno Ozirovo close to its dairy farm. A small part of the section was studied within 1 km west of the farm near the adjacent locality Bratkova Kouka. The numbers of the packets of the studied interval are given after Sapunov et al. (1994, p. 10).

Ozirovo Formation (upper part) (Aalenian - Upper Pliensbachian, upper part)

17. (10 m) (Aalenian)
Dark-grey, fine-grained, slightly sandy limestones with inter-beds of glauconite limestones with belemnites and conglomerate calcareous fragments up to 5 cm with yellow and whitish phosphoritic concretions; Hammatoceratinae, Ludwigia sp. indet.

16. (0.20 m) (“upper zoogenic bed” according to CanyHoB, 1968, p. 136) (Upper Toarcian, condensed Grammoceras thoursense Zone, Phlyseogrammoceras dispansum Zone and Dumortieria levesquei Zone).

15. (1.80m) (Upper Toarcian, Haugia variabilis Zone, Grammoceras thoursense Zone and Phlyseogrammoceras dispansum Zone) Red, highly ferruginous sandy limestones, containing ammonites and numerous belemnites, bivalves and brachiopods.

14. (2.70 m) (Upper Pliensbachian)
Grey, granular sandy limestones with belemnites and bivalves.

Section at the village of Dragovishtitsa, Sofia District (fig. 14, C)

The section is located within 3 km to the north of the village of Dragovishtitsa along the road to the village of Tsarichina, near the abandoned mining excavations at the place of Kyusim. Packets numbers of the interval described below are given according to Sapunov et al. (1976, p. 104).

Ozirovo Formation (an interval of its upper part) (Upper Toarcian - Lower Toarcian)

16. (2.50 m) (Upper Toarcian, Dumortieria levesquei Zone) Red, ooidic sandy goethite ore with inter-beds of highly ferruginous sandy limestones; Dumortieria spp. accompanied by few bivalves.

15. (1.00m) (Upper Toarcian, Haugia variabilis Zone, Grammoceras thoursense Zone and Phlyseogrammoceras dispansum Zone) Red, highly ferruginous sandy limestones, containing ammonites and numerous belemnites, bivalves and brachiopods. Three levels of ammonites are established in this packet:

- upper level (about 1.65 - 1.70 m above the base of the packet) - Phlyseogrammoceras bleicheri Maubeuge, 1949, P. maubeugei sp. n. Metodiev & Sapunov;
- middle level (about 1.20 m above the base of the packet) - Grammoceras spp., Pseudogrammoceras spp.;
- lower level (about 0.10-0.20 m above the base of the packet) - Phymatoceras spp.

14. (2.20 m) (Lower Toarcian, ? Hildoceras bifrons Zone - Dactylioceras tenuicostatum Zone) Grey, fine-grained and thin-bedded limestones with bivalves and brachiopods. In the upper part of the packet Dactylioceras (Orthodactylites) sp. indet was found.

Taxonomic descriptions

Family HILDOCERATIDAE Hyatt, 1867
Subfamily HARPCERATINAE Neumayr, 1875
Genus Osperleioceras Krimholz, 1957

Nomenclature. Type species, by original designation (Krimholz in Krymholz & Tazikhin, 1957, p. 130) is Pseudolioceras beaulizienze Monestier (1921, p. 30, pl. 1, fig. 1, pl. 4, fig. 28). The type specimen comes from the Toarcian (Grammoceras thoursense Zone) at Cornus (Aveyron), south-western France. Pseudopolyplectus Mattei, 1969 in Mattei, 1969, p. 15 - type species Ammonites bicarinatus Zieten (1831, p. 21, pl. 15, fig. 9a-c), by original designation, is a junior subjective synonym.

