

Lower Oxfordian in the Iberian Chain (Spain). Part II. Ammonite Fauna

by

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Summary. Some more important taxa recorded in the Callovian–Oxfordian boundary beds in the Iberian Chain are described and/or figured. The ammonites, especially peltoceratids, *Neocampylites*, *Perisphinctes* (?) *bernensis* Arkell (non de Loriol) and *Prososphinctes* spp. begin to give fairly good evidence for the presence of the Lower Oxfordian. Recent records of kosmoceratids (here and in [2] and ? *Goliathiceras* sp. [2] show that the studied area was also affected by the Boreal Spread and, along with the above-mentioned, that marine connections between the Iberian Chain and other parts of northern margin of the Tethys were fairly good in both the Callovian and Early Oxfordian.

Intense field studies on the Middle–Upper Jurassic boundary in the Iberian Chain made it possible to gather a fairly large collection of ammonites indicative of the Lower Oxfordian, hitherto known from that area from some references only (see Part I of this paper [18]). The available material comprises ammonites of the genus *Neocampylites*, peltoceratids of the genera *Parawedekindia*, *Peltoceratoides* and possibly *Peltomorphites*, euaspidoceratids, *Perisphinctes* (?) *bernensis* de Loriol *sensu* Arkell, some species of the genus *Prososphinctes* including *P. claromontanus* (Buk.), *Passendorferia* (*Enayites*) *czenstochovens* (Siem.) and phylloceratids. Caution is needed in interpretation of this fauna as it comes from infillings of corrosional pockets (Ricla and Aguilon localities), ferruginous-oid-bearing limestones with mixed fauna (Ventas de San Pedro, Moscardon and Anquela del Pedregal localities) and limestones nodular in character (Pozuel del Campo), so both misinterpretations of the age of individual fossils and failures in collecting are to be expected. Nevertheless, the available material begins to give quite good evidence for the presence of the Lower Oxfordian in this region and it makes it possible to draw some paleobiogeographic conclusions. The paper presents descriptions and/or figures of some more important taxa recorded in the Middle–Upper

Oxfordian boundary beds and preliminary paleobiogeographic conclusions. The material is housed at the Department of Paleontology, Faculty of Sciences, Zaragoza University (Spain).

Systematic descriptions. The following abbreviations are used: D—shell diameter, DPh—phragmocone diameter, U—umbilical diameter, H—whorl height, T—whorl thickness, $r:D$ —number of ribs at a given diameter.

Genus *Neocampylites* Callomon, 1973

Neocampylites delmontanus (Oppel 1863)

1863. *Ammonites delmontanus* Oppel, p. 194, pl. 54, Fig. 3a, b

1979. *Neocampylites* (*Neocampylites*) *delmontanus* (Oppel);

Sapunov p. 69, pl. XV, fig. 3 (*cum synonymy*).

Remarks. The available material is rather fragmentary (immature individuals, fragments of whorls and imprints, the largest of which is shown in Part I, Pl. 2, Fig. 2) but it displays sculpture typical of this species.

Occurrence. The species *N. delmontanus* (Oppel) is common in the Lower Oxfordian of Europe, southern USSR, Turkey and Syria [22]. In the studied area, fragments referable to it appear common in all the sections.

Genus *Prososphinctes* Schindewolf, 1925

Prososphinctes claromontanus (Bukowski, 1887)

(Plate I, Figs 1, 5, Plate II, Fig. 5)

1887. *Perisphinctes claromontanus* Bukowski, p. 145, pl. XXVIII, Figs 2–6.

1963. *Perisphinctes* (*Prososphinctes*) *claromontanus* Bukowski; Malinowska, p. 158, pl. XXXIV, Figs. 163–164; pl. XXXV, Figs. 163–184; pl. XXXV, Figs 171–172 (*cum synonymy*).

1980. *Prososphinctes claromontanus* (Bukowski); Marchand et Brochwicz-Lewiński, Text-fig. 1a, b.

Description. Specimens small-sized, with subrectangular flat-sided inner and outer whorls. Coiling moderately evolute, ventral and umbilical margin rounded. Ribs somewhat prorsiradiate, especially on inner whorls, fine and densely spaced on inner whorls, becoming coarser and more loosely spaced on the outer, often united at umbilical margin. Parabolic nodes and smooth ventral band very well developed on the outer whorl.

The largest specimen (Pl. I, Fig. 1) displays body chamber half a whorl long but the last suture lines are not approximated so it seems not fully grown.

Remarks. The specimens well match the diagnosis of this species as given by Malinowska [14].

