A Liassic Pycnoporidium (Calcareous Algae)

Autor(en): **Elliott, Graham F.**

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A Liassic *Pycnoporidium* (Calcareous Algae)

By **Graham F. Elliott** (London)

With 1 Plate (I)

RÉSUMÉ

Pycnoporidium liasicum sp. nov., algue calcaire verte du Jurassique inférieur de la Grèce, est décrite et ses affinités discutées.

Pycnoporidium is a fossil calcareous alga first described from the Upper Jurassic of Japan (*P. lobatum* YABE and TOYAMA, 1928). It occurs as a nodular growth of adjacent sinuous sporadically-branching filaments, very irregularly radial, appearing in thin-section as hollow tubules, divided by irregularly-spaced internal transverse partitions. This general pattern of radial-tubular branching threads occurs in several other genera, including *Solenopora* and *Cayeuxia* in the Upper Jurassic, but *Pycnoporidium* is fairly easily distinguished by its lack of marked concentric zoning and by sinuous tubule-threads which in oblique thin-section occasion a characteristic appearance of close-set somewhat randomly arranged ovoid tubule-sections, differing both from the regularity of *Solenopora* and the consistent branching-plan of *Cayeuxia*.

Subsequent to the original description, *P. lobatum* was recorded from both the Lias and Upper Jurassic of Spain (PFENDER, 1939). The former occurrence was of nodular algal limestone whose age was deduced from regional position and not palaeontology, and this older record is not mentioned in a recent review of the genus (JOHNSON and KONISHI, 1960). Algae of undoubted Liassic age, from Morocco, described as *incertae sedis* by LEMAITRE (1935) are however mentioned by them as being possibly referable to *Pycnoporidium*.

ELLIOTT (1957, 1960) recorded undoubted *Pycnoporidium lobatum* from well-dated Lower Cretaceous of both Iraq and Oman in the Middle East.

Finally JOHNSON and KONISHI (1960) described a new species, *P. sinuosum*, from the Upper Cretaceous of Guatemala, Central America. Discounting an alleged Permian species, the Japanese *P. toyamai* (ENDO 1956), of which they doubt the generic assignment, and referring the Upper Jurassic species *Solenopora melobesioides* PFENDER to *Pycnoporidium*, they give the known range of this genus as Late Jurassic to Late Cretaceous.

It is therefore of interest to place on record a new species from well-dated Lias in Greece, a species which while obviously belonging in the genus is clearly distinguishable from the later species. I am much indebted to Mme G. BIZON, of the Institut Français du Pétrole, Mission Grèce, who kindly sent this to me for examination.

The systematic position of *Pycnoporidium* within the algae has never been very clear. JOHNSON and KONISHI (1960), after a detailed comparison and discussion,

make the interesting suggestion that *Pycnoporidium* is an extinct calcified genus similar to the present-day non-calcified *Cladophoropsis*. In view of the sporadic distribution taxonomically of calcified genera and families within the algae generally, this seems very reasonable. An analogous comparison was made between the Permian *Ungdarella* and the present-day non-calcified *Ahnfeltia* and *Cystoclonium* (MASLOV 1956). These authors are therefore followed in their family assignment of the genus.

Class Chlorophyceae KÜTZING 1843

Order: Siphonocladales (BLACKMAN and TANSLEY) OLTMANS 1904

Family: Siphonocladaceae SCHMITZ 1879

Genus: *Pycnoporidium* YABE and TOYAMA 1928

Pycnoporidium liasicum sp. nov.

PLATE I

Diagnosis

Pycnoporidium with nodular thallus composed of tubular threads of up to 0.130 mm diameter: threads sinuous, irregularly radial, irregularly bifurcating without occasioning the appearance of zoning, circular in cross section, loosely packed with occasional associated smaller perhaps commensal algae in interstices; thin concave partitions or septa irregularly spaced within tubular threads.

Holotype

The specimen figured in pl. I figs. 1 and 2, from the Lower Jurassic, "unité de Margarition"; near Piryi, north of Parga, Epirus, Greece, where it is associated with the familiar Liassic dasyclad *Palaeodasycladus mediterraneus* PIA. These limestone beds occur several tens of metres below *Posidonia*-shales and *Paleotrix*-limestones of Upper Lias–Middle Jurassic age. Registered number of specimen in British Museum (Natural History), Dept. Palaeontology V. 44937.

