

# *Heteroporella lepina* PRATURLON, 1967, revisited (followed by taxonomic notes on the so-called “*Heteroporella*” species)

*Heteroporella lepina* PRATURLON, 1967 – Emendation und taxonomische  
Bemerkungen zu den sogenannten „*Heteroporella*“-Arten

by

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## Abstract

The genus *Heteroporella* CROS & LEMOINE ex PRATURLON, 1967, and its type-species are amended. Two new genera, *Chinianella* OTT ex GRANIER & DELOFFRE, 1994, and *Otternstella* GRANIER, n. gen., with 5 representatives each, are erected; they are respectively based on *Cylindroporella ellenbergeri* BERNET-ROLLANDE & LEMOINE in GRANIER & DELOFFRE, 1994, and *Cylindroporella lemmensis* BERNIER, 1971. As amended hereafter, the genus *Heteroporella* which first included 16 species is restricted to its sole type-species. The 5 remaining species need to be reexamined and are left in open nomenclature.

## Zusammenfassung

Die Definition der Gattung *Heteroporella* CROS & LEMOINE ex PRATURLON, 1967, und ihres Typus werden emendiert. Zwei neue Gattungen, *Chinianella* OTT ex GRANIER & DELOFFRE, 1994, und *Otternstella* GRANIER, n. gen., mit jeweils 5 Vertretern werden aufgestellt. Sie basieren auf den Arten *Cylindroporella ellenbergeri* BERNET-ROLLANDE & LEMOINE in GRANIER & DELOFFRE, 1994, bzw. *Cylindroporella lemmensis* BERNIER, 1971. Zukünftig ist die Gattung *Heteroporella*, die zuvor 16 Arten beinhaltete, einzig auf den Typus beschränkt. Die 5

verbleibenden Arten werden unter offener Nomenklatur beschrieben und müssen erneut untersucht werden.

## 1. Introduction

Apart from its type-species, *Heteroporella lepina* PRATURLON, 1967, the genus *Heteroporella* (CROS & LEMOINE ex PRATURLON, 1967) was supposed to include 15 other representatives, 2 junior synonyms and 3 nomina nuda (GRANIER & DELOFFRE, 1994). None of them has the characteristics ascribed to the genus *Heteroporella* as amended herein. Therefore, they should be either left in open nomenclature (?) or ascribed to some other genera.

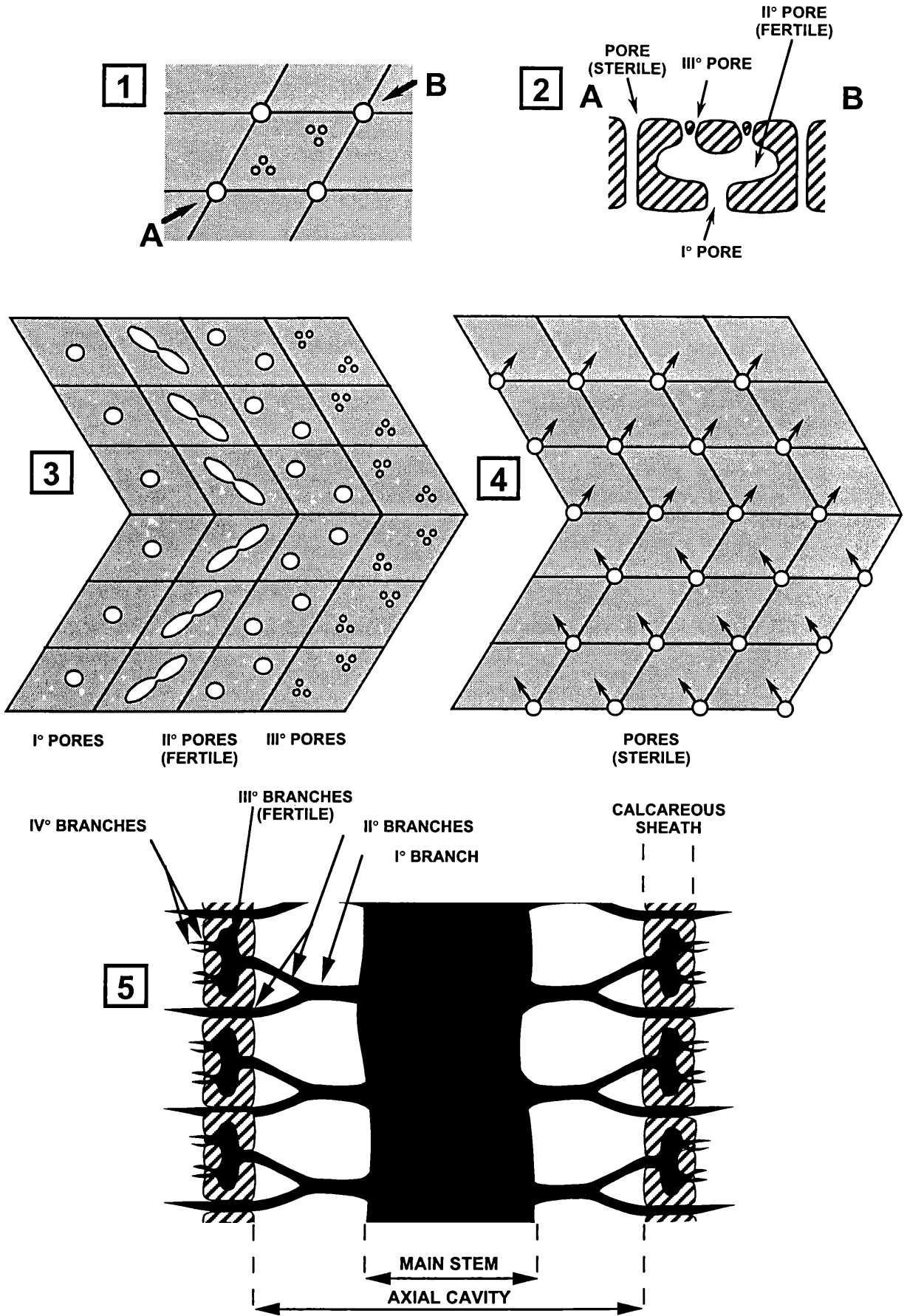
## 2. Systematic description

*Heteroporella lepina* PRATURLON, 1967, revisited  
(Pl. 1, Figs. 1–8)

