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A rare comatulid crinoid, *Semiometra petitclerci* (CAILLET, 1923), from the Upper Oxfordian of Poland

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ABSTRACT:

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A small faunule of feather stars or comatulids (free-living crinoids of the order Comatulida A.H. CLARK, 1908) is recorded from Upper Oxfordian strata (Bielawy/Wapienno sequence) in the Couiavia region, north-western Central Poland. It represents a single, very small-sized species, *Semiometra petitclerci* (CAILLET, 1923), hitherto an extreme rarity in the Jurassic sequences of France and Germany. The present record extends the geographic distribution of the species in Europe, to evidence a wider range of the genus *Semiometra* GISLÉN, 1924, prior to its fairly common occurrence and higher diversity during the Late Cretaceous.

Key words: Crinoidea, Comatulida, Taxonomy, Upper Jurassic, Oxfordian, Poland.

INTRODUCTION

Subject of the present note is a small faunule of free-living (comatulid) crinoids from Upper Jurassic strata in Poland, assignable to the genus *Semiometra* GISLÉN, 1924, which typically contains common Late Cretaceous species in Europe (see P.H. CARPENTER 1881; GISLÉN 1924, 1925; WIENBERG RASMUSSEN 1961, 1978; JAGT 1999). However, there are also extremely rare records from Albian limestones of Texas (see PECK & WATKINS 1972, 1975). In the Jurassic, the genus *Semiometra* is represented by a single Middle Jurassic (Bathonian) species, and another one from the Upper Jurassic (see P.H. CARPENTER 1880, CAILLET 1923, WIENBERG RASMUSSEN 1978). The latter is *Semiometra petitclerci* (CAILLET, 1923), established on two very small-sized cups (3 mm in diameter) and one centrodorsal from Lower Oxfordian marls at Authoison near Belfort, eastern France. These three specimens apparently are the sole material of this species ever reported. A find of new material (three well-preserved cups) in Oxfordian strata of Poland therefore contributes much to the characterisation of the species which so far was presented only in a hardly accessible journal. On the other hand, it adds to data on the occurrence of comatulid crinoids in Jurassic sequences of Poland, from which they have to date been known solely (RADWAŃSKA 2005) in the Lower Kimmeridgian of the Holy Cross Mountains, Central Poland (at Małogoszcz; for location see Text-fig. 1).

GEOLOGIC SETTING

The material studied (see Pls 1-2) comes from the Upper Oxfordian biohermal sequence exposed in the huge Bielawy Quarry within the framework of halokinetic Zalesie Anticline, Couiavia region in north-western Central Poland (see Text-fig. 1). The regional position of this anticline, the structure of the sponge-cyanobacterial bioherm (see Text-fig. 2) and its faunal content, as well as the history of their studies, have recently been outlined in accounts on some special fossil groups encountered in this biohermal sequence, and having been exposed either in the Bielawy Quarry (RADWAŃSKA 2004) or the nearby Wapienno Quarry (RADWAŃSKA & RADWAŃSKI 2003).

The marly set at the Bielawy section, which yielded the comatulids studied represents a talus of the bioherm core, from where the shelly material was swept by currents and/or mass movements towards the basin facies. The fossil assemblage, except for ubiquitous sponges and brachiopods (see KRAWCZYŃSKI 2005), contains also some rare items, such as the aberrant starfish *Sphaeraster* (see RADWAŃSKA 2003b), large echinoids *Rhabdocidaris* and *Plegiocidaris* (see RADWAŃSKA 2003a), and the peculiarly shaped tube-dwelling polychaetes *Pannoserpula* (see RADWAŃSKA 2004). Moreover, cysts of parasitic copepods in echinoid tests (see RADWAŃSKA & RADWAŃSKI 2005) have been recorded. Free-living comatulid crinoids were unknown so far from the Bielawy/Wapienno sequence.