Diagnosis. Small, rarely medium-sized ooxcones with slightly rounded or flat whorl sides converging towards a flat and narrow venter with a strong central keel. Slight ventro-lateral keels may be formed. The ornament is usually represented by single, dense and fine falcoid ribs, strongly projected forwards near the venter. Some species have a sinuous ribbing.
Fig. 1. Sketch map of the outcrops of the Ozirovo Formation in Western Stara Planina Mts and the sections from which studied ammonite genera have been obtained (A). Lithology, ammonites and zonal subdivision of the Toarcian in the sections at the villages of Gorno Ozirovo (B) and Dragovishtitsa (C)

1 - grey granular sandy limestones and glauconite limestones with single belemnites and bivalves; 2 - grey granular organogenic limestones with chloritic ooids; 3 - dark-grey sandy limestones with chloritic ooids, single ammonites and belemnites; 4 - grey organogenic sandy limestones with single chloritic ooids; 5 - grey slightly sandy limestones with rare fossils; 6 - red ooidic, sandy goethite ore; 7 - ferruginous, sandy limestones with numerous ammonites, bivalves and brachiopods; 8 - grey, thin-bedded limestones with single fossils; 9 - outcrops of the Ozirovo Formation; 10 - studied sections
PLATE I

1, 2. Osperleioceras bicarinatum (Zieten, 1831) — from the section at the village of Gorno Ozirovo, Montana District (Vrachanska Planina Mt., Western Stara Planina Mts). Ozirovo Formation, No 16; Upper Toarcian, Dumortieria levesquei Zone (condensed). Museum of Palaeontology, University of Sofia. 1 — BAS J 958. 2 — BAS J 100.


5. Phlyseogrammoceras maubegei sp. n. — from the section at the village of Dragovishitta, Sofia District (Mala Planina Mt., Western Stara Planina Mts). Ozirovo Formation, No 15; Upper Toarcian, Phlyseogrammoceras dispansum Zone. Museum of Palaeontology, University of Sofia. Paratype — BAS J 286.

6. Phlyseogrammoceras bleicheri (Maubeuge) — from the section at the village of Dragovishitta, Sofia District (Mala Planina Mt., Western Stara Planina Mts). Ozirovo Formation, No 15; Upper Toarcian, Phlyseogrammoceras dispansum Zone. Museum of Palaeontology, University of Sofia, BAS J 263.

All figures are in natural size.

Discussion. The representatives of this genus show certain similarities with some species of Harpoceras, Polyplectus and Pseudolioceras. Compared to Harpoceras they are more involute, considerably smaller, differ in a flat narrow venter and in a tendency to form ventro-lateral keels. Osperleioceras are more evolute than Polyplectus and have a strong ventral keel which is not evolved by Polyplectus as in most of Harpoceratina. Some Osperleioceras are similar to certain Pseudolioceras but differ clearly in a more complicated and more incised suture-lines.


Osperleioceras bicarinatum (Zieten, 1831)

Pl. 1, figs 1, 2; Fig. 2/1a-c. 2a-c

1831. Ammonites bicarinatus, Zieten, p. 21, pl. 21, fig. 9a-c.
1874. Ammonites bicarinatus Zieten; Dumortier, p. 55, pl. 11, figs 3-7.
1884. Harpoceras bicarinatum (Zieten); Wright, p. 462, pl. 82, figs 9-11.
1885. Ammonites bicarinatus Zieten; Queenstedt, p. 419, pl. 53, figs 6-8.
1887. Ammonites (Harpoceras) bicarinatus (Zieten); Denckmann, p. 64, pl. 1, fig. 2; pl. 4, fig. 4.
1968. Polyplectus bicarinatus (Münster); Canush, p. 136.
1969. Pseudopolyplectus bicarinatus (Zieten); Mattei, p. 15, pl. 1, figs 1-6; table A, figs 2-7.
1982. Osperleioceras bicarinatum (Zieten); Guex, pp. 639-640, pl. 5, fig. 5.
1992. Osperleioceras bicarinatum (Zieten); Howarth, p. 156, pl. 29, figs 1-3.
1994. Polyplectus bicarinatus (Münster); Sapunov et al., pp. 10, 11.
1996. Osperleioceras bicarinatum (Zieten); Papà & Patrunius, pl. 14, fig. 1.
1998. Osperleioceras (Pseudopolyplectus) bicarinatum (Zieten); Almáras et al., p. 50, pl. 7, fig. 4a, b.

