

New calcareous nannofossil taxa from the Volgian Stage (Upper Jurassic) lectostratotype site at Gorodishche, U.S.S.R.

By M. K. E. Cooper, London

With 1 figure in the text

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Abstract: A new genus: *Paractinozygus*, 3 new species: *Chiastozygus leptostaurus*, *Paractinozygus gorodishchensis*, *Stephanolithion atmetros*, and 2 new name combinations: *Cyclagelosphaera tubulata* (GRÜN & ZWEIL), *Stephanolithion helotatus* (WISE & WIND), are described from the Upper Jurassic (type Volgian) of the U.S.S.R.

Zusammenfassung: Die neue Gattung *Paractinozygus*, drei neue Arten (*Chiastozygus leptostaurus*, *Paractinozygus gorodishchensis*, *Stephanolithion atmetros*) und 2 neue Namenskombinationen (*Cyclagelosphaera tubulata* (GRÜN & ZWEIL), *Stephanolithion helotatus* (WISE & WIND)) werden aus dem Oberjura (Typ Volgien) der Sowjetunion beschrieben.

Introduction

Calcareous nannofossils were examined as part of a general micropalaeontological investigation of samples from Volgian Stage (Upper Jurassic) sites on the Volga River, U.S.S.R. (see LORD et al. 1987). Diverse nannofloral assemblages were found and, as a result, a number of range extensions have been demonstrated (COOPER, in LORD et al. 1987). The present contribution complements the biostratigraphical account by providing taxonomic information about 1 new genus, 3 new species and 2 new name combinations of nannofossils. Two of the species are of great stratigraphical value because of short ranges, i.e. *Stephanolithion helotatus* is restricted to a range of topmost Kimmeridgian to the base of the Middle Volgian (autissiodorensis-panderi Zones) and *S. atmetros* occurs only in the Middle Volgian. Both have been found in strata of equivalent age in southern England. Of the 3 other species described here, *Chiastozygus leptostaurus* and *Paractinozygus gorodishchensis* occur in the Kimmeridgian to Middle Volgian at Gorodishche and *Cyclagelosphaera tubulata* ranges from Oxfordian to Middle Volgian but is particularly abundant in the Kimmeridgian.

The material was examined using both scanning electron microscope and light microscope techniques. Specimen numbers refer to photographic negatives housed in the Postgraduate Unit of Micropalaeontology, Department of Geology, University College London, London.

Stratigraphical and locality information are given in LORD et al. (1987).

Systematic palaeontology

Family: Ellipsagelosphaeraceae NOËL 1965

Genus: *Cyclagelosphaera* NOËL 1965

Cyclagelosphaera tubulata (GRÜN & ZWEILI 1980) n. comb.

Fig. 1 (16)

1980 *Ellipsagelosphaera tubulatum* GRÜN & ZWEILI, p. 256, Text fig. 16, Pl. 3, figs. 5-7.

Remarks: GRÜN & ZWEILI were uncertain as to which genus of the Family Ellipsagelosphaeraceae NOËL 1965b this species belongs, but suggested *Ellipsagelosphaera* NOËL 1965b. The definition of this genus is of an elliptical coccolith, but from GRÜN & ZWEILI's figure and photographs it appears that the species "*tubulatum*" has a circular outline. This shape corresponds to the definition of the genus *Cyclagelosphaera* NOËL 1965a. There is a problem in that the end of the third ring is strongly inclined in a proximal direction, although in *C. margereli* NOËL (the genotype) this outer ring may vary from being gently to strongly inclined proximally.

Range: Oxfordian-Middle Volgian.

Family: Stephanolithiaceae BLACK 1968

Genus: *Paractinozygus* n. g.

Derivation of name: *para* Gk. near — the genus *Actinozygus*.

Type species: *Paractinozygus gorodishchensis*.

Diagnosis: A genus of the Family Stephanolithiaceae characterised by a distal rim of non-imbricate elements and a proximal rim of flat brick-like crystals, with a central cross-bar supporting a spine.

Discussion: The rim of this genus bears a close resemblance to that of *Actinozygus* GARTNER 1968. However, in his definition of this genus GARTNER (1968: 23) described the central areas as consisting of regularly spaced, radially arranged bars.

Paractinozygus gorodishchensis n. sp.

Fig. 1 (5-8)

Derivation of name: From the type locality, Gorodishche.

Diagnosis: A species of *Paractinozygus* with a cross-bar made up of large blade-like elements which is wider at the rim than at the centre.

Description: An elliptical coccolith which consists of two cycles of elements. The distal cycle consists of about 30-38 large, irregularly sized blades which are not imbricated. The proximal rim is small and composed of small flat elements, and it is from this proximal rim that the cross-bar originates. The cross-bar is made up of large flat elements and is wider at the rim than at the centre, which supports the spine.

