

PLATE 16.

Fig. 1. *Niphargus subterraneus*, Leach. The sex of the specimen from which each drawing was made is indicated by the usual sign.

PLATE 17.

Fig. 1. *Niphargus subterraneus*, Leach.

2. *Niphargus Kochianus*, Spence Bate, drawn from a specimen from Dublin.

PLATE 18.

Fig. 1. *Niphargus Kochianus*, Spence Bate, Dublin specimen.

2. Ditto, from a Marlborough specimen.

3. *Crangonyx subterraneus*, Spence Bate.

(All the figures considerably magnified.)

FORAMINIFERA from the Lagoon at Funafuti.

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[Read 6th December, 1900.]

(PLATES 19 & 20.)

INTRODUCTION.

By the study of Foraminifera under abnormal or adverse conditions one is able to learn much that is of biological interest, and more of the real value of the so-called species, than by the mere examination of samples which have been obtained from ordinary extensive littoral or deep-sea deposits, formed under conditions more or less favourable.

So far as I know, we have never before had so good an opportunity of examining a foraminiferal lagoon fauna in detail. The present paper is based on the material dredged by Messrs. G. Halligan and A. E. Finckh across the lagoon of Funafuti; and this was courteously sent to us by Prof. T. Edgeworth David, of Sydney University, under whose direction the dredgings were made.

The dredgings were taken along a line running due E. and W. starting from below the Mission Church on Fongafale Islet, at intervals of half-a-mile, until the opposite rim of the Atoll was

reached at Fuafatu Islet *. These dredgings were sent over in 6 oz. capsuled bottles and numbered consecutively 1 to 18.

The starting point for the dredgings, Fongafale, presents an unbroken rim; but on the contrary Fuafatu, on the opposite side of the Atoll, is situated on the part of the rim which is broken up by channels. These diverse features afford most interesting comparisons of the foraminiferal faunas at the two localities; for at the former place the Foraminifera have lived under more or less tranquil conditions; whereas those of the latter locality were subjected to the action of the currents and surf, and consequently had an abundant food-supply, and this could not fail to make a decided difference in the assemblage found there.

Although the lagoon of Funafuti is open to the sea by many broad channels, chiefly on the S.E. and N.W., the area itself is so large, about 9 miles along the line of the soundings, that we might well expect to find a facies in the middle of the lagoon differing from that near the rim of the Atoll.

The results obtained not only bear out this expectation, but they offer many new points with regard to the habits and preference of conditions exhibited by such lowly forms as the Rhizopoda, far exceeding anything we had anticipated.

The present collection is a remarkable object-lesson on the importance of environment in producing variations; and provided these conditions remain fixed for lengthened periods, the varieties may converge to definite centres of form, and come to be regarded as species. The simplicity of the Rhizopod-structure and the almost infinite adaptability of these animals to their environment enable us to point to innumerable connecting-links or intermediate forms, the despair of the systematist, which afford the biologist material for some important deductions and a general comparative study.

The present work has been chiefly carried out in the Geological Laboratory of the Royal College of Science; and I am indebted to Prof. Judd, C.B., F.R.S., for the facilities he has there given me.

* See Map of Funafuti Atoll, p. 167.

GENERAL ANALYSES OF THE SAMPLES.

The composition of the 18 samples of dredgings from the Lagoon are as follows:—

Sample No.	Distance from Mission Church.	Depth in fathoms.	Foraminifera.	Other Organisms.	<i>Halimeda</i>
1	1 mile.	10	47 per cent.—Chiefly <i>Miliolina</i> , <i>Orbitolites</i> , <i>Textularia</i> , <i>Calcarina</i> , <i>Amphistegina</i> , and <i>Heterostegina</i> .	3 per cent. — Lamellibranchs, Gastropods, Alcyonarian spicules, Echinoderma, Serpulæ, Ostracoda and other Crustacea.	50 per cent.
2	1 mile.	15½	23 p. c.—Chiefly <i>Orbitolites</i> , <i>Calcarina</i> , <i>Textularia</i> , <i>Amphistegina</i> , and <i>Heterostegina</i> .	2 p. c. — Echinoderma, Polyzoa, Lamellibranchs, Gastropods, Serpulæ, Ostracoda.	75 p. c.
3	1½ miles.	20	5 p. c.—Chiefly <i>Sagenina</i> , <i>Amphistegina</i> , and <i>Heterostegina</i> .	5 p. c.—Lamellibranchs, Gastropods, and Serpulæ.	99 p. c.
4	2 miles.	23	20 p. c.—Chiefly <i>Orbitolites</i> , <i>Planorbulina</i> , <i>Gypsina</i> , <i>Calcarina</i> , <i>Amphistegina</i> , and <i>Heterostegina</i> .	4 p. c. — Echinoderma, Polyzoa, Lamellibranchs, Gastropods, Serpulæ, Ostracoda and other Crustacea.	76 p. c.
5	2½ miles.	24	14 p. c.—Chiefly <i>Sagenina</i> , <i>Gypsina</i> , <i>Amphistegina</i> , and <i>Heterostegina</i> .	1 p. c. — Echinoderma, Polyzoa, Lamellibranchs, Gastropods, Serpulæ, and Crustacea.	85 p. c.
6	3 miles.	21	9 p. c.—Chiefly <i>Sagenina</i> , <i>Calcarina</i> , <i>Amphistegina</i> , and <i>Heterostegina</i> .	1 p. c. — Echinoderma, Polyzoa, Brachiopods, Gastropods, Lamellibranchs, Serpulæ, Ostracoda and other Crustacea.	90 p. c.
7	3½ miles.	24	14 p. c.—Chiefly <i>Sagenina</i> , <i>Gypsina</i> , <i>Amphistegina</i> , and <i>Heterostegina</i> .	1 p. c.—Pteropods, Polyzoa, Lamellibranchs, Gastropods, Serpulæ, and Ostracoda.	85 p. c.
8	4 miles.	26	2 p. c.—Chiefly <i>Sagenina</i> , <i>Gypsina</i> , <i>Nonionina</i> , <i>Amphistegina</i> , and <i>Heterostegina</i> .	1 p. c.—Sponges, Gastropods, Lamellibranchs, Serpulæ, and Crustacea.	97 p. c.
9	4½ miles.	25	1 p. c.— <i>Sagenina</i> , <i>Bolivina</i> , <i>Amphistegina</i> , and <i>Heterostegina</i> .	1 p. c.—Serpulæ, Lamellibranchs, Gastropods.	98 p. c.

TABLE (continued).

Sample No.	Distance from Mission Church.	Depth in fathoms.	Foraminifera.	Other Organisms.	Halimeda.
0.....	5 miles.	26	12.5 p. c.—Chiefly <i>Sagenina</i> , <i>Haddonina</i> , <i>Amphistegina</i> , and <i>Heterostegina</i> .	2.5 p. c.—Serpulæ, Gastropods, Lamellibranchs, Polyzoa, Pteropods, Ostracoda and other Crustacea.	85 p. c.
1.....	5½ miles.	25	12.5 p. c.—Chiefly <i>Haddonina</i> , <i>Carterina</i> , <i>Gypsina</i> , <i>Polytrema</i> , <i>Nonionina</i> , and <i>Amphistegina</i> .	2.5 p. c.—Echinoderma, Polyzoa, Lamellibranchs, Gastropods, and Crustacea.	85 p. c.
2.....	6 miles.	23	1 p. c.— <i>Sagenina</i> , <i>Gypsina</i> , <i>Polytrema</i> , and <i>Amphistegina</i> .	1 p. c.—Polyzoa, Gastropods, and Serpulæ.	98 p. c.
3.....	6½ miles.	26	9 p. c.—Chiefly <i>Carterina</i> , <i>Discorbina</i> , <i>Gypsina</i> , <i>Polytrema</i> , and <i>Amphistegina</i> .	1 p. c.—Polyzoa, Gastropods, and Serpulæ.	90 p. c.
4.....	7 miles.	16	9 p. c.—Chiefly <i>Orbitolites</i> , <i>Haddonina</i> , <i>Truncatulina</i> , <i>Calcarina</i> , <i>Gypsina</i> , <i>Amphistegina</i> , and <i>Heterostegina</i> .	1 p. c.—Echinoderma, Lamellibranchs, Gastropods, Heteropods, Serpulæ, and Ostracoda.	90 p. c.
5.....	7½ miles.	19	9 p. c.—Chiefly <i>Textularia</i> , <i>Calcarina</i> , <i>Gypsina</i> , <i>Amphistegina</i> , and <i>Heterostegina</i> .	1 p. c.—Lamellibranchs, Gastropods, and Serpulæ.	90 p. c.
6.....	8 miles.	20	9 p. c.—Chiefly <i>Sagenina</i> , <i>Placopsilina</i> , <i>Carterina</i> , <i>Calcarina</i> , <i>Gypsina</i> , <i>Polytrema</i> , and <i>Amphistegina</i> .	1 p. c.—Polyzoa, Lamellibranchs, Gastropods, and Serpulæ.	90 p. c.
17.....	8½ miles.	12	90 p. c.—Chiefly <i>Spiroloculina</i> , <i>Miliolina</i> , <i>Hauerina</i> , <i>Peneroplis</i> , <i>Orbitolites</i> , <i>Textularia</i> , <i>Verneuilina</i> , <i>Globigerina</i> , <i>Cymbalopora</i> , <i>Discorbina</i> , <i>Calcarina</i> , <i>Gypsina</i> , <i>Polytrema</i> , <i>Amphistegina</i> , and <i>Heterostegina</i> .	1 p. c.—Sponge spicules, Alcyonarian spicules, Echinoderma, Brachiopods, Lamellibranchs, Gastropods, and Ostracoda.	90 p. c. 1) 1817
18.....	9 miles.	½	98 p. c.—Chiefly <i>Spiroloculina</i> , <i>Miliolina</i> , <i>Hauerina</i> , <i>Peneroplis</i> , <i>Textularia</i> , <i>Verneuilina</i> , <i>Spirillina</i> , <i>Cymbalopora</i> , <i>Discorbina</i> , <i>Truncatulina</i> , <i>Tinoporus</i> , <i>Polytrema</i> , <i>Calcarina</i> , <i>Polystomella</i> , <i>Amphistegina</i> , and <i>Heterostegina</i> .	1 p. c.—Sponge spicules, Alcyonarian spicules, Echinoderma, Heteropods, and Ostracoda.	1 p. c.

By a reference to the foregoing Table, we find that the prevailing genus of the Foraminifera under all the varying conditions is *Amphistegina*. The specimens of this genus which are found in the middle of the lagoon are, as a rule, much smaller than those found within reach of the influence of marine currents from the outer side of the reef, whether through channels in the rim or through the submarine interstices of the reef-platform.

The spurred forms *Calcarina* and *Tinoporus* (slightly resembling each other in general form but not related) are both common near the rim at Fuafatu Islet, and on the opposite side of the lagoon at Fongafale Islet; but the latter genus rapidly disappears* on travelling across the lagoon, and *Calcarina* only is found in the various samples taken from the lagoon-floor.

The number of genera of the Foraminifera found close to the lagoon-shore, near the Mission Church at Fongafale, is 21; but on the opposite side, at Fuafatu, the number is increased to 28. This is obviously owing to the greater influence of marine conditions and food-supply from the seaward face. At Fongafale this seems to be due to the passage of water through the reef-platform, and at Fuafatu to currents passing through channels in the rim of the Atoll or between the islets.

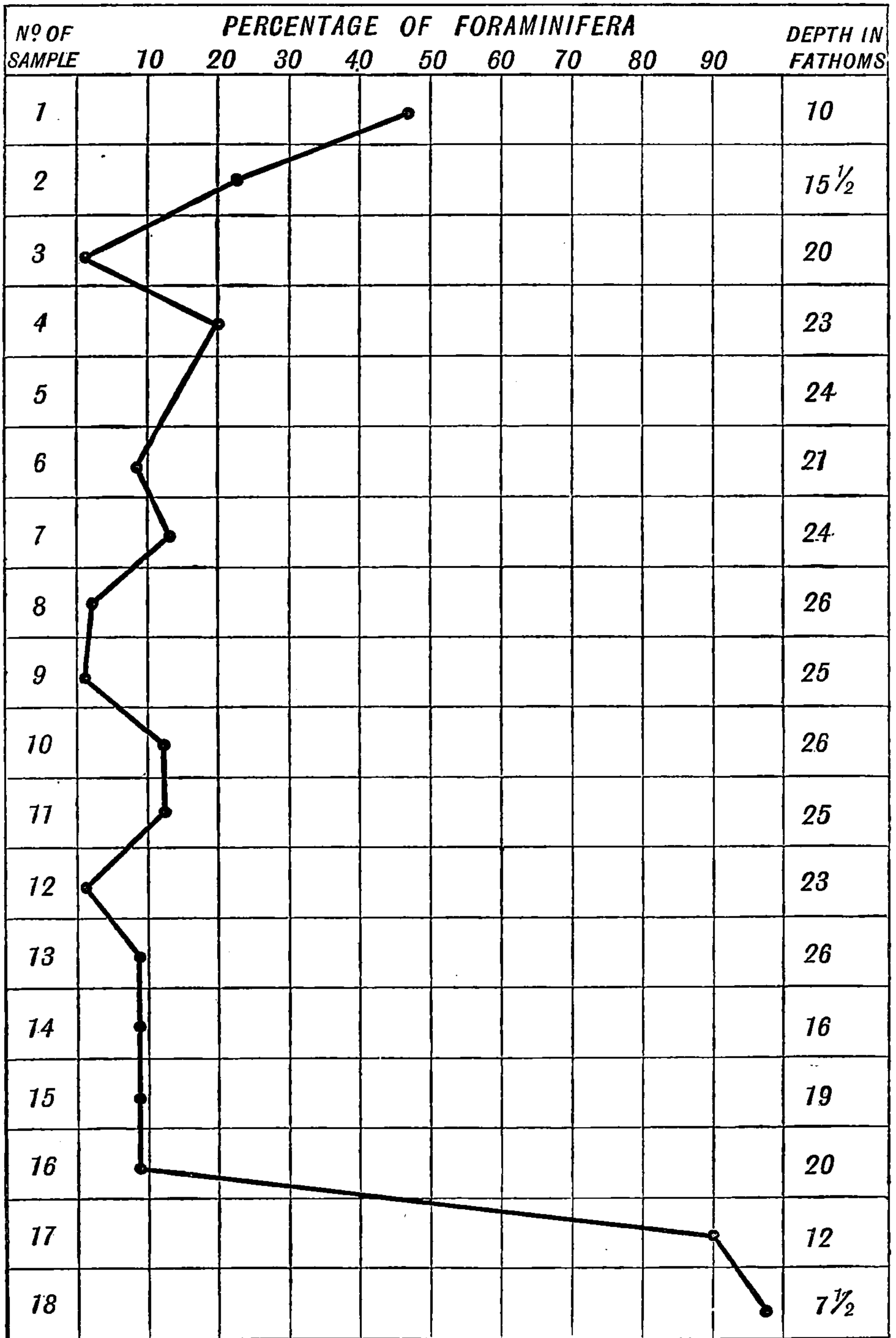
In the middle of the lagoon only three genera are present, namely, *Sagenina*, *Amphistegina*, and *Heterostegina*.

Whilst the greater number of generic forms gradually die out towards the centre of the lagoon, a few, with some special varieties, make their appearance and in tolerable abundance, in consequence of the more tranquil conditions prevailing there. A noteworthy form in this respect is *Carterina spiculotesta*, whose tiny brown tests are usually found attached to *Halimeda*-fronds. The thin papery form *Gypsina vesicularis* var. *squamiformis*, and the adherent *Planorbulina larvata* are also found under similar conditions.

PERCENTAGE COMPOSITION OF THE FORAMINIFERAL SAMPLES.

