

***Scruttonia* (Rugosa, Cnidaria) from the Devonian of Western Australia**

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Abstract

Phillipsastrea delicatula Hill, 1936, from probably the early Frasnian (early Late Devonian) of the Lennard Shelf, Western Australia, is assigned to the cosmopolitan rugose coral genus *Scruttonia*. Its occurrence there supports the previously reported cosmopolitan nature of Late Devonian rugose coral faunas and the faunal similarities between eastern and Western Australia in the Devonian.

Introduction

During the study of a Frasnian (early Late Devonian) coral fauna from the Keepit district of New South Wales, in the New England Fold Belt (Wright *et al.* in press), it was of considerable interest to compare the Keepit fauna with the famous faunas of the same age from the Lennard Shelf of the Kimberley region of Western Australia (Hill and Jell 1970), in order to assess biogeographic relationships. Examination of coral specimens from Western Australia revealed that the somewhat neglected species *Phillipsastrea delicatula* Hill, 1936 is congeneric with corals belonging to *Scruttonia* from the Keepit region. *Phillipsastraeta delicatula* was proposed by Professor Dorothy Hill (1936: 30) in the first of her papers on the Western Australian coral faunas, and has only been redescribed by Hill (1954).

The purpose of this paper is to draw attention to this occurrence of *Scruttonia* in Western Australia; to describe and illustrate the available material; and to report on the biogeographic implications of the distribution of the genus.

Systematics

Phylum Cnidaria

Subclass Rugosa Edwards and Haime, 1850

Family Phillipsastreidae C.F. Roemer, 1883

Genus *Scruttonia* Cherepnina, 1975

Type Species

Smithia bowerbanki Milne-Edwards and Haime, 1851; from the lower Frasnian (early Late Devonian) of south Devon, England.

Diagnosis

McLean (1989) has given a diagnosis for the genus.

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Remarks

The detailed morphology of the cosmopolitan genus *Scruttonia* has been described by Pedder (1986) who reviewed and gave a list of species assigned to the genus. The type species has been described by Scrutton (1968) and Rohart (1981); Pedder (1986) tentatively assigned material showing strong carinae to this species, whereas Scrutton (1968) noted that the septa are never truly carinate in British material (see Rohart [1981] for illustration of septal structure of topotype material of the type species). Diagnostic features of the genus thus include thamnasterioid growth form, carinate or non-carinate septa, lack of horseshoe dissepiments and a narrow symmetrical zone of trabecular fanning close to the inner margin of the non-everted or weakly everted dissepimentarium.

There has been divergence of opinion about the validity of *Scruttonia*, as Birenheide (1978) considered it a synonym of *Haplothecia*, whereas Scrutton (1978), Coen-Aubert (1980), Rohart (1982) and McLean (1989) considered the genera separate; Hill (1981) and Pedder (1986) have tentatively accepted the genus as distinct. Pedder (1986) noted that the two genera are not typical phillipsastreids, and could be referred to a new subfamily.

Several genera of Chinese Devonian rugose corals are difficult to distinguish from *Scruttonia*, as discussed by Pedder (1986), Küster (1987), McLean (1989) and Wright *et al.* (in press). *Haplothecia* (*Kuangxiastraea*) Yü and Kuang, 1982 was considered by Pedder (1986) to be a genus distinct from *Scruttonia*, but not satisfactorily separated from *Sichuanastraea*. *Billingsastraea* (*Sichuanastraea*) He, 1978 was considered by Küster (1987) to be synonymous with *Scruttonia*. *Haplothecia* (*Lanceothecia*) Yü and Jiang in Jiang (1982) is a *nomen nudum* and, according to Pedder (1986: 655), possibly a junior subjective synonym of *Haplothecia* (*Kuangxiastraea*).

Scruttonia delicatula (Hill, 1936)

(Figure 1a, b)

Phillipsastraea delicatula Hill, 1936: 30, figures 4-5

Phillipsastrea delicatula; Hill, 1954: 14, pl. 1, figure 19

Type Material

Hill (1936) designated as holotype "F. 326 [catalogued as F. 328] = 6924" in the collections of the Geological Survey of Western Australia; according to Hill (1936: 30), the specimen was mentioned by Glauert (1910a, b, 1925) and Hosking (1925). This specimen, known only from Hill (1936, figure 4), is missing (S.K. Skwarko pers. comm. 1989).

