

***Oligosphaeridium junctum* sp. nov. A Hauterivian dinoflagellate cyst from the North Sea**DAVID BAILEY¹ & ANTHONY LOY²¹ Biostrat Ltd., Myrtle Cottage, Penny Bridge, Ulverston, Cumbria LA12 7RJ, UK.² Paltec Ltd, 63 Archer Lane, Sheffield S7 2BW, UK.

ABSTRACT – The new species *Oligosphaeridium junctum* is described and illustrated from sidewall core samples in UKCS Well 15/29b-4Z. This species is considered to be an extremely useful stratigraphic marker in Hauterivian aged marine sediments of the North Sea. *J. Micropalaeontol.* 16(2): 159–162, October 1997.

INTRODUCTION

Well 15.29b-4Z was drilled by Conoco (UK) Limited in the South Viking Graben, UKCS North Sea, in 1989 (text Fig. 1). Rich and diverse dinoflagellate cyst assemblages were recovered from sidewall core samples shot through the Lower Cretaceous interval, including a new species, introduced here as *Oligosphaeridium junctum*. This form is restricted to Hauterivian deposits, and occurs in large numbers in Lower Hauterivian strata. The authors have also observed this species from numerous wells in the UK and Norwegian North Sea and it has previously been described informally, as *Oligosphaeridium* sp. 1 by Heilmann-Clausen (1987) from the Danish North Sea. As such, this is considered to be a very useful stratigraphic marker species.

Material

Standard palynological preparation techniques were used to produce strew mount slides of the horizons to be studied. All palynological slides examined are housed in the Palynological Collection of the Industrial Palynology Unit, Centre for Palynological Studies, Sheffield university, England.

SYSTEMATIC PALYNOLOGYDivision *Pyrrophyta* Pascher, 1914Class *Dinophyceae* Fritsch, 1929Order *Peridinales* Haeckel, 1894Family *Gonyaulacaceae* Lindmann, 1928Genus *Oligosphaeridium* Davey & Williams, 1966 emend.

Davey, 1982.

Type Species. *Oligosphaeridium complex* (White, 1842) Davey & Williams, 1966.*Oligosphaeridium junctum* sp. nov.

pl.1, figs 1–4; pl. 2, figs 1–4; text Fig. 2.