Occurrence. In Poland, this species is known from the Bukowskii Zone or lower parts of the Cordatum Zone [14, 5, 16] and recently interpreted as an index fossil for perisphinctid zone equivalent to the former units [5]. In the studied area, it has been recorded at Aguilón (bed. No. 143—see Text, Fig. 2 in Part I of this paper), Pozuel del Campo (bed Po/00), Moscardon Ariño and Anquela del Pedregal (ferruginous-oid-bearing limestones).

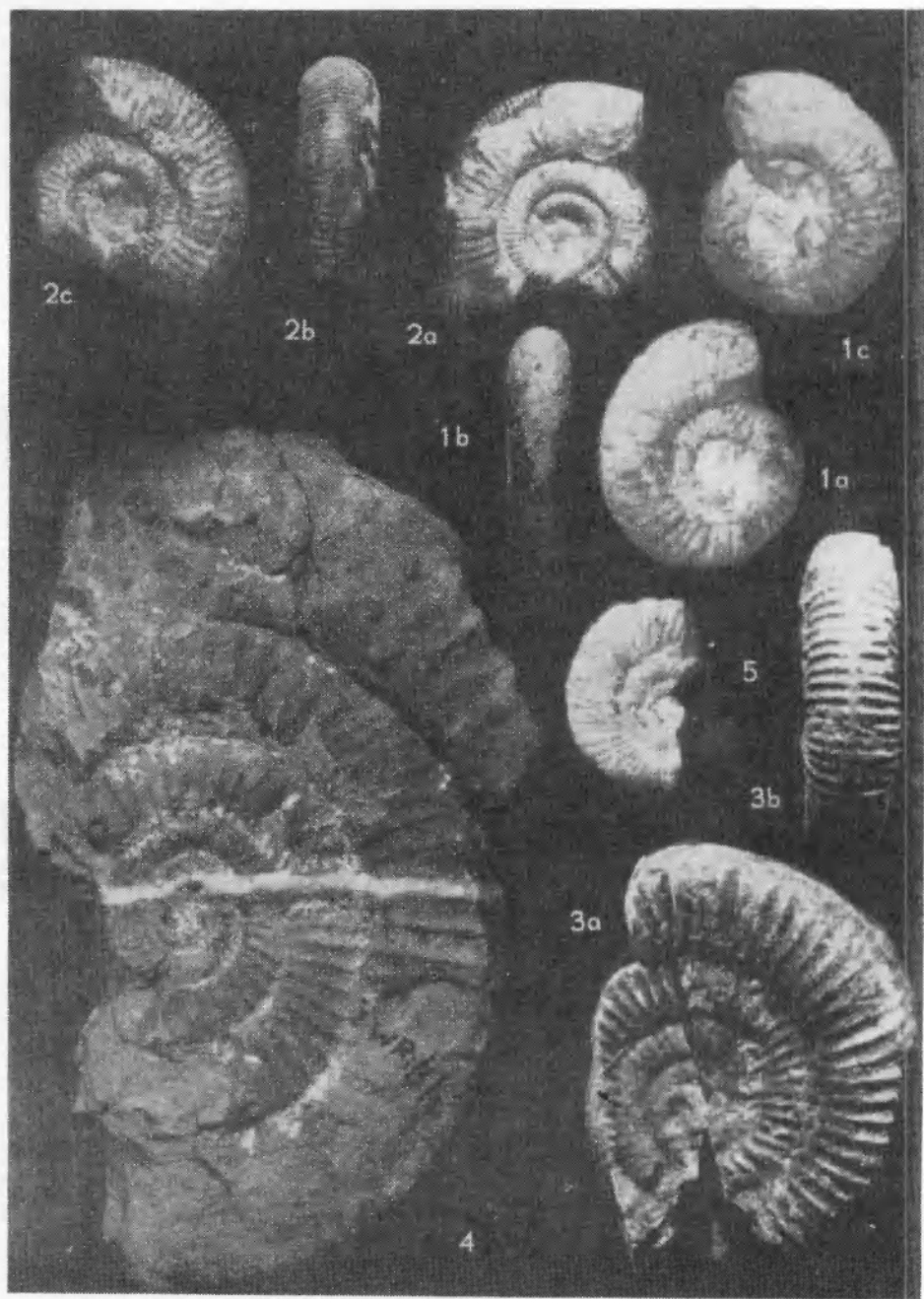


PLATE I

1—*Prososphinctes claromontanus* (Buk.), WPo/1/00/15, Pozuel del Campo, 2—*Passendorferia* (*Enayites*) *czenstochovensis* (Siem.), a—WPo2/30–50(r), Pozuel del Campo, b, c—W AR-1/109A2/40, Ariño, 3—*Perisphinctes* (?) *bernensis* Arkell (non de Loriol), W Po/1/00/7, Pozuel del Campo, 4—*Kranaosphinctes* cf. *methodii* (Neumann), W Ri/1/1, Ricla, 5—*Prososphinctes* cf. *claromontanus* (Buk.), W. AG-1/143/14, Aguilón; nat. size, otherwise stated. For stratigraphic position of the figured specimens see correlation of the sections in Part I of this paper. Number of bed in which a given specimen was found is given in its number, e.g. W AR-1/109A2/20—Ariño section, bed No. 109A2, specimen No. 20.