*Heteroporella lepina* PRATURLON, 1967, was originally described as “having fertile and sterile branches in alternating whorls; sterile branches simple and slender, fertile ones highly inflated and distally ramified (...)” (PRATURLON, 1967). In the forewords, this author says that he had first quoted his species as “*Neomeris* sp.” in an earlier publication (PRATURLON, 1966). Later on this species reappears as “*Neomeris budaense* n. sp.”, which is a nomen nudum as several specimens are figured as “types” (JOHNSON, 1968, Pl. 3, Figs. 4–5). Both authors did make good observations but their conclusions are rather opposite one to the other. As a matter of fact we propose hereafter another point of view. Following PRATURLON’s interpretation, there are “sterile” and “fertile branches” but, in JOHNSON’s opinion, they consist of “secondary branches” and “sporangia” According to us, there are two types of pores:

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**Figure 1:** *Heteroporella lepina*. 1: Outer shape of an individual shield with 6 tertiary pores issued from the largest divided pores surrounded by 4 undivided pores. 2: Section of the calcareous sheath through the 2 types of pores. 3: Organization of the largest divided pores (diagrammatic tangential sections). 4: Organization of the undivided pores. 5: Reconstruction of the alga (diagrammatic oblique section through 3 successive whorls).

1. the so-called "fertile branches" or "sporangia" of the two previously cited authors. We are rather in general agreement with the description of these pores given by PRATURLON (1967). They consist of a thin primary pore passing into an highly inflated part divided into two larger secondary pores, i.e. rounded vesicles, each bearing a tuft of thin tertiary pores (Fig. 1.2). Such pores are surrounded by the typical yellowish calcitic sheath (probably primary calcite) in the form of individual shields. Each pair of secondary pores is oblique to the row plane (and to the thallus axis): so the individual shields have a rhomboid shape (Fig. 1.1). As PRATURLON (1967) pointed out, they are "in the same direction for two-three rows, often in the opposite direction in the contiguous ones" (Fig. 1.3). We consider that ontogenetic stages are recorded in these sequences of two or more rows;

2. the so-called "sterile branches" or "secondary branches". They consist of undivided pores which are commonly located at the junction of four individual shields (Figs. 1.1 & 1.4).

According to JOHNSON's interpretation, the number of "secondary branches" is twice the number of "sporangia" though, in PRATURLON's opinion, there are as many "sterile branches" as "fertile" ones. As a matter of fact, the numbers of pores are equal in both types.

Both types of pores (the so-called "fertile branches" or "sporangia", on the one hand, and the so-called "sterile branches" or "secondary branches", on the other hand) are arranged in regular alternations of rows. Such a pattern was considered as the main character of the genus though it was known from some other genera among them is *Neomeris* (LAMOUREUX, 1816). Following PRATURLON's interpretation, "sterile" and "fertile branches" are arranged in separate "whorls" (rows), either sterile or fertile, which alternate; according to JOHNSON, "secondary branches" and "sporangia" should belong to the same whorl. We follow JOHNSON's opinion, i.e. a whorl consists of two successive rows: one of them bears undivided pores while the other row bears divided ones.

In *Heteroporella lepina*, the inner diameter of the yellowish calcareous sheath is about half the outer one (the "large axial hollow" mentioned by PRATURLON). Such a character is well known in *Neomeris* species too, but it has not been reported in any other species ascribed to genus *Heteroporella*. Therefore we consider that, in this peculiar species, calcification possibly did not reach the main axis: the yellowish calcareous sheath forms a cortex-like structure leaving a large open axial cavity after the decay of the living parts as in many *Neomeris* species (Fig. 1.5).

In conclusion, *Heteroporella lepina*, type-species of a monospecific genus, is found in the form of hollow tubes with a broad axial cavity and relatively thin calcareous sheath; calcification is restricted to the distal part of the branches; divided pores are embedded in individual calcite shields the imbrication of which has a cortex-like structure; branches are consisting of at least 4 orders of branches; branching formula: 1 not calcified / 1 thin undivided + (1

thin / 2 dilateds / 3 (or more) thins), i.e. 1 primary not calcified followed by 2 secondaries, 2 tertiaries, and 6 (or more) quaternaries, calcified.

This species is known from the Uppermost Albian (SOUQUET et al., 1985) to the (Upper) Turonian (SAINT-MARC, 1974); it has been reported in Texas, Brazil, Gabon (B.G., unpublished), Portugal, Spain, France, Italy, Germany, Yugoslavia, and Lebanon. Additional information with respect to *Heteroporella lepina* (measurements, etc.) can be found in PRATURLON (1967):