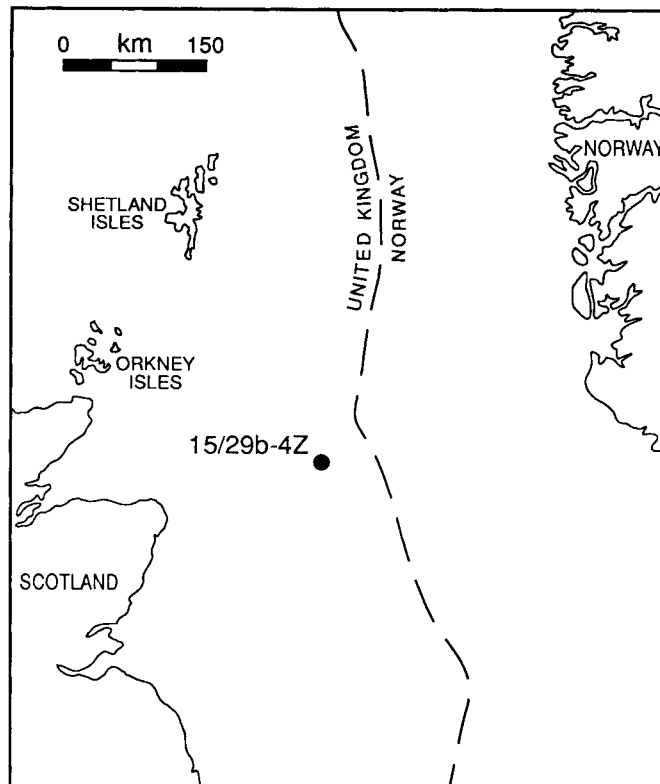
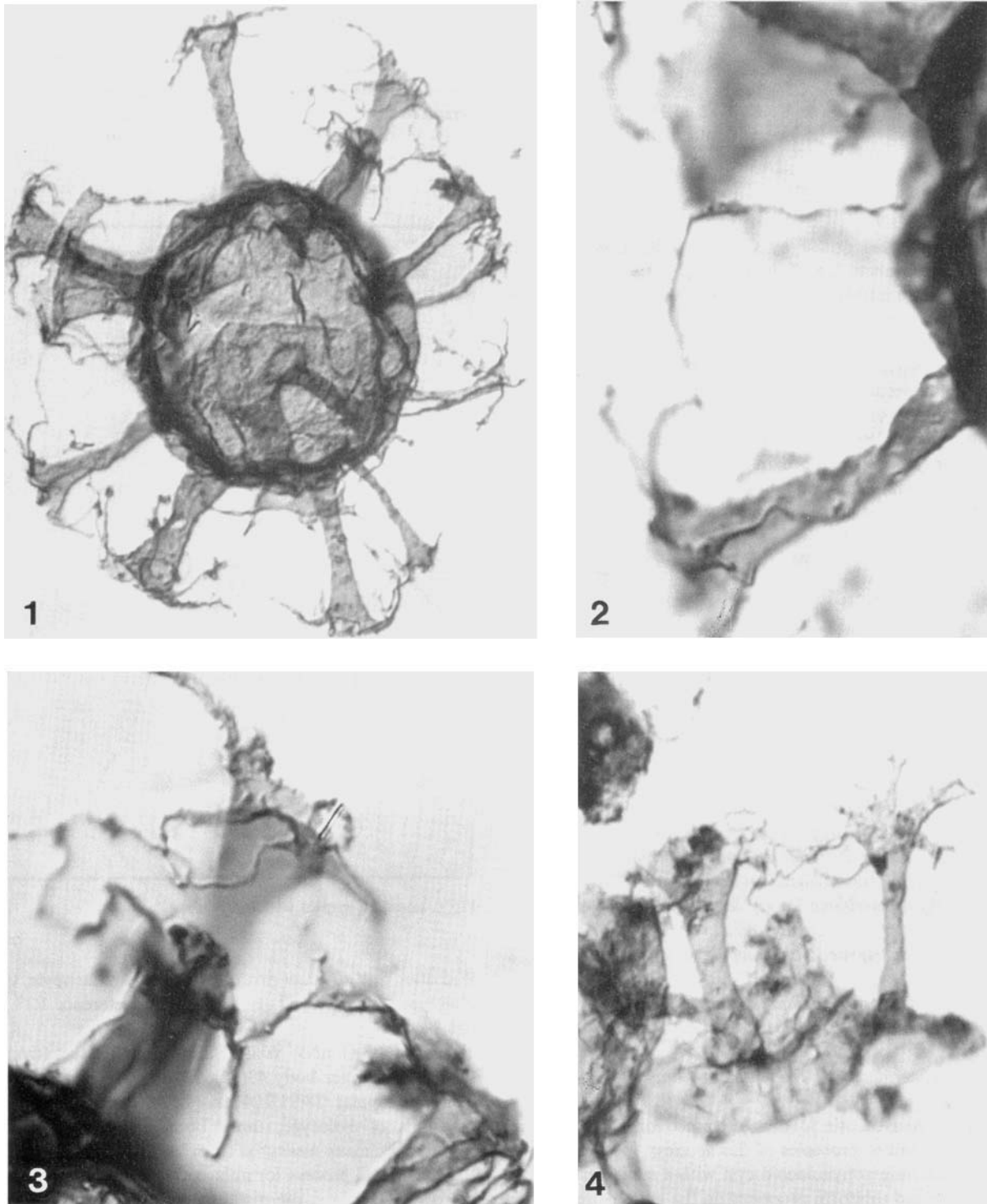
1987 *Oligosphaeridium* sp. 1, Heilmann-Clausen, p. 50, pl. 15, fig. 3.**Derivation of name.** Latin *junctus*, a connection; with reference to the distally linked processes of this species.**Diagnosis.** Chorate gonyaulacoid cyst with a subspherical body and plate centred tubiform processes on the apical, precingular, postcingular and antapical paraplates. Endophragm and periphragm more or less smooth and closely appressed, except where the periphragm separates to form the processes. Processes expanded distally, with complex terminations, comprising elongated, flexuose spines which thin to thread-like trabeculae