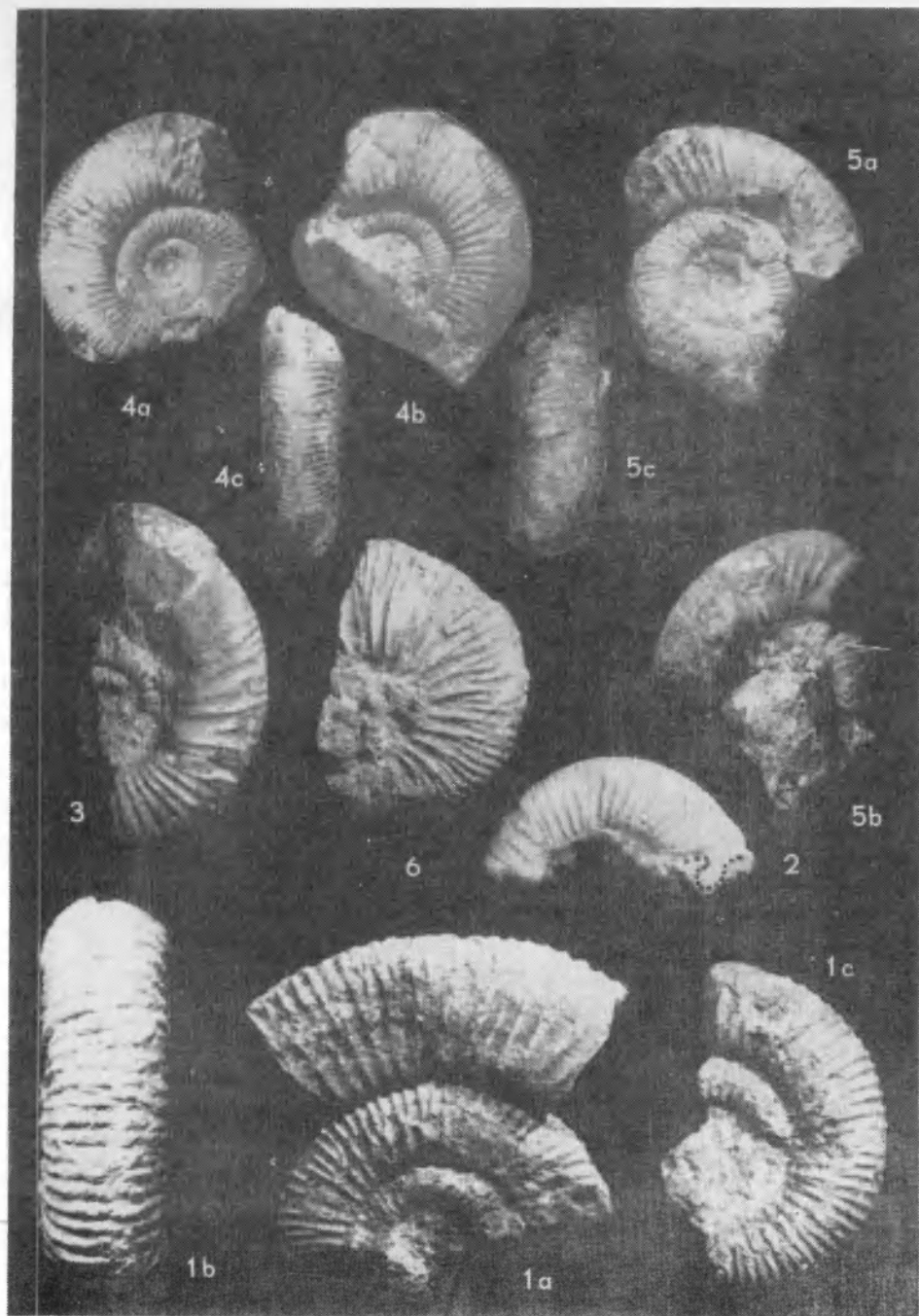


PLATE II

1—*Peltoceratoides* sp., W AR-1/109A1/19, Arino, 2—*Perisphinctes* (*Otosphinctes*) cf. *paturattensis* de Loriol, W AR-1/109A2/14, 3—*P. (O.)* sp. ex gr. *montfalconensis* de Loriol, W AG-1/143/18, Aguilon, 4—*Prososphinctes* cf. *mairei* de Loriol, W AR-1/109A2/25, Arino, 5—*P. claromontanus* (Buk.), W AG-1/143/8, Aguilon, 6—*Keplerites* (*Torricellites*) cf. *lahuseni* Parona et Bonarelli or *distans* Tintant, W/TJ/00/23, Anquela de Pedragal