Differentiation: *P. gorodishchensis* differs from *Zygodiscus elegans* in having a Stephanolithiaceae rim and by the flaring of the cross-bar.

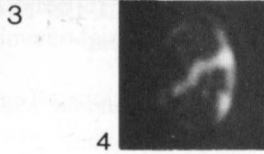
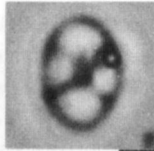
Fig. 1

- 1-4: *Chiastozygus leptostaurus* n. sp.
 1: (holotype) distal view, $\times 7500$ (SEM), UCL-1502-1. "Kimmeridgian", Sample 2, Gorodishche, USSR.
 2: (isotype) distal view, $\times 9100$ (SEM). UCL-1495-2. Middle Volgian, Sample 11, Gorodishche, USSR.
 3: (isotype) phase contrast with one nicol, $\times 3600$. UCL-1516-1. Middle Volgian, Sample 11, Gorodishche, USSR.
 4: (isotype) crossed-nicols, $\times 3360$. UCL-1516-2. Middle Volgian, Sample 11, Gorodishche, USSR.
 5-8: *Paractinozygus gorodishchensis* n. sp.
 5: (holotype) distal view, $\times 6825$ (SEM). UCL-1513-23. "Kimmeridgian", Sample 2, Gorodishche, USSR.
 6: (isotype) distal view, $\times 7275$ (SEM). UCL-1502-7. "Kimmeridgian", Sample 2, Gorodishche, USSR.
 7: (isotype) phase contrast with one nicol, $\times 3180$. UCL-1507-24. "Kimmeridgian", Sample 2, Gorodishche, USSR.
 8: (isotype) crossed-nicols, $\times 3000$. UCL-1507-25. "Kimmeridgian", Sample 2, Gorodishche, USSR.
 9-12: *Stephanolithion atmetros* n. sp.
 9: (holotype) distal view, $\times 8900$ (SEM). UCL-1506-21. Middle Volgian, Sample 11, Gorodishche, USSR.
 10: (isotype) distal view, $\times 9375$ (SEM). UCL-1513-1. Middle Volgian, Sample 11, Gorodishche, USSR.
 11: (isotype) phase contrast with one nicol, $\times 3400$. UCL-1516-6. Middle Volgian, Sample 11, Gorodishche, USSR.
 12: (isotype) crossed nicols, $\times 3400$. UCL-1516-5. Middle Volgian, Sample 11, Gorodishche, USSR.
 13-15: *Stephanolithion belotatus* (WISE & WIND) n. comb.
 13: distal view, $\times 6780$ (SEM). UCL-1495-15. "Kimmeridgian", Sample 4(1), Gorodishche, USSR.
 14: phase contrast with one nicol, $\times 3000$. UCL-1507-27. Lower Volgian, Sample 8, Gorodishche, USSR.
 15: crossed-nicols, $\times 2400$. UCL-1507-26. Lower Volgian, Sample 8, Gorodishche, USSR.
 16: *Cyclagelosphaera tubulata* (GRÜN & ZWEILI) n. comb. "Kimmeridgian", Sample 2, Gorodishche, USSR. Distal view, $\times 11580$ (SEM). UCL-1502-4.

No's 3/4, 7/8, 11/12, 14/15 are light micrographs and each pair depicts the same specimen. All other illustrations are scanning electron micrographs.



1

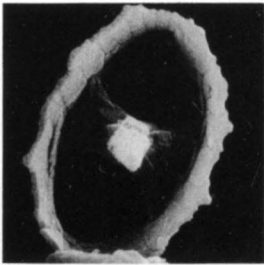


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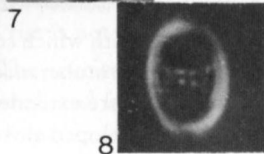
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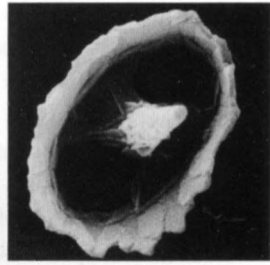


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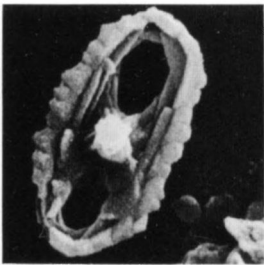


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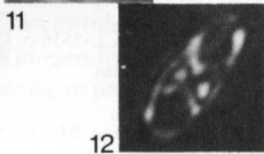
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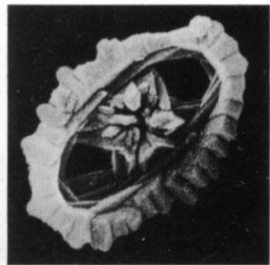


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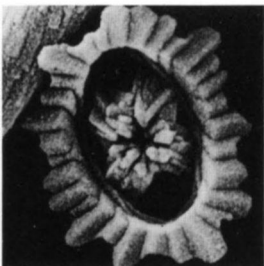


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16

Remarks: There is a close affinity to the genus *Actinozygus* and *P. gorodishchensis* may have evolved from *A. geometricus* by consolidation of the three pairs of radiating arms.

