26. AMMONOIDEA FROM THE LOWER CRETACEOUS OF HOLE 402A IN THE BAY OF BISCAY, DSDP LEG 48

Otto Renz, Museum of Natural History, Basel, Switzerland

INTRODUCTION

Hole 402A (latitude 47°52.48′N, longitude 08°50.44′W) was drilled in a canyon on the northern mid-continental slope of the Bay of Biscay, 380 km west of Brest. Below 2355.5 meters of water from the rig floor the hole penetrated a sediment column of 469.5 meters, ending in lower Aptian sediments. Fourteen ammonites from the Albian-Aptian interval were collected by Prof. P.C. de Graciansky of the Ecole des Mines, Paris, and sent to the author for study. The samples containing the extremely fragile ammonite remains were slowly dried for two weeks and then sprayed with Krylon. The fossils are deposited in the Museum of Natural History in Basel under the numbers J 28489 to J 28502.

The zonal subdivision used is based on the zonal classification of ammonites from the Lower Greensand in Britain (Casey, 1961, p. 487-621).

OCCURRENCE

Two intervals containing ammonites can be distinguished (Figure 1). The upper interval (336.5 to 374.5 m) represented by Cores 22 to 25 consists of dark gray, carbonaceous limey marls, with interbedded mudstone rich in mica and small detrital quartz grains. Within this interval nine samples with ammonites and one with a bivalve were revealed (Plate 1, Figures 1, 4a). In Cores 22, 24, and 25 representatives of the genus *Leymeriella*, restricted to the *Leymeriella tardefurcata* Zone, representing the lower part of the lower Albian, occur (Figure 1). Of importance is one specifically determinable specimen representing *Leymeriella (L.) tardefurcata densicostata* Spath from Core 24. The genus *Leymeriella* is known throughout Europe, and has been studied in great detail by Jacob (1908), by Spath (1925, p. 83), and by Casey (1957).

The lower interval (422 to 441 m), represented by Cores 31 and 32, consists of light gray brownish, chalky limestone, with small angular grains of detrital quartz. The interval yielded three ammonite species of which the youngest one from Core 31, in spite of its very poor preservation, can be compared with *Cheloniceras (Epicheloniceras)* cf. *martinioides* Casey, indicating the *C. martinioides* Zone of the lower upper Aptian. Within the interval of Cores 26 to 30, which is barren of ammonites, the *Parahoplites nutfieldensis* Zone below and the *Hypacanthoplites jacobi* Zone above (middle and upper upper Aptian) can be expected.

CORRELATION OF DSDP HOLE 402A WITH DSDP HOLE 398D BASED ON AMMONITES

Hole 398D (DSDP Leg 47) was drilled south of the Vigo Seamount, 90 km off the western coast of the Iberian peninsula (latitude 40°57.6′N, longitude 10°43.1′W). Cores 84 to 90 represent the *Hoplites dentatus* Zone (middle Albian) and Cores 83 to 99 the *Douvilleiceras mammillatum* Zone (upper part of the lower Albian). The *d. Floridum* Sub-zone of the *d. Mammillatum* Zone is indicated by *Beudanticeras newtoni* Casey in Core 99 (Renz, 1979). The interval separating Core 99 of Hole 398D from Core 22 of Hole 402A can therefore be expected to represent the *Sonneratia kitchini* Sub-zone of the lowest *D. mammillatum* Zone (base of the Albian).