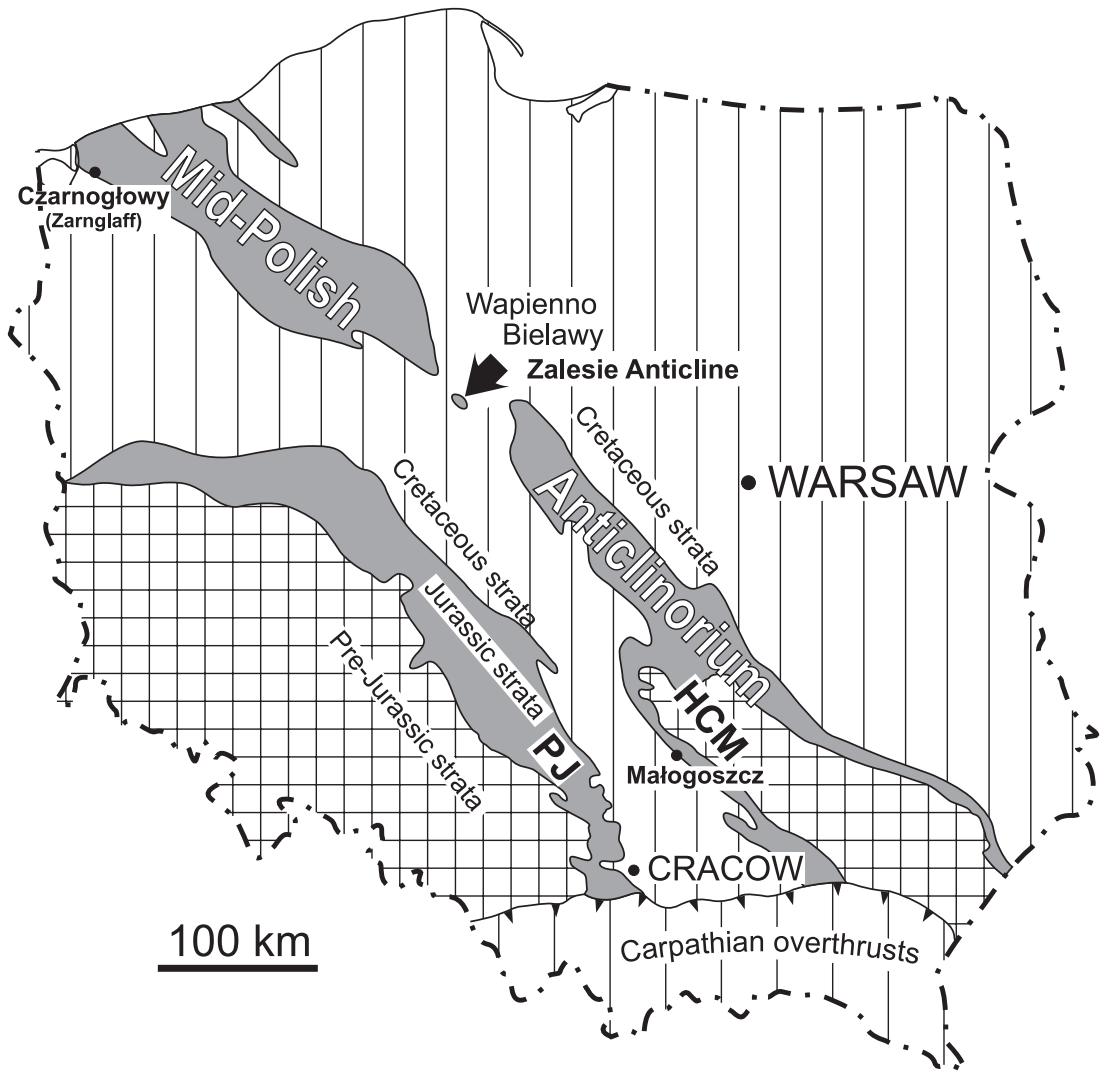

Fig. 1. Location of the Bielawy/Wapienno sequence in the Zalesie Anticline, Couiavia region, Central Poland; geological map adopted from MATYJA & WIERZBOWSKI (2002, fig. 1). Jurassic strata are shaded; PJ – Polish Jura Chain, HCM – Holy Cross Mountains

STRATIGRAPHIC AGE

The stratigraphic age of the part of the talus discussed, exposed at the highest level at Bielawy Quarry (arrowed in Text-fig. 2; Member B_5 of MATYJA & *al.* 1985), is assigned (MATYJA & WIERZBOWSKI 2002) to the Upper Oxfordian Planula Zone, close to the base of the Galar Subzone, just below Unit I of MATYJA & WIERZBOWSKI (2002, p. 412 and figs 3-4; see also RADWAŃSKA 2004, p. 37).

Repository

All comatulid material described here is housed in the Department of Palaeontology, Faculty of Geology, University of Warsaw. It is kept under the collection numbers preceded by the character C (comatulids), followed by a letter symbol Ox indicative of its Oxfordian age.