PLATE III

Kranaosphinctes cf. *cyrilli* (Neumann), W Ri/13/1, Riecl, c. 190 mm in size, Antecedens
Subzone, Plicatilis Zone

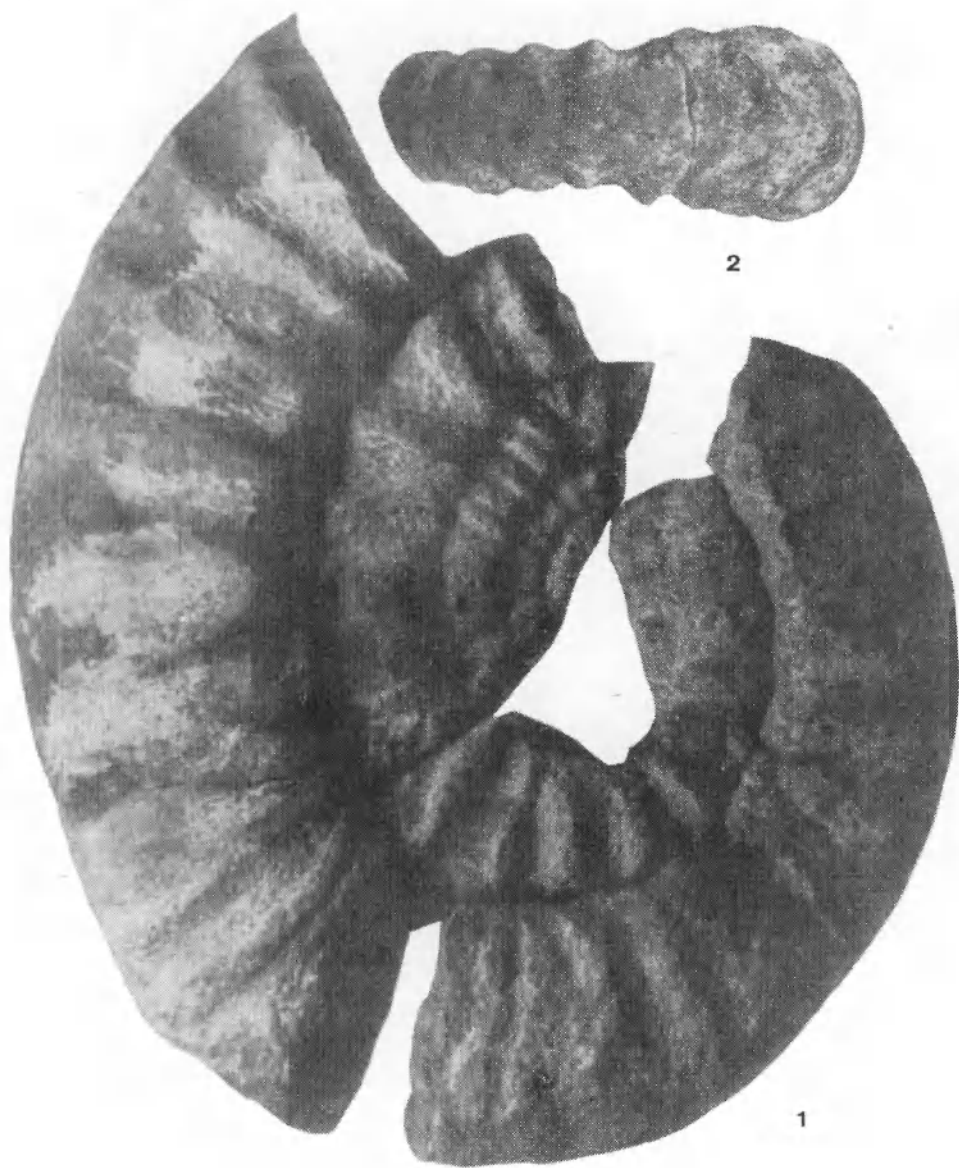


PLATE IV

? *Pseudopeltoceras* sp., W TJ/1/1, D—c. 225 mm, Anquela del Pedregal, coming from basal bed of spongy limestones, ? lower part of the Plicatillis Zone: 1—side view, 2—ventral side at D—c. 80 mm