- 1967 *Heteroporella lepina* n. gen. n. sp. – PRATURLON, 202–204, Pl. 51, Figs. 1–7; Pl. 52, Figs. 1–6 (holotype: Pl. 51, Fig. 3, thin section D 39/1; paratypes: Pl. 51, Figs. 1–2 & 4–5; Pl. 52, Figs. 1–2, thin sections D 39/1–2 & 39/4–5; "paratypes" (sic): Pl. 52, Figs. 3–6, thin sections D 39/6–7, Institute of Geology and Paleontology of the University of Rome, Italy)
- 1968 nom. nud. *Neomeris budaense* n. sp. – JOHNSON, 16–20, Pl. 3, Figs. 4–5; Pl. 4, Figs. 1–4 ("Types": Pl. 3, Figs. 4–5, thin section U.S.N.M. 42611, Division of Paleobotany, U.S. National Museum, Washington, D.C., U.S.A.)
- 1969 nom. nud. *Neomeris budaense* JOHNSON. – JOHNSON, 68, Pl. 43, Figs. 4–5 (from JOHNSON, 1968, Pl. 3, Figs. 4–5); Pl. 42, Figs. 1–4 (from JOHNSON, 1968, Pl. 4, Figs. 1–4)
- 1970 *Heteroporella lepina* PRATURLON. – RADOICIC, 101, Pl. 12, Figs. 1–2
- 1973 *Heteroporella lepina* PRATURLON. – BERTHOU, Pl. 13, Figs. 3–3.a; Pl. 14, Fig. 1; Pl. 21, Figs. 1 & 3; Pl. 29, Fig. 2; Pl. 45, Figs. 3–4
- 1974 *Heteroporella lepina* PRATURLON. – RADOICIC, 102–104, Pl. 1, Figs. 1–4
- 1974 *Heteroporella* cf. *lepina* PRATURLON. – CANEROT, Pl. 30, Figs. 8–9
- 1974 *Heteroporella lepina* PRATURLON. – SAINT-MARC, 272–273, Pl. XV, Figs. 2–5
- 1976 *Heteroporella lepina* PRATURLON. – CHERCHI & SCHROEDER, 803, Pl. II, Figs. 5 & 8
- 1976 non *Heteroporella* aff. *lepina* PRATURLON. – CONRAD & PEYBERNES, 185, text–Fig. 9.d
- 1978 *Heteroporella lepina* PRATURLON. – BASSOULLET et al., 130–131, Pl. 14, Figs. 6–8
- 1978 nom. nud. *Neomeris budaense* JOHNSON. – BASSOULLET et al., 175, Pl. 20, Fig. 6 (from JOHNSON, 1969, Pl. 42, Fig. 4)
- 1978 *Heteroporella lepina* PRATURLON. – LAUVERJAT & POIGNANT, 124, Pl. 2, Fig. 3
- 1981 *Heteroporella lepina* PRATURLON (sic, in the Serbian caption; it turns into "*Pseudocyclammina sphaeroidea* GENDROT" in the English caption). – RADOICIC, Pl. 2, Fig. 4
- 1983 *Heteroporella lepina* PRATURLON. – BENGTON & BERTHOU, Pl. 2, Figs. 18–20
- 1985 *Heteroporella lepina* PRATURLON. – SOUQUET et al., Pl. 10, Fig. 19
- 1988 *Heteroporella lepina* PRATURLON. – BERTHOU & BENGTON, Pl. 34, Figs. A (from BENGTON & BERTHOU, 1983, Pl. 2, Fig. 19), B (from BENGTON & BERTHOU, 1983, Pl. 2, Fig. 18) & C (from BENGTON & BERTHOU, 1983, Pl. 2, Fig. 20)
- 1991 *Heteroporella lepina* PRATURLON. –

1993 SCHLAGINTWEIT, Pl. I, Fig. 8  
*Heteroporella lepina* PRATURLON. –  
 SCHLAGINTWEIT, Pl. 2, Fig. 8.

## 2.1. Taxonomic notes on the so-called “*Heteroporella*” species.

When the genus “*Chinianella*” OTT, 1967, was originally described, it was a *nomem nudum* as its type-species, “*Cylindroporella ellenbergeri*” LÉBOUCHÉ & LÉMOINE, 1963, was not validly published, several specimens being illustrated as “cotypes” (LÉBOUCHÉ & LÉMOINE, 1963, Pl. 2, Figs. 1–6). Recently, the latter species has been typified by BERNET-ROLLANDE & LÉMOINE (in GRANIER & DELOFFRE, 1994). Incidentally, the genus could not any longer be considered as invalid though it was thought a junior synonym for *Heteroporella*: on this basis, we reinstate it as *Chinianella* OTT ex GRANIER & DELOFFRE, 1994.

Several species formerly ascribed to the genus *Heteroporella* have characteristics that fit well with the ones given by OTT (1967) in the original diagnosis of the genus *Chinianella*. However, in our opinion, the occurrence or the absence of second order branches on inflated first order branches, i.e. within the fertile branches, are to be considered as diagnostic criteria at the generic level; this is the reason why we introduce a new generic name in addition to the formerly reinstated genus.

### Genus *Chinianella* OTT ex GRANIER & DELOFFRE, 1994 (Pl. 2, Fig. 1–3)

Type-species: *Chinianella ellenbergeri* BERNET-ROLLANDE & LÉMOINE in GRANIER & DELOFFRE, 1994, n. comb. (= *Cylindroporella ellenbergeri* LÉBOUCHÉ & LÉMOINE, 1963, nom. nud., Rev. Micropaléontol., 6/2:93–94, Paris; = *Heteroporella ellenbergeri* (BERNET-ROLLANDE & LÉMOINE in GRANIER & DELOFFRE, 1994) GRANIER & DELOFFRE, 1994, Rev. Paléobiol., 12/1 (1993): 22, not illustrated, Geneva).