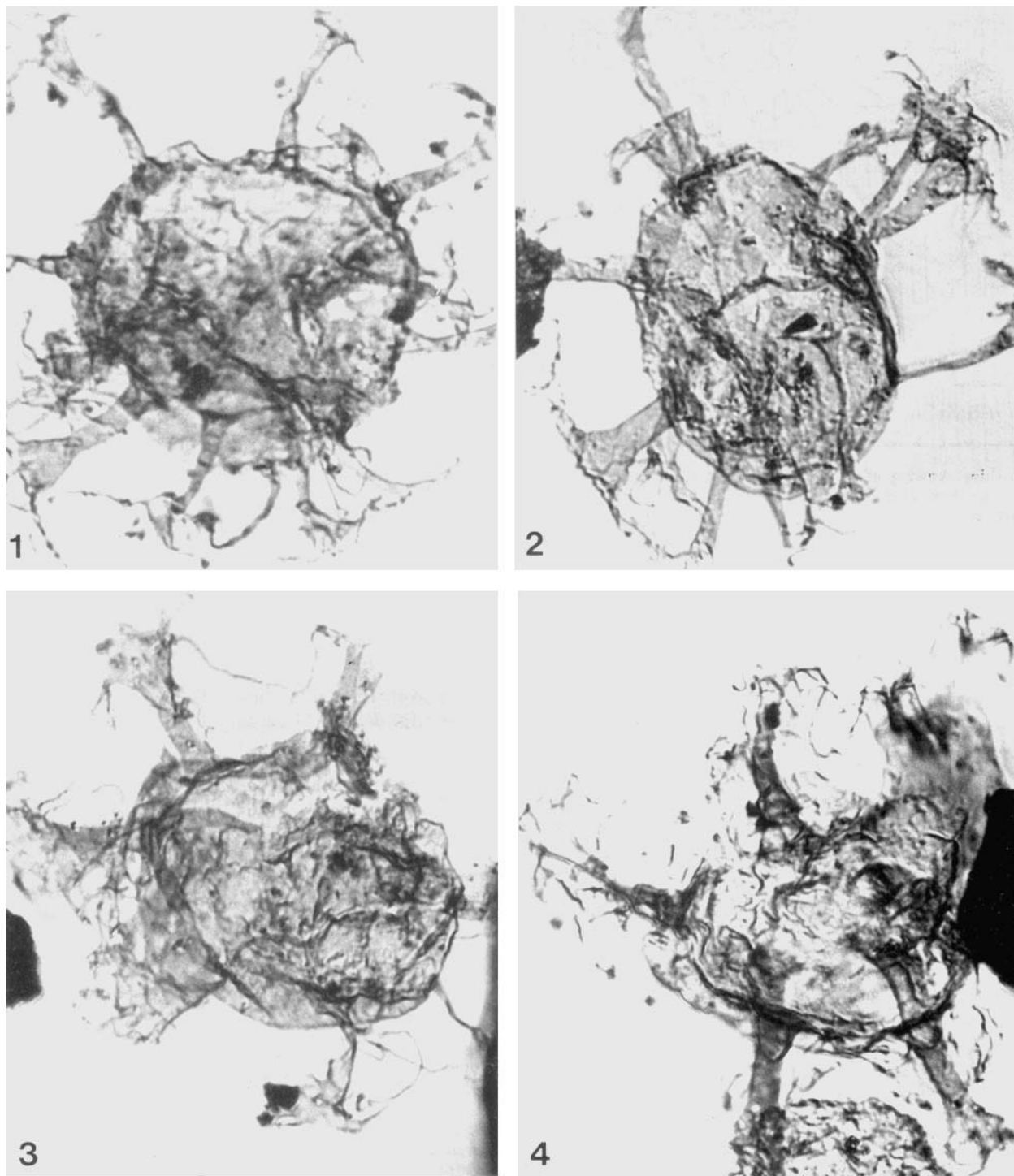
Fig 1. Location map of well 15/29b-4Z.

that often link adjacent processes. Apical archaeopyle, type (tA). **Holotype.** Slide EH1(2). England finder reference E37. Plate 1, figs 1–3.**Type locality.** Conoco Well 15/29b-4Z, 14636 feet (from RKB). **Dimensions.** Inner body 43(52)61 μm (12 specimens measured), overall diameter 78(91)104 μm (12 specimens measured). Dimensions of holotype; inner body 48 μm , overall diameter 96 μm . Specimens measured from samples EH1 and EH2.**Remarks.** The process formula corresponds to that of the type species *O. complex*. the distal trabeculae are thin and irregular, sometimes branching and often connecting with adjacent processes. However, they are very delicate and prone to breakage and often do not interconnect. Distally, the main trunk of some of the larger processes may be deeply furcate (see text Fig. 2).



Explanation of Plate 1

Fig. 1. *Oligosphaeridium junctum* sp. nov. Holotype. Oblique apico-dorsal view in high focus. UKCS Well 15/29b-4Z, EH1(2), EF E37 ($\times 650$). **Figs 2-3.** *Oligosphaeridium junctum* sp. nov. Holotype. UKCS Well 15/29b-4Z, EH1(2), EF E37. Detail of distal trabecula ($\times 1000$). **Fig. 4.** *Oligosphaeridium junctum* sp. nov. UKCS Well 15/29b-4Z, EH1(1), EF R41/3. Detail of distal trabecula on a free operculum ($\times 650$).