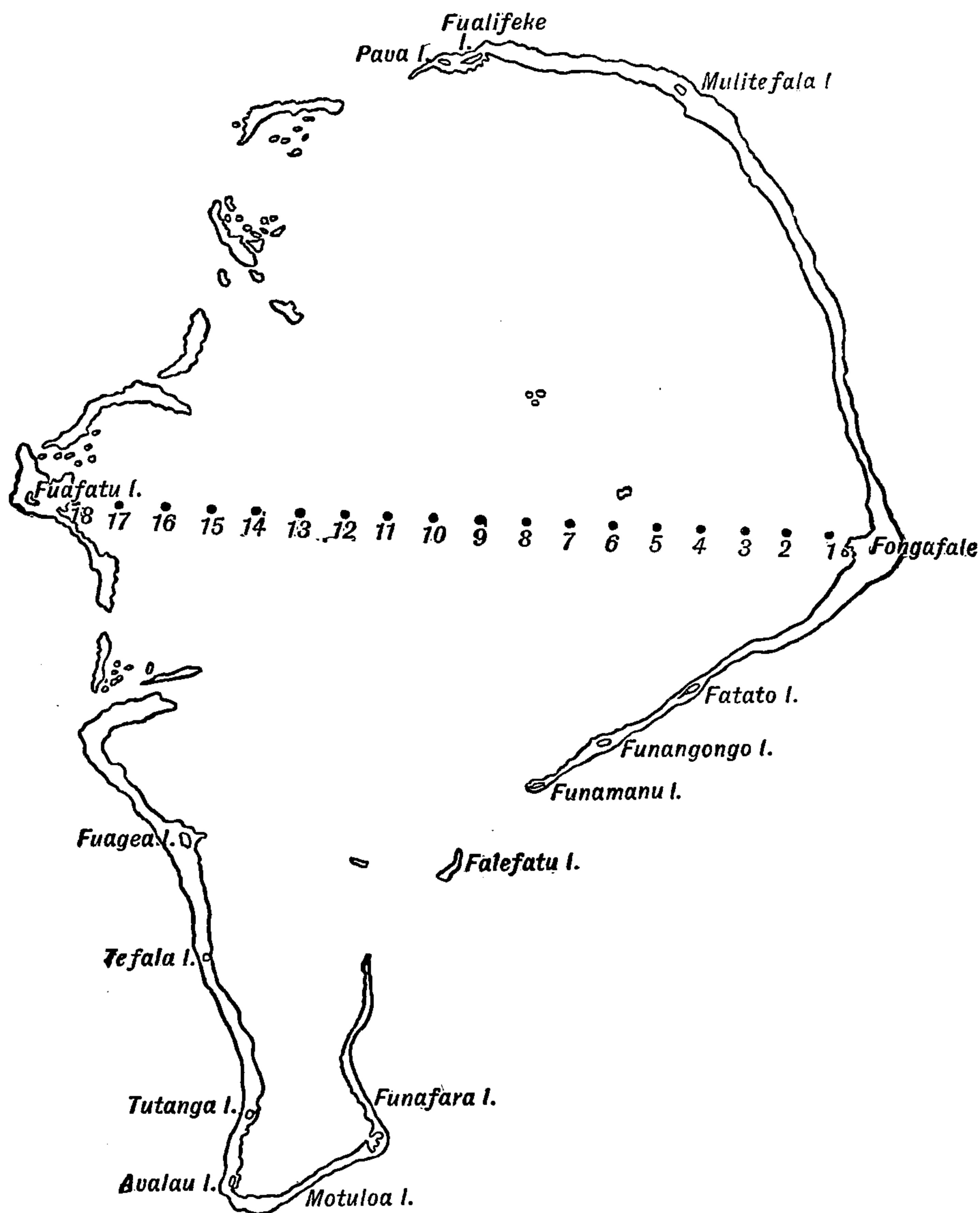
A Chart of the percentage composition of the samples with regard to the Foraminifera is given below. By this we see the almost equal proportion of *Halimeda* and the Foraminifera occurring near the rim of the Atoll at Fongafale Islet. There is

* A solitary specimen of *Tinoporus baculatus*, much worn, and probably carried in by currents, was found in Sample 11, 3½ miles from the rim of the Atoll.



PERCENTAGE OF FORAMINIFERA.—Readings to the left of the zigzag line give percentages of Foraminifera; to the right, percentages of *Halimeda* and other miscellaneous organisms.

then a sudden drop $1\frac{1}{2}$ miles out to .5 per cent. of Foraminifera, followed by an oscillation along the floor of the lagoon, and in no wise dependent upon depth. The percentage of Foraminifera



FUNAFUTI ATOLL.—Showing the principal Islets and the positions whence the Lagoon samples were taken.

here falls as low as 1 and never rises above 20. This low percentage is persistent until within 1 mile of the opposite rim near Fuafatu Islet, where there is a sudden rise to 90 per cent., which is further increased within $\frac{1}{2}$ mile of the shore to 98 per cent.

DESCRIPTION OF THE FORAMINIFERA*.

Family MILIOLIDÆ.

Subfamily NUBECULARIINÆ.

NUBECULARIA, *Defrance* [1825].NUBECULARIA DIVARICATA, *Brady*. (Pl. 19. fig. 1.)

Sagrina divaricata, Brady, 1879, Quart. Journ. Micr. Sci. n. s., vol. xix. p. 276, pl. viii. figs. 22-24.

Nubecularia divaricata, Brady, 1884, Rep. Chall. vol. ix. p. 136, pl. lxxvi. figs. 11-15.

N. divaricata, Brady, Millett, 1898, Journ. R. Micr. Soc. p. 261, pl. v. fig. 4.

This rare form has previously been recorded from Humboldt Bay, Papua; off Raine Island, Torres Strait; off Tongatabu, Friendly Islands; and lately by Millett from three stations in the Malay Archipelago. Our specimen closely resembles that of the figure given by Millett, and it also shows the phialine termination of the aperture characteristic of this species.

Lagoon, Funafuti; very rare. Sample 18 (7½ fathoms).

NUBECULARIA LUCIFUGA, *Defrance*.

Nubecularia lucifuga, Defrance, 1825, Dict. Sci. Nat. vol. xxv. p. 210, Atlas Zooph. pl. xliv. fig. 3.

N. lucifuga, Defrance, Egger, 1893, Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xvii. p. 250, pl. xxi. figs. 4-7.

N. lucifuga, Defrance, Millett, 1898, Journ. R. Micr. Soc. p. 261, pl. v. fig. 7.

A rare form in tropical areas. Recorded from Tongatabu, Friendly Islands; Malay Archipelago, etc. It is represented at Funafuti chiefly by spirally-wound specimens, originally attached to other organisms.

Lagoon, Funafuti; generally rare. Sample 1 (10 fathoms); sample 13 (26 fathoms); sample 17 (12 fathoms).

* The synonymy of the species is here restricted chiefly to references subsequent to Brady's 'Challenger' Report (1884).

NUBECULARIA BRADYI, Millett. (Pl. 19. fig. 3.)

Nubecularia inflata, Brady, 1884, Rep. Chall. p. 135, pl. i. figs. 5-8.

N. Bradyi (*N. inflata* preoccupied), Millett, 1898, Journ. R. Micr. Soc. p. 261, pl. v. figs. 6 *a*, *b*.

This species usually occurs in quite shallow water. It was obtained by the 'Challenger' off Honolulu, Sandwich Islands; off Tongatabu; off Tahiti; Nares Harbour, Admiralty Islands; and Balfour Bay, Kerguelen Island. It is common in the Greek Archipelago, and Millett found it in the Malay Archipelago. Our specimens do not show the fistulose or spouted tendency which the aperture assumes, shown in the specimens figured by Brady and Millett.

Lagoon, Funafuti; very rare. Sample 1 (10 fathoms); sample 18 ($7\frac{1}{2}$ fathoms).

NUBECULARIA LACUNENSIS, sp. nov. (Pl. 19. fig. 2.)

Test porcellanous, free, or (?) attached; consisting of a series of compressed and concave segments somewhat cuspid at the peripheral margin, and arranged in an obscurely rotaline manner. Superior face conical, depressed; inferior, flat. Diameter .55 millim.

Lagoon, Funafuti; very rare. Sample 18 ($7\frac{1}{2}$ fathoms).

Subfamily MILIOLININÆ.

BILOCULINA, d'Orbigny [1826].

BILOCULINA OBLONGA, d'Orbigny.

Biloculina oblonga, d'Orbigny, 1839, in Sagra's Cuba, Foram. p. 163, pl. viii. figs. 21-23.

This species has the aboral end considerably swollen, and the inverted aperture of the penultimate chamber very apparent, thus differing from *B. elongata*, d'Orbigny, which is more regularly oval. D'Orbigny's specimens came from the neighbourhood of the Cuban coral-reefs.

Lagoon, Funafuti; very rare. Sample 8 (26 fathoms); sample 18 ($7\frac{1}{2}$ fathoms).

BILOCULINA SUBSPHÆRICA, d'Orbigny.

Biloculina subsphærica, d'Orbigny, 1839, in Sagra's Cuba, Foram. p. 162, pl. viii. figs. 25-27.

This species was also described from the coral area around Cuba.

Lagoon, Funafuti; very rare. Sample 18 ($7\frac{1}{2}$ fathoms).

BILOCULINA RINGENS (*Lamarck*).

Miliolites ringens, Lamarck, 1804, Ann. du Muséum, vol. v. p. 351; vol. ix. pl. xvii. fig. 1.

Biloculina ringens (Lam.), Egger, 1893, Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xviii. p. 220, pl. i. figs. 7-9.

B. ringens (Lam.), Millett, 1898, Journ. R. Micr. Soc. p. 262.

B. ringens (Lam.), Flint, 1899, Rep. U.S. National Mus. (1897) p. 294, pl. 39. fig. 2.

A widely distributed species both geographically and as regards depth of water. Millett found it generally distributed in the gatherings from the Malay Archipelago.

Lagoon, Funafuti; very rare. Sample 18 ($7\frac{1}{2}$ fathoms).

SPIROLOCULINA, *d'Orbigny* [1826].

SPIROLOCULINA ROBUSTA, *Brady*.

Spiroloculina robusta, Brady, 1884, Rep. Chall. vol. ix. p. 150, pl. ix. figs. 7, 8.

S. robusta, Brady, Flint, 1899, Rep. U.S. Nat. Mus. (1897) p. 296, pl. 42. fig. 1.

This species was found by Dr. Brady in the dredgings near Culebra Island, West Indies, at a depth of 390 fathoms. The specimen from Funafuti is characteristic but small.

Lagoon, Funafuti; very rare. Sample 18 ($7\frac{1}{2}$ fathoms).

SPIROLOCULINA EXCAVATA, *d'Orbigny*.

Spiroloculina excavata, d'Orbigny, 1846, Foram. Foss. Vienne, p. 271, pl. xvi. figs. 19-21.

S. excavata, d'Orb., Rupert Jones, 1895, Pal. Soc. Mon., Crag Foram. p. 106, pl. v. fig. 2; woodcuts, figs. 2a, b.

S. excavata, d'Orb., Millett, 1898, Journ. R. Micr. Soc. p. 264.

S. excavata, d'Orb., Flint, 1899, Rep. U.S. Nat. Mus. (1897) p. 296, pl. 41. fig. 5.

Our specimen is small and very thin-shelled, somewhat resembling *S. impressa*, Terquem, but quite regular in shape.

Lagoon, Funafuti; very rare. Sample 14 (16 fathoms).

SPIROLOCULINA NITIDA, *d'Orbigny*, var. FOVEOLATA, *Egger*.
(Pl. 19. fig. 4.)

Spiroloculina foveolata, *Egger*, 1893, Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xviii. p. 224, pl. i. figs. 33, 34.

Spiroloculina nitida, *d'Orb.* (reticulate variety), *Millett*, 1898, Journ. R. Micr. Soc. p. 266.

This is a very interesting variety which has been recorded from the Mauritius, the Malay Archipelago, and the S. Pacific. It is well developed at Funafuti, but in the external form perhaps more nearly resembles *S. planulata* (*Lam.*).

Lagoon, Funafuti; common. Sample 18 ($7\frac{1}{2}$ fathoms).

SPIROLOCULINA TORTUOSA, sp. nov. (Pl. 19. fig. 5.)

This curious form somewhat resembles *S. lamella* of *Egger**, but is more regular in shape, and is of the *S. excavata* type. The sutural edges of the central series of chambers are strongly contorted. The extremities of the test resemble those of *S. impressa*, *Terquem*. Length .6 millim.

Lagoon, Funafuti; frequent. Sample 5 (24 fathoms); sample 15 (19 fathoms); sample 17 (12 fathoms).

SPIROLOCULINA ANTILLARUM, *d'Orbigny*.

Spiroloculina antillarum, *d'Orbigny*, 1839, in *Sagra's Cuba*, *Foram.* p. 149, pl. xi. figs. 3, 4.

The 'Challenger' collections yielded this species from only one station in the S. Atlantic, at 350 fathoms.

It is rare at Funafuti, and appears to be nearly related to the form *S. grata*, *Terquem*.

Lagoon, Funafuti; rare. Sample 18 ($7\frac{1}{2}$ fathoms).

SPIROLOCULINA GRATA, *Terquem*.

Spiroloculina grata, *Terquem*, 1878, *Mém. Soc. Géol. France*, sér. 3, vol. i. p. 55, pl. x. figs. 14, 15.

S. grata, *Terq.*, *Egger*, 1893, Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xviii. p. 224, pl. i. fig. 39.

This is one of the most frequent species of the genus in shallow-water sands of the coral-reefs. The specimens found here are typical in form and size.

Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xviii. p. 223, pl. i. figs. 24, 25.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 13 (26 fathoms); sample 17 (12 fathoms); sample 18 ($7\frac{1}{2}$ fathoms).

SPIROLOCULINA TENUISEPTATA, *Brady*.

Spiroloculina tenuiseptata, Brady, 1884, Rep. Chall. vol. ix. p. 153, pl. x. figs. 5, 6.

S. tenuiseptata, Brady, Egger, 1893, Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xviii. p. 223, pl. i. figs. 48, 49.

S. tenuiseptata, Brady, Millett, 1898, Journ. R. Micr. Soc. p. 265.

The occurrence of the above species in the lagoon-material is further evidence that it occurs in shallow water as well as in deeper; for Millett has lately recorded it from the Anchor Muds of the Malay Archipelago in depths of 12–14 fathoms. The 'Challenger' specimens were obtained from depths of more than 500 fathoms. The specimens from Funafuti are typical.

Lagoon, Funafuti; very rare. Sample 1 (10 fathoms); sample 2 ($15\frac{1}{2}$ fathoms).

SPIROLOCULINA ACUTIMARGO, *Brady*.

Spiroloculina acutimargo, Brady, 1884, Rep. Chall. vol. ix. p. 154, pl. x. figs. 12–15.

S. acutimargo, Brady, Balkwill & Wright, 1885, Trans. R. Irish Acad. vol. xxviii. p. 323, fig. 1.

S. acutimargo, Brady, Egger, 1893, Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xviii. p. 222, pl. i. figs. 26–28.

S. acutimargo, Brady, Millett, 1898, Journ. R. Micr. Soc. p. 264.

As a rule the Funafuti specimens are small, with exception of an example from sample 1. The species is well distributed over tropical areas, and occurs in shallow and deeper water alike.

Lagoon, Funafuti; common in two places. Sample 1 (10 fathoms); sample 17 (12 fathoms); sample 18 ($7\frac{1}{2}$ fathoms).

MILIOLINA, *Williamson* [1858].

MILIOLINA VALVULARIS (*Reuss*).

Triloculina valvularis, Reuss, 1851, Zeitschr. deutsch. geol. Gesellsch. vol. iii. p. 85, pl. vii. fig. 56.

Miliolina valvularis (Reuss), Brady, 1884, Rep. Chall. vol. ix. p. 161, pl. iv. figs. 4, 5.

M. valvularis, Brady, Goës, 1894, Kongl. Svenska Vet.-Akad. Handl. vol. xxv. p. 115, pl. xxii. fig. 871.

M. valvularis (Reuss), Millett, 1898, Journ. R. Micr. Soc. p. 501, pl. xi. figs. 5–7.

M. valvularis (Reuss), Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 299, pl. 44. fig. 5.

The Funafuti specimens are very small and occur in the deeper part of the lagoon.

Lagoon, Funafuti; very rare. Sample 10 (26 fathoms); sample 11 (25 fathoms).

MILIOLINA CIRCULARIS (*Bornemann*).

Triloculina circularis, Bornemann, 1855, Zeitschr. deutsch. geol. Gesellsch. vol. vii. p. 349, pl. xix. fig. 4.

Miliolina circularis (Born.), Egger, 1893, Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xviii, p. 235, pl. ii. figs. 61-63.

M. circularis (Born.), Jones, 1895, Pal. Soc. Mon., Crag Foram. p. 121, pl. v. fig. 4.

M. circularis (Born.), Millett, 1898, Journ. R. Micr. Soc. p. 499, pl. xi. figs. 1-3.

M. circularis (Born.), Flint, 1899, Rep. U. S. Nat. Mus., Rep. for 1897, p. 298, pl. 44. fig. 1.

A species met with off Cuba and the coast of Australia, amongst other localities. Millett has lately recorded it from the Malay Archipelago. The biloculine form of the species occurs in the lagoon at Funafuti.

Lagoon, Funafuti; specimens rather small. Sample 8 (26 fathoms); sample 18 (7½ fathoms).

MILIOLINA LABIOSA (*d'Orbigny*).

Triloculina labiosa, d'Orbigny, 1839, in Sagra's Cuba, Foram. p. 178, pl. x. figs. 12-14.

Miliolina labiosa (d'Orb.), Millett, 1898, Journ. R. Micr. Soc. p. 502, pl. xi. figs. 8, 9.