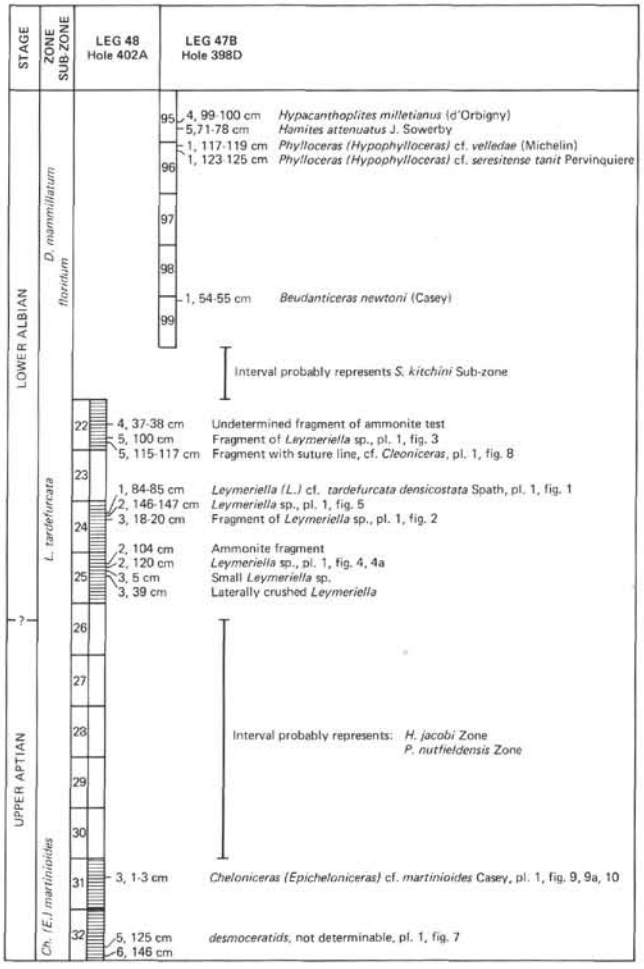

Figure 1. *Correlation, based on ammonites, of lower Albian to upper Aptian of Leg 47, Hole 398D and Leg 48, Hole 402A.*

Preservation

Preservation of the ammonites from Hole 402A is comparable with that from Hole 398D. The tests are little altered diagenetically, and consist of aragonite. The outer layers, covering the prismatic layer, are whitish to light brownish, somewhat brilliant, and mother-of-pearl like. All of the shells have been crushed and flattened during compaction of the sediment; in some cases lateral compression is present, probably caused by local sliding on the continental slope. Septa of resistant phragmacones, such as those of the desmoceratides, are broken or partly bent. All specimens have their venters crushed into small fragments. By removing test fragments, suture lines appear occasionally on the internal molds (Plate 1, Figure 8).

SYSTEMATIC DESCRIPTIONS

LOWER ALBIAN

Family LEYMERIELLIDAE Breistroffer, 1951

Genus LEYMERIELLA Jacob, 1907

Leymeriella is the most common genus of the assemblage. It is restricted to Cores 22 to 25. Seven, mostly fragmental specimens, can be allocated to this genus, but only one permits specific determination.

Leymeriella (Leymeriella) cf. tardefurcata densicostata Spath
(Plate 1, Figure 1)

1957 *Leymeriella (L.) tardefurcata densicostata* Spath, Casey, p. 47, pl. 9, fig. 7, 7a; pl. 10, fig. 9, 9a, 12.

Sample 24-2, 84 to 85 cm (J 28489). Conch rather small. Diameter after reconstruction 25 mm, umbilicus 8 mm, 32 per cent of diameter. Costation on inner whorls, up to about 20 mm diameter, very dense. Ribs thin and sharp, crossing flank in a gently sigmoidal curve, slightly inclined forward. From about 20 mm diameter ribs gradually widen from below mid-flank towards venter. Ribs last exposed broadly flattened, beginning to show a median concavity (better exposed on Plate 1, Figures 2, 3, and 5).

An allocation to *Leymeriella* of such poorly preserved remains, exposing about 50 per cent of morphological features, is unsatisfactory. An equally flat-pressed example of a *Leymeriella* from the Alps in Austria is reproduced for comparison. The specimen derives from the Losensteiner Schichten in the Stiedelsbachgraben near Losenstein in the Enns valley (Kollmann, 1968), where *Leymeriella* is accompanied by foraminifers indicating lower Albian.

Family HOPLITIDAE H. Douvillé, 1890

Subfamily CLEONICERATINAE Whitehouse, 1926

Genus CLEONICERAS Parona and Bonarelli, 1896
(Plate 1, Figure 8)

Sample 22-5, 115 to 117 cm (J 28491). A fragment of test showing sigmoidal growth lines has been removed from the matrix to expose the suture line below. The external saddle between external and lateral lobes (E, L) was exposed. The fragment of suture coincides precisely with the corresponding segment of a *Cleoniceras* (compare Casey, 1966, p. 569, fig. 215).

APTIAN

Family DOUVILLEICERATIDAE Parona and Bonarelli

Subfamily CHELONICERAS Spath, 1923

Genus CHELONICERAS Hyatt, 1903

Subgenus EPICHELONICERAS Casey, 1961

Cheloniceras (Epicheloniceras) cf. martinioides Casey, 1961
(Plate 1, Figures 9, 9a, 10)

1962 *Cheloniceras (Epicheloniceras) martinioides* Casey, p. 239, pl. 37, fig. 1a-c, 2; pl. 38, fig. 3a, b; pl. 39, fig. 2.