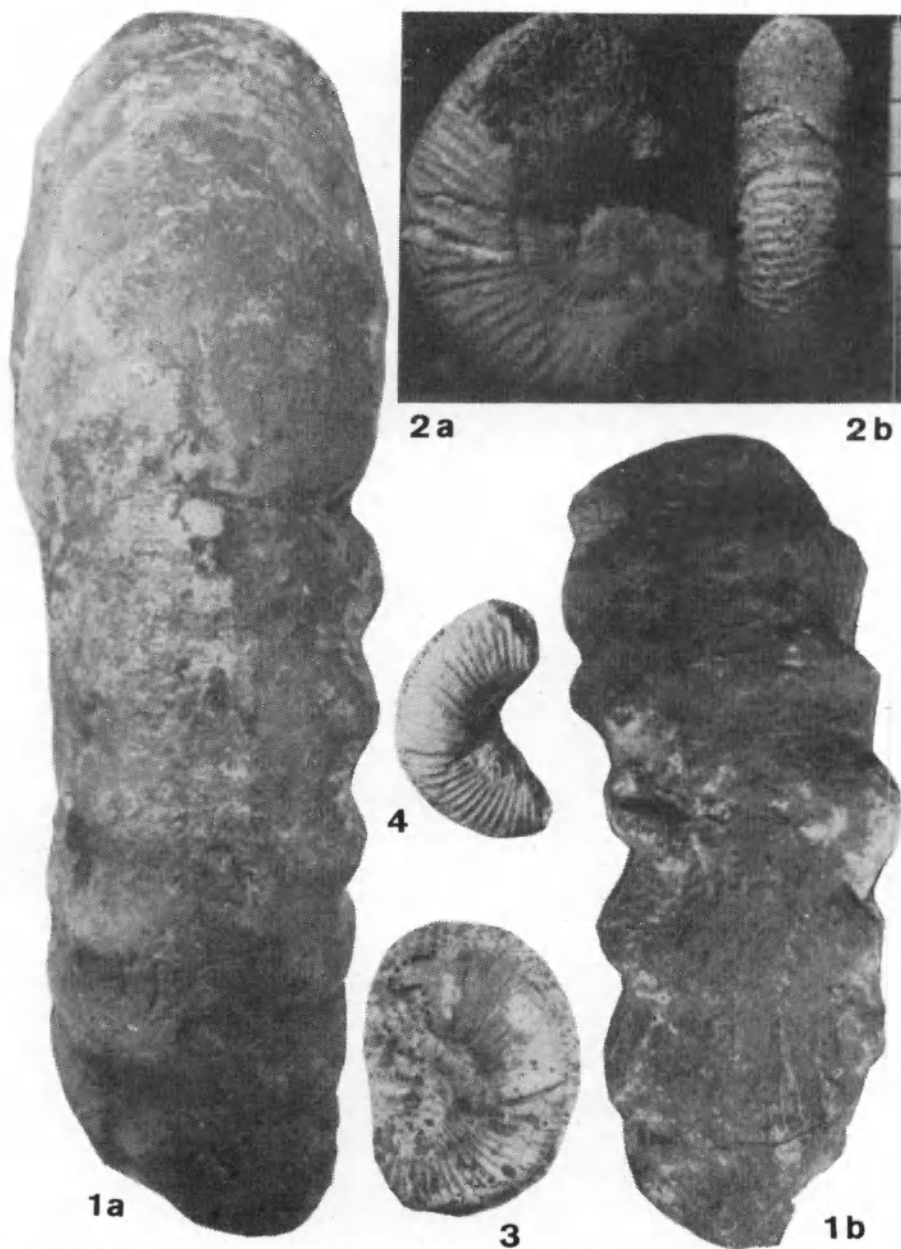


PLATE V

1a—ventral side of ? *Pseudopeltoceras* sp. shown in Pl. IV, at D—c. 185 mm, 1b—as above, at D—c. 120 mm, 2—*Perisphinctes* (*Otosphinctes*) *montfalconensis* de Loriol, W AR-1/109/A1/17, 3—*P. (O.) paturattensis* de Loriol, WAR-1/109A2/20, Ariño, 4—*P. (O.)* sp. ex gr. *paturattensis* de Loriol, W3M/02/13, Moscardon



PLATE VI

Kranaosphinctes kranaus Buckman, W AR-1/109A2/1, Ariño, D—c. 172 mm

Prososphinctes cf. *mairei* (de Loriol, 1900)

(Plate I, Fig. 4)

Description. A single specimen AR-2/109A2/25, characterized by quick growing, evolutely coiled whorls. Whorl section suboval, compressed, becoming subrectangular in the body chamber; venter rounded. Ribbing irregular, with both single and intercalary ribs common; subdivision of ribs irregular, sometimes of "polygyrate" or dischizotomous type; secondaries long, angle of furcation low. Parabolic ribs in the form of swellings numerous, better developed at whorl side than the venter. Ventral smooth band clearly marked. Constructions innumeros, shallow. Another specific feature which is worth noting here is a backward turn of secondaries on the outer whorl.