M. labiosa (d'Orb.), Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 299, pl. 45. fig. 3.

This wild-growing form is not unfrequent in one of the samples from the Funafuti lagoon. It here appears to form a link between *Miliolina valvularis* and *Nubecularia inflata*.

Lagoon, Funafuti. Sample 17 (12 fathoms); sample 18 (7½ fathoms).

MILIOLINA SUBROTUNDA (*Montagu*).

Vermiculum subrotundum, Montagu, 1803, Test. Brit. pt. 2, p. 521.

Miliolina subrotunda (Mont.), Millett, 1898, Journ. R. Micr. Soc. p. 502.

M. subrotunda (Mont.), Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 299, pl. 44. fig. 6.

The specimens found at Funafuti are characteristic.

Lagoon, Funafuti. Sample 17 (12 fathoms); sample 18 (7½ fathoms).

MILIOLINA TRICARINATA (*d'Orbigny*).

Triloculina tricarinata, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 299, No. 7.

Miliolina tricarinata (d'Orb.), Millett, 1898, Journ. R. Micr. Soc. p. 502.

M. tricarinata (d'Orb.), Flint, 1899, Rep. U.S. Nat. Mus., Rep for 1897, p. 298, pl. 44. fig. 4.

The type form of this species is not common here, and varies somewhat in size.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 4 (23 fathoms); sample 18 (7½ fathoms).

MILIOLINA TRICARINATA (*d'Orb.*), var. *TERQUEMIANA*, *Brady*.

Miliolina Terquemiana, Brady, 1884, Rep. Chall. vol. ix. p. 166, pl. cxiv. fig. 1 *a*, *b*.

M. tricarinata (d'Orb.), striate variety, Millett, 1898, Journ. R. Micr. Soc. p. 503, pl. xi. figs. 10, 11.

This variety is distinguished by the numerous interrupted striæ with which the surface of the test is covered. It was rare in the 'Challenger' collections, off Ceylon and the coast of Madagascar; but has been found not uncommon in the Malay Archipelago by Millett.

Lagoon, Funafuti. Sample 17 (12 fathoms); sample 18 (7½ fathoms).

MILIOLINA TRICARINATA (*d'Orb.*), var. *BERTHELINIANA*, *Brady*.

Miliolina Bertheliniana, Brady, 1884, Rep. Chall. vol. ix. p. 166, pl. cxiv. fig. 2.

M. tricarinata (d'Orb.), reticulated variety, Millett, 1898, Journ. R. Micr. Soc. p. 503, pl. xi. fig. 12.

This shallow-water form is usually rare, and occurs in two samples only, near the rim of the atoll at Funafuti.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 18 (7½ fathoms).

MILIOLINA RETICULATA (*d'Orbigny*).

Triloculina reticulata, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 299, No. 9.

Miliolina (Triloculina) reticulata, d'Orbigny, Egger, 1893, Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xviii. p. 239, pl. ii. figs. 83, 84.

Quinqueloculina reticulata (d'Orb.), Schlumberger, 1893, Mém. Soc. Zool. France, vol. vi. p. 214, fig. 25, & pl. ii. fig. 62.

Miliolina reticulata (d'Orb.), Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 301, pl. 46. fig. 5.

This species occurs not uncommonly at Funafuti. The specimens from the lagoon comprise both the triloculine and the quinqueloculine forms.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 17 (12 fathoms); sample 18 ($7\frac{1}{2}$ fathoms).

MILIOLINA UNDOSA (*Karrer*).

Quinqueloculina undosa, Karrer, 1867, Sitzungsber. Ak. Wiss. Wien, vol. lv. p. 361, pl. iii. fig. 3.

Miliolina undosa (Karrer), Egger, 1893, Abhandl. Bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii. p. 237, pl. ii. figs. 41, 42.

M. undosa (Karrer), Millett, 1898, Journ. R. Micr. Soc. p. 506, pl. xii. figs. 5 a-c.

M. undosa (Karrer), Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 300, pl. 45. fig. 4.

This species varies considerably in size in different parts of the lagoon, and attains its largest dimensions in 12 fathoms near the lagoon-margin.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 4 (23 fathoms); sample 17 (12 fathoms); sample 18 ($7\frac{1}{2}$ fathoms).

MILIOLINA PARKERI, *Brady*.

Miliolina Parkeri, Brady, 1884, Rep. Chall. vol. ix. p. 177, pl. vii. fig. 14.

M. Parkeri, Brady, Millett, 1898, Journ. R. Micr. Soc. p. 507, pl. xii. figs. 4 a, b.

Although this form is widely distributed, it appears to be restricted to the neighbourhood of coral-reefs.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 17 (12 fathoms); sample 18 ($7\frac{1}{2}$ fathoms).

MILIOLINA FERUSSACII (*d'Orbigny*).

Quinqueloculina Ferussacii, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 301, No. 18: Modèle No. 32.

Miliolina Ferussacii (d'Orb.), Millett, 1898, Journ. R. Micr. Soc. p. 507, pl. xii. figs. 6 a, b, 7 a, b, c.

This species is very numerous in some samples from the lagoon, but is never found far away from the margin. The variations from the typical form are very many, and they often approach *Spiroloculina* in the expansion and thinning of the test along the

median plane, by which the quinqueloculine form is reduced to a complanate series of chambers.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 17 (12 fathoms); sample 18 ($7\frac{1}{2}$ fathoms).

MILIOLINA AGGLUTINANS (*d'Orbigny*).

Quinqueloculina agglutinans, d'Orbigny, 1839, in Sagra's Cuba, Foram. p. 168, pl. xii. figs. 11-13.

Miliolina agglutinans (d'Orb.), Egger, 1893, Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xviii. p. 239, pl. ii. fig. 55.

M. agglutinans (d'Orb.), Goës, 1894, K. Svenska Vet.-Akad. Handl. vol. xxv. p. 110, pl. xix. fig. 848, pl. xx. fig. 849.

M. agglutinans (d'Orb.), Millett, 1898, Journ. R. Micr. Soc. p. 508.

M. agglutinans (d'Orb.), Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 301, pl. 47. fig. 2.

The above form occurs on both sides and at the extreme margins of the lagoon at Funafuti. It is somewhat curious that in Sample 1 the tests are of the *M. Ferussacii* type, whilst on the opposite side of the atoll, in sample 18, they are all of the form of *M. seminulum*.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 18 ($7\frac{1}{2}$ fathoms).

MILIOLINA LINNEANA (*d'Orbigny*).

Triloculina Linneiana, d'Orbigny, 1839, in Sagra's Cuba, Foram. p. 172, pl. ix. figs. 11-13.

Miliolina Linnæana (d'Orb.), Millett, 1898, Journ. R. Micr. Soc. p. 509.

M. Linnæana (d'Orb.), Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 300, pl. 46. fig. 3.

A single specimen only was found at Funafuti in the lagoon-dredgings, but it is of frequent occurrence in many of the beach-sands of the atoll.

Lagoon, Funafuti. Sample 1 (10 fathoms).

MILIOLINA BICORNIS (*Walker & Jacob*).

Serpula bicornis, Walker & Jacob, 1798, Adams' Essays, Kanmacher's ed. p. 633, pl. xiv. fig. 2.

Miliolina bicornis (W. & J.), Egger, 1893, Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xviii. p. 237, pl. ii. figs. 73, 74.

M. bicornis (W. & J.), Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 300, pl. 46. fig. 2.

The specimens found here are not very typical.

Lagoon, Funafuti. Sample 17 (12 fathoms); sample 18 ($7\frac{1}{2}$ fathoms).

MILIOLINA ALVEOLINIFORMIS, *Brady*.

Miliolina alveoliniformis, Brady, 1879, Quart. Journ. Micr. Sci., n. s. vol. xix. p. 54.

M. alveoliniformis, Brady, Egger, 1893, Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xviii. p. 232, pl. ii. figs. 17-19.

This coral-reef species is restricted, in the lagoon-dredgings, to the margin. They are here small, some specimens being quite minute, measuring only .5 mm., with the exception of a single individual from Sample 17 (12 fathoms), which is 2.3 mm. in length.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 17 (12 fathoms); sample 18 (7½ fathoms).

MILIOLINA OBLONGA (*Montagu*).

Vermiculum oblongum, Montagu, 1803, Test. Brit. p. 522, pl. xiv. fig. 9.

Miliolina oblonga (Montagu), Rupert Jones, 1895, Pal. Soc. Mon., Crag Foram. p. 120, pl. iii. figs. 31, 32, & pl. v. fig. 5.

M. oblonga (Mont.), Millett, 1898, Journ. R. Micr. Soc. p. 267, pl. v. figs. 14 a, b.

M. oblonga (Mont.), Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 297, pl. 43. fig. 3.

The specimen found is very elongate, but otherwise characteristic.

Lagoon, Funafuti. Sample 4 (23 fathoms).

MILIOLINA BOUEANA (*d'Orbigny*).

Quinqueloculina Boueana, d'Orbigny, 1846, Foram. Foss. Vienne, p. 293, pl. xix. figs. 7-9.

Miliolina Boueana (d'Orbigny), Goës, 1894, K. Svenska Vet.-Akad. Handl. vol. xxv. p. 114, pl. xxi. fig. 865.

M. Boueana (d'Orb.), Millett, 1898, Journ. R. Micr. Soc. p. 510.

A solitary specimen, not quite typical, but nearest to the above species, was found in the lagoon-dredgings.

Lagoon, Funafuti. Sample 1 (10 fathoms).

MILIOLINA BOSCIANA (*d'Orbigny*). (Pl. 1. fig. 7.)

Quinqueloculina Bosciana, d'Orbigny, 1839, in Sagra's Cuba, Foram. p. 191, pl. xi. figs. 22-24.

Miliolina Bosciana (d'Orb.), Millett, 1898, Journ. R. Micr. Soc. p. 267, pl. vi. fig. 1.

The specimens from Funafuti are of the smooth-shelled type, and their sutures are not so deeply impressed as in the specimens figured by Millett.

Lagoon, Funafuti. Sample 17 (12 fathoms); sample 18 (7½ fathoms).

MILIOLINA FUNAFUTIENSIS, sp. nov. (Pl. 19. fig. 6.)

Test elongate, distinctly triangular, sometimes with a well-marked keel; aperture slightly prolonged. Surface with delicate, slightly oblique, vertical striations. Length .5 mm.

The above form is of the type of *M. oblonga* and near *M. Bosciana*; it is distinguished chiefly by the triangular contour in cross-section. The striations are finer and more regular than those seen in the striated variety of *M. Bosciana**.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 17 (12 fathoms); sample 18 (7½ fathoms).

MILIOLINA SCROBICULATA, *Brady*.

Miliolina scrobiculata, Brady, 1884, Rep. Chall. vol. ix. p. 173, pl. cxiii. figs. 15 a-c.

This rare form is probably a depauperated variety of *M. bicornis*. It was found originally in shore-sand from Madagascar, and at Nares Harbour at 17 fathoms (Brady). The individual found at Funafuti is characteristic but small.

Lagoon, Funafuti. Sample 17 (12 fathoms).

Subfamily HAUERININÆ.

HAUERINA, *d'Orbigny* [1846].

HAUERINA ORNATISSIMA (*Karrer*).

Quinqueloculina ornatissima, Karrer, 1868, Sitzungsber. Ak. Wiss. Wien, vol. lviii. p. 151, pl. iii. fig. 2.

The specimens found in the lagoon are confined to the samples from near the margin. They are all very small, with one exception from Sample 17.

Lagoon, Funafuti. Sample 17 (12 fathoms); sample 18 (7½ fathoms).

Subfamily PENEROPLIDINÆ.

CORNUSPIRA, *Schultze* [1854].

CORNUSPIRA INVOLVENS, *Reuss*.

Operculina involvens, Reuss, 1850, Denkschr. Akad. Wiss. Wien, vol. i. p. 370, pl. xlvi. fig. 20.

* See Millett, Journ. R. Micr. Soc. 1898, p. 268, pl. vi. fig. 3 (*Miliolina Bosciana*, costate variety).

Cornuspira involvens, Reuss, 1863, Sitzungsab. Akad. Wiss. Wien, vol. xlviii. p. 39, pl. i. fig. 2.

C. involvens, Reuss, Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 303, pl. 48. fig. 3.

The above species is represented here by some rather dwarfed or immature examples.

Lagoon, Funafuti. Sample 17 (12 fathoms); sample 18 (7½ fathoms).

PENEROPLIS, *Montfort* [1808].

PENEROPLIS PERTUSUS (*Forskål*).

Nautilus pertusus, Forskål, 1775, Descr. Anim. p. 125, no. 65.

Peneroplis pertusus (Forskål), Möbius, 1880, Foram. von Mauritius, p. 78, pl. iii. figs. 9-12.

P. pertusus (Forskål), Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 304, pl. 48. fig. 4.

The forms of *Peneroplis*, usually regarded as varieties of a single species, are clearly related, but possibly do not show a more complete series of passage-forms than many other so-called species of Foraminifera. The specimens found at Funafuti fall into three groups—namely, the nautiloid form with dendritine apertures, the compressed nautiloid and prolengthened form, and the delicate crosier-shaped type (subgenus *Monalysidium*). The first-named is by far the commonest form found at Funafuti.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 17 (12 fathoms); sample 18 (7½ fathoms).

PENEROPLIS ARIETINUS (*Batsch*).

Nautilus (Lituus) arietinus (pars), Batsch, 1791, Conch. See-sandes, p. 4, pl. vi. fig. 15, c.

Peneroplis arietinus, Parker, Jones & Brady, 1865, Ann. & Mag. Nat. Hist. ser. 3, vol. xvi. p. 26, pl. i. fig. 18.

P. pertusus (Forsk.), type c, Brady, 1884, Rep. Chall. vol. ix. p. 204, pl. xiii. figs. 18, 19, 22.

The rectilinear portion of the series in our specimens sometimes shows a tendency to curve either inward or outward. This type is evolved from an emaciated *P. pertusus* by the unrolling of the last coil or so of chambers.

Lagoon, Funafuti. Sample 17 (12 fathoms); sample 18 (7½ fathoms).

PENEROPLIS (MONALYSIDIUM) (?) POLITUS, Chapman. (Pl. 19. fig. 8.)

Peneroplis (Monalysidium) politus, Chapman, 1900, Journ. Linn. Soc., Zool. vol. xxviii. p. 4, pl. i. fig. 5.

The specimen now figured, from the Funafuti lagoon, is a weak, thin-shelled peneroplid, and would probably end in a lengthened series such as the specimen previously figured, which however had lost its initial series.

Lagoon, Funafuti. Sample 18 ($7\frac{1}{2}$ fathoms).

PENEROPLIS (MONALYSIDIUM) CYLINDRACEUS (Lamarck).

Spirolina (Spirolinites) cylindracea, Lamarck, 1804, Ann. du Muséum, vol. v. p. 245, no. 2.

Peneroplis pertusus (Forsk.), type *d*, Brady, 1884, Rep. Chall. vol. ix. p. 305, pl. xiii. figs. 20, 21.

The slender tests composed of a small spiral and a long chain of subglobular chambers are frequent in one sample from the lagoon. The surfaces of the chambers are relieved with delicate vertical striæ, which under a high power can be resolved into rows of minute tubercles.

Lagoon, Funafuti. Sample 17 (12 fathoms).

PENEROPLIS (MONALYSIDIUM) SOLLASI, Chapman.

Penerophis (Monalysidium) Sollasi, Chapman, 1900, Journ. Linn. Soc., Zool. vol. xxviii. p. 3, pl. i. fig. 6.

Fragments of the slender test of this species were found in the lagoon; they do not, however, exhibit the initial portion of the shell.

Lagoon, Funafuti. Sample 17 (12 fathoms); sample 18 ($7\frac{1}{2}$ fathoms).

ORBITOLITES, Lamarck [1801].

ORBITOLITES MARGINALIS (Lamarck). (Pl. 20. figs. 1-3.)

Orbulites marginalis, Lamarck, 1816, Hist. Nat. Anim. sans Vert. vol. ii. p. 196, no. 1.

Orbitolites marginalis (Lam.), Carpenter, 1883, Phil. Trans. vol. clxxiv. p. 559, fig. 1.

O. marginalis (Lam.), Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 304, pl. 50. fig. 2; pl. 51. fig. 1.

This species is very characteristic of the shallow-water dredgings

of the Pacific Islands. Out of thirteen 'Challenger' Stations, eleven were from the Pacific. It has been found also in the West Indies, off Madagascar, in the Malay Archipelago, the Mediterranean, and the Red Sea.

More than half the specimens from the lagoon at Funafuti appear to have been at one time attached by a face of the shell to various living organisms, but chiefly to joints of *Halimeda*. Some examples were actually found in position on these calcareous plants. This habit of *Orbitolites* attaching itself to foreign objects is not unknown, but it appears to have only been noticed hitherto in the species *Orbitolites complanata*. The specimens thus found upon other organisms are invariably irregularly discoidal, and are generally concavo-convex in shape. They also have patches of redundant shell-growth scattered over the surfaces, sometimes arranged in radial strigillæ around the peripheral area.