Nomenclature. The holotype is the original of Zieten's (1831, pl. 15, fig. 9a-c) figure and comes from an unrecorded locality in the Lower Jurassic at Gamelshausen (Württemberg), south-western Germany.

Description. Oxycones with high greatly enveloping and quickly increasing whorls. Whorl section triangular and narrow, as whorl heigh exceeds whorl breadth more than twice. Its widest part is in the umbilical area. The umbilicus is small and deep, encircled by vertical umbilical walls and sharp umbilical edge. Lateral walls flat and converging towards flat and narrow venter with short but well developed central keel. A tendency to forming sub-convex ventro-lateral keels is observed at the last whorl of specimen BAS J 958. This specimen has a mid-lateral series of undulating depressions and a small part of preserved body chamber. Suture line of studied examples highly incised and ornate.

The outer whorl of the specimen BAS J 958 is covered with single, dense and fine falcoid ribs developing out of the umbilical seam. Ribs quite fine, slightly protruding forwards and concave at the inner part of the sides. On the outer part of the lateral walls they gradually become wider and gently curve backwards to the middle of the sides. Ribs project strongly forwards near the venter.

Along with increasing of the whorls of specimen BAS J 100 it is observed a distinct change of the ornament. Rare, almost sinuous ribs with low relief are observed in the first third part of the outer whorl. On the second and especially on the last third part of this whorl relief of the ribs increases considerably. Ribs become broad and flat-topped, with narrow interfering intervals. They are strongly protruding forwards at the inner half of the sides while at the middle of the lateral walls they curve sharply backwards at their falcoid bend. That curving is more acute than the one of specimen BAS J 958. Increasing of relief is accompanied by an increasing of projection forwards at ventro-lateral area.

Measurements:

BAS J 958 - D=85.9; H=47.3 (0.55); E--; O=9.7 (0.11).
BAS J 100 - D=34.1; H=18.6 (0.55); E=7.7 (0.23); O=4.5 (0.13).

**Discussion.** The specimen BAS J 958 differs from all the examples of *Oesperleioceras bicorninatum* (Zieten, 1831), listed in the synonymy, in having a larger diameter and in having a series of undulating depressions at the falcoid bend of the ribs. By type of ornamentation it is completely comparable to Zieten’s holotype. The other specimen shows a deviation in ribbing on the last whorl which has not been observed in any specimen with the same diameter, figured by different authors until now. We suppose that in this case it can be speaking of an individual deviation in ornament at earlier stages of growth.

**Occurrence.** Toarcian (H. bifrons Zone, upper part - base of *D. levesquei* Zone). France (Causse, Aveyron, Bas-Languedoc), England (Somerset, Gloucestershire), Germany (Middle-Eastern Swabian Alb), Romania (Bihor Mts.). This species has been established only at the section near the village of Gorno Ozirovo in Bulgaria (Vrachanska Planina Mt., Western Stara Planina Mts., Montana District).

**Material.** Two specimens are collected: BAS J958, BAS J100, section at the village of Gorno Ozirovo (Montana District), Ozirovo Formation, 16. Upper Toarcian, condensed *Grammoceras th-ouarsense Zone, Phlyseogrammoceras dispansum Zone* and *Dumortieria levesquei Zone.*

Subfamily **GRAMMOCERATINAE** Buckman, 1905

**Genus** *Phlyseogrammoceras* Buckman, 1901

**Nomenclature.** Type species, designated by ICZN Opinion 324 (Arkell, 1951, p. 228), is *Ammonites dispansus* Lytce, 1860 (holotype). The type specimen comes from Cotteswold Sands at Forcester Hill, Yorkshire, England. It was figured by Buckman (1922, pl. 340).

**Diagnosis.** Platicones to planulates with flat or slightly rounded lateral walls, sloping or abrupt umbilical walls and rounded but clear umbilical edge. High rounded venter with a well developed keel. The ornament consists of falcoid ribs with different density and relief, grouped in fascicles from 2 to 4. Short primary ribs, umbilical, radial-oblong papular swellings or tubercules are formed at the base of the fascicles. There are often intercalatory ribs. Wholly septated specimens have a smooth or slightly ornamented body chamber.