Sample 31-3, 1 to 3cm (J 28492). A positive and the corresponding negative impression are available. The combination of the two resulted in the sketch Figure 10 (Plate 1). Only inner whorls are preserved. Badly destroyed remains of the next outer whorl are recognizable. After reconstruction, a diameter of about 12 mm resulted. Umbilicus accordingly 35 per cent of diameter. On both impressions, five outstanding broad primary ribs (three on outer and two on inner whorl) are preserved. They attenuate distinctly between ventral tubercles and umbilicus. Umbilical tubercles on primary ribs not visible. Elongated lateral tubercles exposed clearly on negative as well as positive impressions. Three prominent rounded ventral tubercles on outer whorl are recognizable on both impressions. Secondary ribs, as far as preserved, are simple, sharp, with the exception of one, reaching umbilical margin.

The features exposed on the present juvenile stage coincide closely with those on juvenile *Cheloniceras (E.) tschernyschiev* (Sinzow) from Transcaspia, also occurring in the *S. martinioides* Zone of the Lower Greensand (compare Casey, 1962, p. 235).

Family DESMOCERATIDAE Zittel, 1895
(Plate 1, Figure 7)

Sample 32-5, 125 cm. (J 28493). A small, evolute, intensely broken desmoceratid with about eight constrictions on outer whorl. Suture not preserved.

Samples 32-5, 146 cm. (J 28494). A crushed involute ? desmoceratid without sculpture. No traces of suture.

ACKNOWLEDGMENTS

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PLATE 1

Figure 1 — Sample 24-2, 84-85 cm. (J 28489). *Leymeriella* (*Leymeriella*) cf. *tardefurcata densicostata* Spath. Lower Albian, *L. tardefurcata* Zone. Fragments of ammonite test are dispersed on surface. 2×.

Figure 2 — Sample 24-3, 18-20 cm. (J 28496). Fragments of *Leymeriella* (*Leymeriella*) sp., surface of test. Lower Albian, *tardefurcata* Zone. 2×.

Figure 3 — Sample 22-5, 100 cm. (J 28497). Badly cut fragment of a *Leymeriella* (*Leymeriella*) sp., surface of test. Lower Albian, *tardefurcata* Zone. 2×.

Figures 4, 4a — Sample 25-2, 120-120.5 cm. (J 28490, J 28490a) *Leymeriella* (*Leymeriella*) sp., positive and negative impressions, surface of test. Lower Albian, *tardefurcata* Zone. Fragments of test densely dispersed in sediment. 2×.

Figure 5 — Sample 24-2, 146-147 cm. (J 28495). Fragment of *Leymeriella* (*Leymeriella*) sp., surface of test. Lower Albian, *tardefurcata* Zone. 2×.

Figure 6 — *Leymeriella* (*Leymeriella*) cf. *tardefurcata* (d'Orbigny), equally flattened, is reproduced for comparison (internal mold). Lower Albian, *tardefurcata* Zone, from Losenstein in the Austrian Alps. 1×.

Figure 7 — Sample 32-5, 125 cm. (J 28493). Undeterminable desmoceratid, suture line not obtainable. Aptian. 2×.

Figure 8 — Sample 22-5, 115-117 cm. (J 28491). Saddle between lateral and external lobus of possibly a *Cleoniceras*. Lower Albian, *L. tardefurcata* Zone. 4×.

Figures 9, 9a — Sample 31-3, 1-3 cm. (J 28492, J 28492a). *Cheloniceras* (*Epicheloniceras*) cf. *martinioides* Casey, positive and negative impressions. Upper Aptian, *C. martinioides* Zone. 2×.

Figure 10 — Sketch combining morphological features exposed on Figures 9, 9a. 4×.

PLATE 1


1


2


3


4


5


7

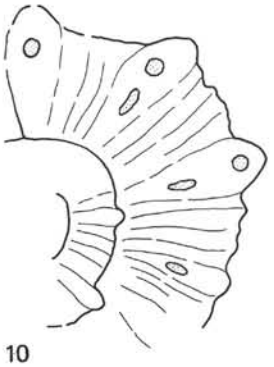

4a


6

8


9


9a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