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MIOCENE CORALS FROM FLORES (EAST INDIES)

BY

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Dr. PH. H. KUENEN kindly entrusted me with a suite of corals collected by him on the island Flores during his cruise with the Expedition on board of H. M. „Willebrord Snellius".

The exact locality is North coast near Papang where the road Papang-Rioeng-Rawoe forkes, 550 m above sea level. Nine different species were collected. Among these is one new species, *Fungophyllia millepunctata* Of one coral, a *Porites*, the species could not be identified with certainty, though it strongly resembles a *Porites* species from the Miocene Progo-beds of Java. From the other 7 corals the following data on their stratigraphical distribution are known.

Cyphastrea monticulifera FELIX „Upper" Miocene (East Borneo).
Progyrosmilia vacua (GERTH), Miocene (Borneo).
Fungophyllia aspera GERTH, „Lower" Miocene (Borneo).
„ *explanata* GERTH, Miocene, West-Progo beds (Java).
„ *monstrosa* GERTH, Miocene, Borneo.
Leptoseris phylloïdes (FELIX), Miocene (Borneo) and Tertiary g (Antjam beds) Borneo.
Goniopora planulata (EHRENB.), from Lower Miocene up to Recent.

Although it is a small collection the available data strongly point to a miocene age of the locality. Four species were mentioned by GERTH (1923) from a locality in East Borneo (Kabasian river), which he presumed to be of a miocene age. (Progyrosmilia vacua, Fungophyllia monstrosa, Leptoseris phylloïdes and Goniopora planulata).

The collection belongs to the National Museum of Geology at Leiden.

The following is a systematic discussion of the material studied.

Cyphastrea monticulifera Felix.

1921. *Cyphastrea monticulifera* FELIX, Borneo, pag. 33, plate 143 (3) fig. 4, 8.

There is only one fragment of a coral, which corresponds in every respect to the description of FELIX's from Binanga. FELIX described the species from probably Upper Miocene strata of East Borneo.

Progyrosmilia (?) vacua Gerth.

fig. 10 and 11.

1923. *Coelocoenia vacua* GERTH, Borneo, p. 63, plate 3, fig. 6.
1937. *Progyrosmilia,* WELLS, p. 74, 75.

One well preserved specimen, only part of the fossil being broken off. The upper surface of the colony is irregularly undulating. The description of GERTH's is entirely applicable to the Flores specimen. The lower surface, which is entirely covered by an epitheca, is well preserved too. The only specimen described by GERTH is from Miocene strata of Borneo.

Fungophyllia aspera Gerth.

fig. 9.

1923. *Fungophyllia aspera* GERTH, Borneo, p. 65, plate 1, fig. 25, plate 2, fig. 1.
1925. „ „ „ , Borneo, p. 47, plate 7, fig. 4, 4a.

The rather large suite of 46 specimens belonging to the species under discussion, shows a great deal of variation in shape. The largest specimen has a diameter of 110 m.m. (GERTH mentions a specimen with a diameter of 200 m.m.). Some specimens, having a diameter of 40 to 60 m.m., are applanate and with a short stalk. The same type occurs among the smaller ones, but in many small specimens the heigth of the coral is larger than the diameter.

Probably the juvenile specimen figured in fig. 9 belongs to the present species too. It is attached to a *Porites* spec. The calice of this specimen has a diameter of 7 m.m. and 26 septa. The septa of the second cycle are slightly shorter and thinner than those of the first cycle. Septa of third cycle again thinner. A few very short septa of the fourth cycle are present. Septa of the first cycle are slightly thickened near the spongious pseudocolumella. Diameter of columella 1 m.m..

Fungophyllia explanata (Gerth).

1921. *Lithophyllia explanata* GERTH, Java p. 407, plate 55, fig. 1, plate 56, fig. 7 (see also GERTH 1931, p. 140).

Three specimens. The larger one has a diameter of 25 m.m. and about 100 septa (6 cycles, the sixth incomplete). The two other specimens are only slightly smaller. All three specimens are very applanate, about 5 m.m. high.

Up to now the species was described only from the West-Progo beds (Djoenggrangan), Java.

Fungophyllia monstrosa Gerth.

1923. *Fungophyllia monstrosa* GERTH, Borneo, p. 65, plate 2, fig. 2—4.