**Occurrence.** Upper Toarcian, *Phlyseogrammoceras dispansum* Suzone of *Dumortieria levesquei Zone* in the North-west European Province - England, France, Belgium, Germany, northern Caucasus, Bulgaria.

<table>
<thead>
<tr>
<th>Comparable specimens</th>
<th>Dimensions</th>
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<tbody>
<tr>
<td><em>Phlyseogrammoceras dispansum evolutum</em> subsp. n. Metodiev &amp; Sapunov (BAS J 942) - holotype from the Gorno Ozirovo section, Bulgaria (pl.1, fig. 3 - this paper)</td>
<td>107.8</td>
</tr>
<tr>
<td><em>Phlyseogrammoceras dispansum evolutum</em> subsp. n. Metodiev &amp; Sapunov (BAS J 941) - paratype from the Gorno Ozirovo section, Bulgaria (pl.1, fig. 4 - this paper)</td>
<td>91.6</td>
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<tr>
<td><em>Phlyseogrammoceras dispansum disparsum</em> (Lytteott) - the holotype from Cotteswold Sands at Forcester Hill (according to Buckman, 1922, pl. 340)</td>
<td>139.0</td>
</tr>
<tr>
<td><em>Phlyseogrammoceras dispansum dispansum</em> (Lytteott) - one specimen from Schlewecce, Germany, figured by Ernst (1952, pl. 5 (5), fig. 1a-b)</td>
<td>104.0</td>
</tr>
<tr>
<td><em>Phlyseogrammoceras dispansum dispansum</em> (Lytteott) from Mont-St-Martin, France (in Gérard &amp; Bichelone, 1940, pl. 12, fig. 1, 1'), refugured by Maubeuge (1961, pl. 6, fig. 3, 3')</td>
<td>110.0</td>
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<td><em>Phlyseogrammoceras dispansum dispansum</em> (Lytteott) specimen from Le Clapier (Causse), France, figured by Guex (1975, pl. 5, fig. 2)</td>
<td>65.0</td>
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<td><em>Phlyseogrammoceras dispansum dispansum</em> (Lytteott) specimen from Holzmaden, Germany, figured by Urtichs (1977, pl. 6, fig. 3)</td>
<td>75.0</td>
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<tr>
<td><em>Phlyseogrammoceras dispansum dispansum</em> (Lytteott) - two specimens from the region of Lyon, France, figured by Ruilhau (1989, pl. 27, figs 3-5)</td>
<td>69.0</td>
</tr>
<tr>
<td><em>Phlyseogrammoceras dispansum dispansum</em> (Lytteott) specimen from Belmont (Rhône), France, figured by Eymi et al. (1997, pl. 11, fig. 5, 6)</td>
<td>83.0</td>
</tr>
</tbody>
</table>
Phlyseogrammoceras dispansum evolutum subsp. n. Methodiev & Sapunov
Pl. I, figs 3, 4; Fig. 2/a-e, 4/a-c
v1968. Phlyseogrammoceras dispansum (Lycett); Sapunov, p. 136.
v1994. Phlyseogrammoceras dispansum (Lycett); Sapunov et al., p. 10.

Nomenclature. Since the new subspecies has a considerably wider umbilicus than Phlyseogrammoceras dispansum dispansum (Lycett, 1960), it is called "evolutum". The holotype (BAS J 942), here designated, is the original specimen figured on pl. I, fig. 3. It comes from the "upper zoogenic bed" of the Ozirovo Formation in the section, 6 km north of the village of Gorno Ozirovo, Montana District. One paratype (BAS J 941) of the same locality is figured on pl. I, fig. 4.

Description. Large, well preserved planulates with wide shallow umbilicus, sloping to abrupt umbilical walls and rounded umbilical edge. Whorl section is narrow and high-rounded venter with strong keel.