Lagoon, Funafuti. Sample 1 (10 fathoms), some of the specimens beautifully smooth and regular, others concave or inflexed and with redundant patches of shell-growth on the surfaces (attached varieties); sample 2 (15½ fathoms), very irregular and inflexed, specimens large; sample 3 (20 fathoms), irregular specimens; sample 4 (23 fathoms), irregular specimens; sample 5 (24 fathoms), irregular specimens; sample 7 (24 fathoms), very irregular specimens; sample 8 (26 fathoms), a regular specimen; sample 14 (16 fathoms), irregular specimens; sample 15 (19 fathoms), an irregular specimen; sample 17 (12 fathoms), both regular and irregular specimens; sample 18 (7½ fathoms), regular and irregular specimens.

ORBITOLITES COMPLANATA, Lamarck.

Orbitolites complanata, Lamarck, 1801, Syst. Anim. sans Vert. p. 376.

O. complanata, Lam., Egger, 1893, Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xviii. p. 249, pl. iii. fig. 40.

Although rarer than the foregoing species, *O. complanata* is common and fairly typical in two of the lagoon samples. The variety *plicata* of Dana* is found in some abundance in the sand from the lagoon beach at Funafuti, but it does not occur

* *Marginopora vertebralis*, Blainville, var. *plicata*, J. D. Dana, 1848, Wilkes' U.S. Expl. Exped., Rep. Zooph. p. 706, pl. 60. figs. 9, 9 a, b.

in the dredgings. It is somewhat surprising that *O. duplex* should be altogether wanting in these foraminiferal deposits.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 2 (15½ fathoms).

Family ASTRORHIZIDÆ.

Subfamily RHABDAMMININÆ.

HYPERAMMINA, *Brady* [1878].

HYPERAMMINA RAMOSA, *Brady*.

Hyperammina ramosa, Brady, 1879, Quart. Journ. Micr. Sci., n. s. vol. xix. p. 33, pl. iii. figs. 14, 15.

H. ramosa, Brady, Goës, 1893, Arctic and Scand. Foram., Sv. Vet.-Ak. Handl. vol. xxv. p. 18, pl. iv. figs. 61, 62.

H. ramosa, Brady, Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 270, pl. 11. fig. 1.

It is unusual to meet with this species in low latitudes, but it has already been recorded by Goës from the Pacific and the Caribbean Sea; and by Flint from Cape Hatteras and the Gulf of Mexico.

The specimens from Funafuti lagoon exhibit the primordial segment, and the test is yellowish brown and composed of very slender and minute calcisponge-spicules.

Lagoon, Funafuti. Sample 15 (19 fathoms).

SAGENINA, *Chapman* [1900].*

SAGENINA FRONDESCENS (*Brady*).

Sagenella frondescens, Brady, 1879, Quart. Journ. Micr. Sci., n. s. vol. xix. p. 41, pl. v. fig. 1.

S. frondescens, Brady, 1884, Rep. Chall. vol. ix. p. 278, pl. xxviii. figs. 14, 15.

Sagenina frondescens (Brady), Chapman, 1900, Journ. Linn. Soc., Zool. vol. xxviii. p. 4, pl. i. figs. 1, 2; pl. ii. figs. 1, 2.

This is one of the most characteristic and widely spread organisms both of the lagoon and the outer reef. It is an attached form, and makes its growth usually upon the fronds of *Halimeda*, but is also found growing upon other objects which present a suitable surface for the purpose.

* *Sagenella*, Brady, 1879, name preoccupied for a genus of Polyzoa, see Journ. Linn. Soc., Zool. vol. xxviii. p. 4.

Unlike the other Foraminifera, this form is conspicuously absent from dredgings taken immediately inside the rim of the atoll on the opposite sides of the lagoon, and increases in numbers and character towards the middle of the lagoon.

S. frondescens is apparently restricted to the S. Pacific.

Lagoon, Funafuti. Sample 3 (20 fathoms); sample 4 (23 fathoms); sample 5 (24 fathoms); sample 6 (21 fathoms); sample 7 (24 fathoms); sample 8 (26 fathoms); sample 9 (25 fathoms); sample 10 (26 fathoms); sample 12 (23 fathoms); sample 14 (16 fathoms); sample 15 (19 fathoms); sample 16 (20 fathoms).

Family LITUOLIDÆ.

Subfamily LITUOLINÆ.

PLACOPSILINA, *d'Orbigny* [1850].

PLACOPSILINA CENOMANA, *d'Orbigny*.

Placopsilina cenomana, *d'Orbigny*, 1850, Prodr. Paléont. vol. ii. p. 185, No. 758.

This species is not a common form, but it is generally distributed in tropical and subtropical areas. It was found by the 'Challenger' at five or six stations amongst the coral-reefs of the Pacific.

The specimens found in the lagoon at Funafuti are typical. The test sometimes branches towards the end.

Lagoon, Funafuti. Sample 5 (24 fathoms); sample 7 (24 fathoms); sample 16 (20 fathoms); sample 17 (12 fathoms).

HADDONIA, *Chapman* [1898].

HADDONIA TORRESIENSIS, *Chapman*.

Haddonia Torresiensis, *Chapman*, 1898, Journ. Linn. Soc., Zool. vol. xxvi. p. 452, pl. xxviii. figs. 1-5 and woodcut p. 453.

H. Torresiensis, *Chapman*, 1900, Journ. Linn. Soc., Zool. vol. xxviii. p. 6.

The particular part of the lagoon where this species appears to thrive best is near the middle, from sample 10, and four miles from the nearest reef; at this place the *Haddonias* have a peculiar habit of sheltering between the fronds of *Halimeda*, and, by adhering at various points to the joints, cement them into a more or less coherent mass.

Lagoon, Funafuti. Sample 6 (21 fathoms); sample 7 (24 fathoms); sample 10 (26 fathoms); sample 11 (25 fathoms); sample 14 (16 fathoms); sample 15 (19 fathoms); sample 16 (20 fathoms); sample 18 ($7\frac{1}{2}$ fathoms).

Subfamily TROCHAMMININÆ.

CARTERINA, *Brady* [1884].

CARTERINA SPICULOTESTA (*Carter*).

Rotalia spiculotesta, Carter, 1877, Ann. Mag. Nat. Hist. ser. 4, vol. xx. p. 470, pl. xvi.; *ibid.* 1879, ser. 5, vol. iii. p. 414; *ibid.* 1880, ser. 5, vol. v. p. 452.

Carterina spiculotesta (Carter), Brady, 1884, Rep. Chall. vol. ix. p. 346, pl. xli. figs. 7-10.

C. spiculotesta (Carter), Millett, 1899, Journ. R. Micr. Soc. p. 365.

This curious little organism, although resembling *Trochammina* in general form and outline, constructs its test of minute calcareous spicules of a fusiform shape. The primary whorls of the test are usually strongly coloured a deep reddish brown, presumably by the sarcode; the last whorl or so of the shell is more often white, although in one example (a fully grown specimen from Funafuti) is strongly coloured to the periphery. The little spicular bodies appear to be somewhat felted together in the central part of the test in each segment, but lie more or less parallel along the outer borders.

C. spiculotesta has been found in the Gulf of Suez, the Red Sea, the Gulf of Manaar, the Malay Archipelago, and the S. Pacific. It is normally adherent, and is found attached to *Halimeda* and *Lithothamnion* at Funafuti.

Lagoon, Funafuti. Sample 10 (26 fathoms); sample 11 (25 fathoms); sample 13 (26 fathoms); sample 15 (19 fathoms); sample 16 (20 fathoms).

Family TEXTULARIIDÆ.

Subfamily TEXTULARIINÆ.

TEXTULARIA, *Defrance* [1824].

TEXTULARIA FOLIUM, *Parker & Jones*.

Textularia folium, Parker & Jones, 1865, Phil. Trans. vol. clv. pp. 370, 420, pl. xviii. fig. 19.

T. folium, P. & J., Moebius, 1880, *Foram. Mauritius*, p. 92, pl. viii. figs. 16, 17.

The principal localities for this delicate little species are situated in the Pacific, where it is found in the shallow water of coral-reefs. It has also occurred at Mauritius, Bass Strait, Torres Strait, and Melbourne.

Lagoon, Funafuti. Sample 18 ($7\frac{1}{2}$ fathoms).

TEXTULARIA CONICA, *d'Orbigny*.

Textularia conica, d'Orbigny, 1839, in Sagra's Cuba, *Foram.* p. 143, pl. i. figs. 19, 20.

T. conica, d'Orb., Egger, 1893, *Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii.* p. 273, pl. vi. figs. 34-36.

T. conica, d'Orb., Flint, 1899, *Rep. U.S. Nat. Mus., Rep. for 1897*, p. 285, pl. 29. fig. 6.

This common and widely distributed species is best represented in the lagoon in the samples close to the rim of the atoll. In all cases they are rather undersized.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 4 (23 fathoms); sample 14 (16 fathoms); sample 17 (12 fathoms); sample 18 ($7\frac{1}{2}$ fathoms).

TEXTULARIA RUGOSA (*Reuss*).

Plecanium rugosum, Reuss, 1869, *Sitzungsb. Ak. Wiss. Wien*, vol. lix. p. 453, pl. i. figs. 3 *a, b*.

Textularia rugosa (Reuss), Flint, 1899, *Rep. U.S. Nat. Mus., Rep. for 1897*, p. 284, pl. 29. fig. 2.

This striking coral-reef species is well represented in the lagoon dredgings. It is one of the exceptions to the rule that the best developed specimens occur near the margin of the lagoon, for extraordinarily large examples were found in samples 6 and 15, at 3 and $1\frac{1}{2}$ miles respectively from the edge. One of these measures 5 mm. in length; whereas the usual length of large specimens is 2 mm.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 2 ($15\frac{1}{2}$ fathoms); sample 6 (21 fathoms); sample 7 (24 fathoms); sample 15 (19 fathoms); sample 17 (12 fathoms); sample 18 ($7\frac{1}{2}$ fathoms).

VERNEUILINA, *d'Orbigny* [1840].

VERNEUILINA SPINULOSA, *Reuss*.

Verneuilina spinulosa, Reuss, 1849, *Denkschr. Ak. Wiss. Wien*, vol. i. p. 347, pl. xlvii. figs. 12 *a-c*.

V. spinulosa, Reuss, Egger, 1893, Abhandl. bayer. Ak. Wiss., Cl. ii. vol. xviii. p. 281, pl. vii. figs. 11, 14-16.

The lagoon specimens are below the average size. The examples from dredgings farthest from the margin of the lagoon have lost their delicate spines, which seems to prove that they have been carried in, in common with many other species, by the action of currents.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 4 (23 fathoms); sample 17 (12 fathoms); sample 18 ($7\frac{1}{2}$ fathoms).

VALVULINA, *d'Orbigny*.

VALVULINA DAVIDIANA, *Chapman*.

Valvulina Davidiana, Chapman, 1900, Journ. Linn. Soc., Zool. vol. xxviii. p. 9, pl. i. fig. 4.

A fully developed example of this interesting species was found near the margin of the lagoon.

Lagoon, Funafuti. Sample 18 ($7\frac{1}{2}$ fathoms).

CLAVULINA, *d'Orbigny* [1826].

CLAVULINA PARISIENSIS, *d'Orbigny*.

Clavulina Parisiensis, *d'Orbigny*, 1826, Ann. Sci. Nat. vol. vii. p. 268, No. 3: Modèle No. 66.

C. Parisiensis, *d'Orb.*, Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 289, pl. 35. figs. 2, 3.

The specimen found in the lagoon is a very neat example with the sutures of the chambers perfectly distinct.

Lagoon, Funafuti. Sample 1 (10 fathoms).

Subfamily BULIMININÆ.

BOLIVINA, *d'Orbigny* [1839].

BOLIVINA PUNCTATA, *d'Orbigny*.

Bolivina punctata, *d'Orbigny*, 1839, Foram. Amér. Mérid. p. 61, pl. viii. figs. 10-12.

B. punctata, *d'Orb.*, Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 292, pl. 38. fig. 1.

A single specimen of this delicate form was found in the central part of the lagoon.

Lagoon, Funafuti. Sample 9 (25 fathoms).

BOLIVINA LIMBATA, *Brady*.

Bolivina limbata, Brady, 1881, Quart. Journ. Micr. Sci., n. s. vol. xxi. p. 57.

A typical example of this species was found near the margin of the lagoon.

Lagoon, Funafuti. Sample 18 (7½ fathoms).

BOLIVINA TORTUOSA, *Brady*.

Bolivina tortuosa, Brady, 1881, Quart. Journ. Micr. Sci., n. s. vol. xxi. p. 57.

B. tortuosa, Brady, Egger, 1893, Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii. p. 298, pl. viii. figs. 43, 44.

A widely distributed form in warm areas. The specimen from the lagoon is rather below the average size.

Lagoon, Funafuti. Sample 18 (7½ fathoms).

Family LAGENIDÆ.

Subfamily POLYMORPHININÆ.

SAGRINA (*d'Orbigny*, 1839) emend. *Parker & Jones* [1865].

SAGRINA RAPHANUS, *Parker & Jones*.

Uvigerina (Sagrina) raphanus, Parker & Jones, 1865, Phil. Trans. vol. clv. p. 364, pl. xviii. figs. 16, 17.

Siphogenerina (Sagrina) raphanus, P. & J., Egger, 1893, Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii. p. 317, pl. ix. fig. 36.

In common with the other true reef-loving Foraminifera, this species is confined to samples from the margin of the lagoon.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 17 (12 fathoms); sample 18 (7½ fathoms).

Family GLOBIGERINIDÆ.

GLOBIGERINA, *d'Orbigny* [1826].

GLOBIGERINA BULLOIDES, *d'Orbigny*.

Globigerina bulloides, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 277, No. 1: Modèles, Nos. 17 & 76.

G. bulloides, d'Orb., Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 321, pl. 69, fig. 2.

The conditions under which these specimens lived are not

favourable to the growth of this pelagic foraminifer, for the specimens found are all below the usual size and are restricted to the lagoon-margin.

Lagoon, Funafuti. Sample 2 ($15\frac{1}{2}$ fathoms); sample 17 (12 fathoms); sample 18 ($7\frac{1}{2}$ fathoms).

GLOBIGERINA BULLOIDES, *d'Orbigny*, var. TRILOBA, *Reuss*.

Globigerina triloba, Reuss, 1849, Denkschr. Ak. Wiss. Wien, vol. i. p. 374, pl. xlvii. figs. 11 a-e.

G. bulloides, *d'Orb.*, var. *triloba*, Reuss, Brady, 1884, Rep. Chall. vol. ix. p. 595, pl. lxxix. figs. 1, 2; pl. lxxxii. figs. 2, 3.

This variety accompanies the type form in two out of the three occurrences in the lagoon. Similarly these are small starved specimens.

Lagoon, Funafuti. Sample 17 (12 fathoms); sample 18 ($7\frac{1}{2}$ fathoms).

Family ROTALIIDÆ.

Subfamily SPIRILLININÆ.

SPIRILLINA, *Ehrenberg* [1841].

SPIRILLINA TUBERCULO-LIMBATA, *Chapman*.

Spirillina tuberculo-limbata, Chapman, 1900, Journ. Linn. Soc., Zool. vol. xxviii. p. 11, pl. i. figs. 8 a-c.

Although in general form this is like *Spirillina inæqualis*, Brady, the two faces of the test are differently decorated to that species, there being no tubercles on the inferior face. It is confined to one point near the lagoon-margin.

Lagoon, Funafuti. Sample 18 ($7\frac{1}{2}$ fathoms).

SPIRILLINA SPINIGERA, *Chapman*. (Pl. 19. figs. 9 & 10.)

Spirillina spinigera, Chapman, 1900, Journ. Linn. Soc., Zool. vol. xxviii. p. 10, pl. i. figs. 7 a-c.

The material from the lagoon affords us many additional specimens of this interesting form. The specimen (fig. 9) showing the long spinous decoration appears to belong to the *megalospheric* type of shell; whilst the larger forms, which by the way are more numerous, and which have a thinner peripheral edge, serrate rather than spinous (fig. 10), are presumably *microspheric*.

Lagoon, Funafuti. Sample 18 ($7\frac{1}{2}$ fathoms).

Subfamily ROTALINÆ.

CYMBALOPORA, *Hagenow* [1850].CYMBALOPORA POEYI (*d'Orbigny*).

Rosalina Poeyi, *d'Orbigny*, 1839, *Foram. Cuba*, p. 100, pl. iii. figs. 18–20.

Cymbalopora Poeyi (*d'Orb.*), *Egger*, 1893, *Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii.* p. 381, pl. xviii. figs. 51, 52.