A single fragmentary specimen doubtless belongs to F. monstrosa. Diameter of the calice must have been about 50 by 60 m.m. Six septa are very strongly developed; between these are 6 rather thick septa nearly reaching the calicular centre. Septa of the next cycle are of nearly equal length but are much thinner towards the centre of the calice. 48 Septa of the fourth cycle are much shorter and those of the fifth cycle are very short to rudimentary. This arrangement of septa is clearly shown on the lower surface of the specimen. On the upper surface this septal arrangement is not so clearly visible, the septa of first and second cycles being subequal and some of these being less thickened (Indeed GERTH mentions a number of 10 thickened septa). GERTH described the species from miocene strata of the Kabasian river in E. Borneo.

Fungophyllia millepunctata species nova.

fig. 1—7.

9 specimens.

The species may be easily distinguished from the other species of the genus by its much greater number of very thin septa. Moreover, the abundant occurrence of granuliform projections on the septa give the coral a very characteristic „millepunctate'' appearance.

The polyps are conical with an applanate or slightly undulate upper surface. A few specimens show a small central concavity on the upper surface. Diameter of calices ranges from 15 up to 30 m.m.. The largest specimen is 22 m.m. high, and has about 300 septa. In a calice of 20 m.m. diameter about 160 septa occur. No distinct septal arrangement according to cycles can be detected. In a thin section perpendicular to the axis of the calice a small spongious columella, connecting the septal ends may be seen; moreover synapticulae and perforations of the septa may be seen in that section.

Leptoseris phylloides (Felix).

1921. *Cyathoseris phylloides* FELIX, Timor, p. 43, plate 143, fig. 3.
1923. „ „ „ , Gerth, Borneo, p. 105.
1929. *Leptoseris* „ „ , Umbgrove, Borneo, p. 62, plate 3, fig. 36, 37.

Identification is based on a comparison with GERTH's specimen from Borneo. In my 1929 paper I referred the species to the genus *Leptoseris*. The specimen from Flores leads to the same conclusion. Perhaps *Leptoseris* and *Cyathoseris* should be united into one genus. A detailed study on a large suite of recent material is much to be desired.

The species occurs in miocene strata of the Kabasian river E. Borneo and in the upper miocene Antjam beds (Tertiary g) of E. Borneo.

Porites spec.

fig. 9.

1921. *Porites spec.* Gerth, Java p. 433.

A *Porites* with a young specimen of *Fungophyllia aspera* attached to it, probably belongs to the same species as was mentioned by GERTH from Gunung Spolong (West-Progo beds, Java). Habitus, concentrical layers and diameter of calices agree with GERTH's type specimen in the National Museum of Geology at Leiden. A further comparison is, however, impossible, the Javanese specimen being even in a worse state of preservation than the fossil from Flores.

The coral has the shape of a top, 50 m.m. high. The upper surface in slightly undulate and has a subcircular diameter of 60 m.m. Diameter of calices 1 to 1,5 m.m. Calices very shallow rounded subpolygonal. In some calices 12 septa reaching the calicular centre may be distinguished. The fossil is, however, too strongly altered to allow a detailed description and comparison.

Goniopora planulata (Ehrenberg).

fig. 8.

1921. *Goniopora planulata* (EHRENB.), Felix, Borneo, p. 56.
1923. „ „ „ , Gerth, Borneo, p. 47, p. 118, plate IX, fig. 6.
1924. „ „ „ , Umbgrove, Ceram, p. 18.
1933. „ cf. „ „ , Gerth, Java, p. 41.

The single specimen is a fragment of an elongate columnar growth. Its lower end has an elliptical diameter of 34 by 28 m.m. The calices are shallow polygonal separated by comparatively thin reticular walls. Diameter of calices 4 to 6 usually 5 m.m. Up to about 30 septa present, those of adjacent calices usually alternating. Columellar tangle inconspicuous. In some calices a crown of 6 conspicuous palar lobes is preserved, strongly resembling those figured by KLUNZINGER (1877) in his plate V, fig. 24.

Distribution: Lower-Miocene (Seraju beds), Java; Miocene Borneo (Gerth); Miocene ?, Pliocene ?, Borneo (Felix); Plio-Pleistocene, Ceram; Pleistocene, Borneo (Gerth); Recent: Indo-Pacific.