Description

The thallus in thin-section has a diameter of 4.5 mm. The threads are similar in form to those in the type-species *P. lobatum*; thin-walled, calcite-filled, sinuous radially-directed tubules, which are loosely adjacent or touching. Individual threads branch infrequently and irregularly by simple bifurcation so that there is no appearance of zoning in the thallus as a whole. The septa of the outer zone of threads are seen to be of irregular spacing and occurrence when one thread is compared with others adjacent: they are thin transverse partitions concave in cross section, the curve being directed proximally. They disappear towards the centre of the thallus, and are probably not present there, as is the case in other species of *Pycnoporidium* and in the Recent *Cladophoropsis*. The interstices between threads show obscure threads or tubules of a very much smaller diameter, about 0.010 mm. These are not seen as clearly as described by JOHNSON and KONISHI (1960) or YABE and TOYAMA (1928) for *P. sinuosum* and *P. lobatum* respectively, but are probably the supposedly symbiotic *Girvanella* or similar cyanophytes of these authors. In a growth of *P. lobatum* from the Lower Cretaceous of the Middle East they are not

to be seen at all, so there may be some variation in this feature. Holdfasts or an attached basal layer are not seen in the available section of *P. liasicum*.

Comments

P. liasicum (Lower Jurassic) resembles the type-species *P. lobatum* (Upper Jurassic–Lower Cretaceous) more closely than the later *P. sinuosum* (Upper Cretaceous), and it is easily distinguished from the clearly-zoned and more regular *P. melobesioides* (if indeed this latter is correctly referable to the genus). *P. liasicum* is easily recognizable by the much greater thread-diameter; 0.100–0.130 mm. In *P. lobatum* and *P. melobesioides* (PFENDER 1931) this is given as 0.050–0.070 mm (up to 0.080 mm seen in Middle East Cretaceous *P. lobatum*), and in *P. sinuosum* it is 0.027–0.060 mm.

This dimension for the Liassic species approaches the smaller thread-diameter of the Recent *Cladophoropsis membranacea* (C. AGARDH) BORGESEN, given as 0.160–0.300 mm by EGEROD (1952) for Hawaiian material.

The type-material of *P. liasicum* occurred in limestone with the dasyclad *Palaeodasycladus mediterraneum* PIA, an association suggesting clear shallow warm waters by analogy with the Recent forms.

Cladophoropsis at Hawaii was accompanied by the dasyclads *Acetabularia*, *Bornetella* and *Neomeris*.

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Plate I

Fig. 1. *Pycnoporidium liasicum* sp. nov., thin-section ×20. Lower Jurassic, Piryi, north of Parga, Epirus, Greece. Holotype, British Museum (Natural History), Dept. Palaeontology, registered number V. 44937.

Fig. 2. The same, a portion ×80, to show detail of thread-tubules.