SYSTEMATIC ACCOUNT

The taxonomic hierarchy is according to WIENBERG RASMUSSEN (1978), modified at the order/suborder ranks (see SIMMS 1988, MESSING 1997), as used by JAGT (1999, pp. 83-84; and *personal communication*).

Class Crinoidea MILLER, 1821
Subclass Articulata MILLER, 1821
Order Comatulida A.H. CLARK, 1908
Suborder Comatulidina A.H. CLARK, 1908
Superfamily Notocrinoidea MORTENSEN, 1918
Family Notocrinidae MORTENSEN, 1918

Genus *Semiometra* GISLÉN, 1924

TYPE SPECIES: *Antedon impressa* P.H. CARPENTER, 1881; *OD.*

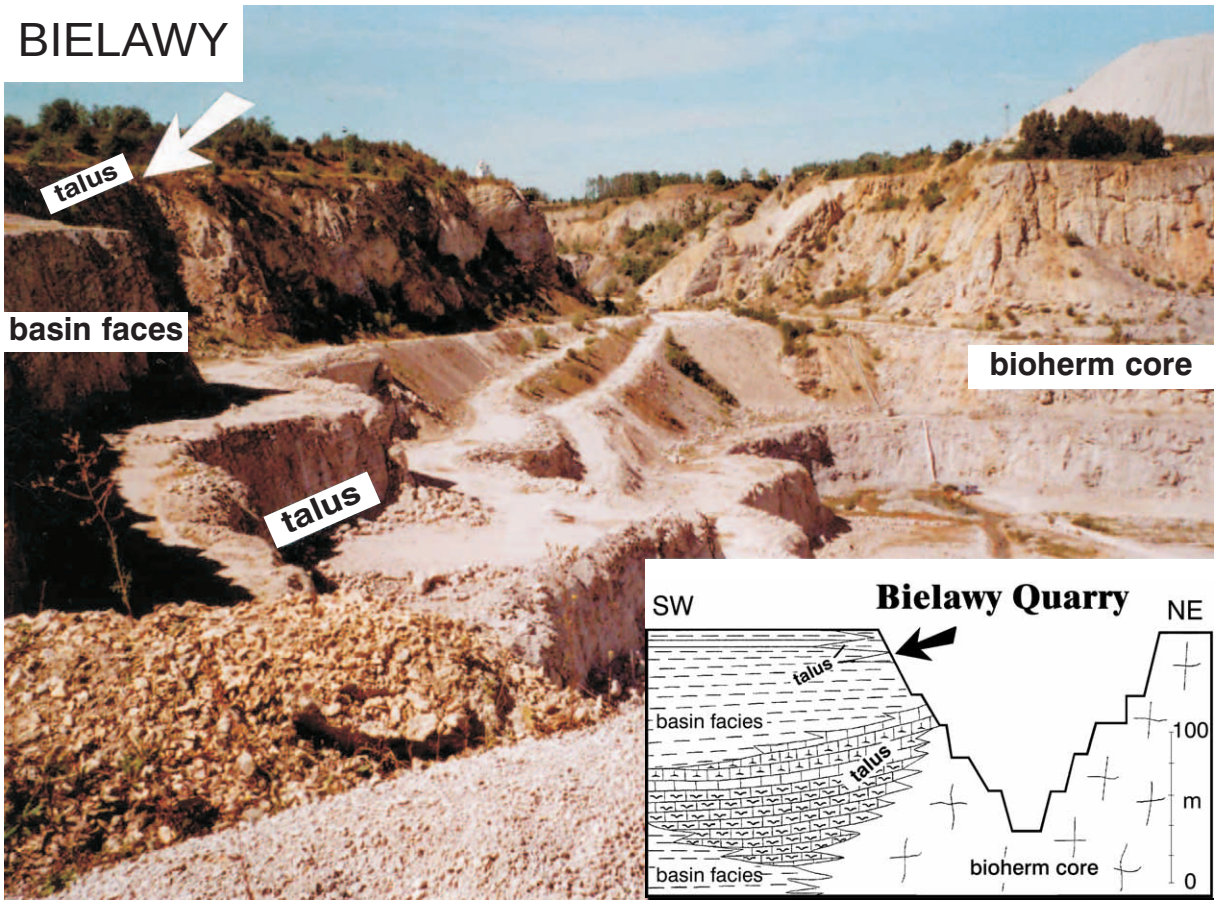

Fig. 2. General view of the Bielawy Quarry, Couiavia region in north-western Central Poland, to show the structure of the sponge-cyanobacterial biohermal buildup, with ubiquitous fossils in the upper part of talus (arrowed), suggested to be protected as a GeoSite