Ornament is represented by comparatively coarse falcid ribs, arranged in fascicles of 2 or 3. There are intercalatory ribs between the fascicles of inner whorls, which decrease along whorl expansion, until they disappear completely at the last whorl. Intercalary ribs develop down the umbilicus and follow the shape of the fascicles. At the beginning of the fascicles, over the umbilical edge, small and sharp papular swellings are formed. Their ribs are slightly protruding forwards at the inner half of the whorl. Ribs curve gently backwards below the middle of the sides and project moderately up to ventro-lateral area. All of them discontinue close to the keel. Ribs curve much stronger at earlier stages of growth. Along with the increasing of the whorls they gradually straighten up. At the same time relief diminish and umbilical swellings disappear.

Measurements: (see table 1).

Discussion. The above described specimens show considerable differences as regards the ornament and expansion of whorls in comparison with the holotype of Phlyseogrammoceras dispansum dispansum, figured by Buckman (1922, pl. 340). Within a diameter of 74 mm specimen BAS J 942 has 52 ribs, BAS J 941 has respectively 54 ribs while the ribs of the holotype of P. dispansum dispansum are about 70 at the same diameter. The fascicles of Lycett's original develop out in the inner whorls of short primary ribs and arrange in groups of 4 thin secondaries. Ribbing of our specimens is represented by fascicles of 2 or 3 secondary ribs, beginning directly from umbilical swelling, without primaries. As a whole the ornament of Phlyseogrammoceras dispansum evolutum is coarser than P. dispansum dispansum. Comparing the style of ornamentation of the last whorl, it can be observed that the point of fascicles ramification of the typical P. dispansum dispansum is situated strongly outwards and ribs are projected pointedly forwards in ventro-lateral area. The new subspecies has higher and stronger ventral keel.

Holotype's whorl proportions of P. dispansum dispansum, estimated according to Buckman's measurements differ from P. dispansum evolutum as well. We can see that whorl height and umbilical breadth of this specimen are equal, while the first parameter in the Bulgarian examples exceeds the second one with 8 to 9%. Umbilical breadth of the holotype of P. dispansum dispansum is 16% smaller and whorl breadth is 5% smaller, i.e. P. dispansum evolutum is more evolve and has lower and wider whorl section. The same regularity is valid for all the examples, given in the Table 1.

Occurrence. Phlyseogrammoceras dispansum (Lycett, 1860) is well known species in Europe: Germany (Middle-Eastern Swabian Alb, Harzburg), France (Lorraine), Belgium and England. There it is represented by the nominate subspecies which is an index of the Upper Toarcian Phlyseogrammoceras dispansum Subzone of Dumortieria levesquei Zone in the North-west European Province. Phlyseogrammoceras dispansum dispansum evolutum subsp. n. has been found only in Bulgaria until now. It was collected in the section near the village of Gorno Ozirovo (Vrachanska Planina Mt., Western Stara Planina Mts., Montana District).

Material. Two specimens are collected: BAS J 942, BAS J 941, section at the village of Gorno Ozirovo (Montana District), Ozirovo Formation, 16, Upper Toarcian, condensed Grammoceras thouransense Zone, Phlyseogrammoceras dispansum Zone and Dumortieria levesquei Zone.

Phlyseogrammoceras maubeugei sp. n. Methodiev & Sapunov
Pl. I, fig. 6; Fig. 2/a-b
1925. Harpoceras (Pseudogrammoceras) Werthi Denckmann; Ernst, p. 115, pl. 6 (6), fig. 1a-c (non figs 3-5).
1949. Phlyseogrammoceras sp. nov. sp. ? du groupe de crassi fasciaticum (Ernst); Maubeuge, p. 5.