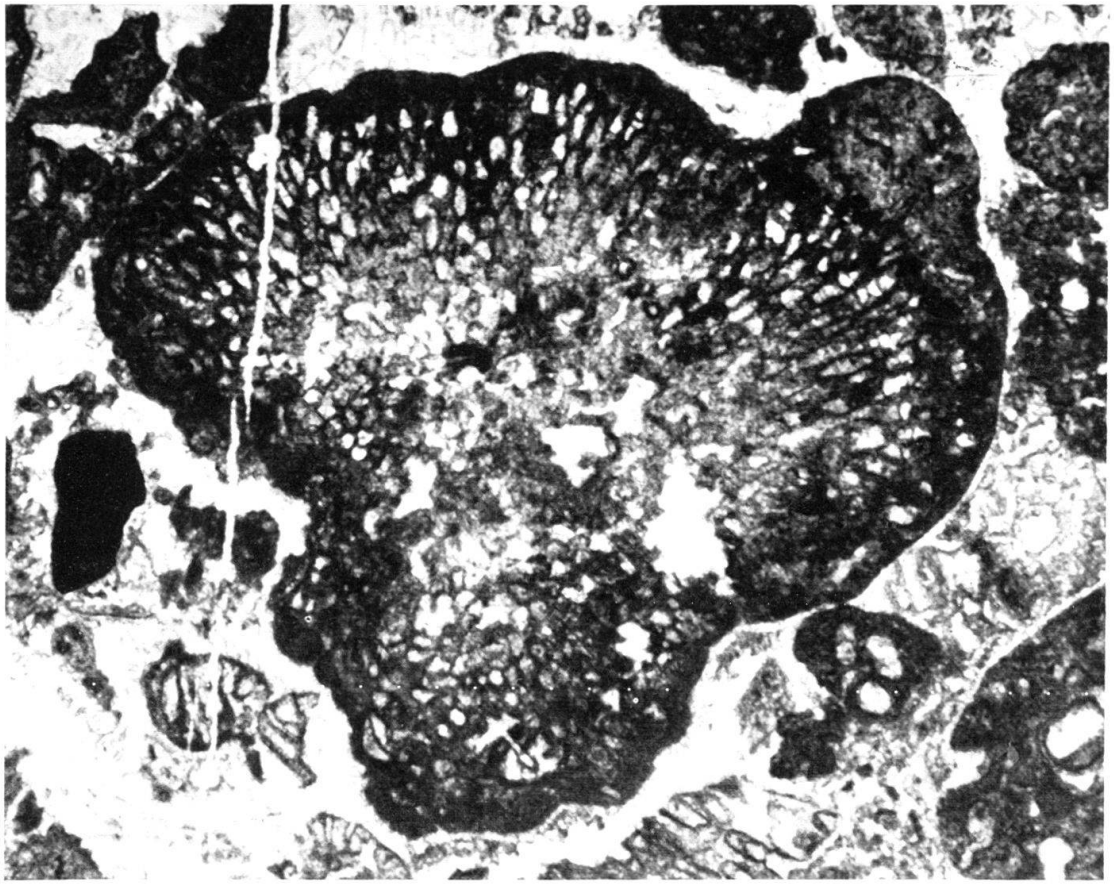

Fig. 1

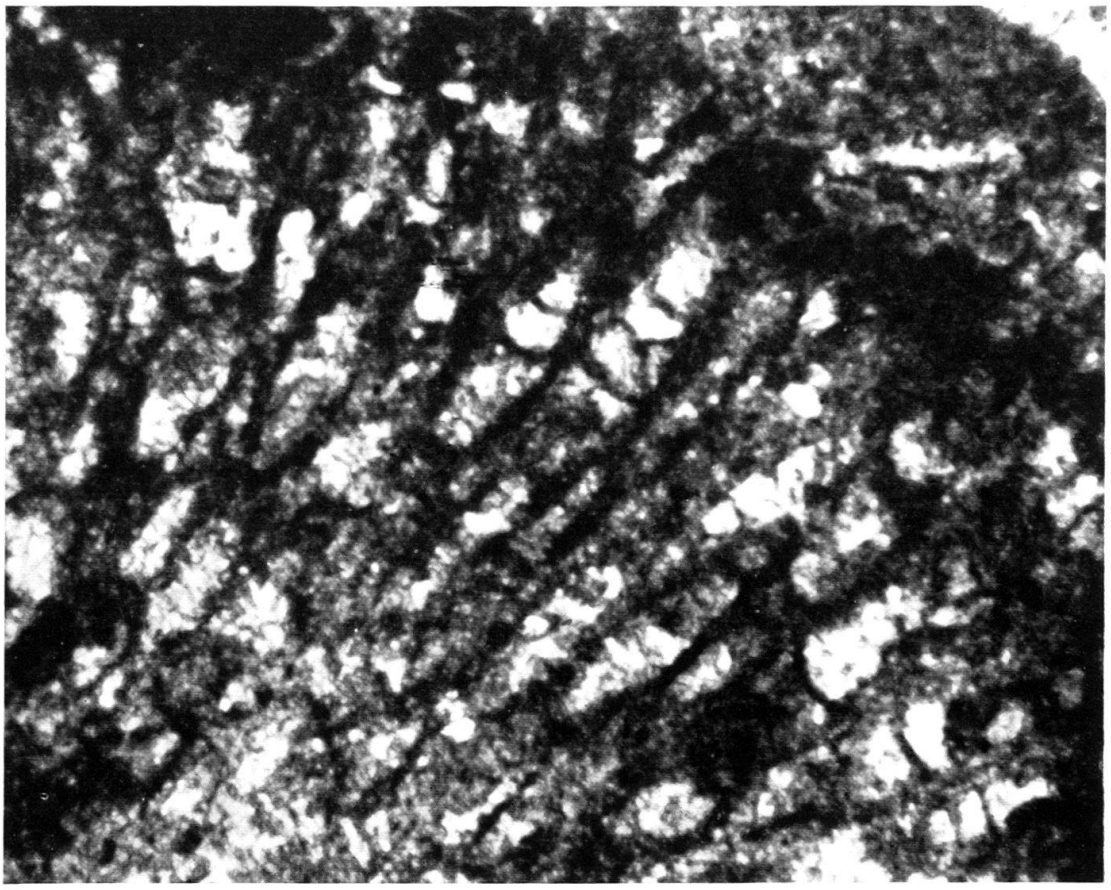

Fig. 2