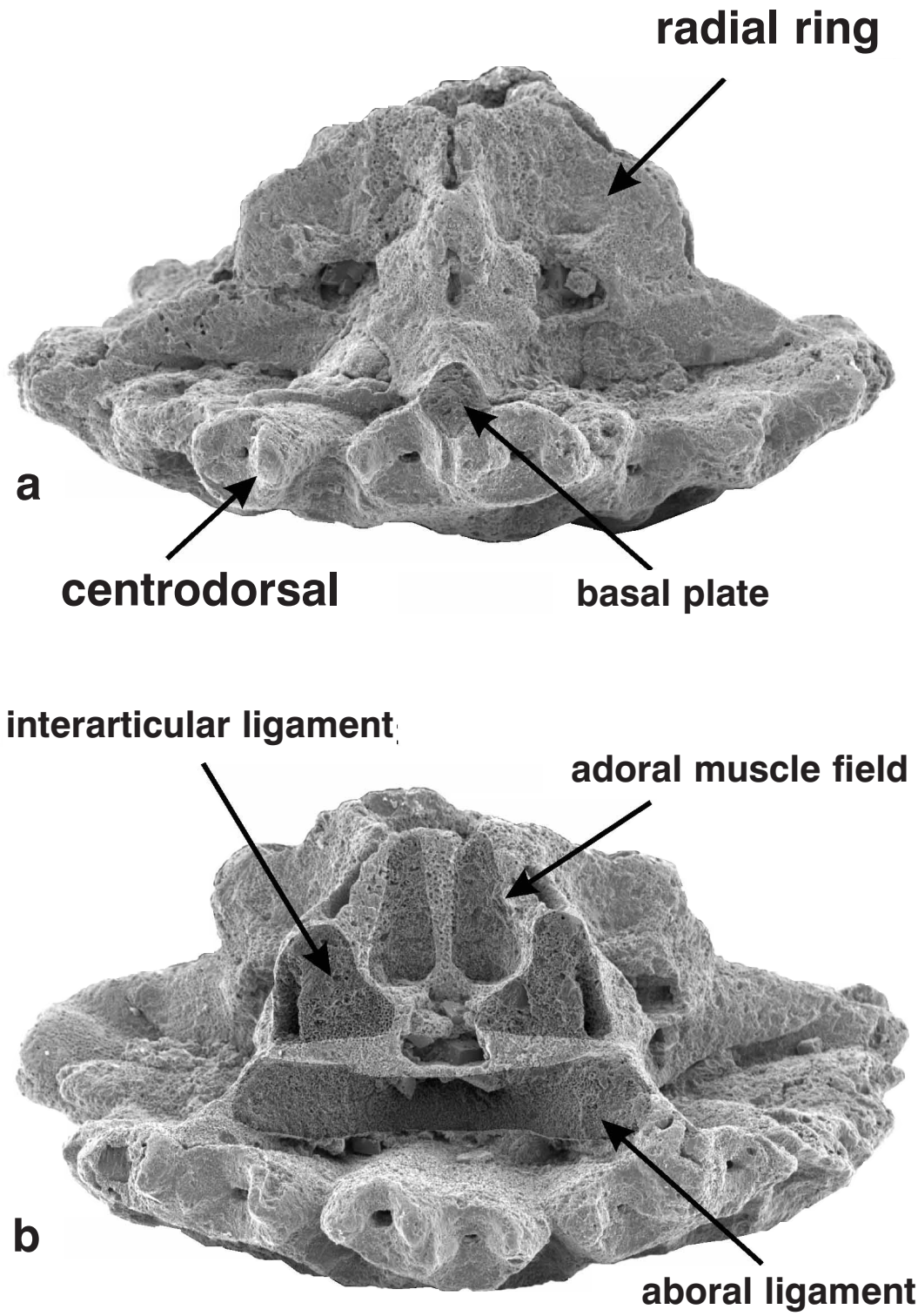

Fig. 3. *Semiometra petitclerci* (Caillet, 1923) from Bielawy, lateral view of the cup (Catalogue number COx/001): **a –** Interradial view, to show proportion between the radial ring and centrodorsal, and position of basal plates; **b** – Radial view, to show details of the radial plate; × 34

