

NEW INFORMATION ON THE TOARCIAN
AMMONITE GENUS *PSEUDOLILLIA*
MAUBEUGE 1949

by D. T. DONOVAN

ABSTRACT. The genus *Pseudolillia* Maubeuge is redescribed on the basis of new material, and *Ammonites emilianus* Reynès is assigned to it. The genus is characterized by straight ribs which die out on the later whorls, and by decrease in the relative diameter of the umbilicus with increasing size of the shell. It is provisionally placed in the Subfamily Grammocerotinae.

THE discovery in Spain of some ammonites belonging to the genus *Pseudolillia*, previously known only by the holotype of the type species, has provided an opportunity to amplify the original description of the genus. Consideration of the inner whorls, now described for the first time, enables the species long ago named *Ammonites emilianus* by Reynès to be placed in *Pseudolillia*.

The new material was collected by Mr. O. Renz, on behalf of Bataafse Internationale Petroleum Maatschappij, N.V., who have given permission for this account to be published. They have also generously presented the material described to the Geology Museum of the University of Bristol. I am indebted to Dr. M. K. Howarth for drawing my attention to the genus *Pseudolillia*, which I had overlooked, and to Dr. J. Sornay for sending me a plaster cast of the holotype of *P. murvillensis*.

SYSTEMATIC ACCOUNT

Family HILDOCERATIDAE Hyatt 1867
Subfamily GRAMMOCERATINAE Buckman 1904
Genus PSEUDOLILLIA Maubeuge 1949

Type species. *Pseudolillia murvillensis* Maubeuge.

Diagnosis. Genus of Hildoceratidae with ribs on the inner whorls which are straight on the whorl side, and curve forwards towards the periphery. The keel may be flanked by grooves. With increasing size the shell becomes smooth, the ventral grooves disappear and the relative size of the umbilicus decreases. These features distinguish the genus from others in the family. The whorl-section is parallel-sided in the early stages, becoming convergent or trigonal later. The body-chamber is unknown.

Pseudolillia murvillensis Maubeuge

Plate 12; text-figs. 1A, B; 2A, B

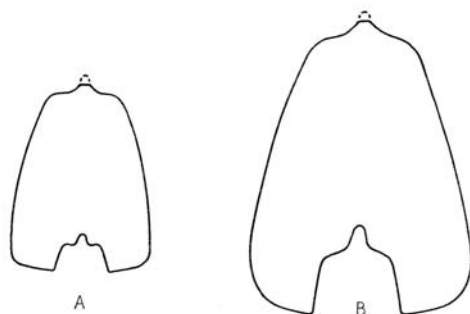
1949 *Pseudolillia murvillensis* Maubeuge, p. 150, pl. 1, pl. 2 (upper figure).

Type. The holotype, from the Mine de Murville (Meurthe-et-Moselle), France, is in the Muséum d'Histoire Naturelle, Paris.

[Palaeontology, Vol. 5, Part 1, 1962, pp. 86-92, pl. 12.]

An example from Salas de los Infantes, 48 km. south-east of Burgos, Spain (University of Bristol Geology Museum no. 15230), shows the inner whorls and supplements the original description. On the basis of this specimen and the holotype the species may be described as follows:

The early whorls are compressed and ornamented with close, straight ribbing. The whorl-section at this stage is nearly parallel-sided. By a diameter of 5 or 6 cm. the whorl-section has become more nearly trigonal, and a little later the umbilical wall becomes steep and sharply demarcated from the whorl-side. From a size of about 10 cm. the inner half of the whorl-side is smooth, only the peripheral ends of the ribs remaining. These are fairly strong on the holotype, faint on the Spanish example. The present



TEXT-FIG. 1. Whorl sections of the example of *Pseudolillia murvillensis* figured in Plate 12, figs. 1, 2. A, at a diameter of 7.0 cm., B, at a diameter of 11.5 cm. Natural size.

writer disagrees with Maubeuge's statement that the ribs are joined in pairs at their inner ends, for a careful examination in oblique light has failed to reveal such a feature. The inner ends of the ribs merge into the surface of the shell, and if an isolated pair of ribs be examined, this could perhaps be mistaken for junction.

The holotype, as Maubeuge pointed out, retains a short section of a high, compressed keel, and this feature is seen in transverse section on the inner whorls of the Spanish example. The keel was septate and the impression of the septum may be seen on the holotype, which is an internal mould. The keel is flanked by well-marked shoulders.