Remarks. The above-mentioned features of the specimen make possible its assignation to the species *Perisphinctes mairei* (de Loriol) as interpreted by de Loriol ([13], p. 65) and Arkell ([1] p. 275 and also p. 1). The exceptions are here specific irregularities in ribbing. The nature of these irregularities represents an open question until more material is gathered so the specimen is assigned to this species with reservation.

Prososphinctes mairei (de Loriol) closely resembles *P. matheyi* (de Loriol) in slow growing, evolutely coiled inner whorls and quicker growing outer ones, suboval, compressed whorl section changing to compressed, subrectangular in the body chamber, and not very strongly prorsiradiate ribs, differing in larger size than the latter and coarser and more often simple ribs. Arkell [1] (p. 275) regarded the two species as separate ones whereas other authors [10, 7, 5] were rather inclined to treat them as extremes of variability within a certain group. This question is still open as both *P. mairei* (de Loriol) and *P. matheyi* (de Loriol) are known on the basis of innumeros material. The Spanish specimen, as it was stated above, appears closer to the type of the former than the latter. The specimen figured as a representative of the *Perisphinctes* (?) *mairei-matheyi* group by Brochwicz-Lewiński and Róžak [7] (pl. XXXI, Fig. 3a, b) seems to be a small-sized fully grown individual of *Prososphinctes mairei* (de Loriol) and that assigned to this group by Brochwicz-Lewiński [5], (pl. I, Fig. 4a, b) would be better accomodated in *P. matheyi* (de Loriol). Of the individuals assigned to *P. mairei* (de Loriol) by Arkell [1] (pl. LXII, Figs. 6–8) three represent well-preserved adults whereas the fourth (i.e., Fig. 5)—a small-sized nucleus characterized by highly evolute coiling, subcircular but rather depressed whorls and strong rectiradiate ribs so it may be treated as a possible representative of this genus but not of that very species.

Occurrence. The species *Perisphinctes mairei* de Loriol has been reported from the "marnes à *Creniceras renggeri*" [13] and subsequently the Lower Oxfordian of Yorkshire and the Mariae Zone of Franche-Comté [1] and upper parts of the "Marnes à *Creniceras renggeri*", dated at lower and middle parts of the Cordatum Zone in the Jura Mts [10] (p. 244–246) and roughly coeval strata in the Polish Jura Chain [16, 5]. The Spanish specimen was

found at Ariño (bed. No. 109A2) along with other ammonites indicative of the Lower Oxfordian.

Prososphinctes sp.

The available material comprises several fragments and incomplete specimens displaying features typical of this genus. The largest of them (No. Po/1/00/2, coming from Pozuel del Campo), displays moderately evolute coiling, and fine, relatively loosely spaced prorsiradiate ribs which make it similar to those of the species *Prososphinctes consociatus* (Bukowski), figured and described by Bukowski [9], (p. 155, pl. XXIX, Fig. 4, pl. XXX, Figs 18, 12) and Malinowska [14] (p. 158, pl. XXXV, Figs 168, 169).

Genus *Kranaosphinctes* Buckman, 1921

Kranaosphinctes kranaus Buckman, 1921

(Plate III)

1921. *Kranaosphinctes kranaus* Buckman; Buckman, p. CCXLIIIA, B.

1939. *Perisphinctes* (*Kranaosphinctes*) *kranaus* Buckman; Arkell, p. 174, pl. XXXVIII, Figs 1-3, Text-Figs 57,61.

Description. A single, wholly septate specimen (No. WAR 1/109-A2/1), about 172 mm in size (at D = 172 mm: H/D—0.25, T/D—0.24, U/D—0.60, T/H—0.96; at D = 142 mm: H/D—0.25, T/D—0.28, U/D—0.59, T/H—1.10). Coiling markedly evolute; whorls subrectangular depressed to almost subquadrate, with broadly rounded margins and ventral side. Ribs fairly strong, loosely spaced, secondaries visible up to the diameter of 160 mm. Constrictions well marked.

Remarks. The Spanish specimen closely resembles the holotype and other individuals assigned to this species by Arkell [1] (p. 174), especially in a trend to flat rib curve and the number of ribs almost identical as in the case of the holotype (43 and 41 in the flat section of the rib curve, respectively). The number of ribs is here as follows: at 47 mm: 35, 57:37, 67:38, 80:41, 92:41, 110:42, 127:43, 142:43, and 172:43.