1962 nom. nud. *Cylindroporella ellenbergeri* n. sp. – LÉBOUCHÉ, 75, Pl. IX, Figs. 3–4; Pl. X, Fig. 2

1963 nom. nud. *Cylindroporella ellenbergeri* n. sp. – LÉBOUCHÉ & LÉMOINE, 93–94, Pl. 1, Fig. 2; Pl. 2, Figs. 1, 2 (from LÉBOUCHÉ, 1962, Pl. IX, Fig. 4), 3 (from LÉBOUCHÉ, 1962, Pl. IX, Fig. 3) & 4–6 (“Cotypes”: Pl. 2, Figs. 1–6, thin section ALG. 535 & ALG. 536, Ecole des Mines, Paris, France)

1967 nom. nud. *Chinianella ellenbergeri*, n. gen. n. comb. – OTT, 216–217, not illustrated

1968 nom. nud. *Cylindroporella ellenbergeri* LÉBOUCHÉ & LÉMOINE. – NIKLER & SOKAC, 164, Pl. II, Fig. 3; Pl. I, Fig. 7

1969 nom. nud. *Cylindroporella ellenbergeri* LÉBOUCHÉ & LÉMOINE. – SOKAC & NIKLER, 111–112, Pl. VI, Fig. 4

1978 nom. nud. *Heteroporella ellenbergeri* LÉBOUCHÉ &

LÉMOINE. – BASSOULLET et al., 126–127, Pl. 13, Figs. 5 (from LÉBOUCHÉ & LÉMOINE, 1963, Pl. 2, Fig. 6) & 6 (from LÉBOUCHÉ, 1962, Pl. IX, Fig. 4)

1994 *Cylindroporella ellenbergeri*. – BERNET-ROLLANDE & LÉMOINE in GRANIER & DELOFFRE, 22, not illustrated (lectotype: LÉBOUCHÉ & LÉMOINE, 1963, Pl. 2, Fig. 3)

1994 *Heteroporella ellenbergeri* BERNET-ROLLANDE & LÉMOINE, n. comb. – GRANIER & DELOFFRE, 22, not illustrated.

A mended diagnosis: cylindrical main axis bearing alternating fertile and sterile whorls; number of branches might vary from one type of whorl to the other (there are commonly more sterile branches than fertile ones in their respective whorls); calcified fertile branches consisting of inflated primary branches bearing small secondaries ending by open pores; calcified sterile branches rather thin with at least one order of branches.

### Species included:

*Chinianella carpatica* BYSTRICKY, 1968, n. comb. (= *Heteroporella carpatica* BYSTRICKY, 1968, Geol. Zb., XVIII/2(1967):302–304, Bratislava).

1967 nom. nud. *Chinianella zankli* n. sp. – OTT, 219–220, Text-Figs. 5.1–14; Pl. 13, Figs. 2–3 (holotype: Pl. 13, Fig. 2, thin section E 109 a/67, Bayerischen Staatssammlung für Paläontologie und historische Geologie, Munich, Germany)

1968 *Heteroporella carpatica* n. gen. (sic) n. sp. – BYSTRICKY, 302–304, Pl. XV, Figs. 1–5; Pl. XVI, Fig. 4 (holotype: Pl. XV, Fig. 3, thin section Nr. 2237, Geologischen Anstalt der Slowakischen Akademie der Wissenschaften, Bratislava, Slovak Republic)

1968 *Heteroporella zankli*, n. comb. – OTT, 258, not illustrated

1969 nom. nud. *Chinianella zankli* OTT. – JOHNSON, 52, Pl. 37, Figs. 1–14 (from OTT, 1967, Text-Figs. 5.1–14)

1975 *Heteroporella zankli* (OTT). – FLÜGEL, E., Pl. 2, Fig. 5; Pl. 4, Fig. 2

1977 *Heteroporella zankli* (OTT). – ABATE et al., Text-Figs. 3 & 5

1977 Algal assemblage (pars). – ABATE et al., Text-Fig. 4; Pl. 2/7

1979 *Heteroporella zankli* (OTT). – FLÜGEL, E., Pl. 2, Fig. 5

1979 *Heteroporella zankli* (OTT). – SENOWBARI-DARYAN & SCHÄFER, Pl. 1, Fig. 8

1979 *Heteroporella zankli* (OTT). – BYSTRICKY, 336, Pl. 4, Figs. 1–6; Pl. 5, Figs. 1–3; Pl. 6, Fig. 8

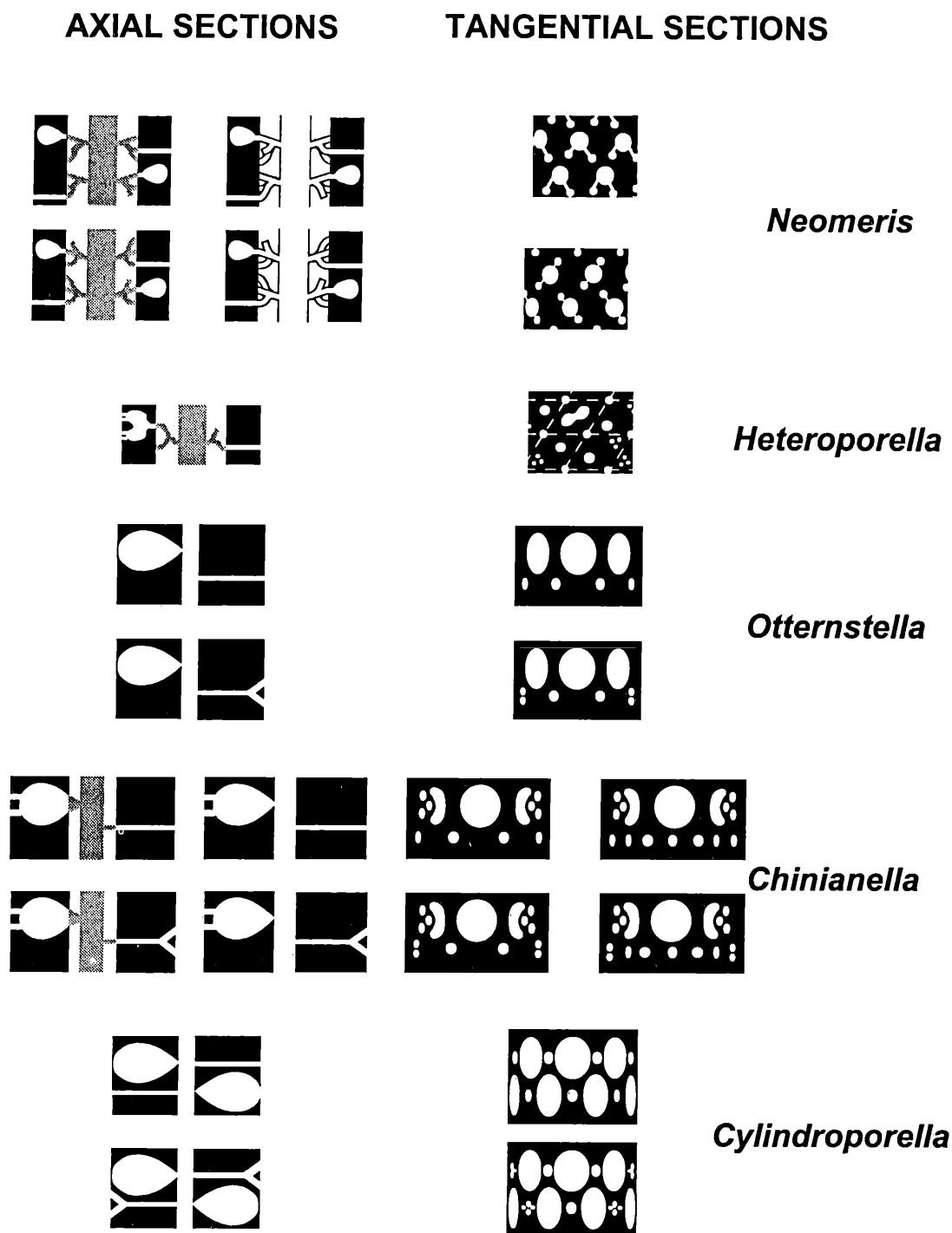
1979 *Heteroporella carpatica* BYSTRICKY. – BYSTRICKY, 333, Pl. 5, Figs. 2 & 4–6; Pl. 6, Fig. 4