Nomenclature. The name of the new species is given to the French palaeontologist Pierre-Louis Maubeuge, who was the first to suppose that the specimen, figured by Ernst (1925, pl. 6 (6), fig. 1a-c) is a new species, probably belonging to the group of Phlyseogrammoceras crassifasciatus (Ernst, 1925) (Maubeuge, 1949, p. 5). The holotype, designated here, is Ernst's original specimen (1925, pl. 6 (6), fig. 1a-c). It comes from Phlyseogrammoceras dispansum Zone at Schlewecke, north-western Germany. One Bulgarian paratype (BAS J 286) comes from P. dispansum Zone in the section of the vil-
Fig. 2. Style of ornamentation, ventral views and whorl shapes of the studied specimens

1, 2 a-c - ribbing and ventral view of Osperleioceras bicarinatum (Zieten, 1831) (figured on pl. I, figs 1, 2) x 0.75; 3 a-e - ornamentation, ventral views and whorl shape of the holotype of Phlyseogrammoceras dispansum evolutum subsp. n. (3 a-d) (figured on pl. I, fig. 3), compared with Lycett’s original specimen (3 e), figured by Buckman (1923, pl. 340) x 0.40; 4a-c - ornamentation, ventral views and whorl section of the paratype of Phlyseogrammoceras dispansum evolutum subsp. n. (figured on pl. I, fig. 4) x 0.73; 5a-b - ribbing and whorl section of Phlyseogrammoceras maubegei sp. n. (figured on pl. I, fig. 6); 6a-b - ornament and whorl section of Phlyseogrammoceras bleicheri (Maubeuge) (figured on pl. I, fig. 5) x 0.73
lage of Dragovishtitsa (Mala Planina Mt., Sofia District) - Ozirovo Formation, 15 (pl. I, fig. 6).

Description. We have a stamp of medium-sized, moderately evolute and compressed ammonite with comparatively wide and deep umbilicus, abrupt umbilical walls and rounded umbilical edge. Whorl section short and high. Its widest part is the umbilical area. Slightly rounded lateral walls converging gently towards narrow and high-rounded venter with thin and sharp keel.

Judging by the moulding that we have prepared, the sides of the whorls are covered with broad fol-coid ribs with low relief, forming the fascicles. At the inner whorls these fascicles have 3 or 4 ribs and thicken at their base. These thick parts at the base of the fascicles transform into small slightly bulging umbilical swellings on the last whorl, ending in 2 ribs. These ribs are directed forwards and curve backwards in inner part of the sides. They are slightly rursiradiate in the lateral area and slightly projecting forwards near the venter. Relief of ornament fades away with the increasing of whorls.

Measurements:
Phlyseogrammoceras maubeugei sp. n. (holotype) (according to Ernst (1925, pl. 6 (6), fig. 1a-c) - D=62.7; H=23.4 (0.30); E=49.0 (0.44); O=28.3 (0.25).
BAS J286 (paratype) - D=62.7; H=23.4 (0.37); E=--; O=20.9 (0.33).
Phlyseogrammoceras crassifasciatum (lectotype) (according to Ernst, 1925, pl. 1 (7), fig. 5a-b) - D=98.5; H=37.0 (0.38); E=37.0 (0.38); O=24.5 (0.23).

Discussion. The specimen from Schlewecke, described by Ernst (1925, pl. 6 (6), fig. 1a-c) as Phlyseogrammoceras werthi (Denckmann) has narrower umbilicus, higher and narrower whorl section and coarser ornament with thin sparse ribs and lower relief than Denckmann's original (1887, pl. 2, fig. 1), which is refigured by this author in the same plate (Ernst, 1925, pl. 6 (6), fig. 2a-b). Furthermore Denckmann's specimen differs in the presence of smaller and sharper umbilical tubercules at the base of the fascicles, covering the sides. It is characteristic of the specimen form Schlewecke an abatement of ornament with the increasing of whors until ribs become scarcely perceptible striations at the last two-thirds (i. e. at the body chamber). This specimen has a striate or nearly smooth body chamber while Denckmann's original remains clearly ribbed. These considerable differences give us a good reason to support Maubeuge's opinion that Ernst's specimen does probably belong to a new species.

On the other hand, the lectotype of Phlyseogrammoceras crassifasciatum (Ernst, 1925, pl. 1 (7), fig. 5a-b), erroneously designated by Maubeuge (1949, p. 5) as holotype, has a wider umbilicus and lower whorl section compared with the holotype of Phlyseogrammoceras maubeugei. Furthermore the ornament of Phlyseogrammoceras crassifasciatum is coarser - within a diameter of 90 mm ribs are shorter and thicker. They have developed from radial fascicle-shaped fillets, extending to the middle of the sides. Therefore relating of these specimens to one and the same species is unconvincing.