Occurrence. This species is known from the Antecedens Subzone, Plicatilis Zone. The Spanish specimen was found in bed No. 109/A2 at Ariño.

Kranaosphinctes cf. *cyrilli* (Neumann, 1907)

(Plate IV)

Remarks. A single specimen (No. WRi/13/1), somewhat deformed, about 190 mm in size, with a part of body chamber preserved (DPH about 120 mm, H/D—0.23, T/D—0.25, U/D—0.32, T/H—1.09). Coiling highly evolute, whorls subelliptical, slightly thicker than high. Ribs radial to subradial, fairly fine on inner whorls, slowly changing to coarse and triplicate on the outer. Such features make the specimen very close to the holotype of *Perisphinctes cyrilli* Neumann [19] (pl. IV, Fig. 12). The comparisons with cast of the holotype, kindly given to us by F. Atrops, showed that the mode and density of ribbing are almost the same (about 53 ribs at 120 mm diameter in the

holotype and about 50 in the Spanish specimen) and differences are primarily connected with underdevelopment of constrictions in our specimen. However, the preservation of the latter makes its assignation to that species without reservation hazardous.

It should be noted that the specimen appears also somewhat close to *Kranaosphinctes collignoni* Brochwic-Lewiński [4] (p. 168, pls. I–II, 6, pl. 4, Fig. 2, pl. 5) in the mode of coiling and ribbing, differing in more depressed and more densicostate outer whorl.

Occurrence. The species *K. cyrilli* (Neumann) and *K. collignoni* Brochwic-Lewiński are known from the Antecedens Subzone, Plicatilis Zone in Czechoslovakia and Poland. The Spanish specimen was found in the Riela section, bed No. 13, also dated at that subzone.

Genus *Passendorferia* Brochwic-Lewiński 1973

Subgenus *Enayites* Brochwic-Lewiński et Różak 1976

Passendorferia (*Enayites*) *czenstochovens* (Siemiradzki 1899)

(Pl. I, Fig. 2)

1976. *Nebroditis* (*Enayites*) *czenstochovens* (Siemiradzki); Brochwic-Lewiński et Różak, p. 383, pl. XXXI, Figs. 3–4 (*cum synonymy*)

Remarks. Several more or less complete specimens, including one attaining 40 mm in size and displaying a part of presumably final body chamber, well falling within the limits of variability of this species [7]. The differences in relation to *P. (E.) birmensdorfensis* (Moesch) (see [10, 7]) include somewhat less evolute coiling, more loosely spaced ribs and, sometimes, better developed parabolic nodes.

Occurrence. In the Częstochowa area (Poland), wherefrom this species has been described for the first time, there is growing evidence that its stratigraphic range is limited to the Lower Oxfordian and possibly lower parts of the Plicatilis Zone, Middle Oxfordian [7, 5]. In the Iberian Chain, it was found in the Ventas de San Pedro locality (bed. No. 109A2) and Pozuel del Campo (bed No. 00).

Genus *Perisphinctes* Waagen 1869

Perisphinctes (?) *bernensis* Arkell, 1944 (non de Loriol, 1898)

(Pl. I, Figs. 3)

1898 *Perisphinctes bernensis* de Loriol; de Loriol, p. 76 (*pro parte*), pl. V, Fig. 24 only.

1944 *Perisphinctes* (*Properisphinctes*) *bernensis* de Loriol; Arkell, p. 272, pl. LXI, Figs 5–6.

1980 *Perisphinctes bernensis* Arkell (non de Loriol); Brochwic-Lewiński, p. 239, pl. 2, Fig. 1.

Material. Two specimens with parts of body chamber and about ten fragmentary.

Remarks. Specimens small-sized, coiling very evolute, whorl section changing from depressed to subcircular on middle and outer whorls. Ribs

relatively closely spaced, subradial to prorsiradiate, with point of furcation obscured by the next whorl. Parabolic nodes weakly marked. Such features make possible assignation of the specimens to *Perisphinctes bernensis* de Loriol as interpreted by Arkell [1] and Brochwicz-Lewiński [5], as the Spanish specimens differ from those figured by these authors in somewhat more closely spaced ribs and, possibly, less clearly marked constrictions.

The generic status of this species remains open [5]. It may only be noted here that less satisfactorily preserved Spanish material comprises some forms which seem to be intermediate in morphology between the above-described ones and those which may be treated as inner whorls of *Kranaosphinctes* (see also the discussion in [14], p. 154).

Occurrence. *P. (?) bernensis* Arkell non de Loriol is known from the lower part of the Cordatum Zone [1, 5]. The Spanish specimens were found in the Ariño (bed No. 109A1/A2), Anquela del Pedregal (bed. No. TJ/00), Pozuel del Campo (bed Po1/00) and Moscardon (bed. No. 3M/00-07) localities.