1980 *Heteroporella zankli* (OTT). – SENOWBARI-DARYAN, 65, Pl. 29, Fig. 3

1980 *Heteroporella zankli* (OTT). – DULLO, 67, Pl. 10, Fig. 6

1981 *Heteroporella zankli* (OTT). – SADATI, 204, Pl. 58, Fig. 4

1981 *Heteroporella zankly* (OTT) (sic). – DI



**Figure 2:** Comparison of *Neomeris*, *Heteroporella*, *Otternstella*, *Chinianella*, and *Cylindroporella* in axial and tangential sections.

1982 STEFANO in CATALANO & D'ARGENIO, Text-Fig. 28.B  
*Heteroporella zankli* (OTT). – SENOWBARI-DARYAN et al., 169, Pl. 23, Fig. 2

1982 *Heteroporella zankli* (OTT). – WURM, 220, Pl. 33, Fig. 6

1985 *Heteroporella zankli* (OTT). – DI STEFANO & SENOWBARI-DARYAN, 191–193, Pl. III, Figs. 1–2 & 5–6

1992 *Heteroporella* sp. – BERGER & KAEVER, Text-Figs. 2.25.g–h

*Chinianella crosi* OTT, 1968, n. comb. (= *Chinianella crosi* OTT, 1967, nom. nud., Staatssamml. Paläontol. hist. Geol., 7:217–218, Munich; = *Heteroporella crosi* OTT, 1968 (not 1967), Staatssamml. Paläontol. hist. Geol., 8:258, not illustrated, Munich).

1966 nom. nud. *Heteroporella* sp. ind. – CROS & LEMOINE, 168, Pl. 2, Fig. 2

1967 nom. nud. *Chinianella crosi* n. sp. – OTT, 219–220, Text-Figs. 3.1–6; Pl. 13, Fig. 1 (holotype: Text-Fig. 3.6 & Pl. 13, Fig. 1, thin section G 646 a/67,