REMARKS: The genus *Semiometra* GISLÉN, 1924, ranges from the Middle Jurassic (Bathonian) to the Upper Cretaceous, possibly to the Eocene (see GISLÉN 1924, WIENBERG RASMUSSEN 1978, JAGT 1999). The Jurassic records are confined to two species transferred by WIENBERG RASMUSSEN (1978, p. *T*906): *Actinometra abnormis* P.H. CARPENTER, 1880 (Bathonian of England) and *Antedon petitclerci* CAILLET, 1923 (Lower Oxfordian of France), the former represented only by its holotype, the latter by few specimens.

Semiometra petitclerci (CAILLET, 1923)
(Text-fig. 3; Pl. 1, Figs 1a-1f; Pl. 2, Figs 1-2)

1923. *Antedon Petitclerci* nov.sp.; H. CAILLET, p. 125, pl. 1, figs 1-3.
1978. *Semiometra petitclerci* (CAILLET); H. WIENBERG RASMUSSEN, p. *T*906.
2003. *Semiometra ithiensis* n.sp.; C. HELM, M. REUTER & I. SCHÜLKE, p. 519, text-fig. 4A-E, text-fig. 5A-D.

MATERIAL: Three cups; all from the Bielawy Quarry (Catalogue numbers COx/001-COx/003).

DESCRIPTION: Centrodorsals small (attaining 3.8 mm in diameter), low (Text-fig. 3; Pl. 1, Figs 1b-1c; Pl. 2, Figs 1b-1c, 2b-2c), slightly bowl-shaped with a flat dorsal (aboral) pole (Pl. 1, Figs 1e-1f; Pl. 2, Figs 2d-2e). Ventral (adoral) side of centrodorsal slightly concave (Text-fig. 3; Pl. 1, fig. 1c; Pl. 2, Figs 2b-2c). Edges of centrodorsal very thin and limited to a single irregular whorl of cirrus sockets (Text-fig. 3). Centrodorsal more or less circular in outline, ragged at margin (Pl. 1, Fig. 1e; Pl. 2, Fig. 2d). Dorsal star (Pl. 1, Fig. 1f; Pl. 2, Fig. 2e) prominent and composed of narrow, deep slits; surrounded by relatively wide cirrus-free area. Remaining part of aboral surface covered by cirrus sockets, numbering about 27 in total. Cirrus sockets closely spaced, transversally oval in outline, moderately deep and adorned with small cirral lumen (Pl. 1, Fig. 1d). Basals distinctly exposed at interradial points (Text-fig. 3a; Pl. 1, Fig. 1d; Pl. 2, Figs 1c, 2c). Radial ring (Text-fig. 3; Pl. 1, Figs 1b-1c; Pl. 2, Figs 1b-1c, 2b-2c) high, at least three times higher than centrodorsal. Radials trapezoidal and tall. Articular facets of radials deeply concave and reaching centrodorsal edge only interradially, leaving large free areas of adoral centrodorsal surface (Pl. 1, Fig. 1a; Pl. 2, Figs 1a, 2a). Aboral ligament pit low, wide and shallow (Text-fig. 3b). Interarticular ligament pits broadly triangular and shallow (Text-fig. 3b). Adoral muscle fields relatively deeply incised and tall, subtriangular (Text-fig. 3b; Pl. 1, Fig. 1b; Pl. 2, Fig. 2b). Radial cavity narrow, tube-shaped, extended at upper edge along interradial suture (Pl. 1, Fig. 1a).

REMARKS: The cups studied match those described from the Oxfordian of eastern France by CAILLET (1923) as "*Antedon Petitclerci* nov.sp.". Due to the general shape of the centrodorsal with a characteristic dorsal star, tall and deeply concave radials reaching the centrodorsal edge in interradial points only, and the presence of large free areas of adoral centrodorsal surface, this species was assigned to the genus *Semiometra* GISLÉN, 1924, by WIENBERG RASMUSSEN (1978, p. *T*906).