C. Poeyi (*d'Orb.*), *Flint*, 1899, *Rep. U.S. Nat. Mus., Rep. for 1897*, p. 326, pl. 72. fig. 1.

When living, the central part of the test of this species is usually of a rose or red-brown tint. The specimens from the lagoon are invariably white, and those from near the middle of the lagoon are discoloured and yellowish-brown. This leads one to conclude that these and many other forms are not actually living in the lagoon, but are carried in by ocean currents.

The depressed variety sometimes found accompanying the typical forms is here very rare.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 14 (26 fathoms); sample 16 (20 fathoms); sample 17 (12 fathoms); sample 18 ($7\frac{1}{2}$ fathoms).

CYMBALOPORA TABELLÆFORMIS, *Brady*.

Cymbalopora tabellæformis, *Brady*, 1884, *Rep. Chall.* vol. ix. p. 637, pl. cii. figs. 15–18.

C. tabellæformis, *Brady*, *Egger*, 1893, *Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii.* p. 382, pl. xviii. figs. 54, 55.

The specimens from the lagoon are typical but rather small. The species is chiefly known from the coral-reefs of the islands of the Pacific, and it also occurs off Mauritius.

Lagoon, Funafuti. Sample 18 ($7\frac{1}{2}$ fathoms).

CYMBALOPORA (TRETOMPHALUS) BULLOIDES (*d'Orbigny*).

Rosalina bulloides, *d'Orbigny*, 1839, *Foram. Cuba*, p. 104, pl. iii. figs. 2–5.

Tretomphalus bulloides (*d'Orbigny*), *Möbius*, 1880, *Foram. Mauritius*, p. 98, pl. x. figs. 6–9.

Cymbalopora (Tretomphalus) bulloides (*d'Orb.*), *Brady*, 1884, *Rep. Chall.* vol. ix. p. 638, pl. cii. figs. 7–12.

C. bulloides (*d'Orb.*), *Egger*, 1893, *Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii.* p. 381, pl. xviii. fig. 53.

It is very probable that the examples found in the lagoon have floated in by the action of currents, especially since this form is

usually found near the surface of the ocean. Our specimens are of the normal size.

Lagoon, Funafuti. Sample 17 (12 fathoms); sample 18 (7½ fathoms).

DISCORBINA, *Parker & Jones* [1862].

DISCORBINA ARAUCANA (*d'Orbigny*).

Rosalina araucana, d'Orbigny, 1839, *Foram. Amér. Mérid.* p. 44, pl. vi. figs. 16-18.

Discorbina araucana (d'Orb.), Egger, 1893, *Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii.* p. 386, pl. xiv. figs. 4-6.

A single specimen, rather small, was found in the lagoon.

Lagoon, Funafuti. Sample 16 (20 fathoms).

DISCORBINA RUGOSA (*d'Orbigny*).

Rosalina rugosa, d'Orbigny, 1839, *Foram. Amér. Mérid.* p. 42, pl. ii. figs. 12-14.

Discorbina rugosa (d'Orb.), Egger, 1893, *Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii.* p. 383, pl. xv. figs. 1-3.

D. rugosa is not uncommon in the lagoon dredgings. One of the specimens is coloured a warm-brown.

Lagoon, Funafuti. Sample 10 (26 fathoms); sample 14 (16 fathoms); sample 17 (12 fathoms); sample 18 (7½ fathoms).

DISCORBINA GLOBULARIS (*d'Orbigny*).

Rosalina globularis, d'Orbigny, 1826, *Ann. Sci. Nat.* vol. vii. p. 271, pl. xiii. figs. 1-4: *Modèle No. 69.*

Discorbina globularis (d'Orb.), Flint, 1899, *Rep. U.S. Nat. Mus., Rep. for 1897*, p. 327, pl. 72. fig. 2.

Our specimens are somewhat variable in size, and the species is not uncommon in the lagoon.

Lagoon, Funafuti. Sample 10 (26 fathoms); sample 15 (19 fathoms); sample 16 (20 fathoms); sample 17 (12 fathoms); sample 18 (7½ fathoms).

DISCORBINA SAULCII (*d'Orbigny*).

Rosalina Saulcii, d'Orbigny, 1839, *Foram. Amér. Mérid.* p. 42, pl. ii. figs. 9-11.

Discorbina Saulcii (d'Orb.), Parker & Jones, 1872, *Quart. Journ. Geol. Soc.* vol. xxviii. p. 156.

D. Saulcii (d'Orb.), Egger, 1893, *Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii.* p. 392, pl. xv. figs. 51-53.

The specimen from the lagoon is characteristically flattened

on the superior face, and the colour of the shell is not unlike that of *D. rugosa*.

Lagoon, Funafuti. Sample 17 (12 fathoms).

DISCORBINA CONCINNA, *Brady*.

Discorbina concinna, Brady, 1884, Rep. Chall. vol. ix. p. 646, pl. xc. figs. 7, 8.

D. concinna, Brady, Egger, 1893, Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii. p. 388, pl. xv. figs. 22-24.

In addition to the localities for this species given by Brady, the 'Gazelle' collected it from Cape Verde, Mauritius, and West of Australia.

Lagoon, Funafuti. Sample 17 (12 fathoms).

DISCORBINA VILARDEBOANA (*d'Orbigny*).

Rosalina Vilardeboana, d'Orbigny, 1839, Foram. Amér. Mérid. p. 44, pl. vi. figs. 13-15.

Discorbina Vilardeboana (d'Orb.), Egger, 1893, Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii. p. 387, pl. xv. figs. 13-15.

This form in common with the other Discorbinae was found at the lagoon-margin.

Lagoon, Funafuti. Sample 18 ($7\frac{1}{2}$ fathoms).

DISCORBINA PILEOLUS (*d'Orbigny*).

Valvulina pileolus, d'Orbigny, 1839, Foram. Amér. Mérid. p. 47, pl. i. figs. 15-17.

Discorbina pileolus (d'Orb.), Egger, 1893, Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii. p. 390, pl. xv. figs. 61-63.

This species is a well-known form from the Pacific; and is frequent in shallow-water dredgings in tropical and subtropical areas. The Funafuti specimens are typical but not common.

Lagoon, Funafuti. Sample 18 ($7\frac{1}{2}$ fathoms).

DISCORBINA ORBICULARIS (*Terquem*).

Rosalina orbicularis, Terquem, 1876, Anim. sur la Plage de Dunkerque, p. 75, pl. ix. figs. 4 a, b.

Discorbina orbicularis (Terq.), Egger, 1893, Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii. p. 389, pl. xv. figs. 16-18, 76-78.

This is well represented in point of numbers, and the specimens are fairly typical. A solitary specimen occurred near the middle of the lagoon.

Lagoon, Funafuti. Sample 8 (26 fathoms); sample 17 (12 fathoms); sample 18 ($7\frac{1}{2}$ fathoms).

DISCORBINA TUBEROCAPITATA, *Chapman*.

Discorbina tuberocapitata, Chapman, 1900, Journ. Linn. Soc., Zool. vol. xxviii. p. 11, pl. i. figs. 9 a-c.

This striking form is not so well developed in the lagoon samples, as in the shallow-water dredgings on the outer part of the reef.

Lagoon, Funafuti. Sample 11 (25 fathoms); sample 13 (26 fathoms); sample 16 (20 fathoms).

DISCORBINA RARESCENS, *Brady*.

Discorbina rarescens, Brady, 1884, Rep. Chall. vol. ix. p. 651, pl. xc. figs. 2, 3, and 4?

D. rarescens, Brady, Egger, 1893, Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii. p. 388, pl. xv. figs. 45-47.

The species which have undoubtedly lived in the lagoon are not numerous, and apparently the present form is an example which has adapted itself to those conditions. It appears to grow attached to the surfaces of other organisms such as *Halimeda*.

Brady records this species from the Philippines and Torres Strait, and Egger from West Africa and Western Australia.

Lagoon, Funafuti. Sample 4 (23 fathoms); sample 6 (21 fathoms); sample 13 (26 fathoms); sample 14 (16 fathoms); sample 16 (20 fathoms); sample 17 (12 fathoms).

PLANORBULINA, *d'Orbigny* [1826].PLANORBULINA MEDITERRANENSIS, *d'Orbigny*.

Planorbulina Mediterranensis, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 280, pl. xiv. figs. 4-6: Modèle No. 79.

P. Mediterranensis, d'Orb., Egger, 1893, Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii. p. 380, pl. xiv. figs. 24-26.

P. Mediterranensis, d'Orb., Goës, 1894, Kongl. Svenska Vet.-Ak. Handl., vol. xxv. No. 9, p. 91, pl. xv. fig. 786.

P. Mediterranensis, d'Orb., Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 328, pl. 72. fig. 6.

This species has a wide geographical distribution. It has already been recorded from the Pacific Ocean. The lagoon specimens are small and arrested in their growth, and are very like the specimen figured by Goës to which reference is given above.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 13 (26 fathoms); sample 18 (7½ fathoms).

PLANORBULINA LARVATA, *Parker & Jones*.

Planorbulina vulgaris, var. *larvata*, Parker & Jones, 1860, Ann. Mag. Nat. Hist. ser. 3, vol. v. p. 294.

P. larvata, Parker & Jones, 1865, Phil. Trans. vol. clv. p. 379, pl. xix. fig. 3 a, b.

P. larvata, P. & J., Egger, 1893, Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii. p. 189, pl. xiv. fig. 31.

Amongst the several planorbuline forms this is one which possesses most individuality, the specimens being nearly all characteristic.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 4 (23 fathoms); sample 6 (21 fathoms); sample 7 (24 fathoms); sample 8 (26 fathoms).

PLANORBULINA LARVATA, *Parker & Jones*, var. CRISPATA, nov. (Pl. 20. fig. 5.)

This is a curious aberrant form in which the several series of chambers have been added to in a semicircular manner, instead of a discoidal, giving rise to a curled or semilunar-shaped test. Greatest length 2.2 mm.

Lagoon, Funafuti. Sample 5 (24 fathoms).

PLANORBULINA ACERVALIS, *Brady*, var. FIMBRIATA, nov. (Pl. 20. fig. 4.)

This example differs from the usual form in having the peripheral series of chambers separated and slightly flattened and squared at the extremities, producing a kind of fringe around the discoidal test. The central area is smoother than usual, but shows a certain amount of acervuline segmentation forming a superficial series of chamberlets. Diameter 1.4 mm.

Lagoon, Funafuti. Sample 8 (26 fathoms).

TRUNCATULINA, *d'Orbigny* [1826].TRUNCATULINA VARIABILIS, *d'Orbigny*.

Truncatulina variabilis, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 279, No. 8.

T. variabilis, d'Orb., Egger, 1893, Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii. p. 404, pl. xvi. figs. 57-59, 63, 64.

Our specimen was found at some distance from the edge of the lagoon; and the test being of a brown tint in the central portion appears to point to the conclusion that the organism was living *in situ*.

Lagoon, Funafuti. Sample 13 (26 fathoms).

TRUNCATULINA PYGMÆA, *Hantken*.

Truncatulina pygmæa, Hantken, 1875, Mittheil. Jahrb. ung. geol. Anstalt, vol. iv. p. 78, pl. x. fig. 8.

T. pygmæa, Hantken, Egger, 1893, Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii. p. 400, pl. xvi. figs. 60-62.

T. pygmæa, Hantken, Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 334, pl. 77. fig. 6.

This is a species of *Truncatulina* usually confined to deep water.

Lagoon, Funafuti. Sample 17 (12 fathoms).

TRUNCATULINA UNGERIANA (*d'Orbigny*).

Rotalina Ungeriana, d'Orbigny, 1846, Foram. Foss. Vienne, p. 157, pl. viii. figs. 16-18.

Truncatulina Ungeriana (d'Orb.), Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 333, pl. 77. fig. 2.

This species is represented by a very small specimen from the lagoon.

Lagoon, Funafuti. Sample 16 (20 fathoms).

TRUNCATULINA ROSTRATA, *Brady*.

Truncatulina rostrata, Brady, 1881, Quart. Journ. Micr. Sci. vol. xxi. n. s. p. 65.

T. rostrata, Brady, 1884, Rep. Chall. vol. ix. p. 668, pl. xciv. fig. 6 a-c.

The test of this species differs in having a peripheral slit-like aperture in addition to the normal truncatuline orifice. This form is restricted almost without exception to the coral islands of the Pacific.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 4 (23 fathoms); sample 14 (16 fathoms); sample 17 (12 fathoms); sample 18 (7½ fathoms).

TRUNCATULINA RETICULATA (*Czjzek*).

Rotalina reticulata, Czjzek, 1848, Haidinger's Naturw. Abhandl. vol. ii. p. 145, pl. xiii. figs. 7-9.

Truncatulina (Rotalina) reticulata, Czjzek, Egger, 1893, Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii. p. 402, pl. xvi. figs. 42-44.

Planorbulina reticulata (Czjzek), Goës, 1896, Bull. Mus. Comp. Zool. Harvard, vol. xxix. No. 1, p. 72.

Truncatulina reticulata (Czjzek), Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 334, pl. 78. fig. 3.

This pretty little species is found in one sample only from the lagoon. The specimens are of normal size.

Lagoon, Funafuti. Sample 18 (7½ fathoms).

ANOMALINA, *d'Orbigny* [1826].

ANOMALINA AMMONOIDES (*Reuss*).

Rosalina ammonoides, Reuss, 1845, Verstein. böhm. Kreide, pt. i. p. 36, pl. xiii. fig. 66, pl. viii. fig. 53.

Anomalina (Rosalina) ammonoides, Reuss, Egger, 1893, Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xviii. p. 378, pl. xiv. figs. 35-37.

A. ammonoides (Reuss), Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 335, pl. 78. fig. 4.

This widely-distributed species is here represented by a small solitary specimen.

Lagoon, Funafuti. Sample 17 (12 fathoms).

CARPENTERIA, *Gray* [1858].

CARPENTERIA PROTEIFORMIS, *Goës*. (Pl. 19. fig. 11.)

Carpenteria balaniformis, var. *proteiformis*, Goës, 1882, K. Svenska Vet.-Akad. Handl. vol. xix. No. 4, p. 94, pl. vi. figs. 208-214, pl. vii. figs. 215-219.

C. proteiformis, Goës, Brady, 1884, Rep. Chall. vol. ix. p. 679, pl. xcvi. figs. 8-14.

C. proteiformis, Goës, 1896, Bull. Mus. Comp. Zool. Harvard, vol. xxix. No. 1, p. 74, pl. vi. figs. 8-17.

Both examples found in the lagoon are attached to joints of *Halimeda*.

Lagoon, Funafuti. Sample 6 (21 fathoms); sample 7 (24 fathoms).

CARPENTERIA UTRICULARIS, *Carter*.

Polytrema utriculare, Carter, 1876, Ann. Mag. Nat. Hist. ser. 4, vol. xvii. p. 210, pl. xiii. figs. 11-16.

Carpenteria utricularis, Carter, 1877, Ann. Mag. Nat. Hist. ser. 4, vol. xx. p. 176.

C. utricularis, Carter, Egger, 1893, Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xviii. p. 438, pl. xxi. fig. 18.

C. utricularis, Carter, Chapman, 1900, Journ. Linn. Soc., Zool. vol. xxviii. p. 12, pl. 2. fig. 4, pl. 4. figs. 3, 4.

This species, like the preceding, appears to prefer the quieter areas of the lagoon. It was found attached to *Halimeda*.

Lagoon, Funafuti. Sample 10 (26 fathoms).

PULVINULINA, *Parker & Jones* [1862].PULVINULINA REPANDA (*Fichtel & Moll*).

Nautilus repandus, Fichtel & Moll, 1803, Test. Micr. p. 35, pl. iii. figs. a-d.

Pulvinulina repanda (F. & M.), Egger, 1893, Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii. p. 405, pl. xviii. figs. 34-36.

P. repanda (F. & M.), Goës, 1896, Bull. Mus. Comp. Zool. Harvard, vol. xxix. no. 1, p. 75.

P. repanda (F. & M.), Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 328, pl. 72. fig. 8.

A full-sized specimen of the above occurred in the lagoon dredgings.

Lagoon, Funafuti. Sample 3 (20 fathoms).

PULVINULINA OBLONGA (*Williamson*).

Rotalina oblonga, Williamson, 1858, Rec. Foram. Gt. Brit. p. 51, pl. iv. figs. 98-100.

Pulvinulina oblonga (Williamson), Egger, 1893, Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii. p. 415, pl. xvii. figs. 23-25.

The specimen found in the lagoon is a very delicate thin-shelled example. The 'Challenger' obtained it from the South Pacific in depths varying from 17 to 275 fathoms. It has a wide geographical distribution.

Lagoon, Funafuti. Sample 17 (12 fathoms).

ROTALIA, *Lamarck* [1804].ROTALIA BECCARII (*Linné*).

Nautilus Beccarii, Linné, 1767, Syst. Nat. 12th ed. p. 1162; 1788, ibid. 13th (Gmelin's) ed. p. 3370, no. 4.