The septal suture is moderately reduced, that is, the minor indentations are small and blunt. The first lateral saddle has a well-marked median incision. The second lateral saddle has a smaller incision on the Spanish example; it is not clearly visible on the holotype. The first lateral lobe is strongly asymmetrical, and in the Spanish example has a prominent little saddle on the ventral side; this element is not well differentiated on the holotype. The saddles are much longer on the holotype than on the Spanish example.

The holotype is still septate at its maximum diameter of 15.1 cm., and bears the trace of the umbilical suture of another full whorl. The maximum size can hardly have been less than 30 cm. The umbilicus of the inner whorls of the Spanish example is about 40 per cent. of the diameter, while at a diameter of 13.0 cm. it is only 32 per cent. The

whorl thickness at the same size is 28 per cent. of the diameter. The holotype at the same size (13.0 cm.) has similar proportions; it cannot be measured at smaller sizes.

Notes on other examples. An ammonite collected by O. Renz from el Cortijo, north of Granada, Spain, University of Bristol Geology Museum no. 15232, agrees fairly well with the inner whorls of no. 15230. Close comparison is impossible because no. 15232 is partly weathered, and probably slightly crushed. It is wholly septate and has a diameter of 7.7 cm., and an umbilicus 35 per cent. of the diameter. A diagram reconstructed from drawings of it is shown in text-fig. 2A, B.

Monsieur R. du Dresnay has kindly sent me for examination a whorl fragment collected by him in beds with *Paroniceras* near Habbou el Kehal, between Bou Arfa and Figuig, in the eastern part of the High Atlas, Morocco. It belongs to the septate part of an ammonite, between 3 and 4 cm. in diameter, and agrees with *P. murvillensis*, although it is inadequate for identification beyond doubt.

Stratigraphical horizon. The holotype was found associated with *Pseudogrammoceras subfallaciosum* S. S. Buckman, below beds with *Phlyseogrammoceras dispansum* (Lycett) (Maubeuge 1949, p. 150). This record clearly places it in the Struckmanni Subzone of the Thouarsense Zone in the new zonal scheme for the Upper Toarcian recently proposed (Dean, Donovan, and Howarth 1961, p. 487).

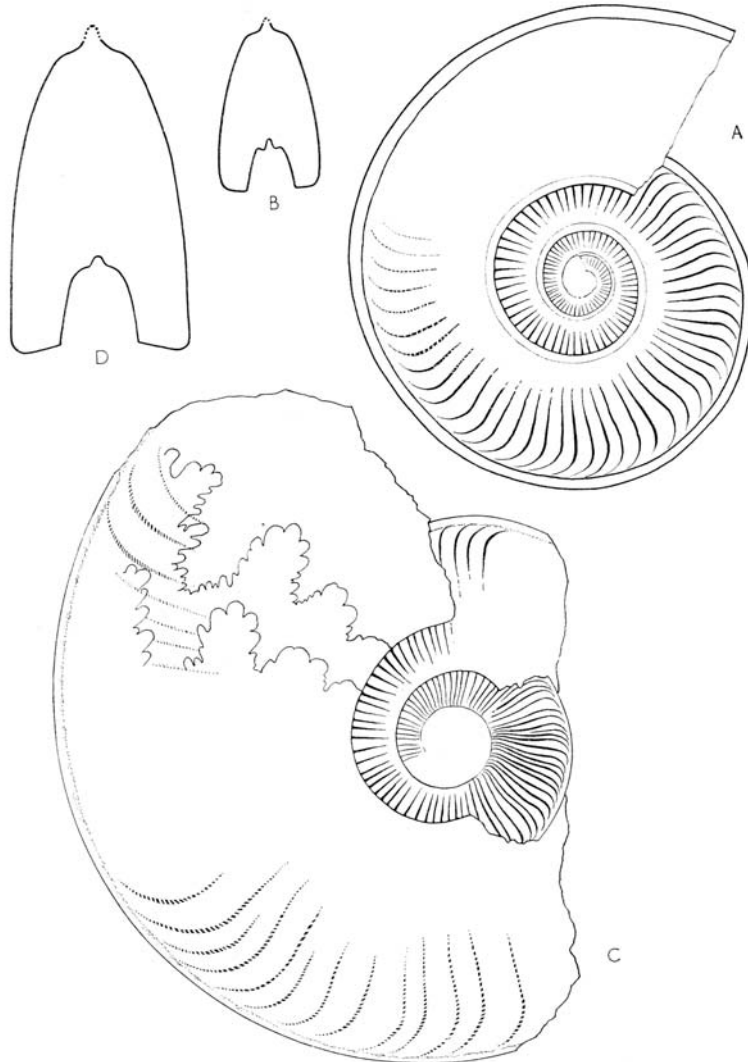
The example from Salas de los Infantes (no. 15230) forms part of the lowest Toarcian assemblage from that locality. The stratigraphical diagram supplied by B.I.P.M. shows that this assemblage was collected from a vertical thickness of about 20 metres of beds. Some of the ammonites are mere weathered fragments, clearly picked up loose, and the relative positions of the others are not recorded. They include two species of stratigraphical value: *Hildoceras sublevisioni* Fucini, which indicates the Mercati Zone of the sequence established by the writer in southern Switzerland and Italy (Donovan 1958), and *Dumortieria* aff. *levesquei* (D'Orbigny), indicating the Meneghinii Zone. There are no fossils certainly attributable to the intervening Erbaense Zone. The example of *Pseudolillia murvillensis* is likely to have come from the Mercati, Erbaense, or Meneghinii Zone but cannot be more precisely dated.

