DINOCYSTS FROM THE UPPER KIMMERIDGIAN (*PECTINATUS* ZONE) OF MARTON, YORKSHIRE

by

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Summary

Two dinocyst assemblages (comprising 32 species) are reported from the Upper Kimmeridgian (*pectinatus* Zone) of Marton, Vale of Pickering, Yorkshire. The assemblages, which constitute the first published record of Kimmeridgian dinocysts from northern England, are similar to those reported by Riley (1974) from the type *pectinatus* Zone of southern England. Allocation to the *Pareodinia mutabilis* (dinocyst) Zone of Fisher & Riley (1979) is indicated. The new combinations *Egmontodinium ovatum* (Gitmez & Sarjeant), *Kleithriasphaeridium telaspinosum* (Riley) and *Lithodinia areneosa* (Muir & Sarjeant) are proposed. *Fromea warlinghamensis* Gitmez & Sarjeant is treated as a junior synonym of *F. amphora* Cookson & Eisenack and existing Kimmeridgian records of *Cyclonephelium distinctum* Deflandre & Cookson and *Oligosphaeridium pulcherrimum* (Deflandre & Cookson) Davey & Williams are considered to be doubtful.

Introduction

During the course of a larger study on Upper Jurassic microplankton, two samples were collected from the Kimmeridge Clay of Yorkshire by Dr. R.C.L. Wilson (Dept. of Earth Sciences, Open University) and made available to the present author for palynological analysis. The samples were obtained from a brickpit, referred to as the Golden Hill Pit, by Cope (1974), lying approximately 0.5 km to the southwest of the village of Marton (Grid. Ref. SE 725828), in the Vale of Pickering. The two samples were collected from Beds 16 and 17 (Cope, 1974), and are assigned to the *pectinatus* Zone of the Upper Kimmeridgian.

Assemblage details

After standard palynological preparation, the two samples yielded organic residues composed of abundant amorphous organic matter in association with large quantities of exinite, the bulk of which is in the form of dinocysts. The dinocyst assemblages are moderately well preserved, although certain forms exhibit signs of diagenetic degradation. Evidence for the latter is clearly indicated by distortion and rupture due to contained framboidal pyrite. Associated structured palynomorphs include moderate numbers of miospores (chiefly of gymnospermous affinities) and microforaminiferal test-linings in association with rare acanthomorph acritarchs and *Pterospermopsis aureolata* Cookson & Eisenack. Small amounts of terrestrially derived humic materials are also present.

The two dinocyst assemblages are so similar in composition as to constitute one dinocyst association. With the exception of fairly numerous, but indeterminate specimens attributed to the genera *Gonyaulacysta Cribroperidinium* and, to a lesser extent, *Cleistosphaeridium*, the dinocysts recovered are represented by the following species:

Apteodinium granulatum Eisenack 1958
Cassiculosphaeridia magna Davey 1974
Chlamydophorella cf. *discreta* Clarke & Verdier 1967
Chytroeisphaeridia chytroeides (Sarjeant 1962) Downie & Sarjeant (1964) 1965 emend. Davey 1979b
Cyclonephelium hystrix (Eisenack 1958) Sarjeant & Stover 1978
Dingodinium albertii Sarjeant 1966

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Egmontodinium ovatum (Gitmez & Sarjeant 1972) comb. nov.
E. polyplacophorum Gitmez & Sarjeant 1972
Epiplosphaera reticulospinosa Klement 1960
Fromea amphora Cookson & Eisenack 1958
Glossodinium dimorphum Ioannides *et al.* 1976
Gonyaulacysta cladophora (Deflandre 1938) Dodekova 1967
G. deflandrei Riley 1979
G. jurassica (Deflandre 1938) Norris & Sarjeant 1965
G. longicornis (Downie 1957) Sarjeant 1969
G. nuciformis (Deflandre 1938) Sarjeant 1968
G. perforans (Cookson & Eisenack 1958) Sarjeant 1969
G. setcheyensis Sarjeant 1976
Hystrichodinium pulchrum Deflandre 1935
Kleithriasphaeridium telaspinosum (Riley 1979) comb. nov.
Leptodinium arcuatum Klement 1960
Lithodinia sp.
Oligosphaeridium pulcherrimum (Deflandre & Cookson 1955) Davey & Williams 1966 *sensu* Ioannides *et al.* 1976
Pareodinia ceratophora Deflandre 1947 emend. Gocht 1970
P. mutabilis Riley 1979 (= *Imbatodinium* cf. *villosum* of Gitmez & Sarjeant 1972
Psaligonyaulax cypraea Ioannides *et al.* 1976
Prolixosphaeridium granulosum (Deflandre 1937) Davey *et al.* 1966
Scriniodinium inritibilum Riley 1979 (= *Scriniodinium* sp. A. Ioannides *et al.* 1976)
Senoniasphaera jurassica (Gitmez & Sarjeant 1972) Lentin & Williams 1976
Sentusidinium echinatum (Gitmez & Sarjeant 1972) Sarjeant & Stover 1978
Systematophora areolata Klement 1960
S. orbifera Klement 1960

Stratigraphical discussion

Comparable, and in many instances, almost identical dinocyst assemblages, have previously been reported from the type *pectinatus* Zone of southern England, the Argiles de Wimereux (Upper Kimmeridgian) of northern France (Riley 1974), the Kimmeridge Clay Formation (*pars*) and its lateral lithological equivalents of the North Sea Basin (Fisher & Riley 1979) and the upper part of the Helmsdale Boulder Beds succession in northeast Scotland (Riley, unpubl. reports).