Rotalia Beccarii (L.), Egger, 1893, Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii. p. 420, pl. xix. figs. 25-27.

R. Beccarii (L.), Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 331, pl. 75. fig. 2.

This species is commonly found in temperate seas, but it is not confined to them. The specimens from the lagoon have the characteristic brown stain of the sarcode remaining with them, and have therefore probably lived where they were found.

Lagoon, Funafuti. Sample 1 (10 fathoms).

CALCARINA, *d'Orbigny* [1826].CALCARINA HISPIDA, *Brady*.

Calcarina hispida, Brady, 1876, Proc. R. Irish Acad. ser. 2, vol. ii. p. 590.

C. calcar, var. *hispidata*, Carter, 1880, Ann. Mag. Nat. Hist. ser. 5, vol. v. p. 453.

C. hispidata, Brady, 1884, Rep. Chall. vol. ix. p. 713, pl. cviii. figs. 8, 9.

This is one of the commonest of the smaller Foraminifera in the lagoon. From its low specific gravity and form it seems to be carried in large numbers to quite the centre of the lagoon. That it does not live there is evident from the fact that the specimens from samples taken at considerable distance from the lagoon shore are invariably stained of a muddy brown and are partially weathered or decomposed.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 2 (15½ fathoms); sample 4 (23 fathoms); sample 5 (24 fathoms); sample 6 (21 fathoms); sample 7 (24 fathoms); sample 8 (26 fathoms); sample 14 (16 fathoms); sample 15 (19 fathoms); sample 16 (20 fathoms); sample 17 (12 fathoms); sample 18 (7½ fathoms).

CALCARINA DEFRANCI, *d'Orbigny*.

Calcarina Defranci, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 276, pl. xiii. figs. 5-7.

C. Defranci, d'Orb., Brady, 1884, Rep. Chall. vol. ix. p. 714, pl. cviii. fig. 6 a-c.

This generally rare form is found in one sample only in the lagoon.

Lagoon, Funafuti. Sample 1 (10 fathoms).

Subfamily TINOPORINÆ.

TINOPORUS, *Montfort* [1808], emend. *Carpenter* [1860].

TINOPORUS BACULATUS, *Montfort*.

Tinoporus baculatus, Montfort, 1808, Conchyl. Syst. vol. i. p. 146, 37^e genre.

T. baculatus, Montf., Carpenter, 1860, Phil. Trans. p. 557, pls. xviii., xix.

T. baculatus [Montfort?], Carpenter, Brady, 1884, Rep. Chall. vol. ix. p. 716, pl. ci. figs. 4-7.

This species undoubtedly attains to its fullest development in the shallow waters of the South Pacific. At Funafuti it is remarkably abundant, and the beach-sand of the lagoon is largely composed of this species. It is rare, however, in the waters of the lagoon, and occurs in three samples only.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 11 (25 fathoms); sample 18 (7½ fathoms).

GYPSINA, *Carter* [1877].GYPSINA GLOBULUS (*Reuss*).

Cerriopora globulus, Reuss, 1847, Haidinger's Naturw. Abhandl. vol. ii. p. 33, pl. v. fig. 7.

Gypsina globulus (Reuss), Uhlig, 1886, Jahrb. geol. Reichsanst. vol. xxxvi. p. 197, figs. 7-9.

G. globulus (Reuss), Brady, Parker & Jones, 1888, Trans. Zool. Soc. vol. xii. p. 229, pl. xlvi. fig. 13.

Some very fine examples of this species occur in the lagoon dredgings. They vary very much in size, the diameter of the test ranging from .5 mm. to 3.5 mm. The smallest specimens came from the middle of the lagoon.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 2 (15½ fathoms); sample 4 (23 fathoms); sample 6 (21 fathoms); sample 7 (24 fathoms); sample 11 (25 fathoms); sample 12 (25 fathoms); sample 13 (26 fathoms); sample 14 (16 fathoms); sample 18 (7½ fathoms).

GYPSINA INHÆRENS (*Schultze*).

Acervulina inhærens, Schultze, 1854, Organ. der Polythal. p. 68, pl. vi. fig. 12.

Gypsina inhærens (Schultze), Brady, 1884, Rep. Chall. vol. ix. p. 718, pl. cii. figs. 1-6.

G. inhærens (Schultze), Goës, 1894, K. Svenska Vetensk.-Akad. Handl. vol. xxv. No. 9, p. 91, pl. xv. fig. 787.

G. inhærens (Schultze), Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 336, pl. 79. fig. 6.

The adherent forms of *Gypsina* are phenomenally numerous at Funafuti. To reduce the gradational series found there into something like order, and keeping in view some central type of structure, it seems convenient to group the more irregular and acervuline structured organisms under the name of *G. inhærens*, reserving the regularly discoidal forms as varieties of the mound-like *G. vesicularis*, from which they graduate down to thin scale-like forms.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 7 (24 fathoms); sample 13 (26 fathoms); sample 14 (16 fathoms); sample 15 (19 fathoms); sample 16 (20 fathoms); sample 17 (12 fathoms).

GYPSINA VESICULARIS (*Parker & Jones*). (Pl. 19. fig. 12.)

Orbitolina vesicularis, Parker & Jones, 1860, Ann. Mag. Nat. Hist. ser. 3, vol. vi. p. 31, no. 5.

Gypsina vesicularis (P. & J.), Carter, 1877, Ann. Mag. Nat. Hist. ser. 4, vol. xx. p. 173.

G. vesicularis (P. & J.), Egger, 1893, Abhandl. bayer. Ak. Wiss., math.-phys. Cl. ii. vol. xviii. p. 382, pl. xiv. figs. 20–23.

This species is usually found accompanying the spherical form *G. globulus*, into which it appears to graduate, but very rarely. On the other hand, it frequently shows affinities with the thinner varieties, by having a peripheral flange around the mound-like test.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 2 (15½ fathoms); sample 4 (23 fathoms); sample 5 (24 fathoms); sample 6 (21 fathoms); sample 8 (26 fathoms); sample 11 (25 fathoms); sample 13 (26 fathoms); sample 15 (19 fathoms); sample 16 (20 fathoms); sample 17 (12 fathoms); sample 18 (7½ fathoms).

GYPSINA VESICULARIS (P. & J.), var. *DISCUS*, Goës. (Pl. 19. fig. 13.)

Tinoporus vesicularis (P. & J.), Goës, 1882, Sv. Vet.-Akad. Handl. vol. xix. No. 4, p. 104, pl. vii. figs. 245–247.

Gypsina vesicularis (P. & J.), var. *discus*, Goës, 1896, Bull. Mus. Comp. Zool. Harvard, vol. xxix. No. 1, p. 74, pl. vii. figs. 4–6.

Upon this remarkable little variety Dr. Goës wrote as follows* :—

“A variety closely allied to the type, from which it differs only in its lenticular shape and its more plainly differentiated set of the central cycle of chambers. It is not found affixed. Caribbean Sea, 400 fathoms; scarce.”

This is one of the most distinct varieties of the *G. vesicularis* type. The little button-shaped tests are usually depressed in the central region on both sides. It is noteworthy that this form was absent from the samples near the margin of the lagoon, appearing to prefer the quieter waters and at greater depths. This fact is further corroborated by Goës' record of its occurrence at 400 fathoms.

Lagoon, Funafuti. Sample 4 (23 fathoms); sample 5 (24 fathoms); sample 6 (21 fathoms); sample 7 (24 fathoms); sample 8 (26 fathoms); sample 10 (26 fathoms); sample 14 (16 fathoms); sample 15 (19 fathoms).

* *Op. cit.* p. 74.

GYPSSINA VESICULARIS (*P. & J.*), var. *MONTICULUS*, nov. (Pl. 19. figs. 14 *a, b.*)

Test attached, roughly discoidal; the attached surface flat or undulate, and showing the more regular central series of chambers, sometimes spiral, followed by the acervuline chambers; the free, superior surface sharply conical in the centre, rapidly sloping to the level of a thin peripheral flange. Distinguished from the thin wild-growing *Planorbulinæ* by the absence of peripheral orifices and the entire absence of regularity in the peripheral chambers. Diameter ranging from 2 to 4 mm.

Lagoon, Funafuti. Sample 2 (15½ fathoms); sample 4 (23 fathoms); sample 5 (24 fathoms); sample 7 (24 fathoms); sample 8 (26 fathoms); sample 11 (25 fathoms); sample 13 (26 fathoms); sample 15 (19 fathoms); sample 16 (20 fathoms); sample 17 (12 fathoms).

GYPSSINA VESICULARIS (*P. & J.*), var. *SQUAMIFORMIS*, nov. (Pl. 19. figs. 15 *a, b.*)

Test thin, normally attached, encrusting surfaces of organisms. Full-sized specimens measure about 3 or 4 mm. in diameter. Shell consists of a single layer of acervuline chambers. The paper-like fragments of the test of this variety are sometimes very numerous in the shallow-water sands, both within and outside the lagoon.

Lagoon, Funafuti. Sample 3 (20 fathoms); sample 4 (23 fathoms); sample 5 (24 fathoms); sample 7 (24 fathoms); sample 8 (26 fathoms); sample 13 (26 fathoms); sample 16 (20 fathoms); sample 17 (12 fathoms).

POLYTREMA, *Risso* [1826].

POLYTREMA MINIACEUM (*Pallas*).

Millepora miniacea, Pallas, 1766, Elenchus Zoophytorum, p. 251.

P. miniaceum (L.), Goës, 1896, Bull. Mus. Comp. Zool. Harvard, vol. xxix. No. 1, p. 75.

P. miniaceum (Pallas), Chapman, 1900, Journ. Linn. Soc., Zool. vol. xxviii. p. 16, pl. 4. fig. 7.

This species is found living in the lagoon in some abundance, but it never attains to the size which it does outside the atoll, usually measuring only 2 mm. across. It is generally found attached to joints of *Halimeda*.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 6 (21

fathoms); sample 7 (24 fathoms); sample 10 (26 fathoms); sample 11 (25 fathoms); sample 13 (26 fathoms); sample 14 (16 fathoms); sample 16 (20 fathoms); sample 17 (12 fathoms); sample 18 ($7\frac{1}{2}$ fathoms).

POLYTREMA MINIACEUM (*Pallas*), var. *ALBA*, *Carter*.

Polytrema miniaceum, var. *album*, *Carter*, 1877, *Ann. Mag. Nat. Hist.* ser. 4, vol. xix. p. 213, pl. xiii. fig. 14.

This variety is generally rare at Funafuti.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 2 ($15\frac{1}{2}$ fathoms); sample 7 (24 fathoms); sample 13 (26 fathoms).

POLYTREMA PLANUM, *Carter*. (Pl. 20. figs. 6, 7.)

Polytrema planum, *Carter*, 1876, *Ann. Mag. Nat. Hist.* ser. 4, vol. xvii. p. 211, pl. xiii. figs. 18, 19. [Immature growth.]

Gypsina melobesioides, *Carter*, 1877, *ibid.* ser. 4, vol. xx. p. 172. [Full-grown form, description only.]

G. melobesioides, *Carter*, 1880, *ibid.* ser. 5, vol. v. p. 445.

Polytrema miniaceum (*Pallas*), var. *involuta*, *Chapman*, 1900, *Journ. Linn. Soc., Zool.* vol. xxviii. p. 17, pl. 2. fig. 3, and text-figure 2.

P. planum, *Carter*, *Chapman*, 1901, *Ann. Mag. Nat. Hist.* ser. 7, vol. vii. pp. 82, 83.

In my earlier description of the Funafuti specimens, this particular form was regarded as a variety of the common branching type of *P. miniaceum*, which is distinguished by its red colour. Since then I have found abundant specimens of *P. planum* of very extensive growth on rough reef-specimens from the same collection, which show that the affinities of *P. planum* are rather towards the white variety of *P. miniaceum*, var. *alba*, *Carter*; for in the fresh specimens its test is often of snowy whiteness, not unlike, as *Carter* remarks, the sugar-coating on a bride-cake. The cemented reef-specimens are often discoloured or yellowish in their tint, but never pink or rose-coloured.

It is exceedingly difficult in some cases to distinguish *P. planum* from certain encrusting plants such as *Lithothamnion* and *Lithophyllum*; and indeed the only distinctive character between *Lithophyllum onkodes* and *P. planum*, when viewed externally, is the presence of the little granular conceptacles often, but not always, to be seen studding the surface of the forms.

Carter's original description and figure dealt only with a young or immature growth, but a comparison between the type-specimen of the so-called *Gypsina melobesioides* at the Natural

History Museum, South Kensington, confirms the identity of the two forms.

This organism, as I have already shown, is of great importance as a rock-builder, by forming concentric encrustations round fragments of coral and algæ. It also plays an important part in cementing loose fragments together, by filling crevices and eventually enwrapping several fragments, until they form a solid conglomerate.

In the lagoon *P. planum* is found binding together the separate fronds of *Halimeda* as they lie on the lagoon-floor. It is impossible to distinguish *P. planum* in the lagoon material without the aid of thin sections made from the accreted fragments for microscopic examination.

Lagoon, Funafuti. Sample 6 (21 fathoms); sample 10 (26 fathoms); sample 11 (25 fathoms); sample 12 (23 fathoms); sample 14 (16 fathoms).

Family NUMMULINIDÆ.

Subfamily POLYSTOMELLINÆ.

NONIONINA, *d'Orbigny* [1826].

NONIONINA DEPRESSULA (*Walker & Jacob*).

Nautilus depressulus, Walker & Jacob, 1798, Adams' Essays, Kammacher's ed., p. 641, pl. xiv. fig. 33.

Nonionina depressula (W. & J.), Egger, 1893, Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xviii. p. 427, pl. xix. figs. 38, 39.

This species is rare in the lagoon.

Lagoon, Funafuti. Sample 13 (26 fathoms): sample 18 (7½ fathoms).

NONIONINA UMBILICATULA (*Montagu*).

Nautilus umbilicatus, Montagu, 1803, Test. Brit. p. 191; Suppl. p. 78, pl. xviii. fig. 1.

Nonionina umbilicatus (Montagu), Egger, 1893, Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xviii. p. 426, pl. xix. figs. 36, 37.

This species is more numerous than the preceding, and the specimens are as a rule typical.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 4 (23 fathoms); sample 7 (24 fathoms); sample 8 (26 fathoms); sample 11 (25 fathoms).

POLYSTOMELLA, *Lamarck* [1822].POLYSTOMELLA STRIATOPUNCTATA (*Fichtel & Moll*).

Nautilus striatopunctatus, Fichtel & Moll, 1798, Test. Micr. p. 61, pl. ix. figs. a-c.

Polystomella striatopunctata (F. & M.), Egger, 1893, Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xviii. p. 433, pl. xix. figs. 49, 50.

P. striatopunctata (F. & M.), Goës, 1896, Bull. Mus. Comp. Zool. Harvard, vol. xxix. No. 1, p. 78.

P. striatopunctata (F. & M.), Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 337, pl. 80. fig. 2.

The lagoon-specimens are neat and small.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 17 (12 fathoms).

POLYSTOMELLA MACELLA (*Fichtel & Moll*).

Nautilus macellus, var. a, Fichtel & Moll, 1798, Test. Micr. p. 66, pl. x. figs. e-g.

Polystomella macella (F. & M.), Egger, 1893, Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xviii. p. 432, pl. xx. figs. 22, 23.

The lagoon-specimens are rather small.

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 5 (24 fathoms); sample 16 (20 fathoms); sample 17 (12 fathoms); sample 18 (7½ fathoms).

POLYSTOMELLA CRISPA (*Linné*).

Nautilus crispus, Linné, 1758, Syst. Nat. 10th ed. p. 709.

Polystomella crispa (L.), Egger, 1893, Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xviii. p. 432, pl. xx. figs. 20, 21.

P. crispa (L.), Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 338, pl. 80. fig. 3.

This occurs very sparingly in the lagoon.

Lagoon, Funafuti. Sample 2 (15½ fathoms); sample 4 (23 fathoms); sample 17 (12 fathoms).

POLYSTOMELLA SUBNODOSA (*Münster*).

Robulina subnodosa, Münster, 1838, Neues Jahrb. für Min. p. 391, pl. iii. fig. 61.

Polystomella subnodosa (Münster), Reuss, 1855, Sitzungsb. Ak. Wiss. Wien, vol. xviii. p. 240, pl. iv. fig. 51 a, b.

P. subnodosa (Münster), Brady, 1884, Rep. Chall. vol. ix. p. 734, pl. cx. fig. 1 a, b.

P. subnodosa (Münster), Goës, 1894, Kongl. Sv. Vet.-Akad. Handl. vol. xxv. No. 9, p. 102, pl. xvii. figs. 817-819.

The specimens from Funafuti agree in most respects with those figured by Goës from Novaya Zemlaia and off Newfoundland. By a comparison of the chief characters of the tests of this species and *P. striatopunctata*, there seems to be a direct affinity between those forms; and it is possible that they represent a single species, of which *P. subnodosa* is the megaspheric type, with an umbonate centre, and *P. striatopunctata* the microspheric type, with a depressed centre.