Other material mentioned by Hosking (1925) and Hill (1936) included Western Australian Museum (WAM) numbers 4435-6, collected by J.E. Wells in 1922. These two (?) specimens and the holotype were stated by Hill (1936) to come from 'Barker Gorge, Napier Range, Kimberley'. However, this numbering refers to only one specimen (K.J. McNamara, pers. comm., 1989); the thin section figured by Hill (1936, figure 5) bears the inscription 4435/6. The only thin section material of the species I have been able to study is the figured longitudinal thin section and a small transverse section prepared from the specimen WAM 4435.

Hill (1954) mentioned two further specimens (CPC 539 and R 225B; Bureau of Mineral Resources, Geology and Geophysics, Canberra collections) collected by H.B. Woodward in 1906 from the Sparke Range, Margaret River, west Kimberleys, and illustrated the former specimen (Hill 1954, pl. 1, figure 19a, b). These specimens are missing, and were probably destroyed in the 1953 BMR fire at Acton (D.L. Strusz, pers. comm., 1988).

Thus, the only relic of this uncommon species in WAM 4435, fortunately a paratype.

Age

Playford and Lowry (1966: 61) state that *S. delicatula* is from the Givetian to early Frasnian part of the Pillarar Limestone. I suggest that the latter age is the more likely. Material from the Barker Gorge may well have been reworked, as the coral specimen is set in a matrix of quartz grains.

Diagnosis

Scruttonia with up to 19x2 septa with mostly zig-zag carinae; trabeculae form a prominent half-fan near inner edge of dissepimentarium, which is not everted; tabularium diameter about 1.3mm, with depressed tabulae flanked by axially-inclined tabellae.

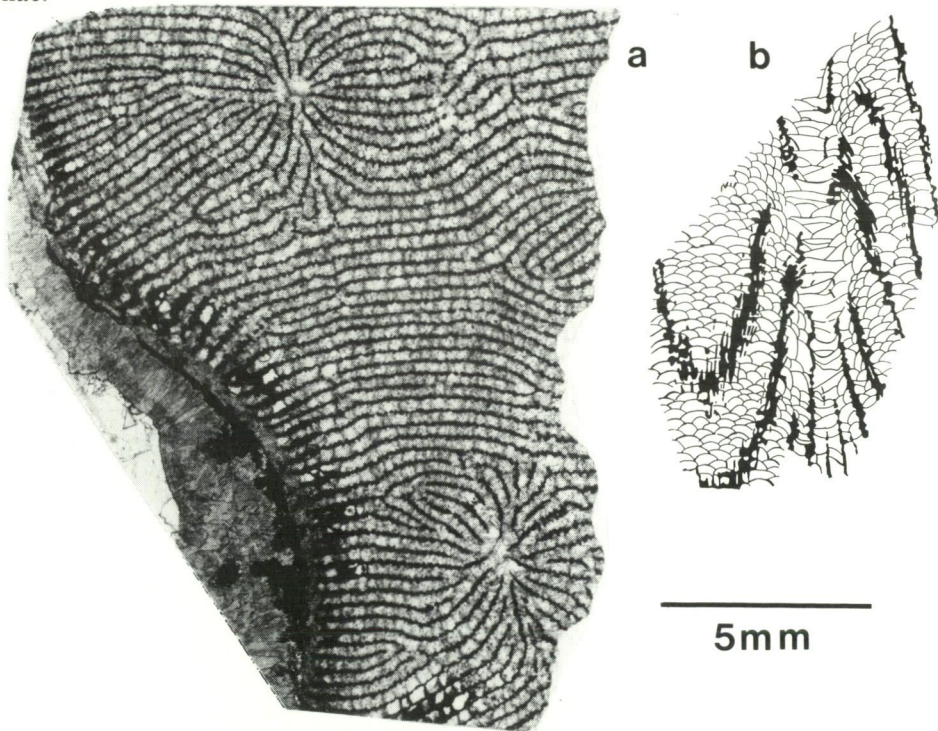


Figure 1a-b. *Scruttonia delicatula* (Hill, 1936), paratype WAM 4435. Pillara Limestone, Barker Gorge, Napier Range, Kimberley district, Western Australia. Probably early Frasnian. 1a, transverse section, x6. 1b, drawing of longitudinal view, x6. Bar scale 5mm.