Explanation of Plate 2

All specimens displaying both broken and unbroken distal trabecula. **Fig. 1.** *Oligosphaeridium junctum* sp. nov. UKCS Well 15/29b-4Z, EH2(2), EF P41/1. **Fig. 2.** *Oligosphaeridium junctum* sp. nov. UKCS Well 15/29b-4Z, EH2(2), EF D31. **Fig. 3.** *Oligosphaeridium junctum* sp. nov. UKCS Well 15/29b-4Z, EH2(1), EF N15. **Fig. 4.** *Oligosphaeridium junctum* sp. nov. UKCS Well 15/29b-4Z, EH2(1), EF T46/3. All figures $\times 650$.

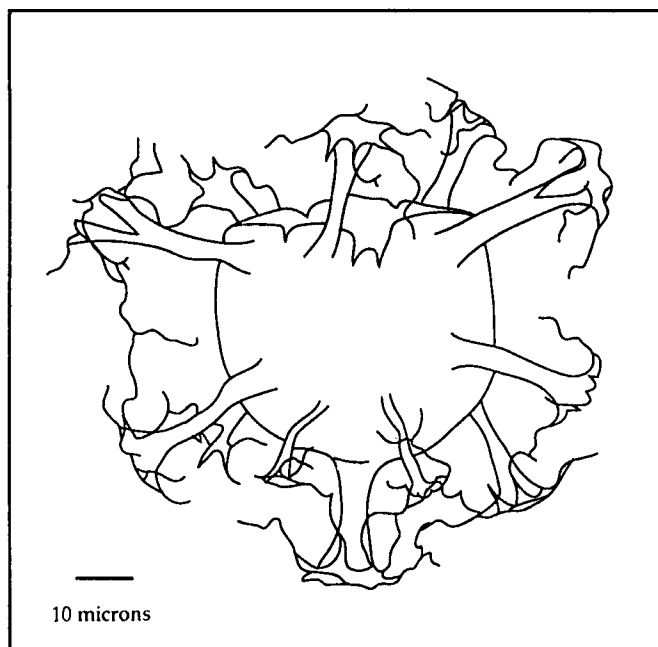


Fig 2. Line drawing of an idealized specimen of *Oligosphaeridium junctum* sp. nov. displaying distal trabecula, sulcal notch and apical archeopyle.

Comparison. Of species published to date *O. junctum* is most similar to the type species, *O. complex* (White) Davey & Williams, 1966, which lacks distal trabecula and has generally less complicated process terminations. *Oligosphaeridium trabeculosum* Singh, 1983 has narrower processes and thicker trabeculae, which do not link pre- and post-cingular processes. Furthermore, the hypocyst processes of *O. trabeculosum* are longer than those on the epicyst, whilst there is no such distinction in *O. junctum*.

The authors feel that this new species belongs to the genus *Oligosphaeridium* rather than *Rigaudella* Below, 1982, even though the processes are distally linked by trabecula. *Rigaudella* exhibits both solid and hollow processes and has an undifferentiated autophragm.

Occurrence. *Oligosphaeridium junctum* is stratigraphically restricted to Hauterivian-aged sediments in the 15/29b-4Z well. It has also been recorded from Hauterivian strata of the Danish central trough by Heilmann-Clausen (1987). The present authors have also observed *O. junctum* in the Hauterivian of numerous North Sea wells (see discussion below).

DISCUSSION

Oligosphaeridium junctum has been observed by the present authors from numerous wells in the central and northern North Sea. It has also been reported in many unpublished palynological reports by various biostratigraphic contractors and oil

companies (usually under the informal name of *Oligosphaeridium 'amplexum'*). In all published and unpublished cases, this taxon is restricted to sediments of Hauterivian age and is a very widespread, often numerous and extremely useful stratigraphic marker species. However, to the authors' knowledge *O. junctum* has not been reported from outcrop material and so age interpretations are based on associated assemblages and stratigraphic relationship to previously published ranges of other dinoflagellate cysts. No information is available as to the relationship of *O. junctum* to other microfossil groups.

In the 15/29b-4Z well, dinoflagellate cysts associated within the overall range of *O. junctum*, include;

Coronifera oceanica, *Oligosphaeridium perforatum*, *Phoberocysta neocomica*, *P. tabulata*, *Cassiculosphaeridia magna*, *Ctenodinium elegantulum*, *Spiniferites dentatus*, *Gonyaulacysta perforobtusata*, *G. ordocava*, *Heslertonella pellucida*, *Cribroperidinium sepimentum*, *Nelchinopsis kostromiensis*, *Sirmiodinium grossi*, *Endoscrinium campanulum*, *Muderongia simplex*, *Achomosphaera neptuni*, *Dingodinium albertii*, *Pseudoceratium pelliiferum* and *Cymosphaeridium validum*.

Based on the above criteria it is possible to recognize three distinct biostratigraphic events within the overall range of *O. junctum*; range top: late Hauterivian, top acme event: intra-early Hauterivian, range base: intra early Hauterivian.

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