The species *Semiometra petitclerci* (CAILLET, 1923) was established upon a relatively rare material, consisting of one centrodorsal and two complete cups. Although CAILLET (1923, p. 126) suggested that some small radial and brachial ossicles, coming from the same strata, might belong to this species, there is no evidence of such an assumption. Absence of illustration, and presence of abundant small-sized ossicles of other crinoids, do not allow to verify that report.

The specimens collected differ from those of the type series presented by CAILLET (1923) by their less convex centrodorsal. The range of variation of the centrodorsal, from bowl-shaped to hemispherical, should be treated as intraspecific, as has been documented (see JAGT 1999) in Late Cretaceous congeners. The limited number of specimens does not allow for further analysis of the relationship between the Polish and French material.

To the synonymy included is the species *Semiometra ithiensis*, established recently by HELM & *al.* (2003) on a single cup from the Middle Oxfordian of northwest Germany (Lower Saxony). The feature of relatively low radials, regarded by HELM & *al.* (2003, p. 522) as distinctive from *S. petitclerci* (CAILLET, 1923) is, in the present author's opinion, of the phenotypic nature of the latter species.

However, although few specimens are currently available, the geographic distribution of the species *Semiometra petitclerci* (CAILLET, 1923) was more extensive than assumed previously (cf. WIENBERG

RASMUSSEN 1978). Still, it must be regarded as a rarity in Oxfordian sequences of Europe.

From the other Jurassic species, *Semiometra abnormis* (P.H. CARPENTER, 1880) of the Bathonian of England, the species studied differs by having a much larger number of cirrus sockets on the centrodorsal (see P.H. CARPENTER 1880, pl. 5, figs 8a-8c).

The studied specimens of *Semiometra petitclerci* (CAILLET, 1923), differ from those of the type species, *S. impressa* (P.H. CARPENTER, 1881) from the Chalk of southern Sweden, by its thinner and more circular centrodorsal, by having basals discernible in interradial points, as well as by the more inclined and more concave articular facets of radial plates, which causes the free areas of the ventral (adoral) centrodorsal surface in the front of these facets to become distinctly deeper (see P.H. CARPENTER 1881, pl. 6, figs 8-9; WIENBERG RASMUSSEN 1961, pl. 45, fig. 1). This species has subsequently been reported by JAGT (1999) from the Campanian of the Netherlands and northeast Belgium.

Neither the species *Semiometra petitclerci* (CAILLET, 1923) nor its genus have hitherto been reported from Poland.

OTHER CRINOIDS FROM THE BIELAWY/ WAPIENNO SEQUENCE

It is noteworthy that diverse crinoids have long been known from the Bielawy/Wapienno sequence, exposed at small quarries since the mid-19th century, when reported under the German name *Hansdorf bei Inowrazlaw* (see GALLINEK 1896; RADWAŃSKA & RADWAŃSKI 2003, p. 303).

The cyrtocrinid *Plicatocrinus tetragonus* JAEKEL, 1892, originally described in a classical monograph by JAEKEL (1892, pl. 25, figs 1-17), was discussed and refigured in the *Treatise on Invertebrate Paleontology* by WIENBERG RASMUSSEN (1978, p. *T*829 and fig. 557/1h-1j); another species, *Tetracrinus langenhani* JAEKEL, 1892, is one of the better known (see JAEKEL 1892, pl. 28, figs 1-6) from Oxfordian sequences of Poland.

Larger-sized stalked crinoids are represented by diverse isocrinids which have not yet been studied in detail (see GALLINEK 1896; RADWAŃSKA & RADWAŃSKI 2003, p. 304).

The mass-occurring large-sized remains of the enigmatic genus *Cyclocrinus* D'ORBIGNY, 1850, interpreted as supposedly root fragments, have been the subject of an eco-taphonomic analysis by RADWAŃSKA & RADWAŃSKI (2003).

To note, the ubiquitous material of disarticulated stalked crinoids from the Bielawy/Wapienno sequence is being currently studied by the present author.

FINAL REMARKS

The occurrence of *Semiometra petitclerci* (CAILLET, 1923) in the Couiavia region of Poland markedly extends the geographic distribution of this comatulid, so far known only from eastern France and northwest Germany. It is guessed that its occurrence in the Oxfordian strata in Europe may really be more common than presently known; the minor size could cause its specimens easily overlooked.

On the other hand, a wider distribution of the genus *Semiometra* GISLÉN, 1924, in Upper Jurassic sequences of Europe suggests its regional spread to have occurred earlier than previously thought, that is prior to its wider range during the Late Cretaceous, when it reached its highest species diversity.