Bulgarian paratype is similar to Ernst's original by a common tendency to reduce relief along with increasing of whors. Its ribs straighten out slightly and its umbilical tubercules disappear within a diameter of 65 mm. It differs in the less robust whors which are narrower and higher than those of the holotype.

The representatives of this species are more involute, with higher and narrower whorl section, than Phlyseogrammoceras dispansum (Lycett). They differ clearly from it by ornament of the inner whors as well as of the last whorl. At earlier stages the fillets at the base of the fascicles are not typical to real P. dispansum which have a finer and more curved ribs, strongly projected forwards in ventro-lateral area. As a whole the ornament of Phlyseogrammoceras maubeugei is sparse and smooth.

Occurrence. Phlyseogrammoceras maubeugei is found in north-western Germany (Schlewecke). It comes from Phlyseogrammoceras dispansum Subzone of the Upper Toarcian Dumortieria levesquei Zone in the North-west European Province. It has been found in Bulgaria only in the section at the village of Dragovishtitsa, place of Kyusim (Mala Planina Mt., Western Stara Planina Mts., Sofia District).

Material. One specimen is collected: BAS J 286, section at the village of Dragovishtitsa (Sofia District), Ozirovo Formation, 15, upper level, Upper Toarcian, Phlyseogrammoceras dispansum Zone.

Phlyseogrammoceras bleicheri Maubeuge, 1949
Pl. 1, fig. 5; Fig. 2/6a, b 1949. Phlyseogrammoceras bleicheri Maubeuge, p. 13, pl. 1, fig. 5.

Nomenclature. The holotype is Maubeuge's original specimen (Maubeuge, 1949, p. 13, pl. 1, fig. 5). It comes from the P. dispansum Zone in oolitic iron-ores at "Mont-Saint-Martin" pit, Lorraine, eastern France. It has been treasured at the collection of the Royal Institute of Natural Sciences in Belgium under number 9439.

Description. Small, moderately involute planulates with narrow elliptical whorl section. Small deep umbilicus surrounded by sloping umbilical walls and rounded umbilical edge. Lateral walls slightly rounded, with no ventro-lateral edges. Narrow high-rounded venter having thin but well developed keel.
Smooth inner whorls within a diameter of 5 mm. Whorl sides covered with very fine fascicles developed from radial-oblong papular swellings with very low relief. Ornament of the last whorl represented by dense fine falcoid ribs also grouped in fascicles. They develop from short, slightly prosiradiate primary ribs with low relief and extend from umbilical seam to umbilical edge. Four thin secondary ribs branch out of the umbilical edge, curving backwards to the middle of the sides. Ribs project slightly forwards in ventro-lateral area and end at ventral keel.

**Measurements:**

Holotype at $D=78$; $H=34$ (0.43); $E=16$ (0.21); $O=-$. (according to Maubeuge, 1949, p. 14).

**Discussion.** The above described Bulgarian specimen is very similar to Maubeuge's original in every respect - whorl section, whorl shape and ornament. It is considerably smaller but whorl ratio $H/D$ coincides entirely with that of the holotype and dimensions $E/D$ of the compared specimens almost the same. Unfortunately Maubeuge has not given any data about umbilical width and we cannot make any parallel. The missing bifurcating ribs of Bulgarian specimen could be explained with its parallel.

The representatives of this species are probably the most involute ammonites of *Phlyseogrammoceras*. In comparison with the above described species they have the densest and finest ribbing as well as a very slight projecting of ribs in ventro-lateral area.

**Occurrence.** Upper Toarcian (*Phlyseogrammoceras dispensum* Subzone of *Dumortieria levesquei* Zone in the North-West European Province), eastern France, Lorraine. It has been found in Bulgaria only in the section near the village of Dragovishitsa, place of Kyusim (Mala Planina Mt., Western Stara Planina Ms., Sofia District).