The example from el Cortijo (no. 15232) was collected from beds of *Ammonitico rosso* facies, overlying grey marls and limestones of 'Germanic' type, and below Middle Jurassic silts and shaly silts with chert layers. The associated fossils are *Hildoceras sublevisioni* Fucini and *Mercaticeras* cf. *umbilicatum* Buckman, both indicating the Mercati Zone, and *Erycites* sp. indet. which cannot be earlier than Erbaense Zone. No stratigraphical order is recorded for these fossils, and again the *Pseudolillia* cannot be exactly dated.

The fragment from Morocco found by M. du Dresnay was associated with examples of *Paroniceras*, above the horizon of *Hildoceras*. In southern Europe *Paroniceras* is

EXPLANATION OF PLATE 12

Figs. 1-4. *Pseudolillia murvillensis* Maubeuge. 1, 2, From the Toarcian of Salas de los Infantes, south-east of Burgos, Spain. University of Bristol Geology Museum no. 15230. Fig. 1 is natural size, fig. 2 is reduced $\times 0.77$. 3, 4, The holotype from the Toarcian of the Mine de Murville (Meurthe-et-Moselle), France, both figures reduced $\times 0.75$. From a plaster cast of the original, Bristol University Geology Museum no. 15396.



TEXT-FIG. 2. A, B Restored diagrammatic side view and whorl section of a specimen of *Pseudolillia* aff. *murvillensis* Maubeuge from el Cortijo, north of Granada, Spain. University of Bristol Geology Museum, no. 15232, natural size. C, D. Side view and whorl section of an example of *Pseudolillia emiliana* (Reynès) from Salas de los Infantes, south-east of Burgos, Spain. University of Bristol Geology Museum no. 15231, natural size.

characteristic of the Bayani Subzone of the Erbaense Zone (Donovan 1958, p. 45), and the Moroccan *Pseudolillia* probably, therefore, belongs to this horizon.

Pseudolillia emiliana (Reynès)

Text-fig. 2c, d

1868 *Ammonites Emilianus* Reynès, p. 104, pl. 6, figs. 1a-c.

1874 *Ammonites Emilianus* (Reynès) Dumortier, p. 64.

1921 *Hildoceras Emilianum* Reynès, Monestier, p. 22, pl. 1, figs. 14, 15, ? fig. 16; pl. 4, fig. 23.

Type. Reynès's figures probably represent a specimen in the Muséum d'Histoire naturelle de Marseille, no. 6564, enlarged to twice natural size. The drawing is not exact and the umbilicus is shown too small, about 30 per cent. of the diameter instead of 34 per cent.

Remarks. The only worker to revise the species has been Monestier, who examined about twenty examples. The two that he illustrated have slightly larger umbilici than the supposed type, but are otherwise in good agreement. Reynès and Monestier figured the inner whorls only. A new specimen from Salas de los Infantes (no. 15231, text-fig. 2c, d) found by O. Renz, exemplifies the later development and shows that the umbilicus becomes smaller, and the ribbing fainter, with increasing size. At a diameter of about 11.5 cm. the umbilicus is only 24 per cent., and only the faint peripheral ends of the ribs can be seen. The body-chamber is missing; when complete the individual could not have been less than about 16 cm. in diameter.