- Bayerischen Staatssammlung für Paläontologie und historische Geologie, Munich, Germany)
- 1968 *Heteroporella* sp. ind. – BYSTRICKY, 304–305, Pl. XVI, Figs. 1–3; Pl. XVII, Figs. 1–2
- 1968 *Heteroporella croisi*, n. comb. – OTT, 258, not illustrated
- 1972 *Heteroporella croisi* (OTT). – FENNINGER & HOLZER, 118, Pl. 12, Fig. 2
- 1978 *Heteroporella croisi* (OTT). – BASSOULLET et al., 125–126, Pl. 13, Fig. 4 (from OTT, 1967, Pl. 13, Fig. 1)
- Chinianella macropora* DI STEFANO ex DI STEFANO & SENOWBARI-DARYAN, 1985, n. comb. (= *Heteroporella macropora* DI STEFANO ex DI STEFANO & SENOWBARI-DARYAN, 1985, Geol. Rom., XXIV: 193–194, Rome)
- 1981 nom. nud. *Heteroporella macropora*. – DI STEFANO in CATALANO & D'ARGENIO, Text-Fig. 28.D
- 1985 *Heteroporellamacropora* n. sp. – DI STEFANO & SENOWBARI-DARYAN, 193–194, Text-Fig. 8; Pl. I, Figs. 1–8 (holotype: Pl. I, Fig. 1, thin section Si 26.b, Coll. A 59, Museum of Geology, University of Palermo, Italy)
- Chinianella micropora* DI STEFANO ex DI STEFANO & SENOWBARI-DARYAN, 1985, n. comb. (= *Heteroporella micropora* DI STEFANO ex DI STEFANO & SENOWBARI-DARYAN, 1985, Geol. Rom., XXIV: 195–196, Rome)
- 1981 nom. nud. *Heteroporella micropora*. – DI STEFANO in CATALANO & D'ARGENIO, Text-Fig. 28.E
- 1985 *Heteroporellamicropora* n. sp. – DI STEFANO & SENOWBARI-DARYAN, 195–196, Text-Figs. 7 & 9–10; Pl. II, Figs. 1–9 (holotype: Pl. II, Fig. 1, thin section Si 24.b, Coll. A 66, Museum of Geology, University of Palermo, Italy).
- Genus *Otternstella* GRANIER, n. gen.**  
(Pl. 2, Fig. 4–5)
- Type-species: *Otternstella lemmensis* BERNIER, 1971, n. comb. (= *Cylindroporella lemmensis* BERNIER, 1971, Géobios, 4/3:177–178, Lyon).
- Diagnosis: cylindrical main axis bearing alternating fertile and sterile whorls; number of branches comparable in the two kinds of whorls; fertile branches consisting of a single order of branch, inflated, and closed in their distal part; calcified sterile branches rather thin with at least one order of branches.
- 1971 *Cylindroporella lemmensis* n. sp. – BERNIER, 177–178, Pl. A, Figs. 1–8 (holotype: Pl. A, Fig. 1, thin section PC 261,8, Office National de Gestion des Collections Paléontologiques, Villeurbanne, France)
- 1975 *Heteroporella fourcadei* n. sp. – JAFFREZO & BENEST, 65–67, Pl. 7, Figs. 1–11 (holotype: Pl. 7, Fig. 2, sample 96, FSL 420.004, Office National de Gestion des Collections Paléontologiques, Villeurbanne, France; paratype: Pl. 7, Fig. 1, sample 160 P)
- 1978 *Heteroporella lemmensis* BERNIER, n. comb. – BASSOULLET et al., 129, Pl. 14, Figs. 1 (from BERNIER, 1971, Pl. A, Fig. 1), 2 (from JAFFREZO & BENEST, 1975, Pl. 7, Fig. 1), 3 (from JAFFREZO & BENEST, 1975, Pl. 7, Fig. 2), 4 (from BERNIER, 1971, Pl. A, Fig. 2)
- 1978 *Heteroporella lemmensis* (BERNIER). – GARCIA HERNANDEZ, Pl. XVI, Fig. 19
- 1981 *Heteroporella lemmensis* (BERNIER). – JAFFREZO, 250, Pl. XVI, Figs. 6–8
- 1982 *Cylindroporella* cf. *arabica* ELLIOTT. – FELBER et al., Text-Fig. 4
- 1984 *Heteroporella lemmensis* (BERNIER). – BERNIER, 466, Pl. 1, Figs. 1 (from BERNIER, 1971, Pl. A, Fig. 1), 2, 3 (from BERNIER, 1971, Pl. A, Fig. 2) & 4
- 1984 *Heteroporella lemmensis* (BERNIER). – MICHAUD, Pl. 2, Figs. 1 & 4–6
- 1985 *Heteroporella lemmensis* (BERNIER). – BENEST, Pl. 18, Figs. 8–11
- 1987 *Heteroporella lemmensis* (BERNIER). – MICHAUD, Pl. 18, Figs. 3–5, 6 (FROM MICHAUD, 1984, Pl. 2, Fig. 1), 7 & 9
- 1987 *Heteroporella lemmensis* (BERNIER). – GRANIER, 136, Pl. 33, Figs. a–b, d & g
- 1988 *Heteroporella lemmensis* (BERNIER). – DELOFFRE, Pl. 8, Figs. 7 (from JAFFREZO & BENEST, 1975, Pl. 7, Fig. 1) & 9 (from JAFFREZO & BENEST, 1975, Pl. 7, Fig. 2)
- 1988 *Heteroporella lemmensis* (BERNIER). – GRANIER, 30, Pl. 2, Figs. a–b, d & g (from GRANIER, 1987, Pl. 33, Figs. a–b, d & g)
- 1991 (non) *Heteroporella lemmensis* (BERNIER). – OKLA, 188, Pl. 1, Fig. 9; Pl. 2, Figs. 1–3.
- Species included:**
- Otternstella bifurcata* BERNIER, 1984, n. comb. (= *Heteroporella bifurcata* BERNIER, 1984, Docum. Lab. Géol. Lyon, 91/2:464, Lyon).
- 1984 *Heteroporella bifurcata* n. sp. – BERNIER, 464, Pl. 1, Fig. 7 (holotype: Pl. 1, Fig. 7, thin section TT 60b, FSL 133.538, Office National de Gestion des Collections Paléontologiques, Villeurbanne, France)
- Otternstella deloffrei* GRANIER, 1987, n. comb. (= *Heteroporella deloffrei* GRANIER, 1987, Mém. Sci. Terre, Univ. P. & M. Curie, 87/49:135, Paris).
- 1987 *Heteroporella deloffrei* n. sp. – GRANIER, 135, Pl. 34, Figs. a–b (holotype: Pl. 34, Fig. a, thin section BT 98, FSL 411.117, Office National de Gestion des Collections Paléontologiques, Villeurbanne, France; paratype: Pl. 34, Fig. b)
- 1988 *Heteroporella deloffrei* GRANIER. – GRANIER, 31–32, Pl. 3, Figs. a–b (from GRANIER, 1987, Pl. 34, Figs. a–b)
- Otternstella jaffrezoi* BERNIER, 1984, n. comb. (= *Heteroporella jaffrezoi* BERNIER, 1984, Docum. Lab. Géol. Lyon, 91/2:465, Lyon).
- 1984 *Heteroporella jaffrezoi* n. sp. – BERNIER, 465, Pl. 2, Figs. 1–5 (holotype: Pl. 2, Fig. 1, thin section PC 199b, FSL 139.539; paratypes: Pl. 2, Fig. 2, thin section MO 69, FSL 139.541; Pl. 2, Fig. 4, thin section TT 147, FSL 139.540, Office National de Gestion des Collections Paléontologiques, Villeurbanne, France)
- 1991 *Heteroporella jaffrezoi* BERNIER. – OKLA, 186–188, Pl. 1, Figs. 4–8

*Otternstella morillonensis* BERNIER, 1984, n. comb. (= *Heteroporella morillonensis* BERNIER, 1984, Docum. Lab. Géol. Lyon, 91/2:468, Lyon)

1984 *Heteroporella morillonensis* n. sp. – BERNIER, 468, Pl. 2, Figs. 6–9 (holotype: Pl. 2, Fig. 6, thin section MO 9, FSL 133542, Office National de Gestion des Collections Paléontologiques, Villeurbanne, France).