**Material.** One specimen is collected: BAS J 263, section at the village of Dragovishitsa (Sofia District), Ozirovo Formation, 15, upper level, Upper Toarcian, *Phlyseogrammoceras dispensum* Zone.

**Conclusions**

The main results of the taxonomic and biostratigraphic study on the described specimens may be formulated as follows:

1. Four taxa of the species group, belonging to the genera *Osperliecoceras* and *Phlyseogrammoceras* have been determined and described in Bulgaria for the first time.

2. Two of the representatives of the species group of *Phlyseogrammoceras* are new.

3. The *Phlyseogrammoceras dispensum* Zone has been characterized by species of *Phlyseogrammoceras* for the first time in this country.

**References**


Arkell, W. J. 1951. Proposed addition to the "Official list of generic names in zoology" of the names of twenty-one genera of Jurassic ammonites (Class Cephalopoda, Order Ammonoidea) and matters incidental thereto. — *Bull. Zool. Nom.*, 2, 6; 8—224—233.


Buckman, S. S. 1909—1930. *Yorkshire Type ammonites*. 1-7. London & Thame: 8-14, pls 9-13 (1910); 3-6, pls 23-37 (1911); 7, 8, pls 84-90 (1913); 9, 10, pls 91-97; pls 84-90 (1914); pls 112-116 (1918); 41-54, pls 134-257 (1922); 37-44, pls 364-391 (1923); 21-24, pls 412-652 (1926); 5-8, pls 518-647 (1927); pls 773-783 (1928).


Ernst, W. 1923-25. Zur stratigraphie und Fauna des Lias ♂ im Nordwestlichen Deutschland. — *Palaeontographica, A*, 65: 1—95, pls 1-6 (1923); 66: 1—126, pls 1(9)-8(14) (1925).


Leycett, J. 1860. On the sands intermediate the Inferior Oolite and Lias of the Cottswold Hills, compared with a similar deposit upon the Coast of Yorkshire. — *Proc. Cottes. Nat. Fid. Cl.*, 2; 142-149.

Mattei, J. 1969. Définition et interprétation de *Pseudopolyplectus*, nov. gen. (Harpoceratinae, Ammonoidea) du Toarcien d'après un matériel des Causses et du Bas-Languedoc. Application de la notion d'ensemble à l'étude de populations fossiles. — *Géobios*, 2; 7—80, pls 1-3; 25 figs, 5 tab.

17, pls. 1, 2.
Quenstedt, F. A. 1882-1885. Die Ammoniten des Schwäbischen Jura. I. Der Schwarze Jura (Lias). Tübingen; 1-48, pls. 1-6 (1882); 49-96, pls. 7-12 (1883); 97-240, pls. 13-30 (1884); 241-440, pls. 31-54 (1885).
Wright, T. 1878-1886. A monograph of the Lias Ammonites of the British Islands. - Monograph of the Palaeontographical Society, 32-39; 1-48, pls. 1-8 (1878); 49-164, pls. 9-18 (1879); 165-264, pls. 19-40 (1880); 265-328, pls. 22A, 22B, 41-48 (1881); 329-400, pls. 49-69 (1882); 401-440, pls. 70-77 (1883); 441-480, pls. 78-87 (1884); 481-503, pls. 88 (1886).
ckaHbU, r. H., Ta.JHXHH, H. H. 1957. HOBble M3TepHanbl K CTP3THrpa$HH topcKHX OTJJOJI(eHHH BHJIOMCKOM CHHe · J(JIHJbl. - /JoKA. AKa/} . HOYK CCCP, 116, 1; 129-130.
CanKJOB, H., lJyMa'leKICO, n., B., monos, B. Jl.. 1976. CTPa· THrpa$MJI H naneOeiCOJJOrHll K3 ll0JIK3Ta 10pa 8 'faCT OT 3ana.nHa li'bJirapHll . - rod . CY.· reo/1 . -Zeozp . rpaiC., 1-zeoA., 67; 101-130.