Description

Apparently strongly thamnasterioid, although the confluent septa cannot be seen joining adjacent corallites in presently available material (see, however, Hill [1936, figure 4] and Hill [1954, pl. 1, figure 19a] for highly confluent septa in this species); about 14x2 carinate septa, possibly up to 19x2; the major septa are slightly withdrawn from the axis; minor septa do not enter the tabularium; both orders of septa show slight, variable development of mostly zigzag carinae, and both are slightly dilated at the colony margin. Septal insertion is marked in the two corallites illustrated (Figure 1a); up to 7 major septa occur in the counter quadrant, and about 4 in the alar quadrant. Coarse trabeculae form a half-fan (Figure 2) towards the inner part of the dissepimentarium, with trabeculae normal to dissepimental surfaces in the coenosteum. Horizontally disposed, gently arched dissepiments form the coenosteum between corallites, without any eversion at corallite margins; several rows of inclined dissepiments; large axially-inclined tabellae merge with the rather widely spaced tabulae which vary from transverse and complete to sagging; Dt about 1.3mm.

Remarks

This small fragment of a colony is quite inadequate for establishing all the specific characters. The transverse section (Figure 1a) shows two apparently immature corallites in which septal insertion is suggested by arrangement of short septa flanking longer septa; unfortunately, it is uncertain which are the counter, cardinal or alar septa (or even whether some septa are major or minor), but there are apparently up to 19 major septa. The longitudinal section (Figure 2) is oblique, and hence the trabecular structure is incompletely known. Although *Scruttonia* is defined as having a symmetrical trabecular fan, the trabecular half-fan seen in *S. delicatula* (Figure 2) is also illustrated for *S. sp. cf. S. bowerbanki* by Pedder (1986, figures 78.20, 78.21) and for *S. boloniensis* Milne-Edwards and Haime by Rohart (1981, pl. 2, figure 1b).

Comparison

This Western Australian species has a greater number of more carinate septa than *S. bowerbanki* as currently known from the work of Scrutton (1968), Tsien (1977), Coen-Aubert (1980a), Rohart (1981) and Pedder (1986). *S. boloniensis* is distinct in its equally spaced corallites; very long, equally withdrawn major septa; and larger tabularia (Rohart 1981).

Implications

The shared occurrence of *Scruttonia* provides another link in the previously recognised similarities at the general level in Late Devonian faunas between Western Australia and New South Wales (e.g. Talent 1984, p. 76). This conforms with the generally recognised cosmopolitan aspect of Late Devonian coral faunas (Oliver and Pedder 1989, figure 3). Unfortunately, the fauna associated with *S. delicatula* is not known (other than sparse data in Glauert 1910b), so the affinities of the entire fauna cannot be assessed. However, further comparisons of the Keepit and Western Australian coral faunas reveal surprisingly few faunal elements common to these two regions

(Wright *et al.* in press). Roberts (1971:1) stated that the Frasnian brachiopods of Western Australia belonged to a world-wide 'platform' fauna, noting (Roberts 1971: 32) that the eastern Australian Late Devonian brachiopod faunas are not well known in detail (see also Veevers 1959).

Pedder (1986: 659) concludes that *Scruttonia* is restricted to the Frasnian, and thus the occurrence of *delicatula* in Western Australia is likely to be of this age.