*Heteroporella fourcadei* JAFFREZO & BENEST, 1975, and *Heteroporella zankli* OTT, 1968 (not 1967), are respectively junior synonyms for *Otternstella lemmensis* BERNIER, 1971, n. comb., and *Chinianella carpatica* BYSTRICKY, 1968, n. comb. (GRANIER & DELOFFRE, 1994). In addition, according to the International Code of Botanical Nomenclature (1988), “*Heteroporella israelense*” JOHNSON, 1968, “*Heteroporella lemoinei*” DRAGASTAN, 1970, and “*Heteroporella potiguarensis*” SRIVASTAVA, 1982, are nomina nuda (GRANIER & DELOFFRE, 1994).

The 5 remaining species, *Heteroporella ? anici* NIKLER & SOKAC ex BASSOULLET et al., 1978 (= *Cylindroporella anici* NIKLER & SOKAC, 1965, nom. nud.), *Heteroporella graeca* CONRAD et al., 1981, *Heteroporella ? lusitanica* (RAMALHO, 1970) BASSOULLET et al., 1978, *Heteroporella ? paucicalcareia* CONRAD, 1970, and *Heteroporella tominae* BUCUR, 1993, are left in open nomenclature. At first sight, fertile branches of *Heteroporella ? anici* NIKLER & SOKAC ex BASSOULLET et al., 1978, and of *Cylindroporella ? lusitanica* RAMALHO, 1970, consist of vesicular branches ending by an open pore. One of the RAMALHO’s figures

(RAMALHO, 1970, Pl. II, Fig. 1, bottom) suggests that in *Cylindroporella ? lusitanica* the fertile branches are connected to the sterile ones in a pattern similar to the one known in the genus *Montiella* (MUNIER-CHALMAS ex L. & J. MORELLET, 1922). *Heteroporella ? graeca* CONRAD et al., 1981, yields “ampoules piriformes (...) donnant chacune naissance à un mince ramule de second ordre”, i.e. genuine acrophorous pores (only one order !). Finally, *Heteroporella ? tominae* BUCUR, 1993, is possibly a representative of the genus *Cymopolia* LAMOUROUX, 1816.

### 3. Conclusion

Among the above mentioned species, 5 are left in open nomenclature and need to be closely reexamined.

*Heteroporella* CROS & LEMOINE ex PRATURLON, 1967, emend., is a singular genus which includes a single species; it is ascribed to the Dasycladaceae, tribe (?) Neomereae.

*Chinianella* OTT ex GRANIER & DELOFFRE, 1994, and *Otternstella* GRANIER, n. gen., with 5 representatives each, are ascribed to the Acetabulariaceae, tribe Uterieae, together with *Angioporella* (MASSE, CONRAD & RADOICIC, 1973) and *Uteria* (MICHELIN, 1845). There are two different “stocks”: *Chinianella* is found in Upper Triassic and Lower Jurassic rocks while *Otternstella* is known in Upper Jurassic and Lowermost Cretaceous series (Table 1).

SYSTEM	TRIASSIC										JURASSIC					CRETACEOUS											
						LIAS					DOGGER		MALM			NEOC.		SENONIAN									
	SC	A	L	CAR	NORIAN	R	H	SI	PL	TO	A	BAJ	BA	CA	OX	KI	PO	BE	VA	HA	B	APT	ALBI	CE	T	S	CAMP

**Chinianella**

- C. carpatica*, n. comb.
- C. crosi*, n. comb.
- C. ellenbergeri*, n. comb.
- C. macropora*, n. comb.
- C. micropora*, n. comb.

**Heteroporella**

*H. lepina*

- H. ? anici*
- H. ? graeca*
- H. ? paucicalcareia*
- H. ? tominae*

**Otternstella, n. gen.**

- O. bifurcata*, n. comb.
- O. deloffrei*, n. comb.
- O. jaffrezi*, n. comb.
- O. lemmensis*, n. gen., n. comb.
- O. morillonensis*, n. comb.

**Cylindroporella**

*C. ? lusitanica*

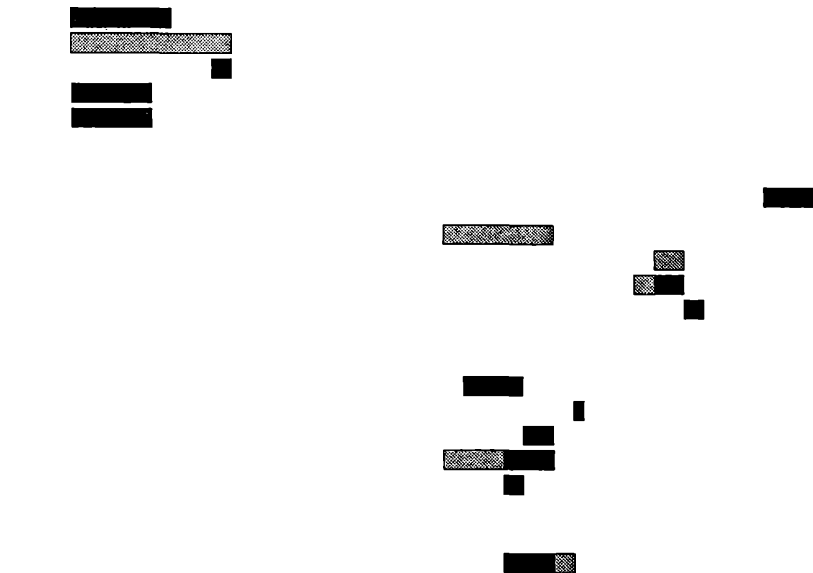


Table 1: Stratigraphic distribution of the species quoted in this article.