Holotype: Negative No. UCL-1513-23.

Isotypes: Negative No's UCL-1502-7, UCL-1507-24, UCL-1507-25.

Dimensions: Length 4.6 μm ., width 2.4 μm .

Type locality: Gorodishche, U.S.S.R.

Type level: panderi Zone, zarasjkensis Subzone, Middle Volgian.

Range: "Kimmeridgian"-Middle Volgian.

Genus: *Stephanolithion* DEFLANDRE 1939

Stephanolithion atmetros n. sp.

Fig. 1 (9-12)

Derivation of name: *atmetos*, Gk. undivided.

Diagnosis: An elliptical species of *Stephanolithion* with a central bar.

Description: A very elliptical coccolith which consists of two cycles of elements. The distal shield has numerous protuberances and contains 34-36 elements. The elements in the proximal rim are extended into the central area and there is a central bar made up of well-developed elements which support a central spine.

Differentiation: This species differs from *S. helotatus* in being more elliptical and in possessing a central bar, rather than four bars supporting the spine.

Remarks: There is a lineage from *S. bigoti* to *S. atmetros* by loss of lateral spines and central bars.

Holotype: Negative No. UCL-1506-21.

Isotypes: Negative No's UCL-1513-1, UCL-1516-5, UCL-1516-6.

Dimensions: Length 3.9 μm , width 2.7 μm .

Type locality: Gorodishche, U.S.S.R.

Type level: panderi Zone, pavlovi Subzone, Middle Volgian.

Range: U.S.S.R., mid-Volgian (panderi Zone); England, Upper Kimmeridgian (pallasioides-fittoni Zones).

Stephanolithion helotatus (WISE & WIND 1977) n. comb.

Fig. 1 (13-15)

1977 *Corolithion helotatus* — WISE & WIND, p. 299, Pl. 85, No's 1-5.

1977 *Stephanolithion bigoti* DEFLANDRE — WISE & WIND, Pl. 79, No.2; Pl. 89, No's. 1, 3 (not Pl. 79, No's. 1,3; Pl. 89, No's. 2, 4, 5, 6).

1979 *Corolithion helotatus* WISE & WIND — PERCH-NIELSEN, Fig. 24.

Non 1977? *Corolithion helotatus* — WISE & WIND, Pl. 89, No. 8.

Remarks: This species is very susceptible to dissolution and etching, and the specimens that WISE & WIND (1977) describe as *Corolithion helotatus* are

etched *Stephanolithion*. They figure some specimens showing normal preservation but assigned them to the species *S. bigoti*. The species is a *Stephanolithion* rather than a *Corollithion* because lateral protuberances occur in normally preserved specimens.

Range: U.S.S.R., "Kimmeridgian"-Middle Volgian (autissiodorensis-panderi Zones); England, Kimmeridgian (hudlestoni Zone).

Family: Eiffellithaceae REINHARDT 1965, emend PERCH-NIELSEN 1968

Genus: *Chiastozygus* GARTNER 1968

Chiastozygus leptostauros n. sp.

Fig. 1 (1-4)

Derivation of name: *leptos* Gk. slender, *stauros* Gk. cross.

Diagnosis: A species of *Chiastozygus* with a narrow rim and narrow cross.

Description: The distal view shows only one rim of elements containing 28-36 elements. The cross is offset and supports a small spine. The junction between the cross-bar and rim is not flared.

Differentiation: The species differs from the Jurassic *C. asymmetricus* MEDD 1979, which is flared, and from the Lower Cretaceous *C. tenuis* BLACK 1971 by its very narrow rim.

Remarks: Distal views only have been found of this species.

Holotype: Negative No. UCL-1502-1

Isotypes: Negative No's. UCL-1495-2, UCL-1516-1, UCL-1516-2.

Dimensions: Length 4.0 μm , width 2.8 μm .

Type locality: Gorodishche, U.S.S.R.

Type level: panderi Zone, zarasjkensis Subzone, Middle Volgian.

Range: U.S.S.R., "Kimmeridgian" — Middle Volgian (eudoxus-panderi Zones); England, Kimmeridgian (eudoxus Zone).

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M. K. E. COOPER, Postgraduate Unit of Micropalaeontology, Department of Geology, University College London, Gower Street, London WC1E 6BT. Present address: Stratigraphic Services International (UK) Limited, Chancellor Court, 20 Priestly Road, Guildford GU2 5YL, Great Britain.