P. subnodosa, as a recent form, has been but rarely found up to the present, for, besides the localities mentioned above, it has only been found amongst the islands south-west of Papua, at depths of from 6 to 28 fathoms.

Lagoon, Funafuti. Sample 18 (7½ fathoms).

Subfamily NUMMULITINÆ.

AMPHISTEGINA, *d'Orbigny* [1826].

AMPHISTEGINA LESSONII, *d'Orbigny*.

Amphistegina Lessonii, *d'Orbigny*, 1826, Ann. Sci. Nat. vol. vii. p. 304, No. 3, pl. xvii. figs. 1-4: Modèle No. 98.

A. Lessonii, *d'Orb.*, Möbius, Beitr. Meeresfauna Insel Mauritius, p. 99, pl. x. figs. 10-14, pl. xi. figs. 1-3.

A. Lessonii, *d'Orb.*, Flint, 1899, Rep. U.S. Nat. Mus., Rep. for 1897, p. 338, pl. 80. fig. 4.

This is the only species of Foraminifera which was obtained from every sample of the lagoon dredgings. It varies in size from a diameter of .75 to 3.5 mm. The test is often flexuose on the peripheral edge; and towards the middle of the lagoon it shows a tendency to make abnormal outgrowths, in beak-like processes near the last series of chambers in adult shells, or as buds around the oral aperture. The test sometimes shows a tendency to become partially attached to algæ, at the oral region, especially in the deeper parts of the lagoon.

Lagoon, Funafuti. In samples 1 to 18. Samples 4, 6, and 15 yielded the finest specimens.

HETEROSTEGINA, *d'Orbigny* [1826].HETEROSTEGINA DEPRESSA, *d'Orbigny*.

Heterostegina depressa, *d'Orbigny*, 1826, Ann. Sci. Nat. vol. vii. p. 305, pl. xvii. figs. 5-7: Modèle No. 99.

H. curva, Möbius, 1880, Beitr. Meeresfauna Insel Mauritius, p. 105, pl. xiii. figs. 1-6.

H. depressa, *d'Orb.*, Egger, 1893, Abhandl. bayer. Akad. Wiss., math.-phys. Cl. ii. vol. xviii. p. 433, pl. xx. figs. 34, 35.

H. depressa, *d'Orb.*, Goës, 1896, Bull. Mus. Comp. Zool. Harvard, vol. xxix. No. 1, p. 79.

H. depressa, *d'Orb.*, Chapman, 1900, Journ. Linn. Soc., Zool. vol. xxviii. p. 18, pl. 3. figs. 6, 7.

This species is well represented in the lagoon samples, but it does not occur in a few from near the middle of the lagoon.

H. depressa here ranges from .75 mm. to 9 mm. in diameter. No specimens of the form B (microspheric) occur in the samples.

The largest specimens occur in sample 8 (26 fathoms).

Lagoon, Funafuti. Sample 1 (10 fathoms); sample 2 (15½ fathoms); sample 3 (20 fathoms); sample 4 (23 fathoms); sample 5 (24 fathoms); sample 6 (21 fathoms); sample 7 (24 fathoms); sample 8 (26 fathoms); sample 9 (25 fathoms); sample 10 (26 fathoms); sample 14 (16 fathoms); sample 15 (19 fathoms); sample 17 (12 fathoms); sample 18 (7½ fathoms).

In the annexed synopsis of species from the Funafuti Lagoon the following significations are used:—v.r.=very rare, r.=rare, f.=frequent, c.=common, v.c.=very common. These indications are printed in three kinds of type: capitals (V.C.) signifying the specimens are well developed or extra large; ordinary type (v.c.) that the specimens are of normal size; and italics (*v.c.*) that the specimens are starved or of diminutive size.

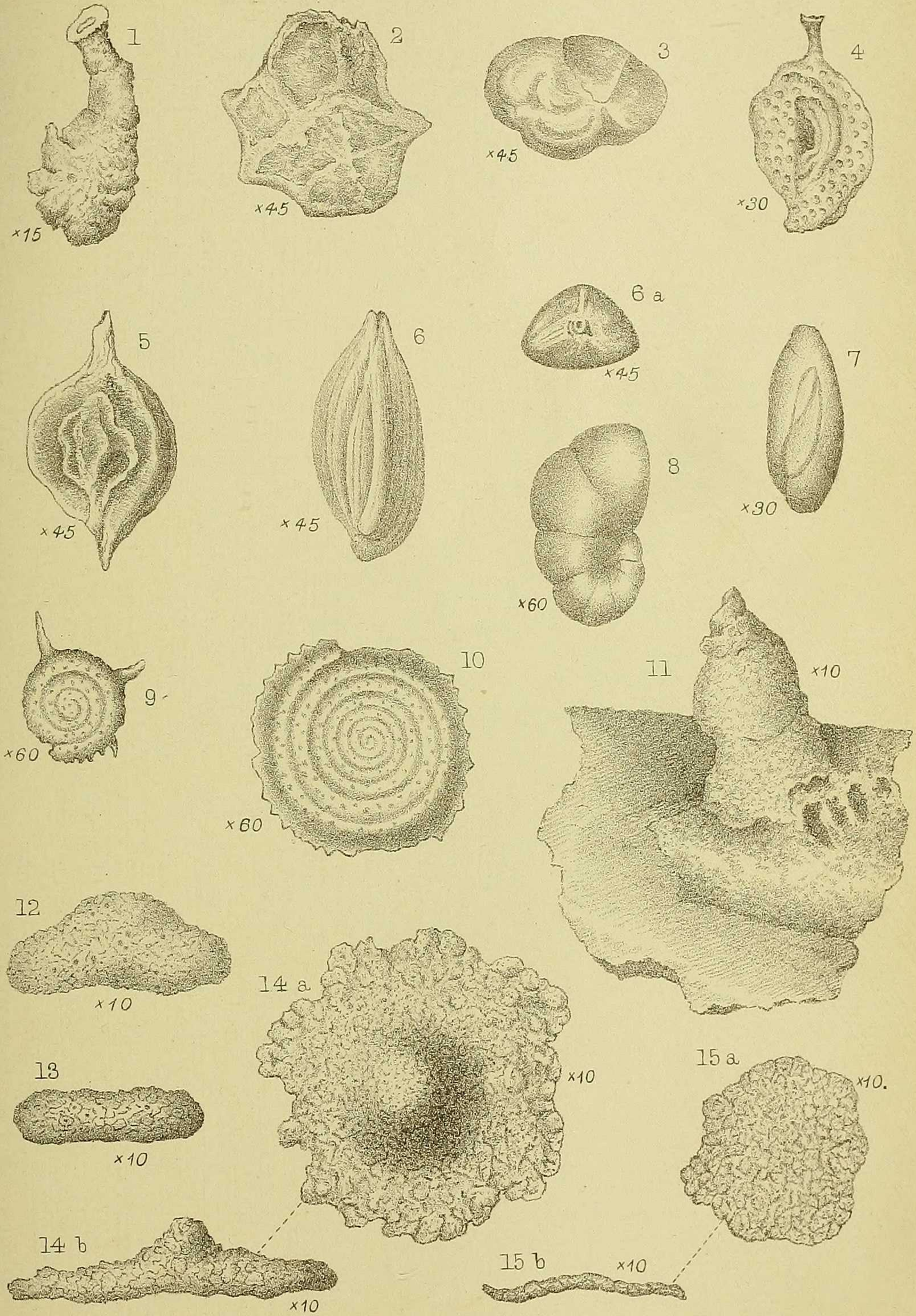
EXPLANATION OF THE PLATES.

PLATE 19.

- Fig. 1. *Nubecularia divaricata*, Brady. Lagoon, Funafuti, No. 18. $\times 15$.
 2. „ *lacunensis*, sp. nov. Lagoon, Funafuti, No. 18. $\times 45$.
 3. „ *Bradyi*, Millett. Lagoon, Funafuti, No. 18. $\times 45$.
 4. *Spiroloculina nitida*, d'Orb., var. *foveolata*, Egger. Lagoon, Funafuti, No. 18. $\times 30$.
 5. *S. tortuosa*, sp. nov. Lagoon, Funafuti, No. 5. $\times 45$.
 6. *Miliolina Funafutiensis*, sp. nov. Lagoon, Funafuti, No. 17. 6 a, oral aspect. $\times 45$.
 7. *M. Bosciana* (d'Orb.). Lagoon, Funafuti, No. 17. $\times 30$.
 8. *Peneroplis* (*Monalysidium*) *politus*?, Chapman. Lagoon, Funafuti, No. 18. $\times 60$.
 9. *Spirillina spinigera*, Chapman. Form A. Lagoon, Funafuti, No. 18. $\times 60$.
 10. *S. spinigera*, Chapman. Form B. Lagoon, Funafuti, No. 18. $\times 60$.
 11. *Carpenteria proteiformis*, Goës. Lagoon, Funafuti, No. 6. $\times 10$.
 12. *Gypsina vesicularis* (Parker & Jones). Lateral aspect. Lagoon, Funafuti, No. 8. $\times 10$.
 13. *G. vesicularis*, var. *discus*, Goës. Edge view. Lagoon, Funafuti, No. 15. $\times 10$.
 14 a, b. *G. vesicularis*, var. *monticulus*, nov. a, superior aspect; b, side view. Lagoon, Funafuti, No. 8. $\times 10$.
 15 a, b. *G. vesicularis*, var. *squamiformis*, nov. a, superior aspect; b, edge view. Lagoon, Funafuti, No. 8. $\times 10$.

PLATE 20.

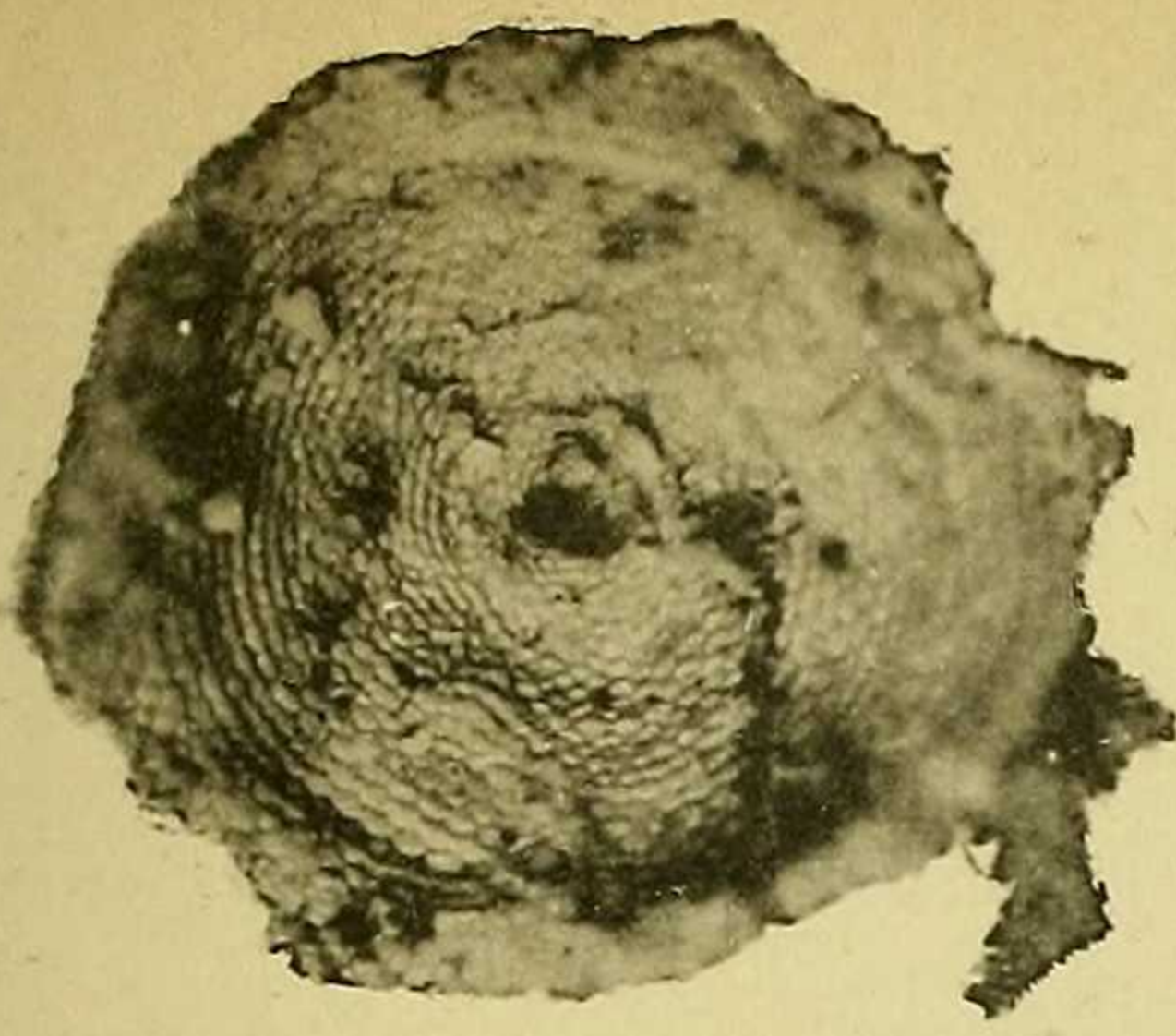
- Fig. 1. *Orbitolites marginalis* (Lam.). Specimen found attached to a joint of *Halimeda*. Lagoon, Funafuti, No. 17. $\times 14$.
 2. *O. marginalis* (Lam.). A radially-marked specimen, probably due to the form of the object upon which it rested. Lagoon, Funafuti, No. 17. $\times 14$.
 3. *O. marginalis* (Lam.). A specimen with secondary thickening of the test arranged radially; a parallel case with *O. complanata*, var. *plicata*, Dana.
 4. *Planorbulina acervalis*, Brady, var. *fimbriata*, nov. Lagoon, Funafuti, No. 8. $\times 20$.
 5. *P. larvata*, Parker & Jones, var. *crispata*, nov. Lagoon, Funafuti. $\times 14$.
 Figs. 6, 7. *Polytrema planum*, Carter. Sections of the organism encrusting *Halimeda*-joints. Lagoon, Funafuti. $\times 14$.



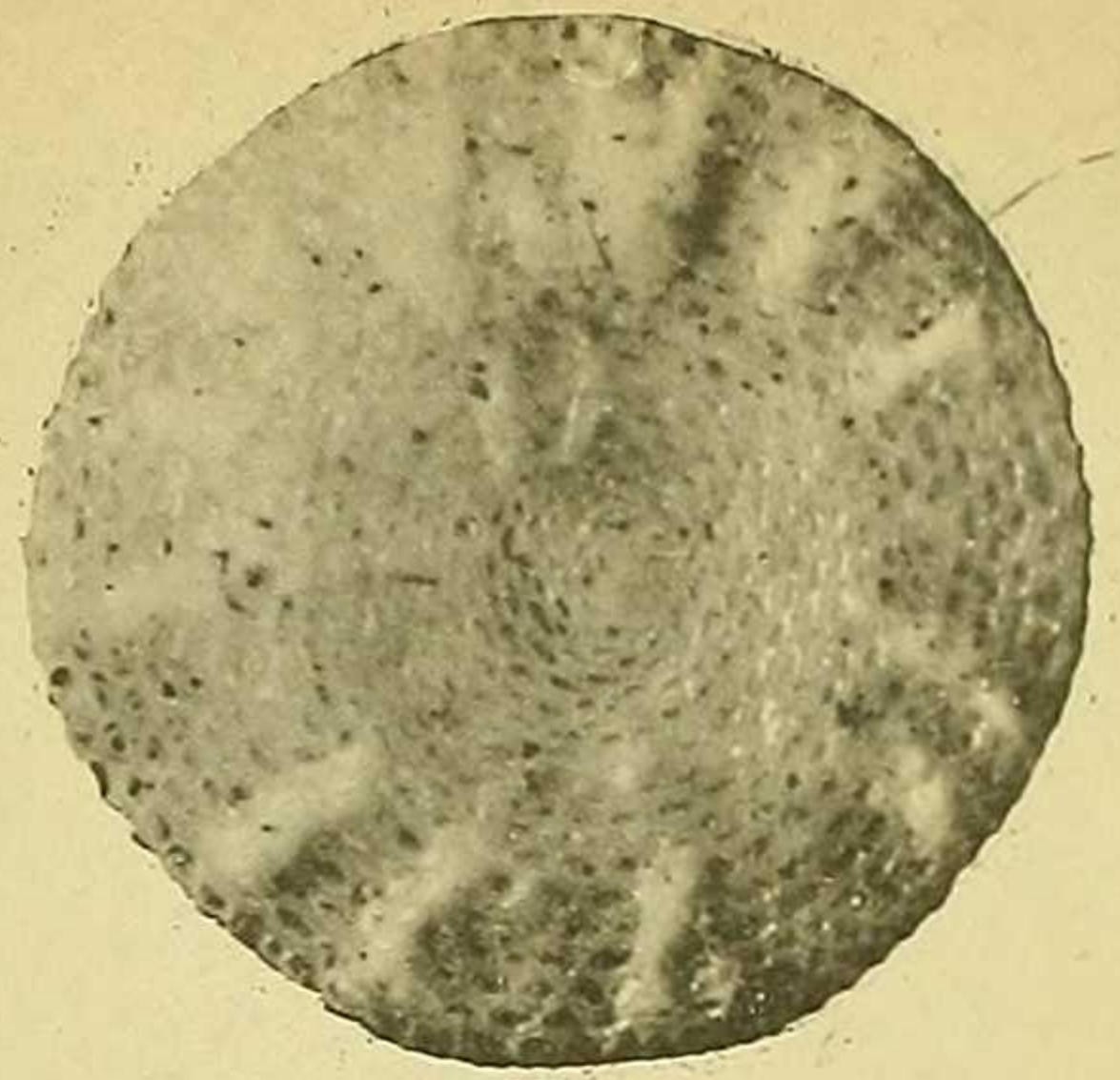
F. Chapman ad nat. del.
A. Hammond lith.