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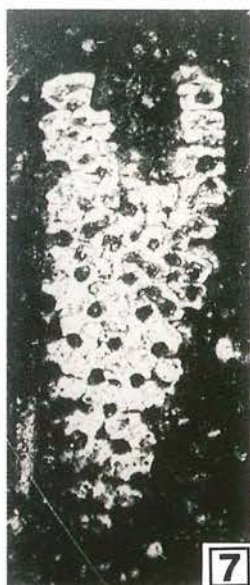
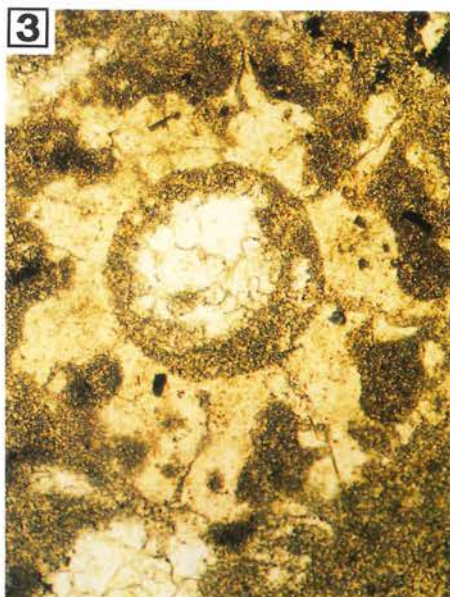
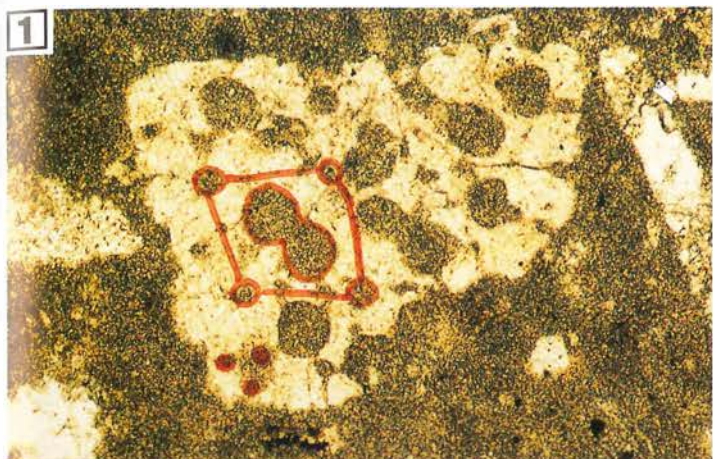
## PLATE 1

Figs. 1–5. *Heteroporella lepina* PRATURLON, 1967, emend. – Lisbon area, Cenomanian.

- Fig. 1. Oblique section through three successive whorls; note the individual shields with the largest divided pores, surrounded by 4 undivided pores; branches are filled in with micrite. – Sample BERTHOU QF9 1984: x 100.
- Fig. 2. Oblique section with the axial cavity; branches are filled in with pyrite. – Sample BERTHOU Gare de Cacem 22: x 63.
- Fig. 3. Transverse section through a whorl; branches are filled in with micrite. – Sample BERTHOU Gare de Cacem 22: x 100.
- Fig. 4. Oblique tangential section; branches are filled in with micrite. – Sample BERTHOU 33AA Cacem Mouro: x 100.
- Fig. 5. Oblique section illustrating sequences of rhombohedra; branches are filled in with a calcite cement. – Sample BERTHOU RIQ17 1983: x 63.
- Fig. 6. Oblique section through four successive whorls of *Heteroporella lepina* PRATURLON, 1967, emend.; note the transition from one order of pores to the other one within the largest divided pores. – Outer Dinarides, Lower Turonian, Sample PRATURLON D39/7 (from PRATURLON, 1967, Pl. 52, Fig. 3): x 65.
- Fig. 7. Holotype of *Heteroporella lepina* PRATURLON, 1967, emend.; oblique section. – “Occhio di Bue”, Carpineto Romano, Lepini Montains, Upper Cenomanian – Lower Turonian, Sample PRATURLON D39/1 (from PRATURLON, 1967, Pl. 51, Fig. 3): x 40.
- Fig. 8. Tangential section of *Heteroporella lepina* PRATURLON, 1967, emend., illustrating sequences of rhombohedra. – “Occhio di Bue”, Carpineto Romano, Lepini Montains, Upper Cenomanian – Lower Turonian, Sample PRATURLON D39/4 (from PRATURLON, 1967, Pl. 51, Fig. 2). x 40.



PLATE 1





**PLATE 2**

Figs. 1–3. *Chinianella ellenbergeri* BERNET-ROLLANDE & LEMOINE in GRANIER & DELOFFRE, 1994, n. comb. – Candors, Lotharingien.

Fig. 1. *Chinianella* microfacies (from LÉBOUCHÉ & LEMOINE, 1963, Pl. 1, Fig. 2): x 6.5.

Fig. 2. Tangential section (from LÉBOUCHÉ & LEMOINE, 1963, Pl. 2, Fig. 6): x 20.

Fig. 3. Various oblique sections, arrows indicate secondary branches on inflated primary branches (from LÉBOUCHÉ, 1962, Pl. IX, Fig. 4): x 18.

Figs. 4–5. *Otternstella lemmensis* BERNIER, 1971, n. gen., n. comb.

Fig. 4. Oblique section – Province of Alicante, Portlandian, Sample FOURCADE G.631: x 100.

Fig. 5. Transverse section through a fertile whorl – Algarve, Berriasian, Sample BERTHOU JV 1–3: x 100.

PLATE 2