Of particular stratigraphical significance is the presence in the Marton assemblages of *Egmontodinium ovatum*, *E. polyplacophorum*, *Gonyaulacysta deflandrei*, *G. longicornis*, *Kleithriasphaeridium telaspinosum*, *Oligosphaeridium pulcherrimum* sensu Ioannides *et al.* and *Pareodinia mutabilis* - a dinocyst association which clearly indicates an age within the limits of the *Pareodinia mutabilis* (dinocyst) Zone of Fisher & Riley (1979). The additional record of *Gonyaulacysta jurassica* would restrict this further to that of the *Gonyaulacysta jurassica* Subzone age; a dinocyst subzone which is considered by Fisher & Riley (1979) to be essentially of *pectinatus* (ammonite) Zone age.

The occurrence of *G. jurassica* at this stratigraphical level is of particular interest and is considered by certain palynologists to be the result of reworking. Davey (pers. comm.) considers *G. jurassica* to range no younger than Lower Kimmeridgian, whereas Brideaux (1977) considers the upper limit of the species to be either Lower, or basal Middle Kimmeridgian. Gitmez & Sarjeant (1972) and the present author (1974 and herein) have, however, recorded *G. jurassica* (albeit in very low numbers) from Middle and Upper Kimmeridgian sediments, whilst Brideaux & Fisher (1976) report the species as rare from the Middle and Upper Kimmeridgian of the northern Canadian mainland. In addition, occasional records of the species have been reported by the present author (unpubl. reports) from the Upper Kimmeridgian of northeast Scotland and the Central Graben area of the

North Sea Basin. Reworking cannot adequately explain all of these post-Lower Kimmeridgian records of *G. jurassica* and, although Brideaux's (1977) comment that the species only rarely occurs above the *autissiodorensis* Zone is accepted, it is maintained that the upper limit of the range of the species is within the *pectinatus* Zone of the Upper Kimmeridgian.

Taxonomic discussion

Kimmeridgian records (Riley 1974, Ioannides *et al.*, 1976) of *Cyclonephelium distinctum* Deflandre & Cookson 1955 are considered to be of doubtful attribution and, on morphological criteria, allocation to *C. hystrix* (Eisenack 1958) Sarjeant & Stover 1978 seems more probable.

The genus *Egmontodinium* Gitmez & Sarjeant 1972 is to date represented by three species - *E. polyplacophorum* Gitmez & Sarjeant 1972, *E. torynum* (Cookson & Eisenack 1960) Davey 1979 and *E.* sp. A Davey 1979. A fourth species is considered to conform with the diagnosis of the genus and the following taxonomic combination is proposed:

Egmontodinium ovatum (Gitmez & Sarjeant) comb. nov. = *Systematophora ovata* Gitmez & Sarjeant 1972, p.237, pl.14, figs.1-3. Kimmeridgian.

Fromea warlinghamensis Gitmez & Sarjeant 1972 is treated herein as a junior synonym of *F. amphora* Cookson & Eisenack, 1958.

The species ?*Hystrichodinium telaspinosum* Riley 1979 is now considered to represent an ancestral Jurassic species of the genus *Kleithriasphaeridium* Davey 1974 and the following taxonomic combination is proposed:

Kleithriasphaeridium telaspinosum (Riley) comb. nov. = ?*Hystrichodinium telaspinosum* Riley 1979 (in press). Upper Kimmeridgian/Middle Volgian.

The genus *Meiourogonyaulax* Sarjeant 1966 is considered by Gocht (1975) to be a junior synonym of *Lithodinia* Eisenack 1936 emend. Gocht 1975. This is endorsed by the present writer and the following taxonomic combination is proposed:

Lithodinia areneosa (Muir & Sarjeant) comb. nov. = *Meiourogonyaulax areneosa* Muir & Sarjeant 1978, p.197-198, pl.1, fig.1; text-fig.1. Callovian.

The dinocyst cited herein as *Lithodinia* sp. is conspecific with *Meiourogonyaulax* sp. Gitmez & Sarjeant 1972.

The Kimmeridgian specimens described and illustrated by Ioannides *et al.* (1976) as *Oligosphaeridium pulcherrimum* (Deflandre & Cookson 1955) Davey & Williams 1966 are considered to have been wrongly assigned to a post-Jurassic species. They are significantly different in morphological detail from the Australian type material of *O. pulcherrimum* and almost certainly represent a new species. Similarly, the specimen attributed to *O. pulcherrimum* by Gitmez (1970) may well be conspecific with the species illustrated by Ioannides *et al.* (1976) and reported herein.

Senoniasphaera jurassica (Gitmez & Sarjeant 1972) Lentin & Williams 1976 may be a junior synonym of *Lithodinia staffinensis* (Gitmez 1970) Lentin & Williams 1977 and a re-study of the type material of these species is accordingly needed.

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