West, Newman imp.

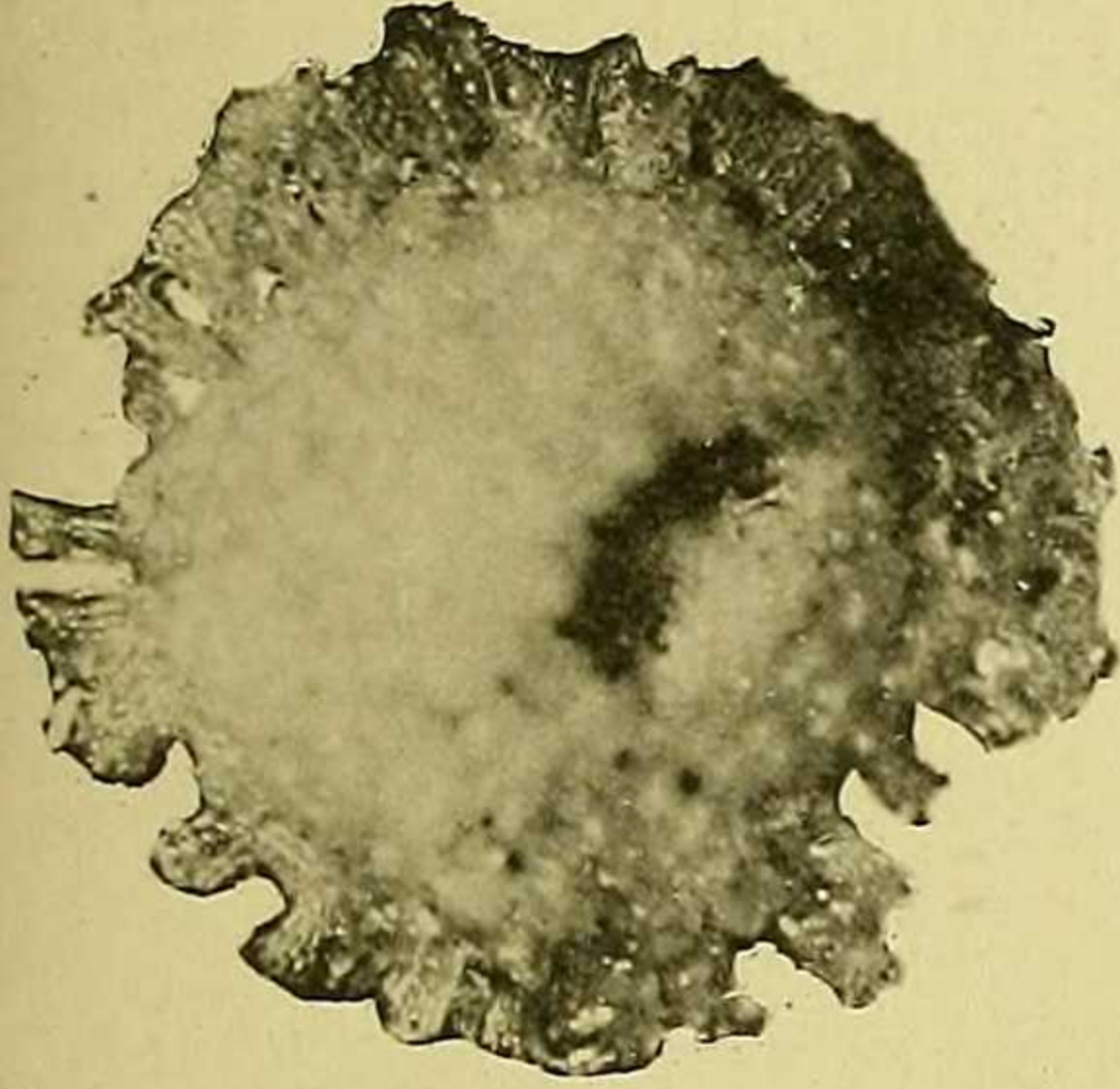
FORAMINIFERA FROM THE LAGOON, FUNAFUTI.



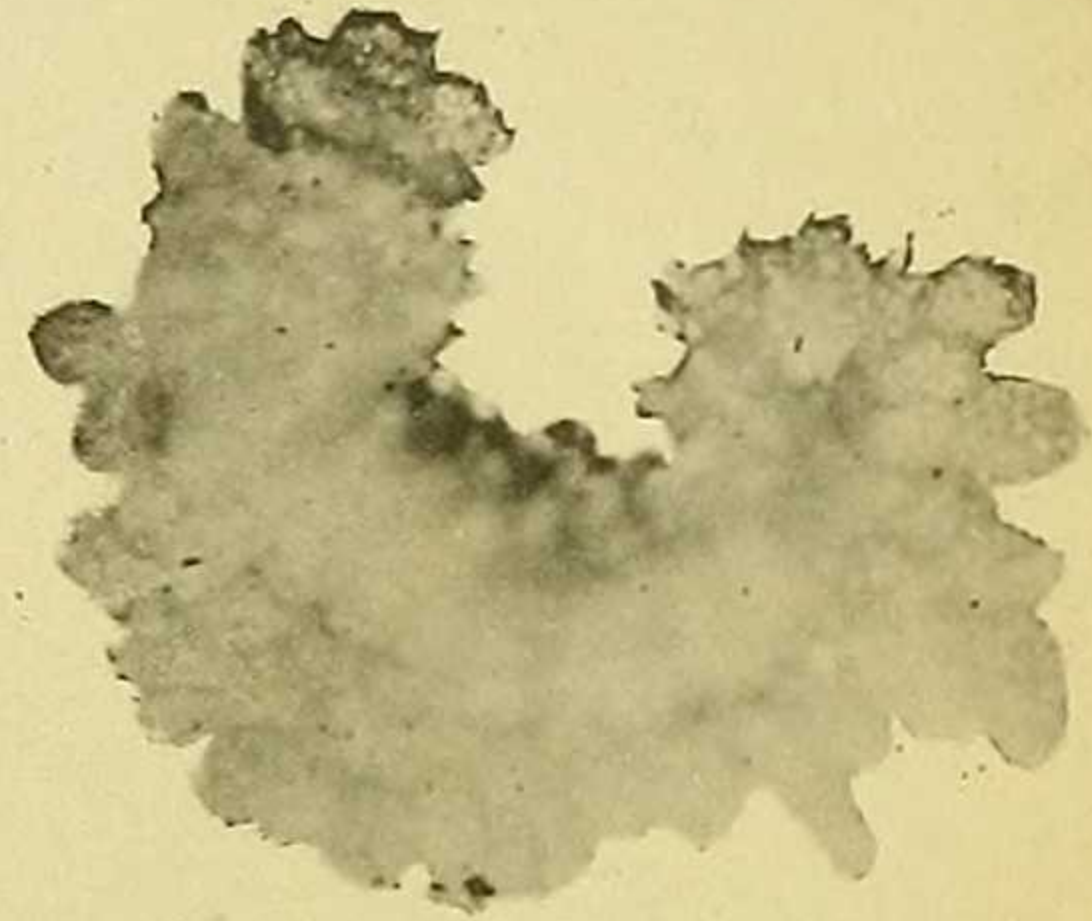
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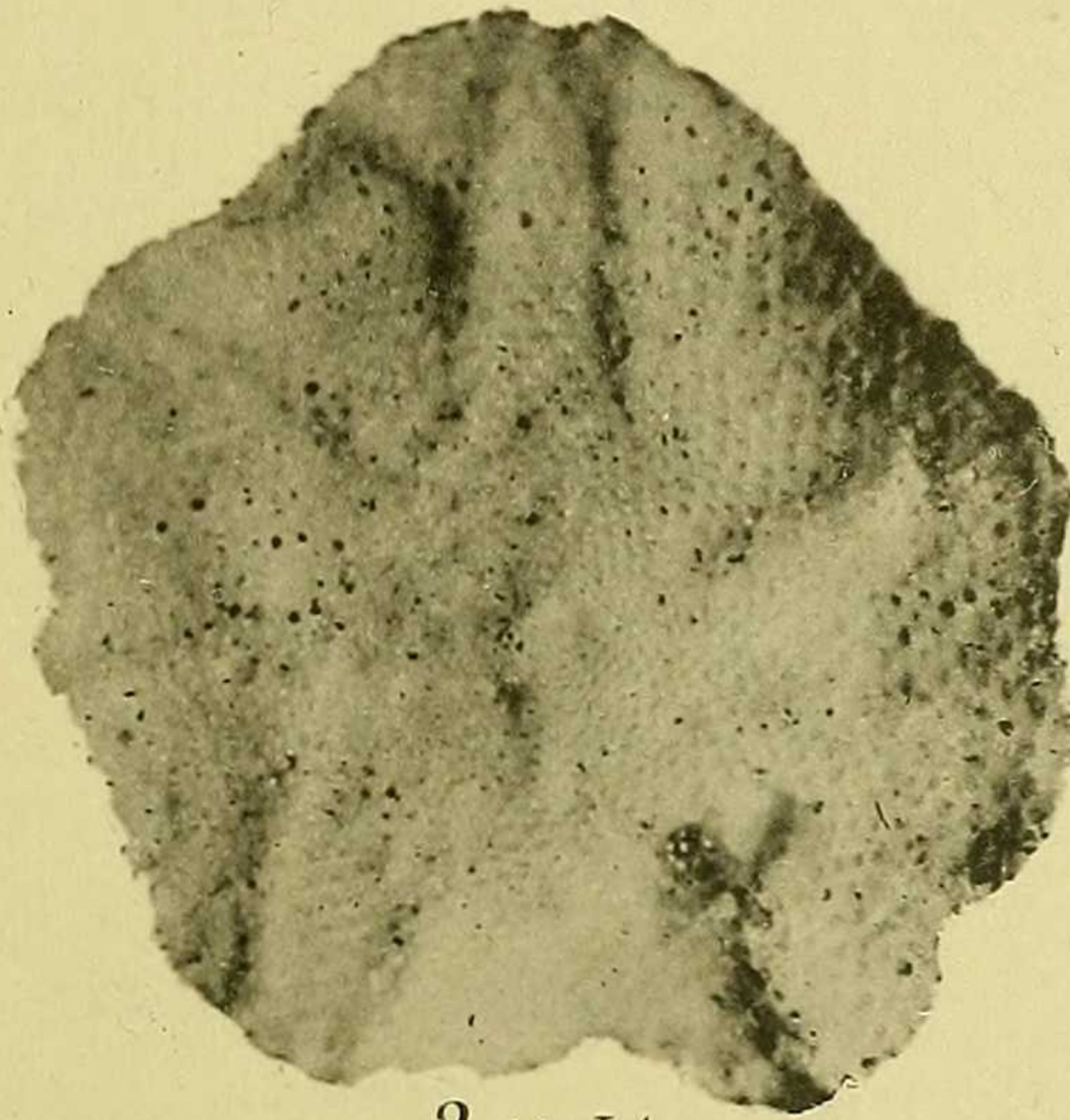
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4 x 20



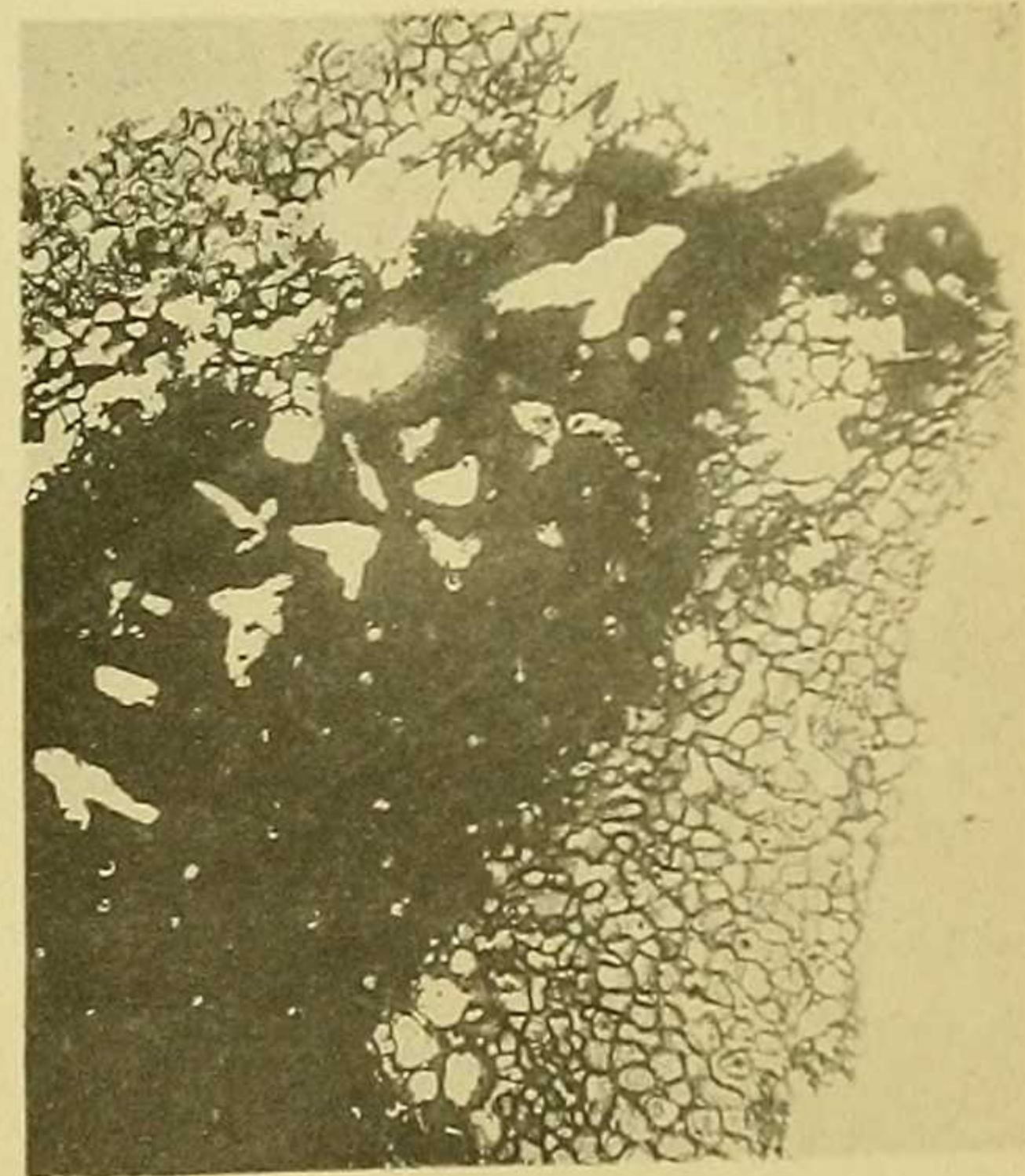
5 x 14



2 x 14

6

7



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CONTENTS.

	Page
I. Foraminifera from the Lagoon at Funafuti. By FREDERICK CHAPMAN, A.L.S., F.R.M.S. (Plates 19 & 20.)	161
II. <i>Goidelia japonica</i> —a New Entozoic Copepod from Japan, associated with an Infusorian (<i>Trichodina</i>). By ALICE L. EMBLETON, B.Sc. (Communicated by Prof. G. B. HOWES, Sec. Linn. Soc.) (Plates 21 & 22.)	211
III. On the Structure and Habits of the Polychæta of the Family <i>Ammocharidæ</i> . By ARNOLD T. WATSON, F.L.S. (Plates 23–25.)	230

See Notice on last page of Wrapper.

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