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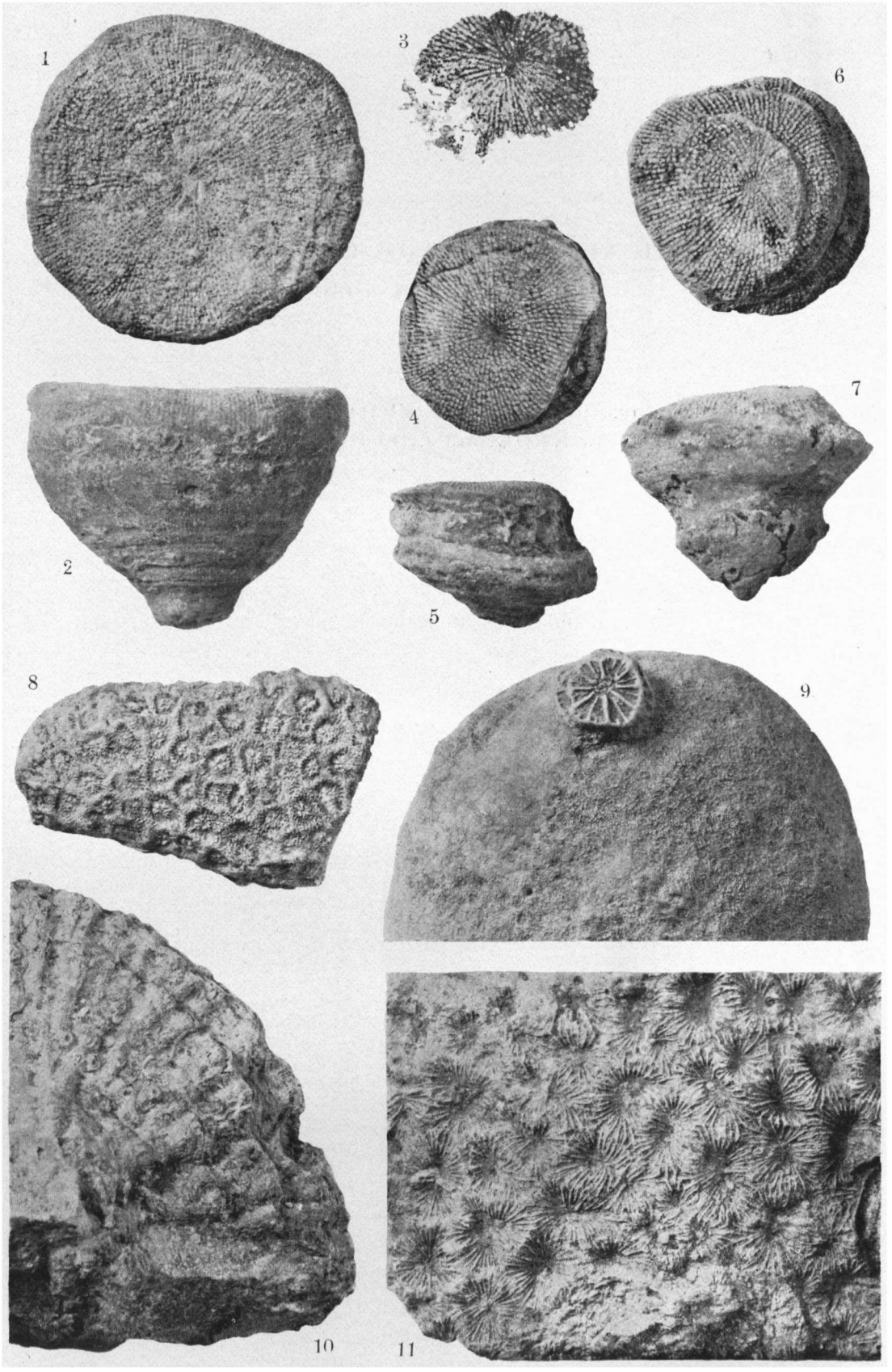
Explanation of figures.

Fig. 1—7. Fungophyllia millepunctata spec. nov. × 2; fig. 1, 4 and 6 oral surface, fig. 2, 5 and 7 lateral view of same specimens; fig. 3 thin section of another specimen.

Fig. 8. Goniopora planulata (Ehrenb.) natur-size.

Fig. 9. Probably young specimen of Fungophyllia aspera Gerth on Porites spec. × $^3/_2$.

Fig. 10, 11. Progyrosmilia (?) vacua (Gerth), fig. 10, part of lower surface, × 1; fig. 11, part of upper surface, × 2.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