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References

- Birenheide, R. (1978). *Rugose Korallen des Devon*. In *Leitfossilien, begründet von Georg Gürich, 2, völlig neu bearbeitete Auflage*, 2, Krömmelbein, K., ed., I-IV + 265p.
- Cherepnina, S.K. (1975). K sistemataike podotriarda Philipsastraeina A. Schouppé, 1958, (On the systematics of the suborder Phillipsastraeina A. Schouppé, 1958), 198-204 in B.S. Sokolov (ed.), *Drevniye Cnidaria*, vol. I, Tr. Inst. Geol. Geofiz., Sib. Otd. vyp. 201.
- Coen-Aubert, M. (1980). Représentants frasnien du genre *Scruttonia* Tcherepnina, S.K., 1974 (Rugosa) en Belgique. *Bull. Inst. roy. Sci. nat. Belg.* **51**(4):1-15.
- Glauert, L. (1910a). A list of Western Australian fossils, systematically arranged. *Bull. geol. Surv. West. Aust.* **36**:71-106.
- Glauert, L. (1910b). New fossils from the Barker Gorge, Napier Range, Kimberley. *Bull. geol. Surv. West. Aust.* **36**:111-114.
- Glauert, L. (1926). A list of Western Australian fossils, Supplement No. 1. *Bull. geol. Surv. West. Aust.* **88**:36-71.
- He, Yuanxing. (1978). Subclass Rugosa. In *Atlas of Fossils of Southwest China; Sichuan volume. Part 1, from Sinian to Devonian*. Chengdu Institute of Geology and Mineral Resources (ed.). Geological Publishing House, Beijing, 98-179, 555-568. (Chinese).
- Hill, D., (1936). Upper Devonian corals from Western Australia. *J. Roy. Soc. West. Aust.* **22**:25-39.
- Hill, D. (1954). Coral faunas from the Silurian of New South Wales and the Devonian of Western Australia. *Bull. Bur. Miner. Resour. Geol. Geophys.* **23**, 51p.
- Hill, D. (1981). Treatise on Invertebrate Paleontology; Part F, Coelenterata, Supplement 1, Rugosa and Tabulata. C. Teichert (ed.). The Geological Society of America and the University of Kansas Press, Boulder and Lawrence, vol. 1, p. i-xi + 1-378, vol. 2, i-ii, 379-762.
- Hill, D. and Jell, J.S. (1970). Devonian corals from the Canning Basin, Western Australia. *Bull. geol. Surv. West. Aust.* **121**, 158p.
- Hosking, L.F.V. (1933). Distribution of Devonian rocks in the Kimberley Division; and description of a recent collection of Devonian fossils from the Kimberley Division. *J. Roy. Soc. West. Aust.* **19**: 67-106.
- Jiang, Shui-gen. (1982). Descriptions of corals. In *Palaeontological Atlas of Hunan Province*. Hunan Provincial Geological Bureau (ed.). Geological Publishing House, Beijing, 81-162, 820-842. (Chinese).
- Küster, P. (1987). Nachweis von Frasnium durch *Scruttonia julli* (Pedder, 1986) in den Flachwasserkalken der Zentralen Karnischen Alpen. *Münst. Forsch. Geol. Pal.* **66**:33-56.
- McLean, R.A. (1989). Phillipsastreidae (Rugosa) in the Frasnian of western Canada. *Mem. Ass. Australas. Palaeontols* **8**:239-249.
- Oliver, W.A. Jr and Pedder, A.E.H. (1989). Origins, migrations and extinctions of Devonian Rugosa on the North American plate. *Mem. Ass. Australas. Palaeontols* **8**: 231-237.

- Pedder, A.E.H. (1986). The Devonian coral genera *Haplothecia*, *Kuangxiastraea* and *Scruttonia*. *Curr. Res., A. Geol. Surv. Can. Pap.* **86-1A**: 649-661.
- Playford, P.E. and Lowry, D.C. (1966). Devonian reef complexes of the Canning Basin, Western Australia. *Bull. geol. Surv. West. Aust.* **118**, 115p. plus atlas.
- Roberts, J. (1971). Devonian and Carboniferous brachiopods from the Bonaparte Gulf basin, northwestern Australia. *Bull. Bur. Min. Resour. Geol. Geophys.* **122**, vol. 1, i-ix + 319p.; vol. 2, i-iii + 59pls.
- Rohart, J.-C. (1981). Phillipsastreidae (Rugosa) du Dévonien de Ferques (Boulonnais, France). 2. *Scruttonia boloniensis* (Milne-Edwards and Haime 1851). *Ann. Soc. géol. Nord* **101**: 105-115.
- Scrutton, C.T. (1968). Colonial Phillipsastreaeidae from the Devonian of south-east, Devon, England. *Bull. Brit. Mus. (Nat. Hist.), Geol.* **15**: 181-281.
- Scrutton, C.T. (1978). Eastern south Devon: in A Field Guide to selected areas of the Devonian of south-west England, C.T. Scrutton (ed.); The Palaeontological Association International Symposium on the Devonian System (PADS 78), 27-49.
- Talent, J.A. (1984). Australian biogeography past and present: determinants and implications, p. 57-93. In J.J. Veevers (ed.) *Phanerozoic Earth History of Australia*, Clarendon Press, Oxford.
- Veevers, J.J. (1959). Devonian brachiopods from the Fitzroy Basin, Western Australia. *Bull. Bur. Min. Res. Geol. Geophys.* **45**, 220p.
- Wright, A.J., Pickett, J.W., Sewell, D., Roberts, J. and Jenkins, T.B.H. (in press). Corals and conodonts from the Late Devonian Mostyn Vale Formation, Keepit, New South Wales. *Mem. Ass. Australas. Palaeontols.*
- Yü, Changmin and Kuang, Guodon. (1982). Rugose corals of the late Middle Devonian of Liujing, Hengxian, Guangxi and their palaeoecological characteristics. *Bull. Nanjing Inst. Geol. Pal.* **4**: 241-278 (English summary 273-276).