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PLATE 1

Semiometra petitclerci (CAILLET, 1923)

1a – Adoral view of cup; **1b** – Lateral view of cup, to show radial plate; **1c** – Lateral view of cup, to show basal plate; **1d** – Close-up of cup, to show basal plate; **1e** – Aboral view of centrodorsal; **1f** – Close-up of aboral side of centrodorsal, to show dorsal star; COx/001

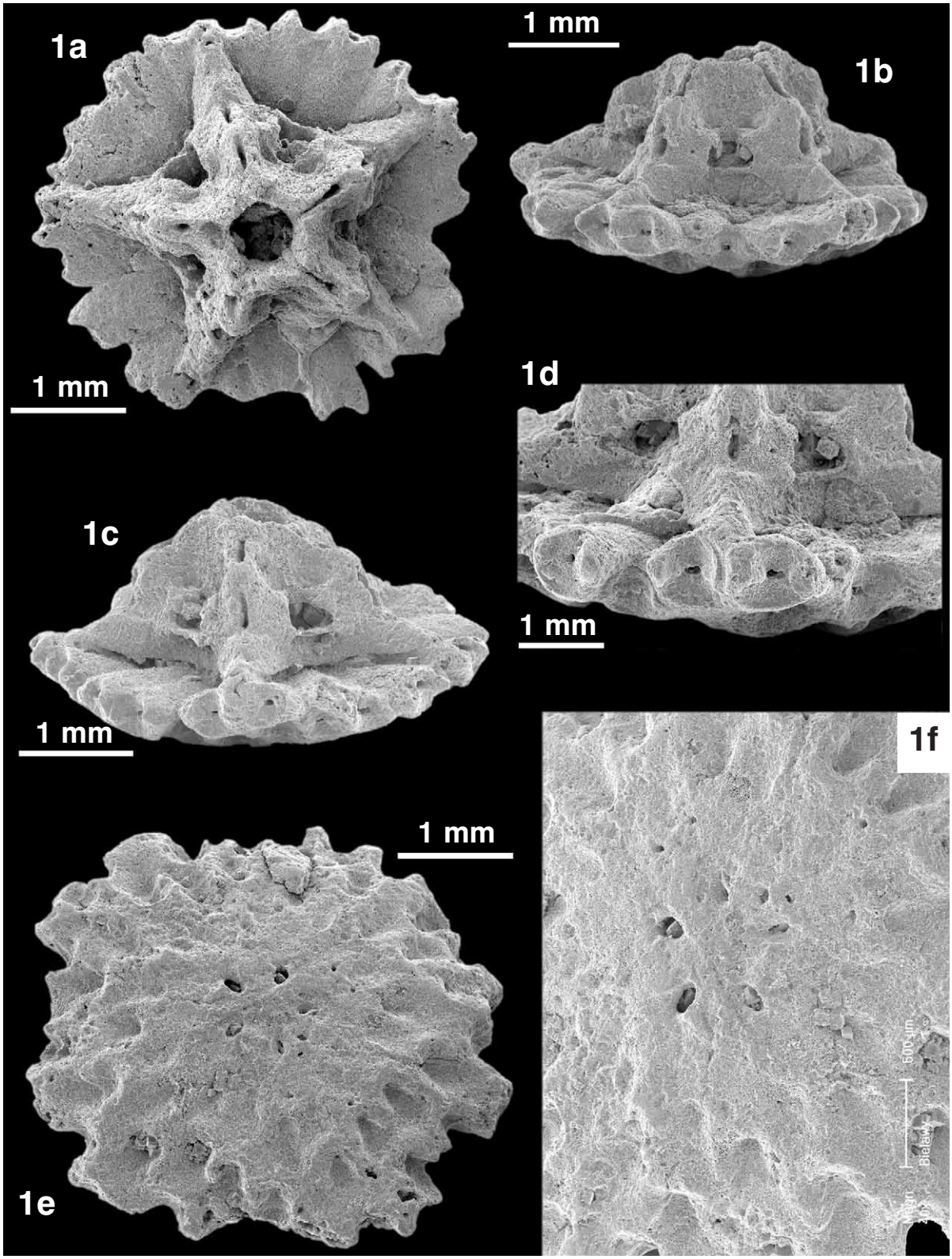
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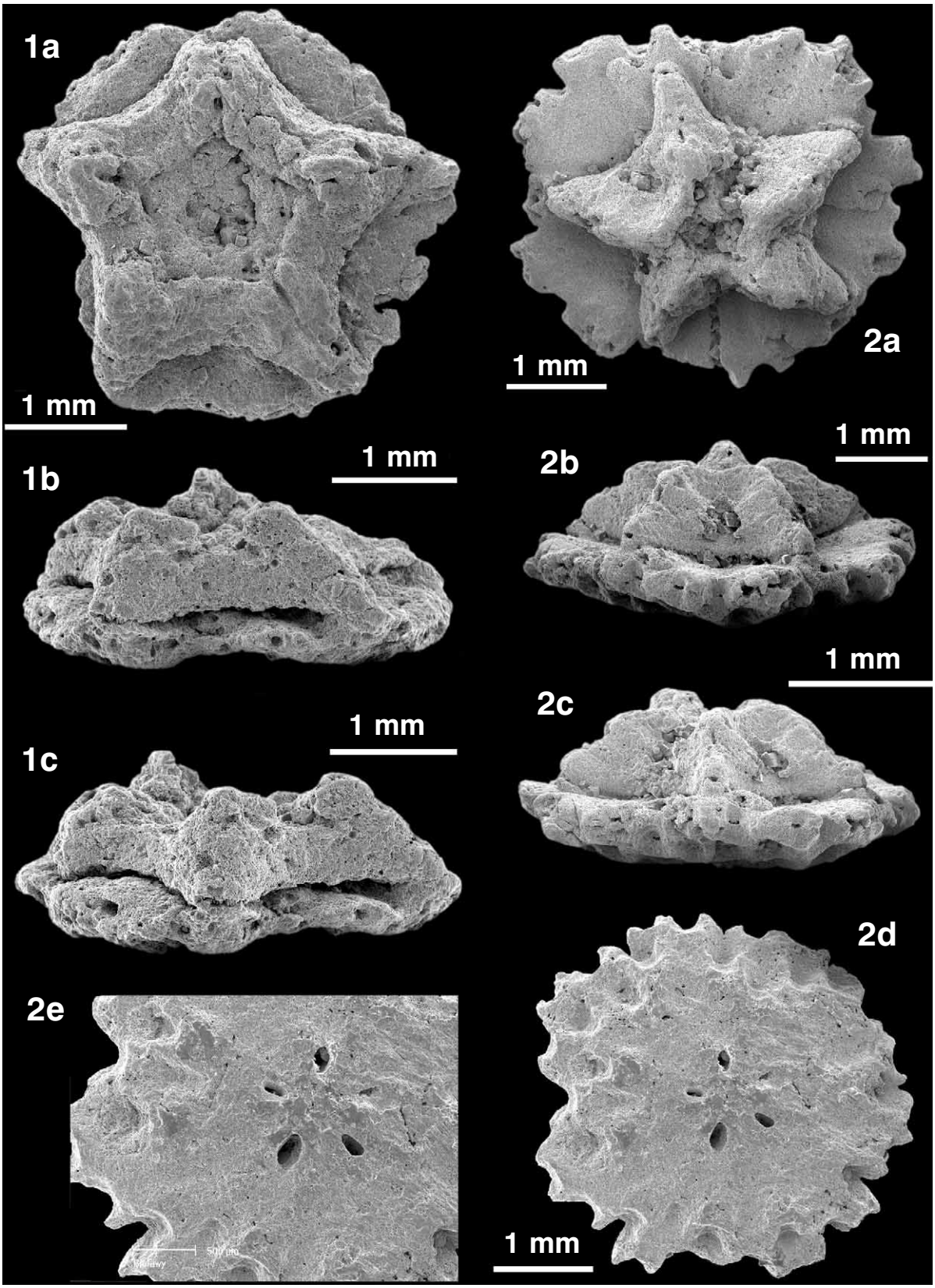
PLATE 2

Semiometra petitclerci (CAILLET, 1923)

1a – Adoral view of cup; **1b** – Lateral view of cup, to show radial plate; **1c** – Lateral view of cup, to show basal plate; COx/002

2a – Aboral view of cup; **2b** – Lateral view of cup, to show radial plate; **2c** – Lateral view of cup, to show basal plate; **2d** – Aboral view of centrodorsal; **2e** – Close-up of aboral side of centro-dorsal, to show dorsal star; COx/003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