Stratigraphical horizon. Reynès (1868, p. 104) recorded *Am. emilianus* from the Bifrons Zone, which he introduced for the middle part of the Toarcian stage, above the Serpentinum and below the Jurensis Zone. Monestier (1921, pp. 22, 23) declared that this was wrong, and that in the Aveyronnais the species was found exclusively in his 'Zone à *Polyplectus discoides* et *Hammatoceras insigne*' which lies above the zone of *Pseudogrammoceras expeditum* (= *fallaciosum*) and below that of *Phlyseogrammoceras dispansum* (Monestier 1921, p. 5), and corresponds approximately to the Struckmanni Subzone of Dean, Donovan, and Howarth (1961, p. 487) and to part of the Bayani Subzone in the scheme proposed for the Italian succession by the present writer. The latter correlation is confirmed by the presence of *Paroniceras* in Monestier's Zone of *P. discoides* and *H. insigne* (Monestier 1921, pp. 8, 9; Donovan 1958, p. 45).

The Spanish example (no. 15231) was found at the same place as the specimen of *Pseudolillia murvillensis*, the horizon of which has already been discussed.

AGE AND AFFINITIES OF *PSEUDOLILLIA*

Stratigraphical position. Datable occurrences of *Pseudolillia* fall in the Thouarsense Zone, Struckmanni Subzone of the North-west European Province, and in the Erbaense Zone, Bayani Subzone, of the Mediterranean Province.

Geographical distribution. *Pseudolillia* is at present recorded from north-eastern France (Meurthe and Moselle Dept.), southern France, Spain, and eastern Morocco. The Aveyron district appears to be the only area where more than one or two specimens have been found, and even there the species is 'assez rare' (Monestier 1921, p. 22).

Affinities. Maubeuge did not assign *Pseudolillia* to a family, but stated that it was most nearly comparable to *Lillia*. Arkell (1957, p. L266) did not uphold the genus, regarding it as a possible synonym of *Brodieia* in the Subfamily Phymatoceratinae (Family Hammatoceratidae). Both these views were presumably founded on the supposed paired ribs, which are not accepted by the present writer.

Pseudolillia is now placed in the Grammocerotinae on account of the straight ribs on the inner whorls, which can be matched in later members of the subfamily such as *Dumortieria*. The Grammocerotinae probably evolved from species of *Mercaticeras* such as *M. umbilicatum* S. S. Buckman, by loss of the ventral grooves, greater compression of the whorl, increase in the rib-frequency, and other changes. These changes must have taken place early in the Bayani Subzone of the Italian sequence (the range of *Mercaticeras* in terms of the north-west European zones is not well known). At the beginning of the succeeding Meneghinii Zone straight ribbing was evolved in *Dumortieria*, but *Pseudolillia* was already in existence in the Bayani Subzone. It is not considered ancestral to *Dumortieria* because the latter genus retains the shell-form of *Grammoceras*, and both these genera show little change of ornament or shell-form with growth, whereas *Pseudolillia* shows modification of both. Moreover, *Pseudolillia* has the flattened or (on the early whorls of some examples) grooved venter characteristic of *Mercaticeras* and other Hildoceratinae, while in most Grammocerotinae this character has been lost and the venter is fastigate.

Pseudolillia may be ancestral to *Hudlestonia*, recently included in Grammocerotinae (Arkell 1957, p. L262). The change of ornament with growth in the two genera is comparable, but the outer whorls of *Hudlestonia* acquire a fastigate or acute venter. The suture-lines of the two genera are similar in general outline, but that of *Hudlestonia* is even more 'degenerate'—that is, the minor subdivisions are less deeply incised. Some species, at least, of *Hudlestonia* have more sinuous ribs than *Pseudolillia*, and the ribs may be joined near the umbilical margin.

The earliest record of *Hudlestonia* is from the Dispansum Subzone (Dean 1954, p. 177), which succeeds the Struckmanni Subzone in which *Pseudolillia* is found in north-west Europe, so the suggested evolution is in accordance with the stratigraphical sequence of the two genera.

Both *Pseudolillia* and *Hudlestonia* are distinct, as regards sequence of ornament and shell-form, from the other Grammocerotinae, and it may be found convenient, in future systematic work, to revive Maubeuge's Subfamily 'Hudlestoniae' (*recte* Hudlestoniinae) (Maubeuge 1950, p. 391), which was regarded as synonymous with Grammocerotinae by Arkell (1957, p. L260).

The inner whorls of *Pseudolillia* are nearly homeomorphous with straight-ribbed Hildoceratidae of different stratigraphical ages. Those most likely to be confused are *Arietoceras* from the Domerian and *Dumortieria* from higher beds in the Toarcian. Typical *Arietoceras* are very evolute, the umbilicus being about 50 per cent. of the diameter, with stout ribbing. *Dumortieria* can be distinguished by its ventral aspect, the ribs ending bluntly without the forward projection found in *Pseudolillia*, and by the keel being blunt and never flanked by well-marked grooves or smooth bands.

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