Paleobiogeographic comments. Lower Oxfordian taxa hitherto identified in the Iberian Chain appear essentially the same as those known from northern margin of the Tethys. Special attention should be paid to the record of representatives of the genus *Prososphinctes*, hitherto known from Bulgaria [22] through southern Poland [9, 14, 5] to England [1] and France [10], and *Passendorferia* (*Enayites*) *czenstochovensensis* (Siem.), known from southern Poland to France [7]. The available material appears typical of the northern margin of the Tethys and no forms which would suggest any trend to endemism have been found so far. This seems to indicate fairly good marine connections but it should be noted that the studied area used to be placed beyond the extent of the Boreal Spread on account of the lack of cardioceratids. These ammonites, known from Portugal, appear to be missing in the whole studied material and intense search for them, carried out recently by the authors, failed to give positive result. However, it should be noted that Benke [2] (text, Fig. 6) reported ? *Goliathiceras* sp. from the studied area. This record became nowadays indirectly supported by Callomon who identified a kosmoceratid cf. *Kepplerites* (*Torricellites*) *lahuseni* (Parona et Bonarelli) or *distans* Tintant in material coming from the horizon with mixed fauna from Anquela del Pedregal (bed. No. TJ/00). This, along with citations of some *Kosmoceras* by Benke [2] (text, Fig. 6), shows that both Portugal and the Iberian Chain were situated within the extent of the Boreal Spread in the Callovian and, possibly, Early Oxfordian, or at least at the periphery of the area affected by the Spread.

If may be concluded that the nature of ammonite fauna of the Lower Oxfordian in the Iberian Range suggests fairly well marine connections between the Iberian Peninsula and other parts of northern shelf of the Tethys in the Early Oxfordian. Moreover, the above-stressed similarity appears to be in favour of advanced transgression and not a trend to regression.

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G. Melendez, L. Sequeiros, W. Brochwicz-Lewiński, **El Oxfordiense inferior de la Cordillera Iberica (España). Parte II. Fauna de ammonites**

En esta parte se presentan las descripciones de lagunas fomas de ammonites recogidas en los materiales de transición Calloviense-Oxfordiense, en las localidades descritas en la parte I. El Oxfordiense inferior aparece representado por lagunas formas de Peltocerátidae (*Peltoceratoides*,

Parawedekindia, *Peltomorphites*), *Neocampylites* y entre los *Perisphinctidae*, destaca la presencia de varias formas de *Prososphinctes*, incluyendo *P. claromontanus* (Buk.), *Perisphinctes* (?) *bernensis* Arkell (non de Loriol).

La fauna de Ammonites aparece muy similar a la descrita en otras áreas de la provincia submediterránea en Europa, excepto en lo referente a la falta de *Cardioceratidos*. No obstante, el horizonte que contiene—faunas mezcladas dentro de los niveles basales en el corte de Anquela del Pedragal ha dado un ejemplar de *Kosmoceratidae*, cf. *Keplerites* (*Toricellites*) *lahusseni* (Parona et Bonarelli) o *distans* Tintant, de la zona Calloviense. Este hallazgo viene a apoyar las referencias previas [2] (Fig. 6) de *Kosmoceras* (*K.*) *spinosum* y ? *Goliathiceras* sp., al tiempo que aportan la posibilidad de nuevos hallazgos de formas boreales, y muestran que el área estudiada se encontraba dentro del ámbito de extensión de la denominada “Expansión Boreal”.

Г. Мелендез, Л. Сегуэйрос, В. Брохвич-Левиньски, **Нижний оксфорд в Иберийском кряже (Испания). Часть II. Аммонитовая фауна**

В статье описаны аммониты, важнейшие из тех, которые были найдены на пограничьи келловее и оксфорда в Иберийском кряже. Эти аммониты, особенно пелтоцерасы *Neocampylites*, *Perisphinctes* (?) *bernensis* Arkell (non de Loriol), *Prososphinctes* spp. включая *P. claromontanus* (Bukowski), начинают служить убедительным доказательством присутствия ние оксфорда на данной территории. Определенные в последнее время космоцерасы (в данной работе и также ?*Goliathiceras* sp. [2] говорят о том, что на этой территории, по крайней мере в слабой степени ощущалось нашествие северной фауны в келловее и раннем оксфорде. Все ассоциации аммонитовой фауны свидетельствуют о том, что между описываемой территорией и другими частями северной оконечности океана Тетиды, как в келловее, так и раннем оксфорде существовало достаточно хорошее сообщение морским путем.